A Publication of the Vertical Flight Society

May/June 2026

VERTIFLITE

Advancing Vertical Flight Since 1943

Sikorsky's Future Rotorcraft Ambitions

KARGO Quadcopter: LogistiWerx and Piasecki

Motivo Partners With VFS Corporate Members

Design-Build-Vertical Flight 2026

Georgia Tech's VLRCOE

X-76: Bell, DARPA and High-Speed Vertical Flight

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Vertiflite is the official publication of The Vertical Flight Society, the professional society for the advancement of vertical flight technology and its useful application throughout the world. *Vertiflite*'s editorial energies are devoted to informing our readers of the advances being made in the field and encouraging increasingly broader use of rotorcraft and vertical lift technology.

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ABOUT OUR COVER

An artistic rendering of the Bell X-76 high-speed VTOL, which has been downselected for Phase 2 of the DARPA SPRINT program. (Image provided by DARPA | Collie Wertz)

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A World Without the Vertical Flight Society

Take a moment and imagine a world without the Vertical Flight Society.

A layperson sees a helicopter overhead and feels a sense of awe, but they don't see the decades of research, collaboration, failure, and persistence that made that moment possible. Unlike any other organization in aerospace, VFS is not adjacent to the vertical flight ecosystem. It is woven into it.

Without the Society, vertical flight would still exist, but it would not look the same, and technologies would not have evolved as rapidly as they have.

In the early days, pioneers like Igor Sikorsky, Army test pilots like H. Franklin Gregory and U.S. Army leaders helped bring the first practical helicopter, the XR-4, from concept to reality in the early 1940s. But what accelerated that progress wasn't just invention, it was a community of engineers, pilots, and advocates aligned around a shared belief that vertical flight mattered. That community became the American Helicopter Society.

Now consider everything that followed.

Would the UH-60 Black Hawk program have matured as quickly without decades of shared research, test data, and professional exchange? Would Frank Piasecki have advanced tandem rotor design into what became the CH-47 Chinook without the early AHS network he helped build? Would Charlie Kaman have developed the K-MAX, the highest payload fraction helicopter ever fielded, without the technical foundation and peer engagement the Society enabled?

The tiltrotor did not emerge in isolation. Engineers like Troy Gaffey built on years of VFS published work, technical exchange at Forum, and direct collaboration, moving from solving instability in the XV-3. Troy found the solution dubbed the "X-Mode", which led to shaping the XV-15 and ultimately the V-22. Today's Future Vertical Lift programs, including the MV-75, trace part of their lineage through that same continuum of shared knowledge and community through the Society.

Without VFS, that continuum breaks, and it's not just aircraft. Without the Society's advocacy, would the Army have sustained the level of investment in vertical flight science and technology that it has over decades? Would key research infrastructure, academic pipelines, and collaborative agreements, like the Army–NASA partnerships and the Vertical Lift Research Centers of Excellence, exist in the same form?

Would DARPA programs in VTOL have the same depth of talent, Dan Newman, Ashish Bagai, drawn from a community that grew up publishing, debating, and learning through VFS? Would the modern eVTOL industry look the same, without the early Technical Vertical Flight (TVF) events that drew in Marc Moore, JoeBen Bevirt, without the NASA Ames community, without the mentorship and technical grounding that shaped its leaders?

Bell V-280

Sikorsky R-4

Even our future workforce would look different. Over $2.1 million in Vertical Flight Foundation scholarships would not have been awarded. Thousands of students would not have entered this field. And perhaps most critically, our collective knowledge would be fragmented.

There would be no central library of over 16,000 vertical flight papers. No singular venue capable of publishing and curating the depth and specificity of research that defines our discipline. No Forum where the full ecosystem—industry, government, and academia—comes together with a shared purpose. Many of the collaborations, programs, and even careers that define vertical flight today began with a conversation at a VFS event. Take that away, and the gaps are everywhere.

So yes, a world without VFS might still have helicopters. But it would have fewer of them. They would be less capable. They would have arrived later. And the community behind them would be smaller, less connected, and far less impactful. That is the quiet power of this Society. Eighty-two years in, we are not just reflecting on history, we are actively shaping what comes next.

So the real question is not what vertical flight would look like without VFS. It's what we will build together because it exists. I look forward to seeing many of you at Forum 82 in West Palm Beach, where the next chapter of vertical flight will be written. Let's make history this week.

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The first quarter of 2026 has reinforced a central theme for the vertical flight community: Washington is no longer debating whether advanced vertical lift aircraft will integrate into the national aviation ecosystem, but how fast—and under what constraints. Budget decisions, regulatory follow through, and new national strategies are converging to shape a more realistic, if still challenging, path forward.

Budget Signals: Prioritization Over Proliferation

The FY 2026 defense and civil aviation budgets reflect a sharpening of priorities across vertical flight. On the military side, the Army's Future Vertical Lift (FVL) portfolio continued its post 2024 restructuring, with clear emphasis on the Future Long-Range Assault Aircraft (FLRAA) and a sustained pivot toward uncrewed systems.

Congress reinforced this direction late last year through the FY 2026 National Defense Authorization Act, which supports early low rate production planning for FLRAA and signals strong legislative backing for accelerating fielding timelines, despite ongoing affordability concerns. For industry, the message is clear: Washington wants fewer, more mature programs with demonstrable operational value.

Looking ahead, the defense budget outlook suggests relative topline stability but increasing pressure within aviation accounts. While near-term national security concerns continue to protect overall defense spending, discretionary growth is expected to remain modest after inflation, forcing sharper tradeoffs among modernization priorities. Recent Government Accountability Office (GAO) analysis highlights that the Army's decision to narrow its Future Vertical Lift portfolio was driven less by technical risk than by long-term affordability under constrained budget projections. That dynamic is unlikely to ease. Congress has signaled strong support for FLRAA as a centerpiece modernization program, but sustainment costs for legacy fleets, munitions replenishment and investments in uncrewed and space systems will increasingly compete for resources. For the vertical flight industrial base, this forecast favors programs that demonstrate clear operational payoff, modular upgrade paths, and export potential, while putting pressure on less differentiated or manpower-intensive platforms. Over the next several budget cycles, success will depend as much on cost realism and production credibility as on performance.

On the civil side, the US Federal Aviation Administration's (FAA) FY 2026 budget request sustains funding increases for certification staff, safety oversight, and modernization—critical enablers for powered lift and advanced air mobility (AAM) integration. However, these investments remain modest relative to the ambition of the sector.

Powered Lift: From Policy to Practice

The powered lift regulatory framework finalized in late 2024 is now firmly in its implementation phase. As of early 2026, 14 CFR Part 194 (SFAR 120) is fully effective, governing powered lift pilot certification and operations across Parts 91, 135, and 136. FAA organizational guidance and air traffic procedures have begun catching up, including updates to FAA Order JO 7110.65 to formally recognize powered lift as a distinct operational category rather than a helicopter or fixed wing subset.

At the same time, safety and airspace sensitivity remain paramount—especially in the National Capital Region. In January 2026, the FAA announced its intent to permanently restrict most nonessential helicopter and powered lift operations near Reagan National Airport, formalizing lessons learned from recent incidents and reinforcing community risk tolerance limits. For vertical flight operators and OEMs, this underscores that local operational constraints will remain a defining feature of early adoption.

Advanced Air Mobility: From Strategy to Execution

With the Advanced Air Mobility National Strategy now several months old, Washington's focus has shifted from vision setting to execution—and, increasingly, to institutional capacity. The most significant development since December has been the FAA's internal reorganization, including the creation of a dedicated Office of Advanced Aviation Technologies, intended to consolidate authority over powered lift, AAM, and other emerging aircraft. This move reflects growing recognition that integrating vertical flight at scale is not a side project but a long term structural task for the agency.

At the same time, implementation realities are beginning to temper expectations. Federal officials are emphasizing demonstrations and limited, mission driven operations over broad near term deployment, while making clear that vertiport development and grid upgrades will rely largely on private capital. State and local governments are also asserting a stronger role, particularly on siting, noise and community acceptance. For industry and operators, the post strategy environment rewards those who can navigate not just certification, but the practical realities of infrastructure, local governance, and operational integration.

Looking Ahead

As of early 2026, Washington's approach to vertical flight is more disciplined, more realistic, and more operationally grounded than in previous years. The era of sweeping promises is giving way to incremental progress, hard tradeoffs, and sustained—but conditional—support. For the vertical flight community, the near term opportunity lies in demonstrating reliability, affordability, and public value within the policy frameworks now firmly taking shape.

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Vertical Flight Foundation Advances Toward 2026 Fundraising Goal

The Vertical Flight Foundation (VFF), is off to a strong start in 2026, raising almost $22,000 in the first quarter toward its ambitious $75,000 annual fundraising goal.

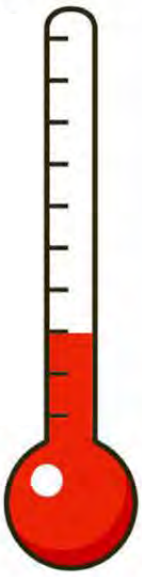
Established in 1967, the Vertical Flight Foundation plays a vital role in supporting the future of the vertical flight industry by funding scholarships for students pursuing careers in aerospace engineering and related fields. With 100% of all donations going directly to scholarships, every contribution has a direct and meaningful impact on developing the next generation of engineers, innovators, and leaders.

This early momentum reflects the generosity of donors across all giving levels—from leadership contributions to individual supporters committed to advancing education in vertical flight.

Leadership Level ($5,000+)
- Marilyn J. Smith
- Mark & Lynn Stoll
- Textron (matching gift in support of Tom Parham)

Champion Level ($250–$4,999)
- David O'Brien
- Mike Hirschberg
- Kelly Morger

Sustainer Level ($100–$249)
- Francis Hurley
- Howard Horton
- Raymond Dagenhart
- David Woodley
- Christos Bais
- Berend van der Wall
- Robert Flemming
- Barbara Lindauer



Supporter Level (Up to $99)
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- Mark Macleod
- Ramon Nonato
- Walther Chong
- James Barnes
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- David Ferrell
- Robert Kufeld
- David Laananen
- Alexander Kovnat
- Allen Huber
- Joseph Sacco
- John Dixson
- Jeffry Purse
- Pieter Buning
- Christopher Cameron
- Brian Babie

VFF has awarded more than 750 scholarships since launching its program in 1977, distributing over $2.1M in support of the next generation of vertical flight leaders. Today, approximately 80% of recipients go on to contribute to the US Army — as civilians, contractors, or through the Vertical Lift Research Centers of Excellence (VLRCOE) ecosystem.

In 2026, VFF approaches another major milestone, with its endowment projected to exceed $2M. The fund is professionally managed under a highly favorable fee structure, ensuring long-term sustainability and maximum impact for future scholars.

"These contributions demonstrate the strength and commitment of our community to investing in the future of vertical flight," said VFF leadership. "Every dollar helps open doors for students and strengthens the pipeline of talent driving innovation across our industry."

Reaching the $75,000 goal will enable VFF to expand scholarship opportunities and support even more students pursuing careers in vertical flight. Beyond financial contributions, supporters can also engage by mentoring scholarship recipients, serving on selection committees, or advocating for the program within their organizations.

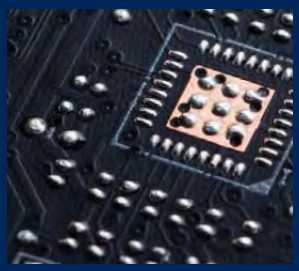
As the year progresses, VFF encourages continued support to build on this early success. With sustained engagement from the vertical flight community, the Foundation is well-positioned to meet—and potentially exceed—its 2026 goal.

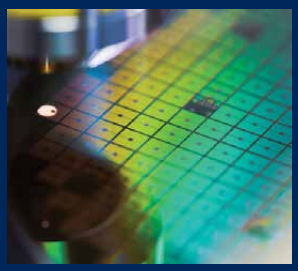
Where are they now?

Jason Cornelius, PhD, is a former 3-time Vertical Flight Foundation (VFF) scholarship recipient recognized for his academic excellence in aerospace engineering at The Pennsylvania State University. His research at Penn State's Vertical Lift Research Center of Excellence and work with NASA Ames contributed to advanced rotorcraft and autonomy programs. He is currently co-founder and CEO of Perseus Defense, where he leads development of next-generation counter-drone technologies—reflecting the impact of VFF support in advancing future leaders in vertical flight.

Clifford B. Smith, PhD, is a leader in the vertical flight community and a 1998 VFF scholarship winner and supporter whose career reflects a commitment to advancing rotorcraft technology and mentoring future engineers. A Lockheed Martin Fellow at Sikorsky, he has led complex test and evaluation efforts while helping develop the next generation of engineers. Through decades of involvement with the Vertical Flight Society, Smith exemplifies the mission of VFF to support and inspire future leaders in vertical flight.

Technology for modern aviation





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VERTICON 2026: The Industry's Commercial Engine

By VFS Staff

Formerly known as HAI HELI-EXPO, VERTICON has evolved into the world's largest gathering of the global vertical aviation community, less a technical conference, and more the industry's primary marketplace. Organized by Vertical Aviation International (a 501(c)(6) trade association), the event is fundamentally designed to enable business: selling aircraft, closing deals, securing service contracts, and sustaining the operational backbone of vertical flight.

For the uninitiated VFS member, the distinction matters. While VFS (a 501(c)(3)) exists to advance the science, engineering, and education of vertical flight, VERTICON exists to support the commercial ecosystem that deploys it. The show floor reflects this reality, spanning more than 600 exhibitors and drawing thousands of attendees from over 80 countries. Operators, pilots, maintainers, MRO providers, suppliers, regulators, and OEM sales teams dominate the landscape.

In short: if Forum is where ideas are exchanged, VERTICON is where commercial aircraft are bought, fleets are sustained, and deals get done. The Defense (Army) counterpart to VERTICON is AUSA's annual event in DC every October.

There is overlap with VFS membership, but it is limited. VERTICON's center of gravity lies with the operational side of vertical flight, civil operators, FAA stakeholders, and a significant population of former military personnel now working in commercial aviation. The conversations are less about advancing aeromechanics or autonomy, and more about readiness rates, lifecycle cost, certification pathways, and mission capability.

photo credit: Angelo Collins

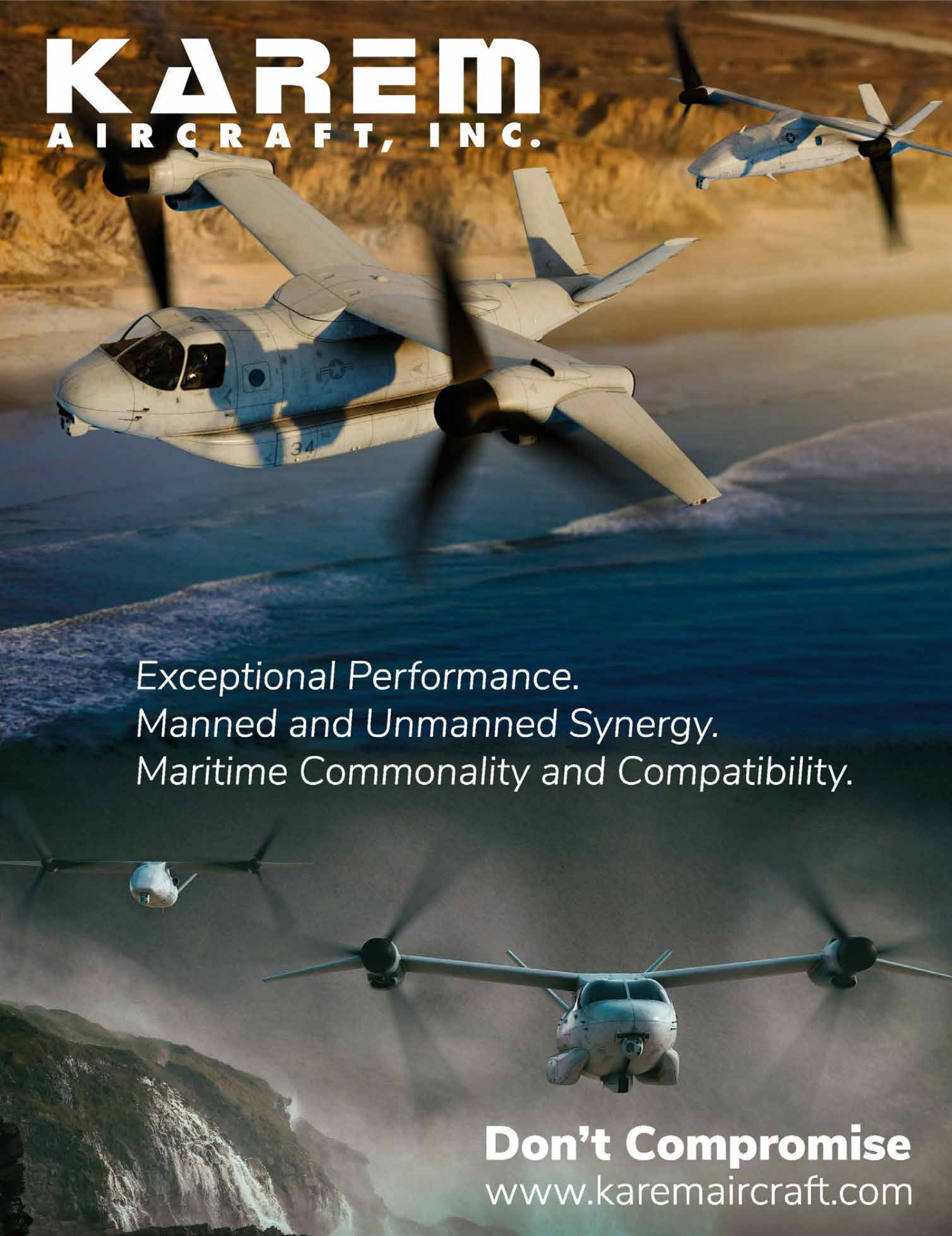
And yet, it matters deeply to our community.

VERTICON represents the largest concentration of vertical flight activity anywhere in the world. It is the proving ground where technologies mature into products, where research transitions into capability, and where the health of the global rotorcraft and VTOL market becomes visible in real time. For researchers, students, and engineers, it offers critical context: understanding not just what is possible, but what is being fielded, supported, and sustained at scale.

2026 Highlights

- Sikorsky emphasized lifecycle sustainment and modernization of the S-92+, highlighting upgraded CT7-8A6 engines, Phase IV gearbox improvements, and continued global fleet relevance across offshore, SAR, and emerging missions like aerial firefighting.
- Boeing focused on continued modernization and sustainment of legacy platforms, reinforcing the enduring operational demand for aircraft like the CH-47F Chinook and AH-64E Apache, while positioning digital sustainment and mission readiness as key differentiators.
- Airbus Helicopters highlighted strong commercial momentum behind platforms such as the H145/H160 families, with continued expansion in EMS, law enforcement, and offshore support markets driven by reliability and low operating costs.
- Bell showcased its full spectrum, from near-term certification progress on the Bell 525 Relentless, to next-generation programs including the MV-75 (V-280 Valor) Future Long-Range Assault Aircraft and the DARPA SPRINT (X-76) Program.
- Leonardo reinforced its position in both military and commercial markets with aircraft like the AW139 and AW169, while advancing future vertical lift concepts including a next-generation civil tiltrotor and securing momentum with the AW149 for military modernization programs

If VFS is where vertical flight is invented and advanced, VERTICON is where it is sold, maintained, and operationalized. Understanding both is essential to understanding the full lifecycle of our industry.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Leonardo Secures £1B UK Contract for AW149s

On March 2, the UK Ministry of Defence awarded Leonardo Helicopters a contract valued at £1B ($1.3B) to manufacture 23 medium-lift AW149s (shown). The deal will sustain an estimated 3,300 jobs for Leonardo's workers at its UK facility in Yeovil, Somerset. The UK through its New Medium Helicopter (NMH) plan aims for the AW149 to conduct defense missions previously operated by three different aircraft types.

This NMH strategy aims for the AW149 to operate alongside uncrewed aircraft systems (UAS). To support that goal, the British military also committed an undisclosed amount of increased investment in the Leonardo uncrewed Proteus rotary-wing demonstrator. The British Royal Navy in January announced the first flight of the Proteus, which features a five-bladed main rotor, along with a shrouded tail rotor to improve safety on crowded naval ships.

Sikorsky Begins S-92A+ Production

On March 6, Sikorsky disclosed it had resumed production of its S-92 (shown) by inaugurating the manufacture of its latest model of the twin-engine, heavy-lift helicopter called the "S-92A+." Five units of this next-generation S-92A+ have already begun production as of March. The Lockheed Martin company announced it had the capacity to produce up to 12 S-92A+ helicopters annually for missions including executive transport, cargo flights, firefighting and military operations.

Upgrades on the S-92A+ include twin General Electric CT7-8A6 turboshaft engines and the S-92 Phase IV main gearbox, which features an auxiliary lubrication system designed to minimize the risks of lubrication failure during emergency landings. The S-92A+ can carry an additional 1,200 lb (545 kg) compared with the previous model for a total maximum gross weight to 27,700 lb (12,564 kg). Sikorsky said the US Federal Aviation Administration (FAA) is in the final stages of testing the Phase IV gearbox and the manufacturer aims to secure regulatory approval by the end of 2026.

Robinson Contracts R88 Providers

Robinson Helicopter Company announced a range of partnerships and developments from March 9-12 during the Verticon conference hosted by Vertical Aviation International. Robinson announced supplier agreements to develop its 10-seat, single-engine R88 (shown). Vermont-based GPMS International will provide its Foresight MX health and usage monitoring system (HUMS) for the R88. Outerlink Global Solutions will provide its Iris system for capabilities including flight data monitoring, communications and video and audio recording. Skurka Aerospace will provide the R88's advanced brushless starter-generator.

Robinson during the conference also announced plans to implement Crewchief Systems' digital aircraft management platform across the future R66 NxGs and R88s, along with all

legacy R22s, R44s and aircraft sent in under the Robinson's trade in program. The Crewchief platform seeks to offer customers a cloud-based digital infrastructure with lifetime visibility into the operational and maintenance history of each aircraft. The manufacturer based in Torrance, California, also announced that StandardAero will be its preferred provider of engine maintenance, repair and overhaul (MRO) and component repair for its global fleet of R66s powered by Rolls-Royce RR300 engines.

Airbus Books Orders for new H140

In March, Airbus Helicopters announced orders from multiple organizations for the new light twin-engine H140 (shown) aircraft that it unveiled in 2025, which Airbus seeks to enter the H140 into service in 2028.

The H140 cabin can be configured to seat six passengers or the seats can be removed for cargo transport and disaster relief. It features a new T-shaped tail boom with an optimized Fenestron that reduces sound levels, a five-blade bearingless main rotor and Safran Arrius 2E 700 engines. The forthcoming aircraft, which is now in flight testing, has great initial appeal among the emergency medical services segment.

On March 11, German operator ADAC Luftrettung and the Austrian ÖAMTC Flugrettung finalized framework contracts for H135, H140 and H145 helicopters. These two operators in 2025 committed to being H140 launch customers and development partners. ADAC Luftrettung has an existing fleet of 60 Airbus helicopters while ÖAMTC Flugrettung operates a fleet of 31 H135s. Air Transport Europe, an emergency medical services operator in Slovakia, announced a contract to purchase one H135 and one H140 helicopter.

German emergency medical services operator DRF Luftrettung ordered four H145s, adding to its orders placed in 2025 for 10 H140s. DRF Luftrettung and its subsidiaries operate more than 50 H135s and H145s for emergency rescue and intensive care transport operations. Powered by two Safran Arriel 2E engines, the H145 is equipped with a full authority digital engine control (FADEC), the Helionix digital avionics suite and a high performance 4-axis autopilot to reduce pilot workload.

Bell Seeks 2026 FAA Certification of 525

During press briefings ahead of Verticon in March, Bell senior vice president Mike Deslatte told reporters that the Textron subsidiary aims to certificate its twin-engine, super medium-lift 525 Relentless (shown) by the end of 2026. Deslatte did not commit to that timeline to certificate the fly-by-wire Relentless, clarifying "that's with the FAA."

All flight tests for the FAA have been completed, he said, adding that the two remaining tests for the agency will be conducted at Bell's system integration facility in Arlington, Texas. These involve software testing and failure mode regression testing, which assess the aircraft's reliability for safe flight and landing during a system failure. Bell is also in discussions with the European Union Aviation Safety Agency (EASA) about the validation process for the Relentless, which is designed to carry up to 16 passengers with a flight range of 619 nm (1,146 km).

On April 17, the Textron subsidiary announced the creation of a new office in Ukraine as part of its long-term approach to industrial cooperation there. Bell Textron Ukraine will support Bell helicopter assembly, maintenance and repair. Bell highlighted platforms that could have strong potential in Ukraine include its AH-1Z Viper and UH-1Y Venom, which are

designed to operate seamlessly together and have high parts commonality and operational flexibility.

On April 22, Bell announced purchase agreements for three 429s for executive transport operators in the UK and Estonia. Complementing the S-92 executive transport capabilities, the Bell 429 boasts one of the largest cabin spaces in the light twin helicopter category. During Verticon, Bell unveiled new luxury interior options for the 429 fleet.

Enstrom to Restart US, Europe 480B Deliveries

On April 10, Enstrom Helicopter Corporation announced that EASA and the FAA had both granted full airworthiness compliance for its turbine-powered 480B (shown). This enabled the Michigan-based company to resume sales of newly manufactured 480Bs that include a crash resistant fuel system (CRFS) designed to meet a regulatory mandate to minimize the risk of post-impact fuel fires.

Enstrom stated it is also nearing completion on ensuring regulatory compliance for fuel system mandates for the piston-powered 280FX. Enstrom seeks to eventually produce new 480Bs with an optional glass panel upgrade, including a Garmin G500H avionics display, GTN digital audio radios, ADSB in/out surveillance and Howell engine indication.

US Army Expands Boeing Chinook Contract

On April 15, the US Army awarded Boeing with $324M contract for six CH-47F Block II Chinooks (shown), increasing the Army's contract to a total of 24 orders for Block II Chinooks. Boeing as of April has produced and shipped six Block II Chinooks to the Army.

The US military also modified a contract with Boeing for postproduction support of AH-6 Little Birds for Saudi Arabia's

National Guard. The modification for services expected to be completed in 2028 brings the contract to an estimated value of $77M.

NATO Plans NH90 Block II Study

On April 20, NATO announced a contract with NHIndustries to begin an architecture study for the Block II iteration of the medium-sized, twin-engine, multi-role NH90 (shown) on how best to meet the strategic needs of the post-2040 environment.

Upgrades sought by NATO include modular avionics, improved commonality and maintenance, along with capabilities to for collaborative combat with uncrewed aircraft systems (UAS). This two-year study valued at €15M ($17.6M) will review whether upgrade design options could be completed through new production, retrofits or remanufacturing. As a joint venture between Airbus, Leonardo and GKN Fokker, NHIndustries is a major supplier to military members of the NATO alliance.

(All photos are courtesy of the respective companies unless otherwise stated)

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X-76: Redefining the Speed Limits of Vertical Flight

DARPA SPRINT Bell X-76 Artist Concept (Image provided by DARPA | Collie Wertz)

By Angelo Collins
Executive Director, Vertical Flight Society

For more than seven decades, vertical flight has been defined by a fundamental trade space. Aircraft capable of hovering and operating independently of runways have historically sacrificed speed, range and efficiency when compared to conventional fixed-wing aircraft. Conversely, aircraft optimized for high-speed cruise have required prepared runways and infrastructure, limiting operational flexibility.

The US Defense Advanced Research Projects Agency (DARPA), in partnership with US Special Operations Command (USSOCOM), is seeking to fundamentally reshape this trade space through the Speed and Runway Independent Technologies (SPRINT) program. The goal is ambitious: demonstrate an aircraft capable of cruising between 400 and 450 knots while retaining the ability to hover and operate from austere, unprepared locations.

The SPRINT X-plane, recently designated the X-76, is not intended as a production aircraft but rather as a proof-of-concept technology demonstrator designed to validate enabling technologies and integrated concepts that could scale across future generations of military aircraft. If successful, the X-76 could represent a transformational shift in how speed, survivability and operational flexibility are balanced in runway-independent aircraft design.

Like many transformational efforts in aerospace, SPRINT did not emerge in isolation. It is the latest chapter in a long lineage of DARPA-sponsored innovation.

DARPA and the Pursuit of Transformational Vertical Lift

DARPA has played a defining role in advancing unconventional vertical flight concepts. Across several decades, the agency has repeatedly challenged industry and academia to rethink fundamental assumptions about aircraft configuration, propulsion integration, autonomy, and operational employment.

Programs such as the Unmanned Combat Armed Rotorcraft (UCAR), Boeing's A160 Hummingbird, the Heliplane, and more recent efforts including ARES, Tern, ALIAS, EVADE, and the VTOL X-Plane program have explored novel approaches to endurance, autonomy, deployability, and speed for runway independent aircraft. While not all resulted in operational systems, each contributed technological building blocks and lessons that shaped future programs.

SPRINT traces its origins to DARPA seedling efforts initiated by Tactical

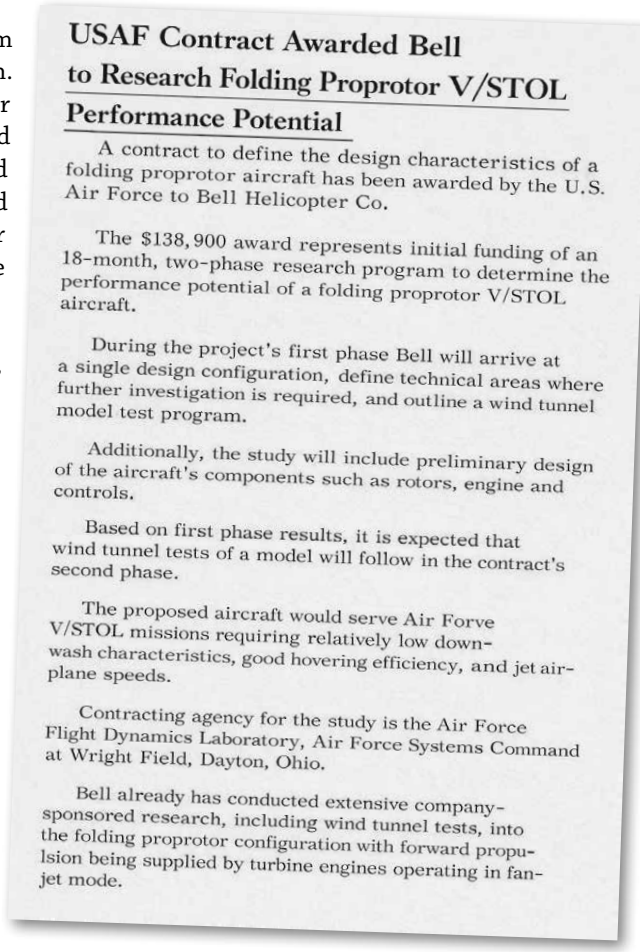
Technology Office (TTO) Program Manager Dr. Xander Walan. Parallel efforts within the Air Force's AFWERX High-Speed VTOL Challenge in 2021 provided additional industry input and served as an informal request for information that helped shape the eventual program architecture.

Following successful early studies, DARPA Director Dr. Stefanie Tompkins, in conjunction with SOCOM, approved the SPRINT program proposed by Dr. Andy Baker in late 2022. The program was publicly introduced by DARPA TTO Director Dr. Mike Leahy in January 2023 at the Vertical Flight Society's 10th Annual Electric VTOL Symposium during the Transformative Vertical Flight meeting. A formal Broad Agency Announcement followed on March 9, 2023, formally launching industry participation.

Early performers included Aurora Flight Sciences, Bell Textron, Northrop Grumman, and Piasecki Aircraft. The program entered Phase 1 on Nov. 1, 2023, with competing teams conducting preliminary design activities. In May 2024, Aurora Flight Sciences and Bell Textron advanced into Phase 1B, refining their concepts over approximately one year.

In June 2025, Bell Textron, Inc. was selected as the final performer and awarded contracts for Phases 2, which encompass detailed design, fabrication, and flight testing of the SPRINT X-plane demonstrator.

In April 2026, VFS recognized the Bell High-Speed VTOL Track Test Team with the Howard Hughes Award for outstanding improvement in fundamental vertical flight technology. The team achieved a first-of-its-kind "stop-fold" rotor demonstration, executing a powered transition from rotor-driven flight to jet propulsion — accelerating with a proprotor, transferring thrust to a turbofan, and stopping and folding the rotor in motion to enable high-speed flight. This breakthrough significantly reduced technical risk for DARPA's SPRINT program. Bell Textron will receive the Hughes Trophy at Forum 82.



USAF Contract Awarded Bell to Research Folding Proprotor V/STOL Performance Potential

A contract to define the design characteristics of a folding proprotor aircraft has been awarded by the U.S. Air Force to Bell Helicopter Co.

The $138,900 award represents initial funding of an 18-month, two-phase research program to determine the performance potential of a folding proprotor V/STOL aircraft.

During the project's first phase Bell will arrive at a single design configuration, define technical areas where further investigation is required, and outline a wind tunnel model test program.

Additionally, the study will include preliminary design of the aircraft's components such as rotors, engine and controls.

Based on first phase results, it is expected that wind tunnel tests of a model will follow in the contract's second phase.

The proposed aircraft would serve Air Forve V/STOL missions requiring relatively low downwash characteristics, good hovering efficiency, and jet airplane speeds.

Contracting agency for the study is the Air Force Flight Dynamics Laboratory, Air Force Systems Command at Wright Field, Dayton, Ohio.

Bell already has conducted extensive company-sponsored research, including wind tunnel tests, into the folding proprotor configuration with forward propulsion being supplied by turbine engines operating in fan-jet mode.

The First Mention of the Folding Proprotor Research in the May 1969 Issue of Vertiflite

Early Foundations in Stoppable-Rotor Research

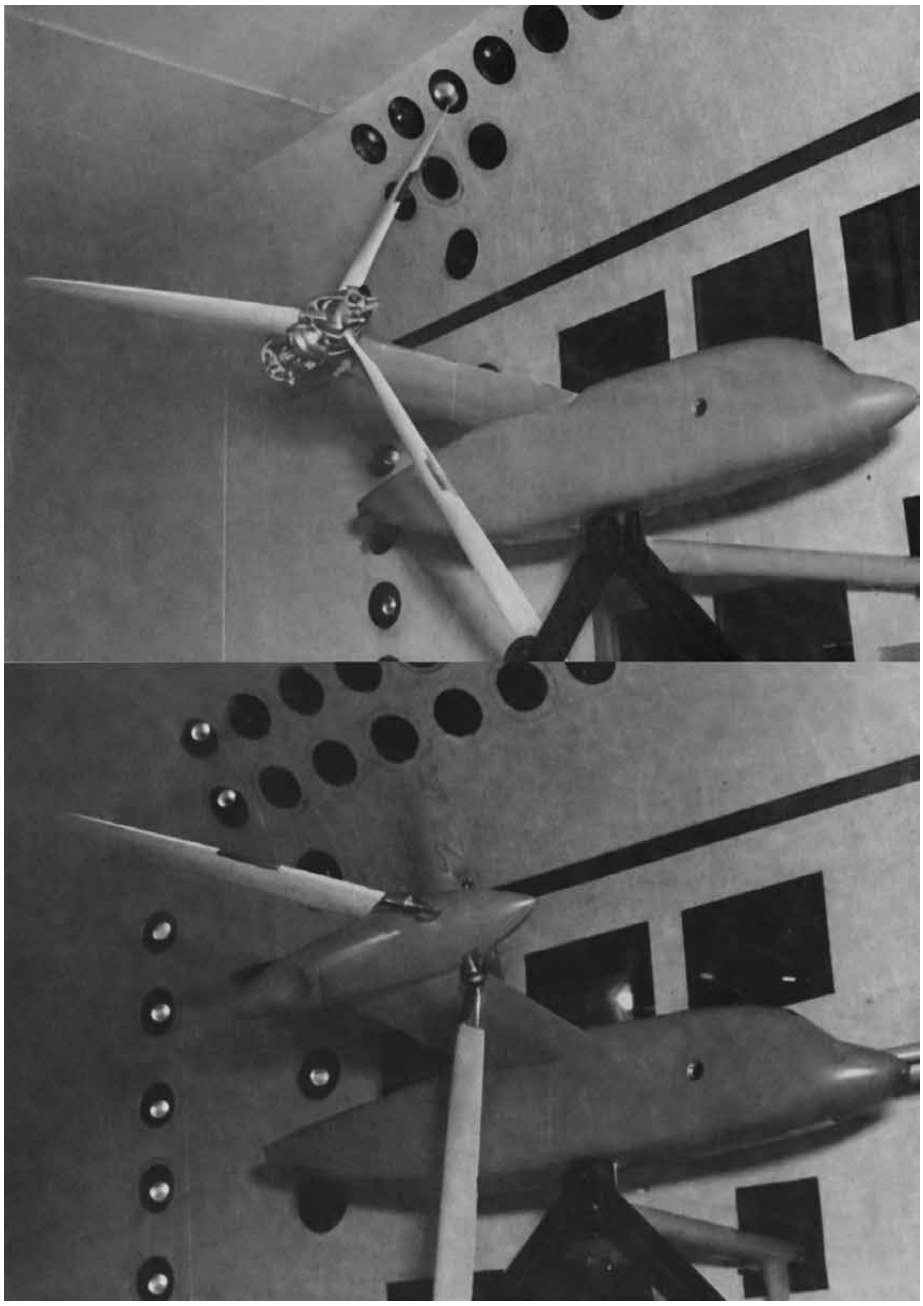
SPRINT represents a modern effort enabled by advances in materials, controls and propulsion integration. Many of its underlying concepts trace back decades. The technical foundations underpinning today's high-speed VTOL concepts extend back to pioneering work conducted in the late 1960s and early 1970s, when researchers began seriously exploring "stoppable-rotor" configurations as a pathway to combining vertical lift with efficient high-speed flight.

An active VFS member now in his eighties, Mr. John M. Davis, who worked in Bell's Stability and Control (S&C) Group from 1967 to 1976 and later supported the US Army's Aviation Applied Technology Directorate (AATD) and NASA Ames, recalls that parallel lines of research were underway during this formative period. In addition to the dynamic modeling efforts led by Dr. Jing Yen and documented in the 1971 technical report "Study of Folding Proprotor VTOL Aircraft Dynamics" (AFFDL-TR-71-7), along with subsequent NASA wind tunnel investigations under contract NAS 2-5461, established foundational understanding that would influence later high-speed VTOL concepts. Davis notes that his supervisor, Mr. Charles "Chuck" Livingston, led complementary work focused on predicting stability and control characteristics of stoppable-rotor aircraft.

As Davis explains, "The S&C work was done in the December 1968 to February 1970 timeframe, whereas the dynamics work was done from February 1969 to February 1971." Despite this overlap, he points out an interesting historical gap: "Although there appears to be overlap in the periods of performance, the 1971 report does not reference the 1969 stability and control work." The absence of cross-referencing between these closely related efforts highlights the fragmented nature of early exploratory research in this emerging field.

Davis also recalls early experimental efforts, including wind tunnel testing of a stoppable-rotor configuration at the LTV Low-Speed Wind Tunnel. He emphasizes that the testing likely involved a fixed airframe model for force and moment measurements, rather than a dynamically operating rotor system.

Dr. Jing G. Yen, a longtime member of the Vertical Flight Society (VFS) and a prolific donor to the Vertical Flight Foundation (VFF), recalls early work at Bell studying the dynamic behavior of



Wind Tunnel Model from AFFDL-TR-71-7 (VFS photo)

folding proprotors under US Air Force sponsorship. The work focused on dynamic stability and transient response during feathering and folding of rotor blades transitioning between helicopter and airplane modes.

In the feathering process, rotor blade pitch increases to reduce rotational speed to zero before indexing and folding the blades for cruise flight. Understanding the complex interactions among elastic rotor blades, wing structures and aerodynamic interference proved essential to making such concepts viable.

For Dr. Yen, this effort represented his first major assignment after joining Bell in June 1968. The program encompassed methodology development, analytical predictions and an extensive series of wind tunnel tests. These included a 1/7th Froude-scale aeroelastic model tested at the LTV Low-Speed Wind Tunnel followed by testing at NASA Langley's 16-Foot Transonic Dynamics Tunnel, supported by Ray Katernik, and later, a half-span, full-scale test conducted at NASA Ames' 40- by 80-foot wind tunnel in 1972.

Reflecting on the work, Yen notes that "this report was the first aeroelastic rotor modeling using modal methods, as well as modeling of wing/rotor aerodynamic interference." These advances marked a significant step forward in understanding the coupled structural and aerodynamic behavior of convertible rotor systems.

The effort was led by project manager and famous VFS member Troy Gaffey, whom Yen credits as both a mentor and a guiding influence during the program. "He was a great mentor and 'dissertation adviser' to me," Yen recalls. Gaffey also found the solution to the "X-Mode" vibration problem that affected the XV-3, leading to success in the XV-15 and, ultimately, the V-22. Gaffey's legacy will be commemorated by his namesake Troy Gaffey VFF scholarship, which will be awarded to Jack Dooher, Texas A&M University at Forum 82.

Muneeb Safdar from the University of Maryland will receive the Dr. Jing Yen VFF Scholarship for Cost Awareness at Forum 82; $6,000 awarded to the top applicant with a focus on improving rotorcraft affordability. The Bell Textron Scholarship, for the highest-scoring applicant will be awarded to Hauke Till Bartzsch, Leibniz University Hannover.

Bell's SPRINT Concept

The wind tunnel test in 1972 went a long way to prove the basic concept, including demonstration of fold mechanisms and capture of full-scale stop-fold loads. In recent years, Bell has combined decades of tiltrotor experience with previous stop-fold efforts to develop a scalable, flight-representative folding proprotor design. Recent efforts have focused on four key enabling technology areas: a robust folding proprotor, multi-mode propulsion, automated transition control and a transonic proprotor air frame. The folding proprotor and multi-mode propulsion technologies were developed and tested initially in a laboratory benchtop environment with subsequent iterations of analysis, design

John Davis (VFS photo)

Dr. Jing Yen (VFS photo)

and test. Upon maturity, the folding proprotor and multi-mode propulsion elements were integrated with an automatic flight control system in a unique vehicle tested on the Holloman High Speed Test Track. That test demonstrated the first-known, powered, prop-to-jet and jet-to-prop transitions, establishing a significant milestone in runway-independent technology development. The DARPA SPRINT program progresses the technology to the next step by integrating rotor, propulsion and control technology elements into a transonic airframe with the objective of exceeding 400 KTAS at relevant altitudes and effective hover in austere environments.

The Bell SPRINT concept builds upon decades of experience in tiltrotor and advanced configuration development, combining lessons learned from operational systems and experimental programs alike. The resulting design seeks to balance aerodynamic efficiency in high-speed flight with controllability and stability during vertical operations.

Engineering Leadership and Program Execution

The SPRINT effort at Bell is led by a team deeply rooted in advanced vertical flight development. Among them is Jason Hurst, Executive Vice President of Engineering and current treasurer of the Vertical Flight Society; Zack Dailey, chief engineer; as well as the dedicated Advanced Programs team at Bell.

Jason Hurst leads Bell's engineering organization and oversees development of testing, talent, tools and technology across the company's military and commercial portfolios, including the DARPA SPRINT program. During his 23-year career at Bell, he has held leadership roles spanning innovation, advanced configurations, autonomy and propulsion integration.

His prior responsibilities included oversight of advanced research programs such as Nexus, Autonomous Pod Transport (APT) and numerous advanced concepts. Hurst also served as program manager for the V-247 Vigilant unmanned system and previously led the experimental V-22 program, supporting rapid testing of upgrades including inlet barrier filters, aerial refueling capability and live-fire testing.

Zack Dailey is currently the chief engineer of Bell's Advanced Program team responsible for exploring and developing new technologies and novel applications in order to radically redefine vertical lift.

Dailey has been with Bell for 20 years serving in a variety of engineering roles. Prior to joining the Advanced Programs team, he served as the chief engineer for the Bell 505 and Bell 429. His background includes propulsion system design, rotor system design and experimental engineering contributing to many of Bell's commercial and military products, including the Bell Boeing V-22, Bell H-1 line, Firescout, Bell 429, Bell 505 and Bell 525.

The DARPA Team

The SPRINT program at DARPA is led by Cmdr. Ian Higgins, US Navy, who joined the TTO in June 2023 as a program manager.

Jason Hurst, EVP Engineering, Bell Textron

Zack Dailey, Chief Engineer, Bell Textron

Bell Textron's High-Speed VTOL Track Test (photo: Bell)

Higgins brings extensive developmental and operational flight test experience to the role. Prior to DARPA, he served as a chief developmental test pilot for the US Navy, conducting testing involving mission-systems integration, loads envelope expansion, ordnance separation, air-to-air refueling, flying qualities evaluation, and carrier suitability testing for the F/A-18 and EA-18G aircraft. Operationally, he completed a carrier-based deployment flying the F/A-18.

The SPRINT program at its core is not simply a research effort, it is an X-plane initiative with a clear purpose: demonstrating capabilities for application by the Department of War. The objective is not just to explore what is possible, but to validate technologies that can transition into future operational systems.

As Cmdr. Higgins emphasizes, the program is designed to "challenge the current paradigm" of vertical flight by combining jet-like speeds with true runway independence, unlocking new operational concepts across a wide range of mission areas.

SPRINT is inherently a joint effort. Led by DARPA in close partnership with USSOCOM, the program actively engages the Navy, Air Force, and Army. These partners are not passive stakeholders—they are integral members of the team, embedded in technical reviews, continuous feedback loops, and ongoing collaboration. Their direct involvement informs the technologies under development, aligning X-76 capabilities with future warfighter needs. This level of joint integration ensures SPRINT is leveraged by the next generation of programs of record..

Behind the program's execution is a team structure that reflects how DARPA operates at speed. In addition to government civilian experts from across the services, SPRINT leverages Systems Engineering and Technical Assistance (SETA) personnel. These individuals serve as the engine of DARPA programs, executing across technical, programmatic, and administrative domains, and enabling rapid progress on complex challenges. As Higgins notes, these are leading subject matter experts working together to solve problems at a pace and level of complexity rarely seen in traditional acquisition programs.

That pace is a defining feature. X-plane programs compress years, often decades, of development into just a few years, moving rapidly from digital design to flight test. This creates a unique environment where decisions, lessons learned and technical breakthroughs occur in rapid succession, accelerating both innovation and experience.

The operational implications are significant. A platform capable of combining high-speed cruise with runway independence offers what Higgins describes as an "asymmetric advantage," enabling new approaches to logistics, special operations, combat search and rescue and distributed operations in contested environments.

Equally important is the human dimension. Programs like SPRINT serve as both proving grounds and inspiration for the next generation of engineers and technologists. By exposing emerging talent to real-world, high-consequence development efforts, DARPA is actively cultivating the workforce that will carry these concepts forward.

In that sense, SPRINT is more than an X-plane program; it is both a technological leap and an investment in the future of vertical flight.

Looking Ahead

As the SPRINT program progresses into fabrication and flight-testing phases, the emphasis will shift from concept validation to demonstrating integrated system performance. Success will ultimately be measured not only by achieved speed or hover capability but also by the ability to transition reliably between flight regimes and validate scalable technologies applicable to future operational aircraft.

Regardless of the final configuration, SPRINT continues DARPA's long-standing role as a catalyst for innovation in vertical flight. The program reflects a recurring theme in aerospace history: Transformational advances emerge when operational need, technological maturity and institutional willingness to accept risk converge.

For the vertical flight community, the X-76 represents more than a single experimental aircraft. It is a continuation of a decades-long pursuit to expand the boundaries of what vertical flight can achieve.

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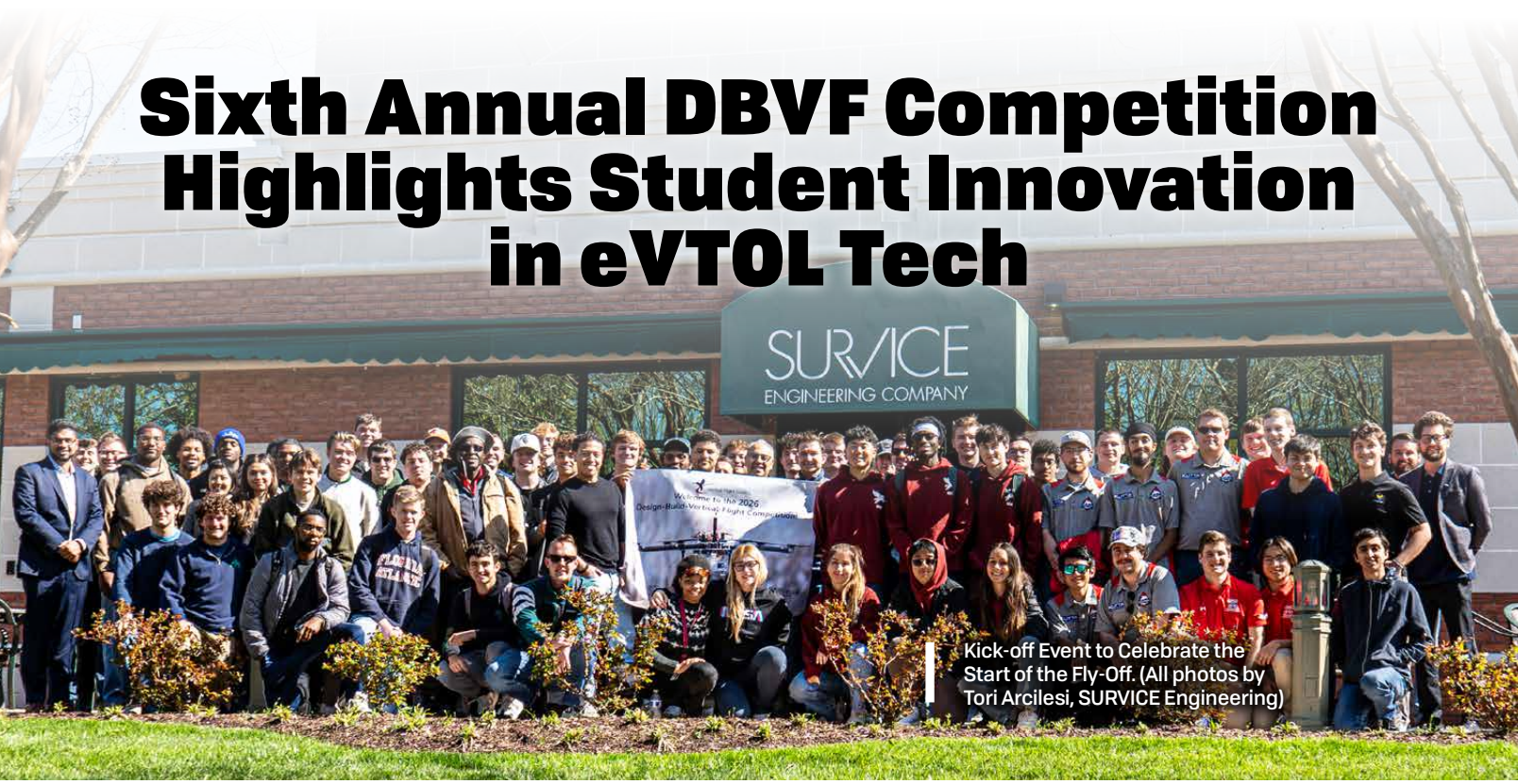
Sixth Annual DBVF Competition Highlights Student Innovation in eVTOL Tech



Kick-off Event to Celebrate the Start of the Fly-Off. (All photos by Tori Arcilesi, SURVICE Engineering)

By Adithya Ramaswami, Chair of the VFS DBVF Student Competition and Founder & CEO of ParaWave

The Vertical Flight Society's sixth annual Design-Build-Vertical Flight (DBVF) Student Competition concluded with an outstanding display of innovation, resilience, and teamwork. Held at DBVF Host Sponsor SURVICE Engineering's Applied Technology Operation facility from April 7 to 10, 2026, the DBVF Fly-Off marked the culmination of months of design, testing, and iteration as student teams from across the country brought their aircraft and ideas to life.

This year's challenge tasked teams with designing and building an electric vertical takeoff and landing (eVTOL) aircraft system capable of supporting wildfire response operations. With increasing demand for advanced aerial systems in emergency scenarios, students were challenged to develop eVTOL aircraft capable of picking up and dropping simulated fire suppressants with precision and reliability.

Twenty letters of intent to compete were submitted at the beginning of the competition, a record for DBVF, and twelve teams advanced to this year's Fly-Off.

Designing for Precision: Simulated Fire Suppressants

The 2025-2026 competition asked teams to imagine their eVTOL aircraft playing a key role in wildfire mitigation, focusing on flight precision and delivering simulated fire suppressants via sandbags to designated zones.

The competition consisted of three flight missions, which could only be unlocked in order:

Flight Mission 1 (Scouting): Teams navigated a waypoint-based course to simulate aerial reconnaissance, testing maneuverability and situational awareness.

Embry-Riddle Aeronautical University (Prescott) pilot coordinating with team at the flight line.

University of Maryland aircraft attempting to pick up their payload in Flight Mission 3.

Georgia Institute of Technology aircraft flying.

Santa Clara University going through their pre-flight check.

Flight Mission 2 (Initial Payload Drop): Aircraft executed precise payload delivery operations, simulating the first response to the spread of the fire. Waypoints representing fire varied in size and placement, requiring accuracy under pressure.

Flight Mission 3 (Re-Supply): The aircraft retrieved additional payload and returned to the mission area, simulating sustained firefighting operations. This mission introduced a new level of complexity, emphasizing system integration, efficiency, and repeatability.

Across all missions, teams could choose to operate manually or incorporate autonomous functionality, further highlighting the growing importance of advanced flight control systems in real-world applications and team communication. The focus on real-world application was a reminder to all teams that engineering impact happens when design meets purpose.

Flights Back to Back

Perseverance and resilience defined the week, as the flight line remained active with teams flying back-to-back throughout the Fly-Off. From unexpected crashes to emotional celebrations, teams adapted in real time, and each mission reflected months of preparation, teamwork, and determination. By the end of the week, it was not just performance that stood out, but the grit and persistence demonstrated by every team on the field.

The University of Akron aircraft flying.

Georgia Institute of Technology wins 1st place overall and top Fly-Off score.

RESULTS AND RECOGNITION After many months of hard work, the following teams earned top honors:

Place	University	Location	Team Name	Prize
First Place	Georgia Institute of Technology	Atlanta, Georgia, USA	DRXC	$2,200
Second Place	The University of Akron	Akron, Ohio, USA	UA VTOL	$1,300
Third Place	University of Maryland	College Park, Maryland, USA	AMAV	$700
Top Score Fly-off Performance	Georgia Institute of Technology	Atlanta, Georgia, USA	DRXC	$400
Top Score Final Technical Report	Embry-Riddle Aeronautical University Prescott	Prescott, Arizona, USA	DOLPHIN	$400

Every Fly-Off has memorable moments, and fun superlatives were recognized in no particular order. North Carolina Agricultural and Technical State University earned recognition for the "Most Impressive Drone Retrofit," while Case Western Reserve University stood out with "Most Mission-Relevant GCS Alerts." Embry-Riddle Aeronautical University (Prescott) received "Drone Most Likely to Hug a Tree," and Texas A&M University impressed judges with precision, earning "Most Accurate Landing into a Fire Waypoint." Santa Clara University also garnered sympathy from many teams, earning the "Most Insane Battery Purchasing Experience."

York College of Pennsylvania aircraft flying.

Closing Reflections

"This year's competition challenged teams to think beyond individual missions and design systems capable of operating seamlessly across back-to-back missions, with a strong focus on optimizing design decisions and tradeoffs. The level of technical rigor, creativity, and perseverance demonstrated by the teams was exceptional, and the sense of collaboration was equally impressive," said Adithya Ramaswami, Chair of the VFS DBVF Competition.

DBVF's focus on supporting the next generation of vertical flight innovators resonated deeply with the companies involved. Host Sponsor SURVICE Engineering designs defense eVTOL platforms for transport, resupply, and tactical missions. Premier Sponsor Perseus Defense focuses on advancing counter-UAS capabilities and next-generation defense systems, while the other Premier Sponsor AVL brings deep expertise in simulation and performance optimization. ParaWave focuses on tactical and advanced computer vision systems. For everyone, this competition fosters critical, highly sought-after real-world skill sets.

"I am incredibly grateful to all the judges, sponsors, and the entire SURVICE Engineering team whose dedication made this year's competition possible," said Ramaswami. "From the flight line to behind the scenes, their commitment and the drive of the student teams are what continue to elevate DBVF each year. As the competition evolves and continues to grow, the strength of this community remains its greatest asset, and we are excited for what lies ahead."

The Vertical Flight Society extends its sincere thanks to this year's Host Sponsor, SURVICE Engineering, for providing access to their FAA-authorized flight test facility and for their continued support of DBVF. Deep appreciation is also extended to DBVF's Premier Sponsors, Perseus Defense and AVL, for their invaluable contributions. Additional gratitude is given to ParaWave's co-founder and CTO, Jack Murray, for his incredible support throughout the competition, as well as to the many members of the VFS and UAS community whose dedication makes DBVF possible year after year.

Next year's DBVF Request for Proposals (RFP) will go live by early Fall. For updates and more information, visit **https://vtol.org/fly**.

An album of photos from the event taken by SURVICE Engineering is available in the VFS Vertical Flight Photo Gallery at **www.gallery.vtol.org/albums**.

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Sikorsky's Bet on Agile Innovation

The H-60Mx Black Hawk shipped to the US Army at Fort Eustis, Virginia, can be piloted or operated through a tablet to autonomously execute missions. (photo: Sikorsky)

Sikorsky seeks a revolution in vertical flight through autonomy, additive manufacturing and other disruptive technologies.

By Tom Risen

Sikorsky aims for its second century to be both more innovative and efficient than its first, groundbreaking century. The pioneering company founded by Igor Sikorsky that made the helicopter part of everyday life wants autonomy and other new technologies to become integral tools for conventional and next-generation vertical takeoff and landing (VTOL) aircraft.

The Lockheed Martin subsidiary in 2026 plans to make progress on uncrewed aerial systems (UAS) and electrification with first flights of the Nomad 100 VTOL drone, the U-Hawk autonomous Black Hawk derivative and the hybrid-electric experimental (HEX) tilt-wing VTOL demonstrator. These technologies comprise the broader Sikorsky "three pillars" strategy of electric systems, autonomy, and VTOL UAV/UAS (see "Pillars to Products," Vertiflite, March/April 2024). The three pillars focus on new and emerging customer missions.

To support its ambition, the Connecticut-based manufacturer has shifted its research and development (R&D) budget in 2026 toward "a new product focus" while still funding the modernization of existing products, Sikorsky vice president and chief engineer Steve Schmidt told Vertiflite.

Pursuing new aircraft is part of Sikorsky's heritage. The company that rose to prominence by pioneering helicopters began as a developer of airplanes, including the Sikorsky S-29 biplane that, in 1925, flew some of the first airline routes in the US.

There have been few examples in recent decades when the overall architecture of VTOL and fixed-wing aircraft have changed dramatically, Igor Cherepinsky, director of the company's rapid prototyping arm, Sikorsky Innovations, told Vertiflite. The vertical flight sector, he said, is ready to pursue revolutionary new aircraft that would surprise Igor Sikorsky and other pioneers. Emerging technologies could enable an industry-wide "explosion" of new VTOL platforms "that don't look like anything people have seen before," Cherepinsky said.

Sikorsky's hybrid-electric Nomad tailsitter UAS should make its first hover flight in 2026 before the HEX and U-Hawk aircraft, Schmidt said. In the fourth quarter this year, he added, Sikorsky aims to fly the U-Hawk, a fully autonomous, uncrewed utility aircraft converted from the UH-60L Black Hawk (see "Sikorsky Unveils the U-Hawk at AUSA," Vertiflite, Nov/Dec 2025). "We're in the midst now of starting to modify that aircraft and getting ready for integration testing," Schmidt said of the U-Hawk.

The H-60Mx Black Hawk is equipped with the Matrix autonomy suite (photo: Sikorsky)

Nomad 1- In 2025, Sikorsky completed a test flight of its Nomad 50 rotor-blown wing uncrewed aerial system (UAS). It aims to test fly a larger Nomad 100 UAS in 2026 (photo: Sikorsky)

In 2026, Sikorsky also plans to fly a powered system testbed aircraft to demonstrate the hybrid-electric HEX, a fully autonomous VTOL aircraft with a gross weight of more than 7,000 lb. (3,175 kg). The HEX powertrain is designed for cruising speeds of 200–300 kt (370–550 km/h) and a range of more than 500 nm (see "Sikorsky's HEX Signs," Vertiflite, May/June 2024).

Each of the first flights planned this year will demonstrate electrification and autonomy technologies. All three aircraft are equipped with Sikorsky's Matrix autonomy system. Only the Nomad and HEX have hybrid-electric powertrains, yet all three rely more on electric actuators and power electronics compared to the mechanical parts used in conventional helicopters or tiltrotors. Electrification is aimed at reducing the mechanical complexity that has limited vertical flight designs in the past.

Large electric motors and other parts don't exist that match Sikorsky's plans for the HEX demonstrator, so GE Aerospace will provide the company with a CT7 turboshaft and the 1.2-MW generator to power the aircraft. The HEX hybrid-electric powertrain builds on work done by GE Aerospace for NASA and the US Army. GE is developing a lightweight silicon carbide inverter for MW-class hybrid-electric applications, drawing on the company's research to improve silicon carbide semiconductors.

Hybrid-electric powertrains provide greater range and speed compared with fully electric propulsion, Cherepinsky said, although Sikorsky is still "very carefully watching" the development of solid-state batteries. As battery technology improves, he wants new aircraft to have architecture that can simplify the replacement of gas-powered turbines or jet fuel with battery power.

"The whole power versus energy density equation doesn't work for us just yet, but it's coming," Cherepinsky said of fully electric propulsion. The near-term development of hydrogen fuel cell technology is also uncertain, he said, but "there is a lot of good there."

"We absolutely are not ignoring hydrogen propulsion," he said. "We are working on a couple of vehicles that have hydrogen fuel cells."

Ground tests and integration of engines, electric motors and power electronics have been a learning process with Sikorsky's testbeds, Schmidt said. While he was able to share very few engineering details about ongoing work at the Sikorsky Innovations hangar, Schmidt reflected: "I'm pretty proud of this team."

Advancing Autonomy

The Matrix autonomy suite is a centerpiece of Sikorsky's strategy. Aircraft integrated with Matrix can operate through a tablet interface to autonomously execute missions from start-up to shutdown. The system automatically generates a flight plan to help navigate aircraft safely by integrating light detection and ranging (lidar) scanners, sensors and algorithms. Upgrading existing aircraft with Matrix can enable uncrewed flights and extend their operations lifespan.

The system is funded through the Defense Advanced Research Projects Agency's (DARPA) Aircrew Labor In-cockpit Automation System (ALIAS) program. In 2022, Matrix enabled an uncrewed ALIAS Black Hawk to fly tactical courses and deliver cargo.

Among the Matrix testbeds is the U-Hawk, which is a UH-60L modified by replacing the cockpit with clamshell doors and a loading ramp while also integrating a third-generation fly-by-wire system. These changes enable missions ranging from cargo transport and launched effects deployment to missile delivery and long-range endurance flights. The U-Hawk can self-deploy over 1,600 nm or loiter for up to 14 hours without refueling, carrying oversized loads or up to four modular containers, and lifting 9,000 lb (4,082 kg) externally.

The U-Hawk is Sikorsky's first fully autonomous helicopter — a Group 5 UAS — that can only be flown autonomously. An operator using a tablet will have full command from start-up, to flight, to shutdown.

Separately from the U-Hawk, the US Army on March 20 announced the delivery of an H-60Mx Black Hawk helicopter equipped with Matrix so it can fly with or without a pilot at the controls. Army pilots and engineers will test the optionally piloted Black Hawk as part of its stated effort

The U-Hawk autonomous Black Hawk derivative (photo: Sikorsky)

The hybrid-electric experimental (HEX) tilt-wing demonstrator (image: Sikorsky)

"to develop a universal and scalable autonomy kit that can be installed across the Army's entire fleet of hundreds of Black Hawk helicopters and integrated into the designs of future aircraft."

Sikorsky is also collaborating with Robinson Helicopter Company, which in March unveiled the R66 Turbinetruck autonomous cargo helicopter that features Matrix with the aim of enabling a range of civil and military missions including cargo delivery and resupply. This aircraft is part of the broader Robinson Unmanned company strategy.

Open architecture for the Matrix software development kit is a critical part of its design, Cherepinsky said, to enable customers to "do their own thing" however they decide to integrate the suite onto aircraft.

Safety is a priority among Sikorsky engineers, and Cherepinsky said the company will rigorously test every new technology and coordinate with the US Federal Aviation Administration before relying on new features to safeguard the lives of passengers and pilots.

"It's a pretty long road from something that works to something you are willing to trust with people's lives," Cherepinsky said.

Autonomy is an evolving technology but holds great promise to make flight both safer and more reliable. Helicopter pilots approaching offshore oil rigs "on a fairly regular basis" accidentally land on the wrong platform, Sikorsky vice president of global commercial and advanced programs Leon Silva told Vertiflite, referring to aircraft built by Sikorsky and others. The existing Sikorsky S-92 "rig-approach" flight control feature allows the aircraft to automate the last phases of approaching the rig while still being landed by a pilot. "We are in the process of rejuvenating that feature so more customers can have access to it," Silva said.

Further autonomy and optional piloting capability could also lower workload for pilots during flights at night or in areas of poor visibility. Many helicopter accidents are classified as "controlled flight into terrain," which involve an airworthy vehicle and a qualified pilot that still crash, usually during landing because of poor visibility of situational awareness. Implementing Sikorsky flight controls and Matrix technology could reduce the risk of such accidents, Silva said.

Family of Systems

Customer feedback inspired Sikorsky to plan new aircraft that have common designs so they can be developed more easily in larger and smaller versions to meet the needs of different missions. Schmidt called that strategy the "family of systems."

"We want to keep our designs highly common," Schmidt said. "That way when a customer operates different sizes, they have similar components." Partnerships with GE and others are crucial, he said, yet building parts in house whenever possible also makes it easier to design a common series of parts that can streamline upgrades and other modifications for novel designs. Commonality also supports Sikorsky's goal of placing a greater focus on dual-use capability for both civil and military customers. Any future product based on the HEX prototype, for instance, could be designed for military missions or scaled up for larger passenger transport aircraft, Schmidt said.

The Nomad demonstrates technologies used on HEX in a smaller, UAS vehicle configuration, Cherepinsky said. "These are not tiltwings of the past," he added. "Both tilt the actual wing and have cyclic and collective thrust."

The first hover flight of the Nomad 100 "rotor-blown wing" tailsitter planned this year will follow up on the flight in 2025 of a smaller demonstrator called the Nomad 50. The Nomad 100 features a wingspan of 18 ft (5.4 m) with the goal of demonstrating its capability for civilian missions, including wildfire monitoring and cargo delivery, along with military missions, including deliveries in contested airspace and reconnaissance flights.

Sikorsky aims to plan new products including advanced air mobility (AAM) platforms for both military and commercial applications, Schmidt said. The US Army wants UAS for the capabilities of aerial assault, launched effects and autonomous flight into a contested airspace to minimize the risk for pilots and crew. Firefighting and emergency response are two civilian missions for UAS that are in great demand where the capabilities of military aircraft could be repurposed. Integrating autonomy on existing Sikorsky S-70 Firehawks, for instance, could help crews target fires with greater precision by using sensor data to automatically maneuver for water drops.

Agile Testing and Manufacturing

Sikorsky aims to accelerate its design and manufacturing processes by using disruptive technologies including generative design, artificial intelligence, robotics and additive manufacturing — a process sometimes called 3D printing.

There is wide-ranging potential in the evolving science of using digital designs to mold materials including thermoplastics or metal additives into parts, tools and other objects. Additive manufacturing could simplify supply chains and reduce both cost and schedule. If a part or tool needed to be rapidly replaced or modified, they could be 3D printed instead of shipped or built using conventional methods.

Robinson Matrix R66 (photo: Robinson Helicopter Company)

Nomad 50 UAS in 2025 (photo: Sikorsky)

"Additive manufacturing allows us to rapidly produce parts for testing, improve the design, and reprint them," Schmidt said. "We are also integrating additive manufactured parts on production aircraft."

"Thousands of additive manufacturing parts" are used on the HEX, Nomad and U-Hawk aircraft, he said. "We've made a significant bet on additive manufacturing."

Testbeds like HEX and Nomad, he explained, can help Sikorsky's ongoing effort to demonstrate the airworthiness of additive manufacturing parts. Detailing the Lockheed Martin company's efforts to prove the safety of additive manufacturing for use on legacy aircraft, Schmidt said "we hope to have a production metal additive part on an H-60 platform" by the end of 2027.

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India Institute of Technology Kanpur
Department of Aerospace Engineering,
Kanpur, UP 208016 India
https://www.iitk.ac.in/aero/

The institute's Aerospace Engineering Department, with over 40 years of legacy, was formerly known as the Department of Aeronautical Engineering until 1991, when it expanded its focus to include spacecraft studies. The department has consistently maintained a balance between experimental, hardware-oriented work and theoretical, computational research.

India Institute of Technology Madras
Sardar Patel Rd Adyar
Chennai, 600036 India
https://www.iitm.ac.in/

The institute's initiatives in aerospace technology, driven through its Centres of Excellence, focus on advancing research and innovation in areas such as aerodynamics, propulsion, space systems, and autonomous aerial platforms. By bringing together interdisciplinary expertise and state-of-the-art facilities, the institute fosters cutting-edge developments that address both national priorities and global challenges in aviation and space exploration.

Texas A & M University
701 Ross St.
College Station, TX 77843 USA
https://engineering.tamu.edu/aerospace/index.html

The Aerospace Engineering Department is a leading centre for research and innovation in aerospace technology, with strengths in aerodynamics, propulsion, space systems, and autonomous flight. Supported by advanced experimental and computational facilities, the department integrates theory and practice to address challenges in aviation, space exploration, and emerging aerospace systems.

The University of Texas at Austin
2617 Wichita St.
Austin, TX 78712 USA
https://cockrell.utexas.edu/

The Aerospace Engineering and Engineering Mechanics program at Cockrell School of Engineering is a leading centre for education and research in aerospace technology. It has strong focus areas in aerodynamics, propulsion, astronautics, and computational engineering.

Supported by advanced experimental and analytical facilities, the program integrates theory, computation, and hands-on learning to address challenges in aviation, space systems, and emerging aerospace technologies.

University of California, Davis
1 Shields Ave
Davis, CA 95616 USA
https://www.ucdavis.edu/

The aerospace program at University of California, Davis focuses on core areas such as aerodynamics, propulsion, structures, and control systems. It provides a strong foundation in aerospace engineering through an integrated approach to theory, computation, and experimentation.

Supported by interdisciplinary research in fluid mechanics, robotics, and advanced materials, the program addresses challenges in aviation, space-related technologies, and next-generation mobility systems.

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KARGO Calculus

Intermodal freight expert LogistiWerx plans to test the business model for unmanned cargo vertical flight with Piasecki's autonomous quadcopter in a real-life environment.

By Frank Colucci

The KARGO autonomous quadcopter, with its detachable joint modular intermodal container, will provide a robust testbed for vertical lift in an integrated shipping environment. (All photos via Piasecki Aircraft Corp.)

For all the promise of advanced air mobility (AAM), few demonstrations have generated business data to justify larger cargo drones in intermodal freight networks. Shipping orchestrator LogistiWerx, Inc. is teamed with KARGO quadcopter developer Piasecki Aircraft Corp., the Augusta (Georgia) Regional Airport and Part 135 charter operator Lowcountry Aviation to fly uncrewed freight missions in early 2027. "It's not just a proof-of-concept," explained LogistiWerx CEO Kaydon Stanzione. "I look at it as trying to characterize the business model analytically. If we can make it work analytically, if we can fly those missions, those pilot programs, we'll go through with certification, production and operation."

LogistiWerx, headquartered in Merchantville, New Jersey, markets artificial intelligence (AI) software that manages intermodal shipping via two or more forms of transportation. The company's AirWerx application today routes high-value and time-critical freight via air-charter services to optimize cost and efficiency. The same AI portal will book freight flights on Piasecki's autonomous quadcopter with Lowcountry Aviation in the Central Savannah River Area around Augusta Regional Airport. Lowcountry founder and CEO Marco Cavazzoni said, "We're in the process of understanding what this does and figuring out what is going to be required in order to operate it in a real-life environment."

KARGO, with its four teetering rotors on folding booms, was designed to resupply military operators at austere sites (see "Cargo Carrier in a Can," Vertiflite, Nov/Dec 2021). Piasecki Aircraft Corp. (PiAC) found its first commercial customer in helicopter fleet operator PHI looking to deliver critical loads to oil rigs, day and night. The LogistiWerx demonstration expands the concept of operations. PiAC president John Piasecki acknowledged: "I think what we've focused on is in the offshore oil and austere markets. What's so attractive here is penetration for a much bigger demand to get high-value cargo around bottlenecks in our transportation system. That is a much bigger market."

Logistics networks today interface short-range cartage carriers with longer-range transportation. Initial flights of the KARGO turbine-powered quadcopter will model the more powerful KARGO II and possible electric vertical takeoff and landing (eVTOL) aircraft moving freight in intermodal networks. Stanizone observed that "eVTOLS are not going to be landing in your backyard. You'll need land transport to take it to your delivery destination. That's where you have this whole intermodal challenge."

The challenge is to deliver less-than-truckload (LTL) freight to multiple customers in a highly regulated environment. "Along the way, you have to track the freight, notify the shippers, the brokers, the receivers," said Stanzione. The intermodal challenge will be further complicated by a non-traditional aircraft operating without a pilot beyond visual line-of-sight (BVLOS) in the National Air Space. The potential payoff is speedy delivery. "Speed in terms of flight, but more speed in terms of routing options," said Stanzione. Direct flights across bodies of water and uninterrupted by required driver rest stops can save hours in transit. "We're looking at the Georgia

area to start everything around the Savanah River and down south."

"We're in a prime location," offered Augusta Regional Airport director of business development Diane Johnston. "We're equidistant from Atlanta and Charlotte, but there are lots of rural areas around us. There's no easy way to get to these areas when you're looking at the eastern part of South Carolina and the eastern part of Georgia. There's no highway access." Augusta Regional Airport started to address AAM about eight years ago with an industry working group now including LogistiWerx, TruWeather and Collins Aerospace. The airport has a small, secure freight processing building with doors opening on- and off-airport to isolate freight carriers from aircraft on the ramp. A larger maintenance building may be repurposed to support unmanned cargo operations, and hangar space is available for KARGO maintenance.

Lowcountry Aviation, based about 100 nm (185 km) from Augusta at Lowcountry Regional Airport in Walterboro, South Carolina, now flies Part 135 medical and critical cargo charters with King Air turboprops. "Sometimes we move a box, and sometimes we move a 200 lb (99 kg) machine with a heart beating in it," said Marco Cavazzoni. The company also provides Part 145 repair services for corporate jets. It plans a satellite presence at Augusta Regional for the KARGO demonstration. "We're the people that will ensure the infrastructure is there, the regulations are there and that they can be maintained at the large scale that these drones will operate."

Stanzione noted most proposed eVTOL aircraft were designed for passengers rather than containerized or palletized freight. Purpose-built cargo drones demonstrated so far are generally smaller than the 1,400 lb (640 kg) KARGO TAV-1 demonstrator aircraft, with its detachable joint modular intermodal container. "Everybody has a hunch, but there's no business model," said Stanzione. "What we need to do is do the modeling, the investigation. We have to put all the pieces together and write a very detailed plan of attack. I want commercial investors to put funds into this."

The uncrewed KARGO was designed to move freight in austere settings without elaborate infrastructure or highly trained operators.

Commercial KARGO

While LogistiWerx plays prime contractor for the intermodal demonstration, PiAC — in Coatesville, Pennsylvania — continues to develop the KARGO quadcopter. PiAC acquired rights to the turbine-powered KARGO from Kaman Aerospace in April 2025. "The aircraft is in a prototype stage of maturity," acknowledged company president John Piasecki. "Our development strategy is spiral insertions to mature the product as we gain operational experience. We're going to support the aircraft in the field, and we're going to leverage that experience to feed back into the design improvements to make it fully operational."

PiAC continues hybrid-electric VTOL development with an eye to future aircraft, but KARGO, with proven turboshaft propulsion, provides a ready demonstrator. John Piasecki observed, "In terms of the value proposition, rule number one is utilization, which will bring down our costs. What KARGO offers is an uncrewed solution. We can drive up utilization by operating day or night, independent of fog or whatever weather condition. It's not just replacing an aircrew — you still need people to operate uncrewed systems. You're driving a better utilization rate, and you're operating with costs that are usually lower than a light helicopter that's similar."

The first instrumented KARGO prototype flew in the first phase of the US Marine Corps MARV-EL (Medium Autonomous Resupply Vehicle — Expeditionary Logistics) competition at Yuma Proving Ground in July 2024 (see "Advancing Autonomy for Cargo," Vertiflite, Sept/Oct 2024). The Marines still envision an unmanned logistics carrier to sustain units when traditional ground or manned air resupply is unavailable. The first-phase MARV-EL competition required systems to carry 300-to-600-lb (136-to-217-kg) loads 50 nm (93 km). KARGO, with its 300 shp Rolls Royce RR300, was sized to carry 800 lb (360 kg) over 100 nm (190 km) in an integral pod or external sling.

The Marines now plan a second-round MARV-EL demonstration that aims for payloads from 1,300 to 2,500 lb (590 to 1,134 kg). PiAC intends to fly a production-conforming KARGO II with a 400 to 450 shp Rolls Royce 250-series engine and redesigned drivetrain in late

KARGO flight test data will support product improvements in the more powerful KARGO II.

autumn 2026. The redesigned vehicle is expected to have a payload capacity of 1300 lbs (590 kg) and a range of 240 nm (444 km). Civil and military versions will differ only in avionics, communications and payload integration. John Piasecki explained, "Depending on when this demonstration is, we can employ both aircraft. One is going to have a lot more performance/payload capability. The other will be used to implement the autonomy, communications, etc."

The KARGO II drivetrain, with proven dynamic components, will be sized for 600 shp. "The requirement is more stringent than the margin between anticipated use and design-rated use in a regular commercial helicopter," said John Piasecki. "We are paying a higher weight empty, but we're making an operational trade for reliability, durability and low maintenance cost per flight hour."

Piasecki continued, "The whole operating concept is tailored to being simplified with maintenance in LRUs [line replaceable units] and modular systems that allow for reduced manhours per flight hour. Just the ruggedness of the platform is going to be much better suited to the environments we're anticipating. A light helicopter is going to take a lot more care and feeding. This thing folds up in a box."

KARGO program manager Romin Dasmalchi operated TH-57s, CH-46s and MV-22s in the US Marine Corps. He noted, "With an aircraft chip light that required a change of transmission, you knew that aircraft was coming off the flight schedule for days. With KARGO, we experienced a chip light — it was a metallurgy problem — on the demonstrator. It took about three hours of touch-time by two people to take the booms off the airplane, disassemble the transmission on-site, repair it with a new part and put it back together." Dasmalchi concluded, "Obviously, we never want to break anything, but when it happens, we've designed it so we can get to it quickly."

The developmental KARGO support plan calls for three operators/maintainers per aircraft, but the ratio is expected to improve as KARGO II matures from demonstrator to moneymaker. "We're going to learn a lot as we do these operations," said Dasmalchi. "Our objective is multi-platform operations, not only for the maintenance of the vehicle but also in-flight operations. We're leveraging mission management, mission planning, multi-vehicle control, surveillance control, leveraging autonomy so that an operator can handle more than one aircraft."

PiAC remains partnered with Near Earth Autonomy in Pittsburgh, Pennsylvania, to give the unpiloted KARGO II a simplified user interface that requires minimal operator training. "We're looking for that graphic user interface based on commercial requirements," said Dasmalchi. "There's already been a lot of learning to this point. There are options to choose from; that includes the ground control station." The evolving autonomy stack gives the hands-off quadcopter sense-and-avoid capability. Dasmalchi added, "Don't forget the level of safety that autonomy brings. A good autonomy suite with the right sensors and the right processing power increases your safety margins exponentially."

The commercial KARGO II already has a buyer in PHI, but Dasmalchi noted, "To move forward, we needed a clear path to certification and revenue flying. The environment right now is an airworthiness exemption that allows our customer to fly for revenue." A FAR Section 44807 exemption allows drone operators to deviate from certain Part 107 regulations. "That will support

The first KARGO prototype flew in the first phase of the US Marine Corps MARV-EL competition at Yuma Proving Ground in July 2024.

the commercial thrust of the program. That's going to be a key aspect to generate revenue in the program earlier than it would be otherwise. We want a good, steady, productive test program to get ready for our 44807."

Start Flying

The LogistiWerx test program will start with a marketing experimental certificate that permits KARGO charter flights without fees beyond expenses. Augusta Regional Airport is within range of the 6,000-acre Savannah River National Laboratories proving ground and offers the autonomous quadcopter airspace away from residential areas or flight hazards. The customer-rich Central Savannah River Area also provides safe test-flight paths. Stanzione said, "Our goal is to fly over water and work with the Georgia Department of Transportation to fly over very austere environments where there are no houses or hazardous environments." He added, "Once we've done a couple of runs, we'll start booking in advance for shippers where BVLOS would make sense."

Augusta Regional Airport is surrounded by industrial sites and located at the entrance of the Central Savannah River Area. Diane Johnston observed, "We have a little over 600,000 people in the metropolitan area — mid-sized, really — but we have a ton of rural communities around us, so we feel like we would be in a prime location to develop an economic model that would work not only for us but for other smaller rural-type communities regarding how they're going to be operating this equipment — how to determine if it's going to be economically feasible."

Airspace management and airport infrastructure are also to be determined. Johnston noted, "We have a lot of airspace capacity here because we're not an extremely busy airport." AAM working group member Collins Aerospace has airspace management systems aimed at smaller, lighter aircraft, and TruWeather Solutions offers a meteorological reporting infrastructure tailored to local airfield conditions.

Augusta Regional has applied to the Federal Aviation Administration (FAA) for an eVTOL and AAM integration pilot program (eIPP) that would accelerate the KARGO demonstration. Johnston said, "We would develop a safety plan, the outline of the airspace, hours of operation, submit that for review to start testing." She concluded, "The idea is let's start testing, show what can be done, and develop an economic model that identifies companies that could utilize these types of aircraft and have Augusta as the hub."

Shipping tenders from the AirWerx portal will be forwarded to Lowcountry Aviation. "The routing, just like an airline, depends on what the requirements are," said Cavazzoni. KARGO may fly straight from pick-up to delivery or transfer its cargo to third-party logistics operators for last-mile cartage. "We would set up the routing to do that, not in a vacuum, but we would have pretty strong input into it."

While Piasecki Aircraft Corp. has responsibility for KARGO engineering, the quadcopter may be operated and maintained by technicians from the original equipment manufacturer or from the Lowcountry Part 145 repair organization deployed at satellite locations. Cavazzoni said, "We have been working in the past with eVTOL manufacturers, supporting them." He added, "We'll do what makes sense from a cost perspective."

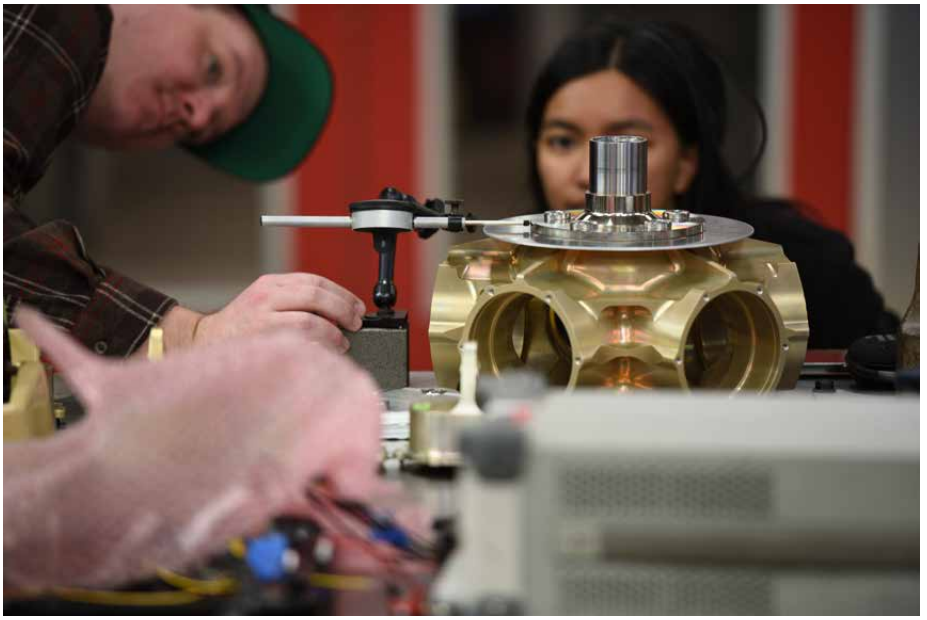
KARGO is a robust air vehicle with proven propulsion and dynamics. It was not designed to reduce helicopter noise. Stanzione noted, "We work with hundreds of trucking terminals. They're loud, incessantly loud, so loud you wouldn't even hear a helicopter. A lot of these large terminals are near some kind of waterway or port. Having a turboshaft helicopter fly between controlled airports and these yards, I don't have to worry about noise."

LogistiWerx studies have indicated that the most cost-effective VTOL freight operations would carry 8,000 lb (3,629 kg) at 150 kts over 300 nm (556 km). Piasecki's compact KARGO is meant to make the business case in an operational context. "We've really taken a hard look at this," said Stanzione. "The vehicle is really a utility. We'll look at it and see if there's an economic, viable need for these vehicles. If there is, how do you make it work with the FAA airspace system? You have to consider everything from cradle to grave."

Motivo Aims Beyond Impossible

Motivo Engineering Offers Partners Solutions For a New Era of Aerospace Innovation.

By VFS Staff



Motivo engineers inspecting variable pitch assemblies (photo: Motivo)

The Vertical Aerospace VX4 prototype (photo: Vertical Aerospace)

Motivo Engineering recently joined the Vertical Flight Society as a corporate member and is proud to support several VFS members in their advanced air mobility (AAM) and other aviation programs.

The Southern California-based product development firm specializes in complex electromechanical systems, rapid prototyping, and low-volume production. The developer based in the Los Angeles area contributes to novel propulsion systems, battery architectures, actuation mechanisms, test infrastructures and integrated subsystems. The company's stated mission is to avoid the word "impossible," to challenge traditional thinking and to push boundaries.

Motivo is also good at keeping the secrets of its customers as they progress from early design to operational readiness. British electric vertical takeoff and landing (eVTOL) developer Vertical Aerospace partners with Motivo, for instance, but the California company was unable to share details with Vertiflite about its involvement.

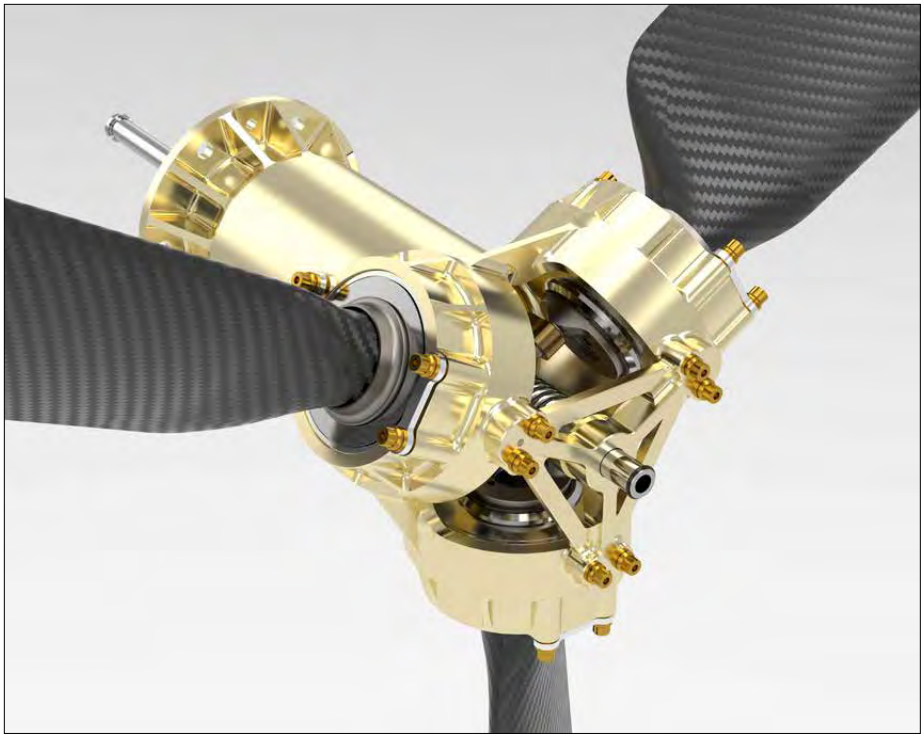
In April, the UK developer announced several milestones in the flight test campaign of its VX4 prototype. Following the announcement on April 6 of its first piloted thrust-borne transition with the aircraft, Vertical Aerospace chief engineer David King shared credit with Motivo for the accomplishment.

"Big thanks to the Motivo team for helping us achieve this challenging milestone," King said in a statement to Motivo, adding that the company "embodies the agility and spirit of innovation needed to turn novel flight concepts into reality."

Among the projects Motivo can publicly discuss is its partnership with Airbus on the Vahana uncrewed eVTOL program that launched in 2016 and completed in 2019 through the Airbus A3 innovation

Motivo Engineering partnered with Airbus to develop the Vahana prototype (photo: Airbus)

Variable pitch fan on Vahana aircraft (photo: Motivo)



Motivo developed parts for the Vahana including its variable pitch fan hub (Photo: Motivo)

arm based in Silicon Valley. Motivo supported development of propulsion, power and test systems for the eight-propeller Vahana prototype, which Airbus operated on 138 uncrewed test flights from 2018-2019.

Airbus drew on its lessons from the Vahana prototype when developing its CityAirbus NextGen eVTOL aircraft, which made its first flight in 2024. Airbus in 2025 announced it would pause development of CityAirbus to consider the next steps and eventual commercial launch of the eVTOL program.

"There was a hint of magic in what we accomplished in such a short time, and it was entirely due to the family that we formed and the absolute resilience Motivo showed," Airbus A3 vice president of urban air mobility Zach Lovering said in a statement to Motivo.

While unable to disclose much about its current aviation partnerships, Motivo told Vertiflite that it works on both "advanced aerospace and autonomous flight programs," supporting rapid development, system architecture integration and validation. The company said manufacturability of an aircraft is "considered from the kickoff," with a focus on accelerating time to flight and real-world deployment.

Founded in 2010 with an interdisciplinary engineering culture, Motivo's mechanical, electrical, controls, industrial design and fabrication teams work side by side in sequence with knowledge transfer embedded into every stage of the engagement. Motivo aims to set itself apart through embedded engineering partnerships that integrate directly into client programs, rather than deliver design packages and step away.

The ability to translate complex systems into validated, test-ready hardware is a critical service for AAM programs working toward certification. Motivo is proud to support the VFS community and said that it "looks forward to continued collaboration across the evolving vertical flight ecosystem."

Hampton Roads Chapter

February Luncheon — The Hampton Roads Chapter (HRC) held its February Luncheon at Eagle Aviation Technologies in Newport News, Virginia, on Feb. 12. Mr. Bruce Bailey, president and CEO, hosted the chapter meeting at the Eagle Aviation Newport News facilities and provided an overview of recent VTOL projects that Eagle has undertaken and a tour of its design, analysis, fabrication and test capabilities. The presentation was an excellent collaboration opportunity for HRC; approximately 30 members participated in the February luncheon.

Eagle Aviation luncheon participants.

April Luncheon — About 22 members of the HRC met on April 9 for lunch and a technical presentation. The presentation was given by Mr. William Fredericks, a founder and CTO of Advanced Aircraft Company. The presentation was titled "The Next 30 Years Requires a New Generation of UAS." The audience was engaged throughout the presentation with good discussion of UAS design and capability advancements.

Luncheon presenter Mr. William Fredericks.

Some of the April luncheon participants

Upcoming Events

June Luncheon — The Hampton Roads Chapter will hold its luncheon on June 11. The featured speaker will be Dr. Karen Jackson, a VFS Technical Fellow and the 2017 Nikolsky Lecturer! Dr. Jackson will address VTOL vehicle crashworthiness design, analysis and testing.

August Luncheon — The August luncheon will be held on August 13, with the speaker and topic to be announced soon.

The Hampton Roads Chapter's 2026 Technical Conference has been canceled, and the HELMOT Conference will be replanned as a 2027 Chapter event.

Chapter events in the fall include the Annual Seafood Feast on Sept. 24 and a Christmas Social in December.

Georgia Tech Student Chapter

Guest Speaker: Margaret Donovan
Feb. 19, 2026

The Georgia Tech Student Chapter, based in Atlanta, Georgia, had the pleasure of virtually hosting Margaret Donovan, a PhD student at the University of Maryland. She gave a presentation on Martian rotorcraft blade fabrication, the topic of her research. We had a great turnout, and everyone learned a great deal about the manufacturing process, including carbon-fiber layups and 3D printing.

Workshop Series — Momentum Theory
March 31, 2026

The Georgia Tech Chapter held the first installment of rotorcraft workshop classes open to the entire student body. Our VFS president, Gray Simmons, gave a lecture on an introduction to aeromechanics, including topics such as deriving the aerodynamic coefficients and total power equations. These

topics typically aren't taught at Georgia Tech until senior-level undergraduate classes, such as rotorcraft design and aeromechanics, so this workshop was a great opportunity for students to explore rotorcraft earlier.

Georgia Tech plans to hold another speaker series event on April 28 with Dr. Natasha Schatzman, an award-winning aerospace engineer at NASA Ames. Schatzman is one of the Georgia Tech mentors in residence and will give a presentation on her work advancing the field of vertical flight and urban air mobility.

Montréal-Ottawa Chapter

The Montréal-Ottawa Chapter hosted two webinars over the winter covering the Canadian helicopter market and some new applications of AI to supplement pilot capabilities.

The McGill University Aerial Design team and VFS Student Chapter held the 2026 AeroHacks design competition bringing over 150 students together for three days to code, collaborate and compete using real ESP32-powered drones. A case competition was included as well to build a business model around drone operations. Montréal-Ottawa chapter leadership

was on hand to serve as judges in the competition as well as to offer up insight on design best practices and the aerospace industry.

Philadelphia Chapter

On Feb. 19, members of the Philadelphia Chapter were invited to an evening tour of Leonardo's facilities in Northeast Philadelphia. The tour included the assembly lines, maintenance trainers, flight simulators and the AW609 tiltrotor flight test hangar. The Chapter is very appreciative of Leonardo for inviting us into their facility, and of the VFS members at Leonardo who helped plan the event and guided us on the tour.

In April, two university-focused events will took place at the Philadelphia Chapter. On April 15, midshipmen from the United States Naval Academy toured Leonardo and Boeing during the day, then went to the American Helicopter

Museum and Education Center in nearby West Chester, Pennsylvania, for a Chapter Dinner Meeting. The focus of the meeting was two presentations by the midshipmen: a senior capstone aircraft design presentation on the "Maneuverable Anti-Swarm Tactical Intercept System (MANTIS)" and a technical talk on "System Identification of a Blowing Wing UAV in Hover."

The second university event in the Chapter was on April 22, when seniors from Widener University visited Boeing to present their senior capstone project as a Lunch N' Learn, followed by a tour of the factory. Both events are yearly traditions that members look forward to very much at the Philadelphia Chapter.

Redstone Chapter

Barry Baskett Golf Tournament Update

The VFS Redstone Chapter hosted their annual Barry Baskett Golf Tournament on Friday, Oct. 24, 2025. It was a great tournament and a beautiful day for golfing. The number of golfers was down from prior years, due to the challenge of the government shutdown at the time, but overall, it still raised money for the local chapter scholarship fund. We want to thank all our golfers for supporting this cause and our terrific sponsors that helped make the event a success. A big thank you to: Systems Planning and Analysis (SPA), Avion Solutions, Radiance Technologies, Torch Technologies, Bell Textron, PPT Solutions and Wheeler Solutions.

2026 VFS Development, Qualification and Affordability of Complex Systems Update

The chapter had to cancel the Complex Systems meeting this year. Army policy changes that only allow four attendees at any non-federal entity hosted meetings significantly impacts the ability of chapters to sponsor symposia without adequate time to request an exception. The implementation of the policy was so near to the meeting that there was not sufficient time for individuals to request exceptions to the policy.

Scholarship Assessments

The Redstone Chapter has conducted its initial assessment of five students who are interested in pursuing degrees in vertical flight and opportunities the industry may provide. Results were sent after board approval of the scholarship committee input.

San Francisco Bay Aero Chapter

Technical Seminars

SFBAC had the privilege of hosting Mike Hirschberg for our second technical seminar held on March 18. Hirschberg is the former VFS executive director and Dr. Robert A. Ormiston is the former chairman of the AHS Dynamics Technical Committee, now retired emeritus scientist for the Computational Aeromechanics Branch. SFBAC looks forward to hosting elite speakers in future technical seminars.


Vertical Flight Society
SAN FRANCISCO BAY AREA CHAPTER
Advancing Army Aviation at Ames: A 60-Year Legacy
Michael J. Hirschberg
Robert A. Ormiston
About the Speakers

Lichten Award Competition

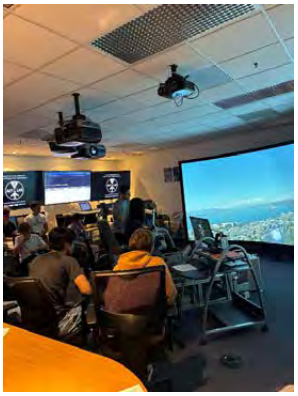
Congratulations, again, to Parth Kumar, Senior Flight Controls Engineer at Joby Aviation, who was selected as the winner in the VFS National Lichten Competition. In January 2026, Parth was selected as the winner in the Western Region for his work on "A High-Integrity State-Machine Framework for In-Flight Disturbance Injection and Failure Response Validation." Parth will be presenting his work at The Vertical Flight Society's 82nd Annual Forum & Technology Display in West Palm Beach, Florida, in May.

Outreach

On Feb. 13, we hosted about 25 students who were members of various STEM clubs from Leigh High School. Students got the chance to try piloting an eVTOL at the ACT Lab, toured the world's largest wind tunnels, and experienced the challenges of piloting a drone in a windy urban area at the Wind Lab for themselves.

On March 27 and April 4, we hosted field trips for the freshman class of San Marin High School, totaling 90 students across the two days. Students got the chance to visit the ACT Lab

to learn about the importance of managing pilot workload, the Future Flight Central where they experienced a 360-degree view of LAX and Mars, and the wind tunnels at the National Full-scale Aerodynamics Complex. SFBAC sponsored the field trips by providing lunch, swag and volunteers for the event.



On April 24, SFBAC members will conduct a school visit to Stevenson Elementary School to introduce the physics of flight to fourth graders. In addition to the engaging presentation, the students will also get the chance to participate in hands-on experiments, such as folding a paper helicopter.

On May 8 and May 22, the SFBAC will once more sponsor a field trip for the Stevenson Elementary School students to visit NASA Ames.

Penn State Student Chapter

Vertical Flight Society
Penn State Chapter

Penn State Student Chapter hosted their widely anticipated 11th Annual STEM Rotor Day on March 21! STEM Rotor Day is a fun and engaging event meant to inspire K–12 kids about engineering and vertical flight through interactive exhibits including (but not limited to) a vortex cannon, LEGOs, drones, a mini wind tunnel, model helicopters, stickers and more! More than thirty undergraduate and graduate student volunteers come together every year to make this event a success, with help from faculty and the VFS organization. Penn State's Student Chapter looks forward to seeing everyone again next year!

Southwest Chapter

During Engineering Week, Bell's Engineering Talent Team brought a Bell 206 to the University of Texas at Arlington (UTA), offering students a hands-on opportunity to engage with rotorcraft. UTA aerospace students and VFS chapter members explored the aircraft and connected with Bell's recruitment team and the College Work Experience Program (CWEP). Student Michael Kiff highlighted the value of these experiences, encouraging peers to explore careers in vertical flight through opportunities like CWEP.

East New England Chapter

The East New England Chapter hosted Dr. Will Staruk, an aeromechanics engineer at Joby Aviation, who works remotely in the Boston, Massachusetts, area. His presentation titled "eVTOL Wind Tunnel Testing" provided an overview of Joby Aviation's eVTOL isolated propeller system, intended to study the behavior of the propeller in the transition regime. The Chapter welcomed over 35 individuals, including Executive Director Angelo Collins, who joined Rotor Technologies for a tour the day prior, and provided a presentation on VFS to the GE Aerospace Engineers in Lynn, Massachusetts, as part of their Lunch and Learn program series.

Federal City Chapter

The VFS Federal City Chapter (Washington, DC) welcomed nearly 50 attendees — primarily students from the University of Maryland Vertical Lift Research Center of Excellence (VLRCOE) — for its latest meeting. Featured speaker Romin Dasmalchi, head of Cargo Programs at Piasecki Aircraft Corporation, delivered an engaging talk on the KARGO UAV and shared insights from his experience addressing logistics challenges as a Marine aviator flying the MV-22 Osprey and CH-46 Sea Knight.

venmo

A donation to the Vertical Flight Knowledge Initiative (VKFI) helps make events like Penn State's STEM Rotor Day possible. Please consider donating.

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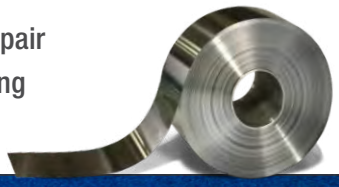

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VFS Executive Director's Brief Disruption of Georgia Tech VLRCOE

Jan Goericke, Director of Operations and Business Development at Advanced Rotorcraft Technology Inc. (ART), winner of the Forum 82 Supplier Excellence Award, having just returned from Hawaii, showcases his exceptional tan amongst the ghosts of Forum past in the John J. Harper Wind Tunnel. (All photos VFS)

Let's just say an… "eclectic" selection of wraps (Thai? maybe?) showed up for the VLRCOE faculty lunch. All the while, Dr. Ilkay Yavrucuk, Chair Professor at TUM and Head of the Institute for Rotorcraft and Vertical Flight, was reflecting on delivering his dissertation in that very room… sometime around the early 2000s (we'll leave the exact year alone).

Dr. Juergen Rauleder proudly displays a test artifact from yet another almost successful US Defense Advanced Research Projects Agency (DARPA) program.

Jan happily taking a turn in the sim… after only being asked three times. As we all know, universities with flight simulators never want to show them off or nudge their guests into a quick photo op.

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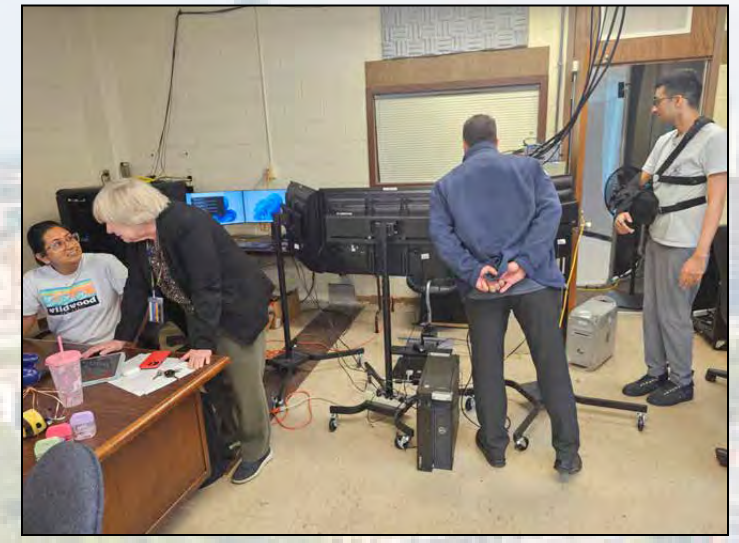
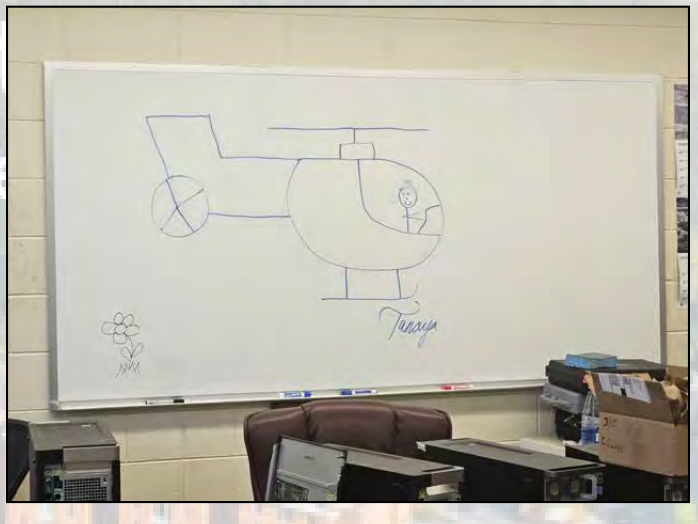
The Guggenheim School of Aeronautics, an impressive and exceptional building on campus at Georgia Tech, where the equations are long, the ambitions are higher, and someone is definitely still arguing about boundary layers.

Students of the Vertical Lift Research Centers of Excellence (VLRCOE) wonder who they need to impress more for good grades: VLRCOE Director Dr. Marilyn Smith or Jan Goericke, who answers all their FlightLab questions.



Some see a glorified office setup on wheels, while others believe dozens of Vertical Flight Society papers were written from the results of this testbed.

Jan and Juergen carefully reviewing the "security footage" to ensure no operatives from the University of Maryland or Penn State VLRCOEs managed to infiltrate any wind tunnel testing. Can't be too careful when protecting those next-gen rotorcraft breakthroughs.



Tanaya's submission on behalf of Georgia Tech to this year's Student Design Competition RFP, expertly crafted by Leonardo. Wait, didn't Leonardo have a tiltrotor in mind this year?

Follow the Leader: A Double-Edged Sword

By Kaydon A. Stanzione

I came from a military family — an Army brat. I am and will always be. I was raised on, "Do as you're told, fall in line, play by the rules and be a good soldier." My dad, a tough E-8, hardened by service in WWII, Korea and Vietnam, was the family rock, but my mom was also an Army Sgt. who served in WWII, and she was the boss! This was confusing for a kid, especially with instructions like, "Do as I say, not as I do." OK, so you want me to follow you, the leader, but only your voice commands? Got it … I think? Oh, but, Mom! You also told me, "Don't be a follower, be a leader." With that exception, I was to follow her lead.

Life has taught me many things about leadership. Leadership can result in good or bad outcomes, and managing leadership can be critical. The benefit of singular leadership can be quick and decisive action, while consensus leadership can miss opportunity at the expense of debate. However, the opposite is equally possible. A quick but wrong decision could spell failure, while consensus invites deliberation and risk avoidance. This is the "knife-edge," which signifies a delicate balance where a minor event, mistake or piece of luck can cause success or failure. It depends on who is leading, who is following and does the structure best manage the outcome. As a follower, your decision may or may not affect a mass of people, but it always directly affects you. If you are the leader, the responsibility, results and consequences could be great. Great as in really good or really, really bad. This emphasizes the importance of managing leadership.

The fairy tale of the Pied Piper of Hamelin is a great example of leadership gone wrong. He was a legendary figure who used a magical pipe to lure a plague of rats out of the German town of Hamelin. After the townspeople refused to pay for his services, he returned and used his music to lure 130 children away, leading them into a mountain cave, never to be seen again. Fortunately, that part of the story is fictional, but it makes the point. Leadership needs constraints. On the other hand, you've probably heard idioms like, "Too many cooks spoil the soup." Does collaboration really spoil the soup, or does it provide the input to make it better? There's also the group-think cliché used to highlight the danger of peer pressure and the bandwagon fallacy, "If your friends jumped off a bridge, would you?"

Let's not dwell on the bad leaders. World history is full of great leaders like Abraham Lincoln, Mahatma Gandhi and Nelson Mandela.

There is another option as opposed to those singular forces of nature — team leaders. You can see this in nature by looking up and watching migrating birds. There is no single, permanent leader in a migrating bird flock; rather, birds take turns leading the V-formation to share the energy burden. The lead bird, working the hardest, breaks through undisturbed air and frequently rotates to the back to rest while another, more refreshed bird takes over. Ah, but there are even challenges with team leadership. Not all birds in a flock possess the same level of navigational skills. While most migratory birds possess an innate, genetic ability to navigate, their internal "navigation" system can be inaccurate, similar to your GPS, which doesn't always take you to the location you seek.

The advantage of team leadership implies that if two heads are better than one, then the more heads (brain power) the better. This simple premise is one reason why organizations implement boards of directors, advisory boards, trustees, or other governing bodies to oversee operations, set strategic direction and ensure legal compliance. All that brain power also implies just as many opinions, suggestions, agreements and disagreements. High consensus results in quick and easy leadership decision-making. Low consensus can be time-consuming and frustrating. No consensus? Well … you get it!

According to the National Association of Corporate Directors (NACD), three-year terms are common for board positions. Directors often serve multiple consecutive terms, with the NACD recommending10–15-year limits to promote fresh perspectives. Companies within the S&P 500 offer experienced board member terms of around 11 years, though the typical term ranges from six to12 years.

Board tenure continuity for two or more years can create significant strategic and governance advantages, particularly in complex industries like advanced air mobility, national airspace and infrastructure, where long development cycles and regulatory environments matter. Long-tenured directors understand how previous strategies and emerging market trends fared or failed. The result is more educated and astute executive decisions going forward.

Playing Army as a kid in the playgrounds and running around Fort Monmouth with other military brats, we would play follow the leader. Usually the leader was the strongest, biggest, or loudest kid. Those kids had the power of control and influence. I call them all Simon because they were the self-proclaimed "Simon Says" at any time, using their over-powering personalities to get the neighborhood kids to replicate their movements upon voice command. However, in the case of a 12-year-old, redheaded girl named Pricilla, she was the smartest and always got the kids to follow whatever she wanted to do. Ah, the first example of brains over brawn!

A collection of very smart, focused board members is generally found within professional societies. These societies, such as engineering, medical, legal and scientific, are typically governed through a structured, member-driven framework designed to balance mission stewardship, financial oversight and professional standards.Professional societies often rotate board members or officers annually within staggered terms for governance discipline, leadership development and member engagement.

The executive director in a nonprofit professional society is the CEO responsible for operational leadership, financial stewardship and execution of the board's strategy — while the board retains governance authority. The board governs and the executive director manages. Running a professional society through democracy (the "team approach") fosters member engagement, innovation and long-term sustainability through shared decision-making, while autocratic leadership (one who controls most of the votes) enables rapid decision-making, clear direction and high efficiency in crises. Democratic societies often see higher growth through empowered members but may suffer from slow, inefficient decision-making, whereas autocratic firms risk poor decisions, low morale and lack of innovation if the leader is not benevolent or competent.

In practice, many modern societies operate somewhere in between, adopting an autocratic approach to speed up critical, time-sensitive decisions while using a democratic approach for strategy, culture and team-level development. A review of several professional societies and nonprofit organizations illustrates various levels of the optimal approach, often depending on the membership size, industry focus and the need for speed versus collaboration.

The Executive Director in a non-profit professional society is the chief executive officer responsible for operational leadership, financial stewardship, and execution of the board's strategy — while the board retains governance authority. The Board governs and the Executive Director manages.

We are members of the Vertical Flight Society. Why society and not organization, association, institute, or league? The American Institute of Aeronautics and Astronautics (AIAA) was formed by merging two societies. A society is a broad, loosely connected group that shares common culture or interests; an organization is a formal, structured entity with specific goals; an association is a specific group for specific goals; an institute is also structured but focused on education or research; and a league is a specialized organization focused on structured competition or alliances.

Touting roughly $21B in annual revenue, the National Football League (NFL) has developed their own optimal mix of control between the commissioner (think executive director) and the owners of each team (a small member base of 32). The NFL commissioner holds broad, unilateral authority over day-to-day operations, discipline and league integrity, acting as the principal executive officer. However, the 32 owners hold ultimate power, as they employ the commissioner, vote on rule changes (requiring 75% approval) and can remove the commissioner. The commissioner serves at the pleasure of the owners but with authority and skill to move unilaterally and quickly on timely decisions. There is no "you snooze, you lose" or "paralysis through analysis" with the NFL.

I first joined VFS in 1977 when it was called the American Helicopter Society. Today, it is international, and it addresses all functions of societies, organizations, associations, institutes, and leagues. Essentially, VFS is EVF ... Everything Vertical Flight! Staying current with vertical flight technology, infrastructure, manufacturing, materials, education, politics, funding and diverse missions and user groups is exhausting! I look to VFS for timely and concise information and trust that our board of directors sets the Society governance. The staff have the skills and authority to provide leadership and guidance to our members that are shaping the vertical flight world. And I must say, I am very pleased with results of the rotating boards and the staff!

If you are not a VFS member, I urge you to join. VFS is at the forefront of fostering a world that is transforming how people will move in your lifetime! As a VFS member, you get to participate and have a vote in shaping this transformation! If you watched the Artemis II mission, it wasn't just four astronauts who felt a twinge of accomplishment upon splashdown. It was shared and felt by tens of thousands of people who played a part in making it happen. So, be a part of making Vertical Flight happen through your contributions and through educating and encouraging others to play a part in our dynamic vertical world!

JUERGEN RAULEDER

Growing up in a small village near Stuttgart, Germany, Juergen Rauleder did not initially set out with a singular focus on rotorcraft or even aerospace engineering. Instead, his path began with curiosity about how machines worked and a willingness to pursue difficult challenges, traits that would eventually lead him across the Atlantic and into one of the world's leading rotorcraft research communities.

"My dad was a technician working with machines; CNC machines, milling machines, lathes," Rauleder recalls. "He worked on the shop floor first and later moved into sales for the same machines." That early exposure to the precision and craftsmanship of German manufacturing left an impression, even if aviation was not yet on the horizon.

Like many students in Germany, Rauleder's educational path was shaped early. After elementary school, students are recommended for different academic tracks based largely on their grades. Rauleder entered the academically oriented track that prepares students for university study. Yet even then, his future discipline remained open.

"I considered business and other things," he says. "But aerospace seemed exciting and like a good challenge. I thought, 'Let's try aerospace engineering, and if it doesn't work out, I can still switch.'"

That decision led him to the University of Stuttgart, one of Germany's premier technical universities. The institution offers one of the few programs in Germany where students can study aerospace engineering from the very beginning of their university education.

"The aerospace program at Stuttgart is very highly regarded," Rauleder explains. "It was also close to where I grew up, so it was a natural choice."

During his studies he developed strong foundations in fluid mechanics, aerodynamics and thermodynamics, but one particular class would ultimately redirect his career. That course was a rotorcraft aeromechanics class taught by Professor Siegfried Wagner, a former head of aerodynamics at Messerschmitt-Bölkow-Blohm (MBB), which later became part of Airbus Helicopters. "He had a long career in rotorcraft and could connect the fundamental classroom theory to how

Juergen Rauleder

industry actually applies it," Rauleder says. "That's what really hooked me."

At the time, rotorcraft education opportunities in Germany were limited. A few universities offered isolated courses, but there were no dedicated rotorcraft specialization tracks comparable to those in the United States.

"The University of Maryland, Penn State, and Georgia Tech had rotorcraft centers where you could learn everything, aerodynamics, dynamics, structures, design, etc." he says. "That just wasn't possible in Germany at the time."

Encouraged by Wagner, Rauleder began exploring opportunities in the United States. Wagner reached out to several rotorcraft centers on his behalf, and one response stood out. "Professor Gordon Leishman responded quickly and positively," Rauleder says. "And that's how I ended up at the University of Maryland."

Initially, the move was meant to be temporary, stay 6 months, do the master's thesis research, then defend in Germany. Instead, the experience reshaped his career.

Graduation ceremony with Rauleder's first three Georgia Tech PhD graduates.

Working with Leishman and the rotorcraft center at Maryland exposed Rauleder to cutting-edge experimental research in rotor aerodynamics. The collaborative research environment and strong connections to industry and government programs proved irresistible. "I got hooked," he says. "I wanted to do more of it."

Leishman recognized his potential and offered him the opportunity to remain at Maryland as a doctoral student. What was originally planned as a six-month research visit soon became a four-and-a-half-year journey culminating in a Ph.D. in 2014. "I took all the rotorcraft courses I could and did exciting experimental research in the lab," Rauleder says. "It was a lot of fun."

After completing his doctorate, Rauleder returned to Germany for a postdoctoral position at the Technical University of Munich (TUM), that later grew into a senior lecturer position, also leading a research group. There he worked with Professor Manfred Hajek, one of Europe's leading rotorcraft researchers. At TUM, Rauleder established and grew an externally funded rotorcraft aerodynamics research group with six PhD students at the peak.

Rauleder secured funding from the U.S. Office of Naval Research (ONR) and the U.S. Army, while also working on major European Union H2020 research initiatives involving institutions such as DLR, TU Delft and the University of Bristol. In 2020, another opportunity emerged, this time bringing Rauleder back to the United States.

A faculty position opened at the Georgia Institute of Technology following the retirement of an aerodynamics professor. Colleagues encouraged Rauleder to apply. "I always keep my eyes and ears open," he says. "Someone reached out and said, 'Hey, we have this opening, why don't you apply?' So I did."

Aboard a V-22 Osprey on the way to aircraft carrier USS Abraham Lincoln.

Today, Rauleder is an associate professor in Georgia Tech's Daniel Guggenheim School of Aerospace Engineering, where he also serves as the director of the large Harper Wind Tunnel and as associate director of the Vertical Lift Research Center of Excellence. His research is on the experimental and applied numerical aerodynamics, with a focus on rotorcraft and fixed-wing applications. His research in interactional aerodynamics, configuration aerodynamics, aero-propulsive interactions, aeroelasticity and fluid-structure interactions, and real-time flow field computations for piloted flight simulators are critical for design, optimization, efficiency, and safety of aerial vehicles and their operation. See https://sites.gatech.edu/cereal/ for more info on lab and research.

Rauleder enjoying a quiet Sunday morning on the USS Carl Vinson

While his work continues to push the frontiers of rotorcraft science and technology, Rauleder says the most rewarding part of his job lies elsewhere. "The greatest joy in the job is working with the students, mentoring them, seeing their growth, and watching them move on to their own careers," he says.

Several of his former students have already begun establishing their own successful industry or academic careers. "One of my students recently became an assistant professor at Texas A&M," Rauleder notes with pride. "Seeing them take that step is very rewarding."

Looking ahead, Rauleder sees several technological developments reshaping vertical flight, particularly electrification, autonomy, and new aircraft configurations emerging from the advanced air mobility (AAM) sector.

"Electric flight is a big enabler," he says. "Designers now have a lot of freedom, you can place propellers or rotors wherever it suits the vehicle design."

Hybrid-electric propulsion and hydrogen-based systems may also extend the capabilities of future aircraft, especially as battery limitations constrain fully battery-electric vehicles to smaller ranges.

Seahawk helicopter and F-18 fighter jets aboard USS Carl Vinson during training exercises in the Pacific Ocean.

At the same time, Rauleder believes advances will continue to depend on a combination of computational modeling, experimental testing and real-world flight demonstrations.

"Computational, experimental and theoretical approaches all need to work hand in hand," he says. "And we still need flight demonstrators. If you don't take any risk, then you're stuck."

That philosophy is especially timely as a new generation of experimental aircraft comes into focus. With DARPA's X-76 program featured on the cover of this issue, Rauleder sees these kinds of X-planes as essential to advancing the field. "We have seen so many great X-planes, and we learned a lot from them," he says. "Yes, they can be expensive and carry risk, but with measured risk, you can get far. If you don't take any risk, then you're stuck."

For now, Rauleder is focused on the responsibilities, and opportunities, that come with academia.

"The professor role is one of the most fulfilling things I can think of," he says. "You're educating the next generation of aerospace engineers, and that impact lasts much longer than your own career."

Whether he remains in academia for decades to come or eventually explores other paths, Rauleder is certain about one thing: the next generation of engineers will define the future of vertical flight.

"Our job is to excite them about engineering and equip them with the right skills to help them develop great things," he says. "That will carry on much longer than any one of our careers."

Vertical Flight Society

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Volunteer your expertise for Vertiflite magazine! Help spotlight the people, programs, and progress that make the Vertical Flight Society unique. We are seeking pro bono editorial support from members interested in contributing short articles, news items, and updates that celebrate the achievements of the VFS community.

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Here are news highlights about some of the leading electric vertical takeoff and landing (eVTOL) aircraft developers and their progress toward certification. (Note: All photos are courtesy of the respective companies unless stated otherwise).

Archer Aviation

Santa Clara, California-based Archer Aviation continued working with the US Federal Aviation Administration (FAA) on its goal of certificating its Midnight aircraft for commercial flights. On March 9, Archer detailed plans for its participation in the FAA's eVTOL Integration Pilot Program (eIPP) to accelerate the development and commercialization of advanced air mobility (AAM) vehicles. The FAA pilot projects over the course of three years plan to address piloted and uncrewed approaches to short-range air taxis; longer-range, fixed wing flights; cargo logistics; emergency supply services; and increasing automation safety. As early as the second half of 2026, Archer as part of the eIPP will begin laying the groundwork for early Midnight operations with partners in Texas, Florida and New York. The FAA program "creates a first-of-its-kind pathway to help bring the first new category of aircraft in nearly 80 years to market," Archer said in a press release. Participating in this program could also help generate public acceptance ahead of Archer's plan to operate Midnight air taxi flights during the 2028 Olympic Games in Los Angeles. The fully electric Midnight is designed to carry up to four passengers and is built with redundant systems across the aircraft including 12 total engines and propellers.

Beta Technologies

Vermont-based Beta Technologies continued development of both its Alia CX300 electric conventional takeoff and landing (eCTOL) aircraft and its Alia eVTOL model. On March 9, the FAA announced that the eIPP will include Beta's Alia VTOL and its charging systems. Beta aims to certificate the four-seat Alia eCTOL by the end of 2026 and to start deliveries to customers in 2027. The eVTOL version of the Alia is designed with four two-bladed lift propellers and four V600A electric-lift motors. The Vermont developer also plans to eventually develop a larger CTOL aircraft that could carry 19 passengers.

A variant of the Alia being developed with GE Aerospace for military use could also carry 2,000 lb (907 kg) and fly 250 nm with the potential for autonomous flight. The Vermont developer and Near Earth Autonomy have partnered on the initial integration of a perception and guidance suite into the fly-by-wire flight control systems of its aircraft. Beta aims to begin uncrewed flight tests with this software suite in 2026. In March, Beta CEO Kyle Clark told Reuters that the company plans to accelerate development of its Alia MV250 cargo VTOL drone for the military so it can start test flights this year.

Eve Air Mobility

Melbourne, Florida-based Eve Air Mobility, a subsidiary of Brazil-based Embraer, began test flying its uncrewed full-scale eVTOL prototype with the goal of certificating the aircraft with Brazil's Civil Aviation Agency (ANAC). The Embraer subsidiary will build six prototypes to support certification efforts. By 2027, Eve seeks to certificate its eVTOL with ANAC and other regulators, begin first deliveries and enter the aircraft into service.

On March 25, Eve announced the flight of its full-scale engineering prototype at Embraer's test facility in Gavião Peixoto for Brazil's president Luiz Inácio Lula da Silva and other officials including ANAC president Silvio Costa Filho. By April 9, Eve had conducted 50 test flights since its first hover test with the prototype in December. During test flights, the uncrewed aircraft reached an altitude of 140 feet (43 m) above ground level. Preliminary results showed propulsion and battery performance exceeded initial expectations, while noise levels remained quieter compared with conventional helicopters. Initial flights focused on low-speed operations up to 15 kt, enabling validation of control laws, rotor aerodynamic efficiency, thermal behavior and the propulsion model. Eve plans to expand the flight envelope and test at higher speeds up to 30 kt. Ground tests and related activities included sensor calibration for measuring aerodynamic loads during flight.

Joby Aviation

Santa Cruz, California-based Joby Aviation on March 11 began flight testing its first FAA-conforming aircraft. Later this year, FAA pilots will visit Joby's facility in Marina, California, to conduct type inspection authorization as a step toward validating the aircraft for commercial service. Joby will also participate in the FAA eIPP with partners in Florida, New York, New Jersey, North Carolina, Texas and Utah. The Joby eVTOL will feature in the FAA pilot projects along with the developer's applications including Joby's Superpilot autonomous flight platform.

On April 7, Joby announced a partnership with software company Air Space Intelligence (ASI) to study how airspace coordination can enable increasingly autonomous flight operations through use of ASI's Flyways artificial intelligence platform. Joint demonstrations including live operational exercises in 2026 seek to test how eVTOL operations can scale safely within the existing national airspace framework.

Vertical Aerospace

Bristol, England-based Vertical Aerospace achieved testing milestones and secured financing, making progress towards its goal of certificating its Valo production model aircraft in 2028. On April 20, Vertical completed its previously announced financing package worth up to $850M. This followed the testing milestone on April 2 of piloted thrustborne transition with its VX4 prototype (shown), demonstrating the ability of the aircraft to takeoff vertically and then transfer lift from propellers to wings. On April 14, Vertical's chief test pilot Simon Davies completed another milestone by transitioning from vertical takeoff to wingborne cruise and back to vertical landing during one continuous flight.

Previous performance tests with the VX4 informed Vertical's design of the battery-powered Valo, which the developer aims to certificate for commercial flights through both the UK Civil Aviation Authority (CAA) and the European Union Aviation Safety Agency (EASA). The Valo is designed to seat up to six passengers, has a flight range of 100 miles (161 km) and a top speed of 150 mph (241 kph). The UK developer has booked 1,500 pre-orders for Valo aircraft including American Airlines, Avolon, Bristow, Gol and Japan Airlines. Vertical aims to produce 175 Valos by 2030 and eventually plans to develop defense, hybrid-electric and autonomous variants.

Wisk Aero

Mountain View, California-based Wisk on March 19 published a white paper on "Candidate Architecture Solutions for Interoperable Crewed and Uncrewed Midterm UAM Operations" in collaboration with NASA's Air Mobility Pathfinders project. The paper analyzed ways to leverage operational concepts put forth in the FAA UAM Concept of Operations, along with the varying roles and responsibilities of key stakeholders. This paper published with NASA followed a white paper published in February by the Boeing subsidiary that outlined needs for both regulation and infrastructure to support uncrewed air taxis. Wisk aims to certificate its Generation 6 autonomous aircraft with the FAA by 2030.

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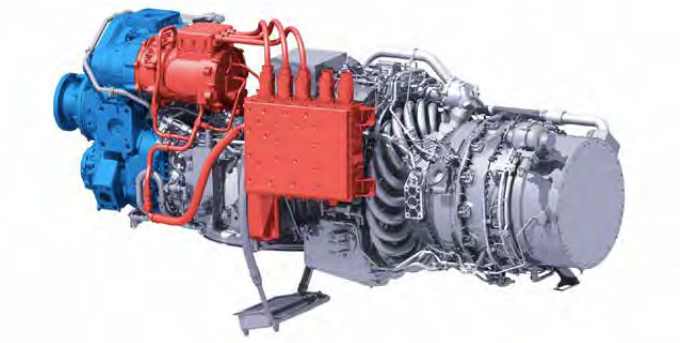
Here is our roundup of news on battery-electric, hybrid-electric and hydrogen-electric vertical takeoff and landing (eVTOL) aircraft from our Electric VTOL Newsletter. More than 1,100 eVTOL aircraft have been cataloged to date in the VFS World eVTOL Aircraft Directory (www.eVTOL.news/aircraft), with new aircraft added after every unveiling. Check it out for more information on each of the advanced air mobility (AAM) aircraft described here or to subscribe to our newsletter. (Note: All photos are courtesy of the respective companies unless otherwise stated.)

Pratt & Whitney Plans Hybrid Engine



On March 19, Pratt & Whitney Canada clarified its plans to implement electric hybridization of its 2,750-shp (2,050-kW) rated PW127 turboprop, which currently powers ATR 42- and 72-series aircraft. The hybridized PW127 engine (shown) will integrate a 250 kW Collins Aerospace electric motor into its gearbox to manage transient power peaks while aiming to achieve 20% fuel savings. This development is being carried out under the Clean Aviation Joint Undertaking — a European Union initiative that promotes low-emission and low-noise aircraft technologies by 2035 through industry and government collaboration. The resulting hybrid-electric propulsion system is intended for next-generation platforms such as the ATR Evo, with entry-into-service targeted for the mid-2030s.

Horizon to Develop Cavorite X7 With Mitsubishi

On April 8, Horizon Aircraft announced its collaboration with Mitsubishi Heavy Industries Regional Jet Aviation Group (MHIRJ) on developing its Cavorite X7 aircraft (shown). Under this agreement, MHIRJ will design and develop flight instrumentation for Horizon Aircraft's seven-seat, hybrid-electric VTOL to enable data collection during flight testing, planned for early 2027.

The company based in Ontario, Canada, seeks to complete assembly of its full-scale Cavorite X7 prototype by the end of 2026 and to begin ground testing in 2027. The Cavorite X7 features 12 vertical lift fans, with five in each wing and one in each canard. When transitioning into forward flight,

sliding panels in its wings close over the fans, allowing it to fly faster and farther (see "Horizon Bets on Extended Range with Hybrid Cavorite X7," Vertiflite, May/June 2025). Horizon in January added updates to the Cavorite design, which included standardizing its fans by replacing four smaller canard fans with two wing-size fans to improve both performance and manufacturing efficiency. The canard and tails have been reprofiled to lower drag, improve cruise efficiency and enhance stability. The aircraft cabin has also been slightly extended and its windows redesigned to improve passenger comfort.

Odys Aviation Partners With Honeywell

On March 31, Long Beach, California-based Odys Aviation disclosed a year-long partnership with Honeywell to equip its uncrewed, hybrid-electric Laila VTOL aircraft (shown) with Honeywell's Stationary and Mobile Uncrewed Aircraft System Reveal and Intercept (SAMURAI) mobile counter-drone system. Powered by Jet A and JP-8, Laila's powertrain can deliver nearly 400 nm of range or up to eight hours of flight time with an almost 130-lb (59-kg) payload without the need for a dedicated charging station. This makes it suitable for protecting critical infrastructure in offshore and remote

expeditionary scenarios, such as pipelines and refineries that are in jeopardy amidst conflict in the Middle East. Honeywell's model-based systems engineering (MBSE)-based, turnkey system is fully Modular Open Systems Approach (MOSA) compliant and will obviate the need for high-end uncrewed aircraft system (UAS) platforms, costly kinetic defense or extensive operator training. The combined system will also be capable of defending UAS threats in groups 1 through 3. Both companies aim to debut the SAMURAI-enabled Laila aircraft in June during exercises held in Norway. Odys plans to use technology proven on the Laila to eventually develop its piloted Alta regional aircraft. The nine-passenger, blown-wing Alta would have a range of up to 750 miles (1,207 km).

AIR Test Flies Uncrewed Cargo Aircraft

On April 15, Israeli startup AIR successfully flew its heavy-lift cargo eVTOL (shown), making it one of the largest eVTOL cargo platforms to achieve a flight milestone. This fully uncrewed, heavy-lift cargo electric aircraft, designated as a Group 4 UAS by the US Department of Defense, can carry up to 550 lb (250 kg) of payload and operate at a mean sea level (MSL) below 18,000 ft

(5,486 m), while boasting an endurance of about 100 miles (161 km) on a single charge. Over 25 units have been ordered and paid for as the demand for cargo delivery and resupply in remote expeditionary environments continues to grow. The heavy-lift cargo eVTOL, which was developed in partnership with Singapore's ST Engineering, made its debut as the DrN-600 at the Singapore Airshow back in February. It has since been rebranded as the Production AIR Cargo-Heavy Lift UAS.

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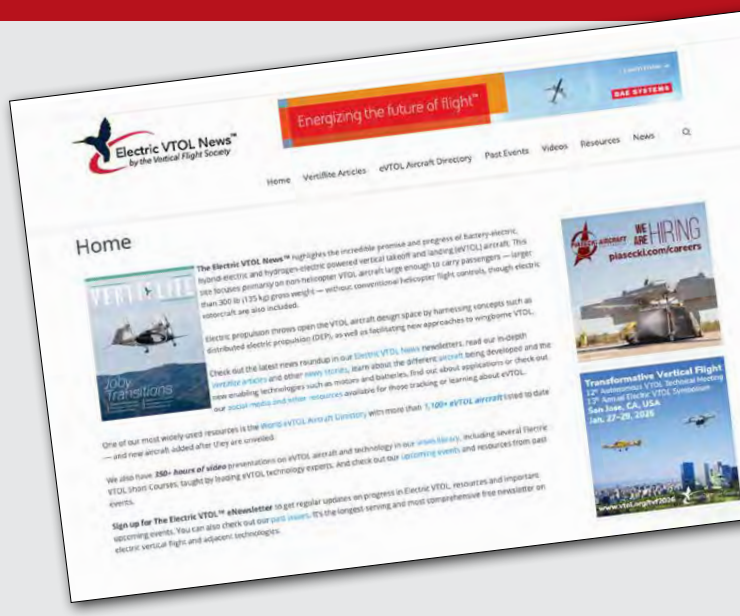

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VFS Calendar of Events

Check out these exciting upcoming vertical flight technical events, and make your plans today to be part of tomorrow's vertical flight technology!

June 2-4, 2026
West Palm Beach, Florida, USA

International Powered Lift Conference (IPLC) 2026

IPLC focuses on the latest developments in vertical and/or short takeoff and landing (V/STOL) aircraft research, concepts and programs. It is a co-sponsored event focused on the promise and progress of manned and unmanned powered lift systems, ranging from nano-scale drones through powered-lift aircraft. SAE is the host organization this year, and will incorporate IPLC into its AeroTech Aerospace Technology Conference. **Registration is Open!**

July 18-19, 2026
Oshkosh Wisconsin, USA

20th Electric Aircraft Symposium

The VFS Federal City Chapter will host this year's Annual Electric Aircraft Symposium (EAS). This event brings together aviation innovators to share insights, build meaningful connections, and advance the future of flight. **Registration is open and program details are available**

Sept. 1-4, 2026
Amsterdam, Netherlands

52nd European Rotorcraft Forum 2026

The European Rotorcraft Forum is one of the premier events in the rotorcraft community's calendar bringing together manufacturers, research centers, academia, operators and regulatory agencies to discuss advances in research, development, design, manufacturing, testing and operation of rotorcraft. The Forum takes place annually across Europe, rotating around the United Kingdom, Germany, France, Italy, the Netherlands and Switzerland.

Nov. 3-5, 2026
Gifu, Japan

Heli Japan 2026 and 12th Asian Australian Rotorcraft Forum (ARF)

Heli-Japan was established by the VFS Japan Chapter in 1998 and is held every four-years. This year it will be combined with the ARF meeting and held in Gifu, Japan – home of the aeronautical industry in Japan.

Feb. 23-25, 2027
Long Beach, California, USA

Transformative Vertical Flight

The 2027 Transformative Vertical Fligh (TVF) conference will take place in Long Beach, California. The event will feature and 14th Electric VTOL Symposium and the Rotorcraft as a Service for Public Good Meeting, sponsored by the VFS SoCal Chapter. **More information coming this summer - save the date!.**

May 11-13, 2027
Phoenix, Arizona, USA

83rd Annual Forum & Technology Display

The Forum is the longest running and leading global event on vertical flight technology. Hear from top inustry experts and leaders and connect with an elite community shaping the future of vertical flight. **Save the date!**

Find out more at **vtol.org/forum-and-events/upcoming-events**

Penn State's annual STEM Rotor Day is a fun and engaging event that inspires K-12 students' interest in engineering and vertical flight through interactive exhibits. The 11th STEM Rotor Day was held on March 21, 2026.

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