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14

Each of the Evio 810's four nacelles houses a turbine engine, electric motor and battery pack.

DEPARTMENTS

- 6 | Feedback
- 8 | Who's Where
- 10 | Up Front
- 11 | The DEW Line
- 102 | Tech Take
- 105 | Contact Us

COMMERCIAL AVIATION

- 12 | Boeing's skies brighten with improved production and delivery performance
- 14 | Montreal startup Evio launches "strong hybrid" regional airliner
- 15 | Charting a path to profitability, JetBlue calls for a more level playing field
- 16 | European airlines sound an alarm about sustainable aviation fuel
- 18 | IndiGo confronts fallout from December cancellation crisis
- 19 | Airbus and Embraer make inroads in Latin America with small jet orders

- 20 | Pentagon acquisition reform moves ahead as budgets grow

MILITARY SPACE

- 22 | How the U.S. Space Force aims to avoid a second Sputnik moment

HYPERSONICS

- 23 | Stratolaunch targets 747 and Roc hypersonic test rate ramp

100 YEARS OF PRATT & WHITNEY

- 24 | The storied engine-maker powers up next-generation propulsion plans

FROM THE EDITOR

- 106 | Can NASA administrator nominee Isaacman reinvigorate the agency?



BEHIND THE SCENES

Aviation Week editors recorded 57 Check 6 podcasts in 2025, including new video podcasts that debuted in July. Continuing a year-end tradition, Editor-in-Chief Joe Anselmo sat down (virtually) with eight editors to hear their predictions for 2026 and grade themselves on how their predictions for 2025 turned out. Watch their discussion at: AviationWeek.com/Check6

AEROSPACE & DEFENSE

FEATURES

28 | **Leaderboard**

Younger domestic and international players are challenging leading U.S. aerospace and defense companies

30 | **Watchpoints**

Look for lunar missions, electric air taxis, advanced tiltrotors and autonomous combat aircraft in 2026

32 | **Home Defense**

 The new global trend: National security is turning toward interests perceived as closer to home

42 | **Defense Competitions**

The decade-long demand outlook for military aircraft has jumped 30% over the past year

46 | **Defense Predictions for 2026**

Tech mergers, laser weapons, an expanded MRTT+program, electronic attack aircraft and more

48 | **A New NASA**

 The White House and Congress concur on space while Europe aims for greater autonomy

55 | **Space Predictions for 2026**

More IPOs, launch offerings, reusable rockets, maneuverable spacecraft and more

58 | **It's All About Execution**

 Airbus and Boeing are displaying more optimism despite ongoing supply chain troubles

70 | **Commercial Aviation Predictions for 2026**

Boeing certifications, Airbus derivatives, Spirit-Frontier tie-up, a Leap-1 milestone and more

72 | **Will It Keep Pace?**

 A few key factors from 2025 are strong indicators for business aviation's performance in 2026

80 | **Business Aviation Predictions for 2026**

Aircraft privacy, luxe flying, connectivity competition, electric aircraft certification and more

82 | **Leveling Off**

 After five years of headwinds, is the commercial engine sector in for smoother sailing in 2026?

86 | **Return to Growth**

The rotorcraft market surges, but stalled flagship programs raise questions about the sector

90 | **Cargo Cult**

 China's emerging low-altitude economy drives development of large uncrewed logistics aircraft

94 | **More, More, More**

 Strong aftermarket demand for legacy platforms and material shortages are set to continue

100 | **MRO Predictions for 2026**

Market consolidation, supply resilience, in-house MRO, connectivity demand and more

30

The U.S. Army has accelerated the Future Long-Range Assault Aircraft program, with Bell's first YMV-75A prototype now planned to fly by the end of 2026.

ON THE COVER

Returning from the third successful launch of its Talon hypersonic test vehicle, Stratolaunch's Roc carrier aircraft was escorted to its base at the Mojave Air & Space Port in California by Boeing F-15s of the U.S. Air Force 422nd Test and Evaluation Sqdn. and F/A-18s and Lockheed Martin F-35Cs of the U.S. Navy VX-9 Air Test and Evaluation Sqdn. Senior Editor Guy Norris' update on Stratolaunch's hypersonic test plans begins on page 23, and our editors' analysis of what else may lie in store for aerospace and defense in 2026 begins on page 28. Stratolaunch photo by Domenic Saenz Moen.

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DATA

40 | **Military Aircraft Market**

44 | **Defense Data Center**

56 | **Space Data Center**

64 | **Commercial Aviation Forecast**

68 | **Commercial Aviation Data Center**

79 | **Business Aviation Data Center**

87 | **Rotorcraft Data**

98 | **MRO Forecast**

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ICING INQUIRY

I have been following the developments of vertical-takeoff-and-landing vehicles for the past years with great interest. After reading “Electrical Breakdown” (*Oct. 27-Nov. 9, p. 16*), although there is no doubt that these creations will become a familiar sight in and around the cities of the world, I have been wondering what the operational limitations are with respect to icing conditions and how ice is prevented from building up on nonmoving surfaces as well as on rotating fans/propellers.

Jan Alblas, The Hague, The Netherlands

Executive Editor for Technology Graham Warwick replies: The first electric vertical-takeoff-and-landing air taxis will be certified initially for visual flight rules only and no flight into known icing (FIKI). Manufacturers know that to scale up operations they must eventually certify for instrument flight rules (IFR) and for FIKI, which is already a challenge for helicopters. Few have detailed their plans to obtain certification, but Beta Technologies intends to certify its electric Alia for both IFR and FIKI and says it will be easier than for helicopters.

CHALLENGING INSIGHTS

I strongly disagree with the reader who wrote “Bias Beware” (*Dec. 8-21, p. 5*). The reader has confused commentary, which provides analysis of facts and data, with

hit pieces because they appear contrary to his own opinions. His argument is specious, as he fails to also cite a recent example of what others may consider bias: the Viewpoint article by Alex Krutz, deputy assistant secretary for manufacturing of the International Trade Administration in the Commerce Department, trumpeting the Trump administration’s trade policies (*“Maintaining the U.S. Lead in Aerospace,” Oct. 27-Nov. 9, p. 66*).

The biases the reader cites are instead examples of where AW&ST does an excellent job compared to other media today: presenting thoughtful, educated insights into the impacts on defense from both reckless and brilliant economic and policy actions governments make. Indeed, these pieces were precisely where they needed to be—in the commentary section.

When I finish an edition of your magazine feeling in equal measure that you have represented my opinions as well as challenged them, I say that is journalism at its finest, since I’m better informed of different sides of an issue or argument. Keep up the good work!

Mike Pereira, Santa Fe, New Mexico

DEPLANING PLAN

I read with interest the letter to the editor “Key To Saving Lives” (*Nov. 24-Dec. 7, p. 5*) proposing locking overhead bins to save lives in an emergency evacuation.

Why not also get everyone off the airplane quickly during normal deboardings without carry-on chaos in four deboarding groups, based on even or odd rows and left or right side of the aisle(s), so each row doesn’t sequentially block the aisles?

Stickers directly in front of seated passengers tell them which group they are in so that when the flight attendant announces their group, they can jump up, grab their bags and immediately exit the aircraft. There could be many advantages such as having passengers with the tightest connection in Group 1.

Randy McDonnell, Las Vegas

ON AVIATIONWEEK.COM, in response to “Opinion: Can Hegseth Transform U.S. Defense Acquisition?” (*Dec. 8-21, p. 82*), **ROGERTHAT** writes:

Anyone who has been in or studied the Department of Defense since before the end of the Vietnam War can recognize that, in Defense Secretary Pete Hegseth’s carefully thought-out and “deeply introspective” analyses, he shows a misunderstanding of the U.S. Armed Forces acquisition systems and a complete, unashamed ignorance of them.

Just like Robert S. McNamara 60+ years ago, Hegseth’s vision doesn’t go any further than the coffee table of the reception area outside of his office and the “bun boys” running for coffee.

Address letters to the Editor-in-Chief, *Aviation Week & Space Technology*, 2121 K Street, NW, Suite 210, Washington, DC, 20037 or send via email to: awstletters@aviationweek.com Letters may be edited for length and clarity; a verifiable address and daytime telephone number are required.



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Discover More

Hamad Ali Al-Khater

has been named **Qatar Airways** CEO, succeeding Badr Mohammed Al Meer. He was chief operating officer of Hamad International Airport in Doha, Qatar and before that held senior positions at state-owned oil and gas company QatarEnergy.



Frontier Airlines has appointed **James Dempsey** interim CEO, replacing Barry Biffle, who remains at the carrier in an advisory role until Dec. 31. Dempsey was president of the carrier,



which he joined in 2014 from Ryanair.

Paul Terstegge has been appointed CEO of Dutch low-cost carrier **Transavia**, effective Feb. 1. He was executive vice

president of inflight services at KLM and has been with the Air France-KLM Group for 25 years.

Aviation training company **FlightSafety International** has named **Eric Hinson** to succeed Barbara Telek as CEO. Hinson was president and CEO of Simcom International and previously chairman of the General Aviation Manufacturer Association. Before that, he was an executive vice president at FlightSafety International.

Eivind Roald has been appointed president and CEO of **Norse Atlantic Airways**, succeeding founder **Bjørn Tore Larsen**, who becomes chairman. Roald was CEO of QNTM Group and previously chief commercial officer of SAS Scandinavian Airlines.

AeroVironment has hired **Milancy Harris** as vice president and chief security officer. She was undersecretary of defense for intelligence and security for the U.S. Defense Department and before that worked at the National Counterterrorism Center, National Security Council, Office of the Director of National Intelligence and Defense Intelligence Agency.

Eastern Airlines has promoted **Brian Newhart** to chief operating officer from director of operations. He joined as an assistant chief pilot in 2021 and before that was a pilot with American Airlines.

Cheryl Paquette has been named chief financial officer at Terran Orbital.

She was a senior business operations manager at Lockheed Martin Space, overseeing programs in deep space exploration, weather and advanced development.

Abigail Smith has been hired as chief operating officer at uncrewed aircraft systems (UAS) software developer **AX Enterprise**. At the FAA, she led UAS security programs and oversaw Air Traffic Organization Technical Training Modernization.



BAE Systems Inc. has promoted **Brad Pelachyk** to chief global supply chain officer from vice president of supply chain and **Anjali Chaturvedi** to chief ethics officer from vice president and associate general counsel for litigation and investigations. Before BAE Systems, Pelachyk held senior positions in procurement and supply chain at Thales and FIAT. Chaturvedi was deputy assistant attorney general at the U.S. Department of Justice Criminal Division and before that assistant general counsel for Northrop Grumman and BP.



Sarah Flanagan

has been named interim chief financial officer at **AAR**, succeeding Sean Gillen.

She was vice president of financial operations and has held various executive finance positions at the company, as well as at Honeywell International and PwC.

Bridger Aerospace has hired **Anne Hayes** as deputy chief financial officer, effective immediately, and to succeed Eric Gerratt as chief financial officer in March 2026. She was a member of the board of director and chair of the audit committee; **Ernie Freedman** succeeds her in the latter position. Before joining the company, Hayes was a director at Quadrant Capital Advisors, and Freedman was chief financial officer at Invitation Homes.

UK regional carrier **Loganair** has hired **Ronnie Matheson** as chief com-

mercial officer and **Chris Harcombe** as director of business development for charter and nonschedule. Matheson was chief revenue officer of Blue Islands and prior to that worked at EasyJet, Flybe and British Airways. Harcombe was venue director at the Murrayfield Experience and previously managing director of Doncaster Sheffield Airport in South Yorkshire, England.

John Baum has joined **Voyager** as executive vice president of strategy and advanced concepts. He was vice president of business development at Vast as well as a cofounder of Draken International.

Menzies Aviation has hired **Christopher SanGiovanni** as senior vice president of risk for the Americas. He last worked for the company as head of safety for the Americas in 2009-13. In the interim, he was director of safety management systems at Forterra and Joby ground safety lead.

Robert Bassey has joined vertiport system developer **Skyportz** as technical and regulatory advisory lead. He has worked for more than at the FAA's Office of Airports, where his work included helping develop U.S. vertiport design standards.



Vertical-takeoff-and-landing aircraft developer **Odys Aviation** has hired **Oliver Reinhardt** as head of design organization. He was chief risk and certification officer at Volocopter.

Bradley Tilden has joined the board of directors at **Boeing**. He retired in 2022 as executive chairman of Alaska Air Group, where he had been president and CEO since 2012.



The **UK Civil Aviation Authority** has named **Crispin Orr** nonexecutive director. He has more than 25 years of experience, most recently as chief inspector of air accidents in the country's Air Accidents Investigation Branch. ☼

To submit information for the Who's Where column, send Word or attached text files (no PDFs) and photos to: whoswhere@aviationweek.com For additional information on companies and individuals listed in this column, please refer to the Aviation Week Intelligence Network at AviationWeek.com/awin For information on ordering, telephone U.S.: +1 (866) 857-0148 or +1 (515) 237-3682 outside the U.S.

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UP FRONT

P. BARRY BUTLER



ALTHOUGH AVIATION TENDS TO focus on learning from mistakes—and rightly so—the potential to learn from positive outcomes often goes unrecognized.

Jon Holbrook, a cognitive scientist specializing in aviation at NASA's Langley Research Center, says that pilot intervention has "kept millions of flights safe."

Pilots intervene to manage aircraft malfunctions on a fifth of routine flights, according to a 2013 joint report by a team that analyzed safety and operational data from the Line Operations Safety Assessment program.

Holbrook, by extrapolating this finding to worldwide jet data on 266 million flights between 2007 and 2016, estimated that pilots kept flights safe from aircraft malfunctions nearly 49 million times during that period. According to Holbrook, this means that crews intervened 157,000 times for every time human error was implicated in an accident during that same 10 years.

The reasons for that success are harder to measure. Investigative resources to date have focused on negative outcomes, for good reason. But as a result, the system is not designed to capture the routine yet unexpected events that pilots manage safely.

Research has also shown that pilots are not likely to reflect on their day-to-day challenges—from sick passengers to traffic conflicts—and how their planning, adaptation and coordination help them overcome these challenges. That is why a team of researchers from Embry-Riddle and NASA is working to find ways to capture systematically the practices that keep the U.S. aviation system—the largest and most complex in the world—so safe.

A key objective is collecting and analyzing data on specific pilot actions taken to manage operational difficulties. Researchers have already begun to address this knowledge gap.

First, they are using automatic speech recognition to analyze audio and video from simulator sessions in which pilots navigate real-world challenges, including heavy traffic, weather diversions, shifting winds and wake turbulence. The recordings also capture video of the pilots reviewing their performances as they narrate play-by-plays of their flights.

The Embry-Riddle and NASA team is now applying coding and natural language processing to identify re-

silient performance and evaluate the impact of the pilot debriefing sessions.

"When we analyze those data, we are looking for evidence of resilient performance—what did the crews do that helped them anticipate problems, plan for possibilities and coordinate their response?" explains Kristy Kiernan, associate director of the Boeing Center for Aviation and Aerospace Safety at Embry-Riddle and the project's lead investigator.

Second, the team is developing a large language model to analyze NTSB accident reports and dockets for evidence of resilient performance, with the goal of maximizing lessons learned from these unfortunate events.

Major airlines are working with their pilots on various debriefing methods. Both American Airlines and Southwest Airlines have dedicated teams and resources for programs that collect data on positive performance. Directors of these programs say they have seen results.

Capturing more granular information about operations on the 45,000 daily flights in the national airspace will require new approaches. Fortunately, newer aircraft are collecting more data. Tools and techniques for analyzing it, including artificial intelli-

gence, hold promise for "insights into routine performance that were not possible before," Kiernan says.

Finally, aviation is entering a new era of automation and autonomous flight. An already congested airspace will need to accommodate a growing number of new entrants, including more drones and breakthrough categories such as advanced air mobility aircraft. Flight controls are evolving, and pilots will need to learn new technologies and flight capabilities.

For now, however, it is in the "human element where most of the resilience resides," Kiernan says, and that resilience is what needs to be captured to reinforce safety in this emerging system.

Aviation has always benefited from a culture of continuous learning, and our industry must learn from all operations for this positive, resilience-based approach to work. We have created the world's safest form of transportation through obsessively reporting our errors. Imagine what our industry could achieve if we examine our successes with equal rigor. ✎

P. Barry Butler is president of Embry-Riddle Aeronautical University.

Measuring Success

A new approach to resilient performance in aviation safety



An Embry-Riddle and NASA team analyzed captioned video from simulator sessions to identify positive pilot performance.

THE DEW LINE

STEVE TRIMBLE



WHILE GOVERNMENT MINISTERS in Beijing criticize the U.S. pursuit of space-based interceptors as reckless, China's academic institutions are quietly researching similar concepts.

A series of recent articles in prestigious journals by Chinese scientists dive into the orbitology and feasibility of stationing kinetic interceptors in orbit to shoot down incoming threats.

The articles appeared even as Chinese government officials called out objections to the Golden Dome program, which the U.S. launched in February.

In late May, Mao Ning, spokesperson for China's Foreign Affairs Ministry, said Golden Dome would violate the principle of the Outer Space Treaty and increase the risk of creating a space arms race.

But three weeks earlier, a team of Chinese scientists, led by Wang Zhongyan, of Northwestern Polytechnic University in Xian, published a paper in the *Chinese Journal of Aeronautics* titled "Dynamic Multi-objective Optimization of Task Assignment for Space-based Interceptor Cluster." The research focused on orbital weapons for intercepting hypersonic vehicles in near space.

"This paper proposes a task allocation method to realize the interception of dynamic multitarget near-space hypersonic vehicles by interceptor missiles mounted on a space-based weapon platform," the researchers wrote in the May 5 article. "Simulation results based on examples show that the established model and its solution algorithm can effectively solve the task allocation problem of space-based interceptor swarms."

The article's date implies that Zhongyan's team of researchers began their work months before the Trump administration unveiled the Golden Dome concept. The Golden Dome architecture features space-based interceptors as part of a multilayer network of air and missile defenses for the U.S. homeland.

As that architecture became finalized in September, Chinese government officials again sounded the alarm. The U.S. program "makes an arms race in outer space a real threat, and [it] undermines global strategic stability and lasting peace in outer space," Shen Jian, China's ambassador for disarmament affairs at the United Nations, said in October during a debate on space issues.

But another team of Chinese researchers had just released another paper in the journal *Aerospace and Science Technology*, titled, "Research on the Design of Low-Earth-Orbit Megaconstellations with Space-based Defense Capabilities."

The research, led by Ji Jiang, a scientist at Sun Yat-Sen University, focused on ways to adapt proliferated constellations of communications and navigation

satellites into launch platforms for missile interceptors. The team focused on shooting down space debris and asteroids rather than incoming missiles, but the technology appears to apply to both roles.

"As a complement to the Ground-Based Interceptor system, space-based defense systems are primarily designed to intercept small targets such as large space debris with thermal protection, out-of-control reentering spacecraft and small asteroids in the 5-20-m-dia. [16-65-ft.] class," the authors write.

The Chinese government has never acknowledged a funded program to develop space-based interceptors, but the country's missile defense capabilities are rapidly evolving

since acquiring its first S-300 anti-missile system from Russia in 1991. In addition to fielding homegrown copies of the S-300 and the HQ-19 and HQ-29 anti-missile batteries, China also has been testing a surface-based interceptor with an exoatmospheric kill vehicle. The Dong Ning-3 interceptor is classed as a defense against intermediate-range and intercontinental ballistic missiles, as well as satellites in low Earth orbit. It could be deployed in the future on Chinese Type 55 destroyers.

To be sure, China remains a relative newcomer in the air and missile defense domain. Whereas the Russian and U.S. defense technologies date back to the early 1960s, China's homegrown technology is not yet three decades old. It has only been in the last decade that China launched their first early-warning satellites into orbit, with Russian assistance.

So far, China's air and missile defense network has been focused on tactical concerns, such as protecting military forces, government facilities and critical infrastructure. It is not clear if Beijing shares Washington's interest in a strategic defensive system, which would be focused on protecting the population instead. ☼

Great Dome

Beijing officially deplores U.S. Golden Dome, but scientists are quietly exploring the idea



President Donald Trump launched the Golden Dome initiative on May 20 in the Oval Office.

WHITE HOUSE

BRIGHTER SKIES

- > BOEING'S IMPROVED DELIVERY AND PRODUCTION NUMBERS BOLSTER ITS BALANCE SHEET
- > CFO'S 2025 CASH-BURN FORECAST IS AN ENCOURAGING SURPRISE
- > MEDIUM-TERM FINANCIAL PROSPECTS ARE LOOKING BETTER

Michael Bruno and **Sean Broderick** Washington

As 2025 comes to a close, the end-of-year outlook for Boeing is decidedly upbeat. Production rates and deliveries are increasing, and the company's balance sheet is strengthening amid signs of improvement across the organization.

Speaking at the UBS Global Industrials conference on Dec. 2, Boeing Chief Financial Officer Jay Malave said the airframer expects to report a \$2 billion cash burn for all of 2025—better than previous projections—and that in 2026 it expects to record positive free cash flow in the low-single-digit billions of dollars that is anticipated to grow annually.

Malave, who took office in August, also endorsed a three-year-old management goal of reaching \$10 billion in free cash flow across the company, although he declined to put a timeline on the ambitious target. Still, the affirmation was notably different from his evident hesitation when he spoke about the goal during a third-quarter earnings call with analysts on Oct. 29.

A little over a month later, Malave's confidence had grown. "Yeah, I'm very comfortable saying that we can absolutely deliver \$10 billion," he said at the conference.

Boeing's momentum will benefit suppliers beyond the boost that comes from increasing production rates. He suggests Boeing will carry more parts inventory going forward than it did during the last production upcycle.

"When you look at one of the les-

sons learned for us, it is that we probably need to carry a little bit higher inventory than we may have in the past when we were at these kinds of higher [production] rates," he said. The inventory stability will come after burning down a "multibillion"-dollar stockpile that built up in recent years amid lower-than-expected rates.

Boeing is increasing 737 production to 42 aircraft per month from 38 (AW&ST Nov. 10-23, p. 24). Data from Aero Analysis Partners (AAP) shows Boeing rolled out 34 737s in November, including one P-8 military variant. This is down from 40 in October, and it is the first month-over-month decline since July, AAP figures show.

Deliveries reflect a similar trend. After totaling 40 737 deliveries in October, November's 737 figure was 32—all 737 MAXs.

Given that November includes the U.S. Thanksgiving holiday, the sequential decline in monthly production and deliveries is not a surprise.

Boeing's 11-month delivery total of 537 aircraft this year included 402 737s—396 of which are 737 MAXs. Malave said Boeing is eyeing 440-450 737 deliveries for the full year. About 50 will be from inventory—most of



Boeing's balance sheet is benefiting from higher 737 production and delivery figures.

them for Chinese customers who have seen delivery dates slide due to geopolitical issues.

Looking ahead, 737 deliveries in 2026 are to rise, even as Boeing runs out of inventoried aircraft—loosely defined as those built before 2023. "There won't be hardly any aircraft, if any at all, that will be coming out of inventory," Malave said.

The 787 is on a similar path. The final assembly line is slated to be producing eight aircraft per month by year-end, with plans to shift to 10 per month in 2026 (AW&ST Nov. 24-Dec. 7, p. 41).

Rollouts have been hovering around seven per month since midyear, AAP data shows. Supply chain constraints have challenged Boeing's effort to stabilize 787 output for several years, and they will not disappear anytime soon.

Interiors components, including bespoke business class seats and monuments—the assemblies that divide cabin sections—are facing longer-than-expected certification and initial



JIM ANDERSON PHOTOGRAPHY/DJ & CO.

procurement timelines. Boeing CEO Kelly Ortberg has said their availability could slow Boeing's push to get to a monthly rate of 10 787s per month in 2026.

Boeing will head into 2026 in full control of a major part of its supply chain following the Dec. 8 finalization of its Spirit AeroSystems asset acquisition. The complex deal brings roughly 15,000 workers to Boeing and 4,000 to Airbus (*AW&ST* Oct. 27-Nov. 9, p. 39). A new, wholly separate subsidiary called Spirit Defense based in Wichita will continue as an independent aerostructures supplier to industry rivals and partners.

"Completing the acquisition removes an operation overhang and should allow Boeing management to focus on production execution, in our view," RBC analyst Ken Herbert wrote. "We believe the acquisition will be most impactful for 737 MAX production."

On the certification front, Boeing envisions FAA approval of its 737-10 "later" in 2026, while the 777-9 re-

mains on its recently adjusted schedule that puts FAA approval in time to start deliveries in 2027, Malave said.

"We'll be building [737-10s] next year," he said. "We're expecting certification of that aircraft to be later in the year."

Boeing is working with the FAA to win approval of a redesigned engine anti-ice system that is mandatory for both the 737-7 and 737-10 before they are certified. The 737-10 also has FAA-required flight testing to complete before earning approval.

The 737-7 first flew in March 2018 and wrapped up formal FAA Type Inspection Authorization (TIA) flight testing in late 2021. But Boeing has seen the variant's certification program prolonged by new FAA requirements and the engine anti-ice issue.

The 737-7 is expected to earn certification before the 737-10. Boeing is confident that both will be approved in 2026. But given the TIA-related challenges that the 777-9 program has experienced, the 737-10 may need

more than another year to wrap up its remaining requirements.

Securing approvals for both variants will lead to a slight, temporary delivery boost. Boeing has produced a total of 40 of the two variants—27 737-7s and 13 737-10s—the Aviation Week Network Fleet Discovery database shows. This includes aircraft in the certification test programs. Once each aircraft is modified to the FAA-approved configuration, they become part of Boeing's ready-for-delivery inventory.

Malave also provided a brief but positive update on 777-9 certification. The company's progress is tracking on its recently revised schedule that pushed the 777-9's first deliveries into 2027 from late 2026, pointing to the recent granting of the next phase of FAA TIA as evidence (*AW&ST* Nov. 10-23, p. 18).

"I think we're pretty well-positioned per the schedule that we laid out in the [October] earnings call," Malave said. "We've got it here in the fourth quarter, and so we're pretty much on schedule." 🗣️

Montreal Startup Evio Launches 'Strong Hybrid' Regional Airliner

➤ HYBRID POWERTRAIN BUILT AROUND P&WC PT6 TURBOPROPS

➤ FIRST FLIGHT PLANNED IN 2029 FOR EARLY-2030s SERVICE ENTRY

Graham Warwick Washington

Montreal-based startup Evio has emerged from stealth with plans to develop a hybrid-electric regional airliner to enter service in the early 2030s, targeting the 50-100-seat market. The company says it has pre-orders and options for 450 aircraft from two major airlines.

The Evio 810 is described as a "strong hybrid-electric design." The aircraft is a parallel hybrid, with both Pratt &

"My cofounder and I have been together on multiple programs, mainly on the defense side," Derman says. "What is different here is you have a lot of startups where the CEO is the genesis behind the aircraft. That's not the case here. Luc is our CTO and our aircraft designer. He has a huge quiver of experience . . . and does an amazing job thinking about operator economics."

Each of the Evio 810's four nacelles houses a turbine engine, electric motor and battery pack.



Whitney Canada PT6E turboprops and battery-powered electric motors driving four propellers—each turbine, motor and battery pack is packaged together in a wing-mounted nacelle.

Evio's cofounders are Michael Derman and aircraft designer Luc Van Bavel. CEO Derman was previously with Sierra Nevada Corp. (SNC) where he worked on the Freedom jet trainer. He also cofounded AirLand Holdings, which partnered with Textron to develop the Scorpion light attack aircraft.

Evio Chief Technology Officer (CTO) Van Bavel was conceptual designer of the Freedom and Scorpion. He has consulted with Bombardier's special missions group, and he worked with Diamond Aircraft on the D-Jet light jet, Epic Aircraft on the single-turboprop Victory and Safire Aircraft on the unflown Safire Jet.

The company's board includes Rob Dewar, who led development of the Bombardier C Series/Airbus A220, and Frank Cappuccio, former head of Lockheed Martin's Skunk Works.

Starting about seven years ago, the company began by looking at aircraft in the 9-12-seat category and then 18-19 seats. "The more we looked at it, the more we realized that the heart of the market is that 50-100-seat space, with 70-90 seats being the center of gravity," Derman says.

"It was operator economics, trying to restore dropped routes and passenger experience that drove us from Day One," he says. "We looked at modifying legacy aircraft. We looked at a clean-sheet 'mild hybrid.' And we didn't see the economics there that an already challenged segment of the industry could thrive on. It had to be a clean-sheet strong hybrid."

Evio is planning a family of aircraft, starting with a 76-seat dual-class/88-seat single-class configuration to comply with U.S. pilot scope-clause limitations. With a scope-complaint takeoff gross weight of 86,000 lb., the Evio 810 is designed for routes up to 500 nm. It would fly shorter routes all-electric and use the turbine engines in cruise as range extenders for longer flights.

Only two regional aircraft families remain in production, the ATR 42/72 and Embraer E-Jets E2 series, and their market is contracting, Derman says. "The operators are challenged already," he notes. "Their routes are getting truncated. They need something with a more modern passenger experience, something that is going to disrupt the economics they have today."

For the batteries, "we're not using anything exotic," he says. "We're dealing with some of the leading cell producers and the energy density they have today." The aircraft is designed to fly shorter missions gate to gate all-electric. Longer term plans are to dispense with the turbines as batteries improve.

With four-abreast seating, the cabin is slightly more than 10 ft. in diameter, wider than both the ATR and E-Jet E2, to provide passengers with a narrowbody airliner experience in terms of seat and aisle width and overhead bin size, Derman says.

Evio's team of about 45 engineers, mostly based in Montreal, has completed 75% of the tasks required for the conceptual design review, and the company is engaging suppliers in preparation for entry into the preliminary design phase. First flight is planned for 2029, Derman says.

Evio completed a Series A funding round in 2023, raising more than \$16 million, according to private equity tracking services, and is preparing for its next round, which he says will target larger investors. The company says it has already secured investment and technical support from Boeing Canada.

The startup is looking also at cargo and defense applications of the Evio 810. In addition to commercial LD3 containers, the fuselage can accommodate military pallets, and the large battery capacity is suited to defense missions such as directed energy, jamming and acting as an emergency charging station, Derman says, adding "We're also thinking about autonomy." 🛩️

Charting Path to Profitability, JetBlue Calls for Level Playing Field

➤ THE LCC IS SIX QUARTERS INTO A PLAN FOR EVOLUTION

➤ CEO JOANNA GERAGHTY IS ADVOCATING FOR BETTER SLOT ACCESS AND FAIRER COMPETITION

Christine Boynton Fort Worth

For JetBlue Airways, 2025 has been focused on execution as it works through a strategy to position itself for long-term profitability.

Heading into 2026, the carrier will be six quarters into its Jet Forward road map. Thus far, JetBlue has repositioned 20% of its network, introduced its Blue Sky partnership with United Airlines, retired its last remaining Embraer 190 to streamline the fleet and launched its first premium credit card, among other moves. Outside of its operations, JetBlue is also pushing for broader change.

JetBlue is looking at creative ways to address scale, which it expects will continue to be a challenge.

This comes after the carrier's recent attempts to gain scale have failed. A merger with Spirit Airlines and a Northeast Alliance partnership with American Airlines were each blocked through antitrust suits levied by the U.S. Justice Department; federal court rulings deemed the arrangements overreaches. CEO Joanna Geraghty is now calling on government to level the playing field for smaller carriers and take the long view for healthier competition.

"What that means to us is the opportunity to actually effectively compete and succeed in competing," she said at the Skift Aviation Forum here on Dec. 3. "Right now, you've got four airlines that occupy 80% of the domestic markets, and we're 5%."

Better access to slots and gates is one priority. "We're constantly knocking at the door of airport authorities trying to find a way into markets . . . and a lot of times the doors get shut in our face," Geraghty noted. "We're very active on [Capitol] Hill trying to point out the challenges that small carriers have in this environment. The government needs to pay attention and start looking for opportunities to tilt things our way in areas that they can."

Geraghty explained: "Our ask of airport authorities and others is to recognize that sometimes, you do have to put your finger on the scale for the small guy, because if you don't, then they can't succeed."



MARIO TAMM/GETTY IMAGES

JetBlue believes that scale will remain an issue and is looking at creative ways to address the challenge internally, including through partnerships like Blue Sky for organic growth or using its nonair-travel-services subsidiary, Paisly, to augment earnings. Unique revenue streams "perhaps can make up for some of that," Geraghty told Aviation Week on the sidelines of the event, but she stressed that more is needed. She suggested that this could involve allowing for greater coordination on commercial partnerships between smaller and larger airlines and periodic scrutiny of existing, large joint ventures (JV).

"These JVs have gotten really big—over time they can become anticompetitive," she said. "The [U.S. Transportation Department] really should be making sure that they're pressure-testing what it's doing to fares and whether they're using the strength of

that JV to act in an anticompetitive way."

Geraghty also pointed to uniquely restrictive rules and regulations on U.S. airlines, such as foreign ownership limits reflective of a World War II-era mindset. As JetBlue advocates for change, its CEO believes officials in Washington are aware of an imbalance.

"I think they struggle a little bit with how to change some of the decisions of the past, and I think they all look at Spirit and say, 'Gosh, you guys were trying to buy them, look at where they've ended up now,'" Geraghty said. "Unfortunately, I don't think they necessarily have all the answers, and I question whether some of them have

the wherewithal to say, 'We have to do something differently.'" This was a nod to the 2024 beyond-perimeter slot allocation at Ronald Reagan Washington National Airport. The process excluded new entrants and ultimately awarded access to the four largest U.S. carriers, plus Alaska Airlines.

JetBlue intends to continue pushing for better access while executing on Jet Forward, and remains optimistic about its plans for growth in 2026. As nearly year-old revenue initiatives begin to mature, the carrier is preparing to launch airport lounges in New York and Boston, a new domestic first class and additional stages of Blue Sky, capitalizing on continued strong demand for premium. Advocating for broader change, Geraghty is confident in the moves JetBlue is making on its own.

"We're an airline evolving," she said. "And we're evolving in all of the right ways to be stronger in the future." 🌐

Airlines Sound a SAF Alarm

➤ IATA WARNS THAT INDIVIDUAL AIRLINES MAY MISS THEIR OWN 2030 GOALS

➤ INDUSTRY TARGETS SHOULD ALSO BE REEVALUATED, IATA DIRECTOR SAYS

Helen Massy-Beresford Geneva

Slowing growth of sustainable aviation fuel production and disappointing decarbonization progress is the stark year-end message from the International Air Transport Association, which is calling for authorities to reconsider policies aimed at boosting alternative fuels, the industry's main tool for cutting emissions.

At its Global Media Day in Geneva on Dec. 9, the International Air Transport Association (IATA) said it had cut its sustainable aviation fuel (SAF) production forecast for 2025 and noted that mandates imposed on the industry should be reevaluated and airlines risk missing their own 2030 targets due to high prices and scarce availability of SAF.

The airline industry group estimated 2025 SAF production at about 1.9 million metric tons—nearly double the 1 million metric tons in 2024. But that represents only 0.6% of total jet fuel consumption.

In December 2024, IATA had forecast SAF production would reach 2.1 million metric tons in 2025, 0.7% of total jet fuel production. The association said it revised its 2025 output estimate down “due to the lack of policy support to take full advantage of the installed SAF capacities.” SAF production growth is projected to slow in 2026 but still put out 2.4 million metric tons, 0.8% of total jet fuel consumption.

The association also said Europe's ReFuelEU Aviation mandates, requiring 2% SAF uptake starting on Jan. 1, 2025—and set to rise to 6% by 2030 and 70% by 2050—should be reevaluated.

“Airlines that need to comply with mandates are unable to get supply,” IATA Director General Willie Walsh said. “It's just physically impossible to get, so they can't meet their obligations. I think these mandates will have to be reevaluated.”

European airlines sounded a similar warning in March, saying at an Airlines For Europe event that they thought the 2030 targets would need to be pushed back because of scarce availability, which alternative fuels provider Neste disputed at the time.

Walsh also cast doubt on the ability of airlines to achieve their own more ambitious SAF targets for 2030. “Personally,

I believe 10% of SAF in 2030 is beyond the reach of the vast majority of airlines, through no fault of their own,” he said.

Air France-KLM and International Airlines Group are among those with that target. While Walsh conceded that large players may be able to secure the necessary supply, he said there is simply not enough for the majority.

The IATA head also said it will be “challenging” for the European Union to achieve the 6% target in place for 2030 as part of ReFuelEU Aviation legislation. He referred to a report by the European Union Aviation Safety Agency (EASA) in October on the status of the SAF sector in Europe, which concluded that the 2030 mandates were in reach but that progress on e-fuels was lagging.

The first ReFuelEU Aviation Annual Technical Report, published in October, was based on 2024 data—from before the mandates began—from aviation fuel suppliers and aircraft operators. Fuel suppliers reported that 0.6% of all aviation fuel supplied at EU airports was SAF, avoiding CO₂ emissions equivalent to about 10,000 Madrid-Paris flights, according to the International Civil Aviation Organization CO₂ calculator.

The ReFuelEU report said production capacity assessments indicate the EU is on track to meet the SAF target of 6% in 2030. It also highlighted the other major area of concern for airlines: price. The average price of SAF in 2024 was €2,085 per metric ton (\$2,428), a massive markup compared with the €734 per metric ton for conventional jet fuel.

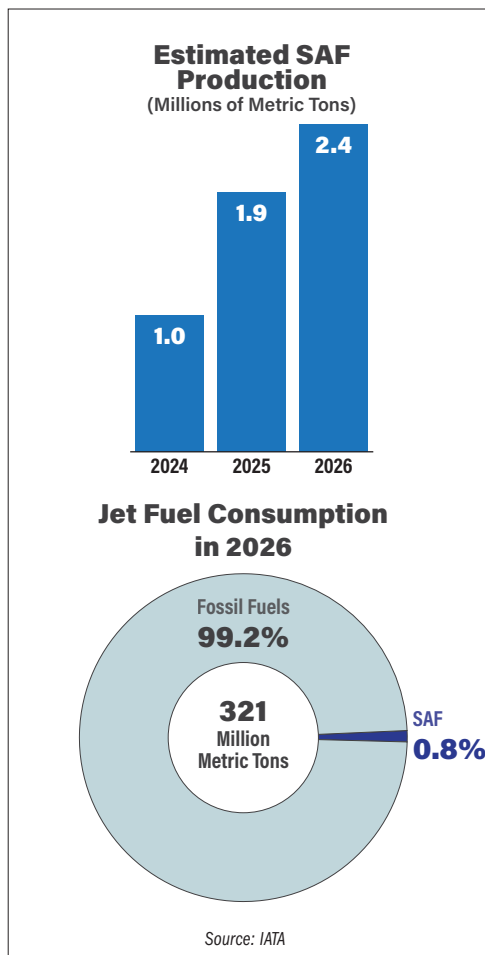
For now, the market is highly concentrated as well, the report found, with 25 suppliers to 33 EU airports in 12 member states but 99% of supply coming from France, Germany, the Netherlands, Spain and Sweden.

“The scale-up of synthetic aviation fuel production in the EU is lagging,” the report said. “As of today, none of the synthetic aviation fuel facilities in the EU have reached Final Investment Decision (FID), putting at risk the 2030 subtarget for synthetic aviation fuels. To meet

that target, given project development lead times, several facilities must reach FID by 2026 at the latest.”

“I think it's a report that is biased to the optimistic and requires everything to go in the right way” Walsh said. “Personally, I don't believe it is achievable.”

Regulators “urgently need to look at what is actually happening versus what they believed would happen,” he added. Walsh noted that the mandates had not led to greater SAF production. “We've seen it lead to a huge increase in the price of SAF as fuel suppliers, in my opinion, abuse their position to extract additional money from the airline industry through these compliance fees that they have introduced, which are artificially increasing the price of SAF for airlines who are trying to comply with their obligations.” Walsh was



referring to fees charged by fuel suppliers on jet fuel to cover the costs of complying with the ReFuelEU legislation.

"The cumulative impact of poorly designed policy frameworks is that airlines paid a premium of \$2.9 billion for the limited 1.9 [million metric tons] of SAF available in 2025," IATA said. "Of this, \$1.4 billion reflects the standard SAF price premium over conventional fuel."

Looking ahead to e-SAF, which is expected to be an important part of aviation's long-term net-zero drive and subject to mandates in the UK starting in 2028 and the EU in 2030, IATA urged regulators to learn lessons from the mandates related to biomass SAF.

E-SAF already has a cost-base potentially up to 12 times higher than conventional jet fuel, IATA said, adding that "without strong production incentives (as opposed to mandates), supply will fall short of targets."

"Current policies are not having the desired effect," Marie Owens Thomsen, IATA senior vice president for sustainability and chief economist, said. "Faced with such facts, regulators must course-correct, ensure the long-term viability of SAF production and achieve scale so that costs can come down."

European authorities can see that mandates for biomass-based SAF have not increased production and have only raised costs, Owens Thomsen said. "Yet they are very keen on doing exactly the same regarding e-SAF. There's no e-SAF, but they want to put on mandates," she said. "Instead of mandating the output, it would be good if we

first prepared our markets so that we can actually produce that output." She noted that Europe needs to develop its renewable electricity to make e-SAF production on a large scale feasible.

Looking at overall SAF prospects in the long term, IATA does not see feedstock availability as the problem, however. "Feedstock is not a limiting factor when it comes to production of SAF," Preeti Jain, IATA head of net-zero research and programs, said. "There is sufficient available SAF feedstock to allow industry to reach net-zero CO₂ emissions by 2050."

The industry will need 500 million metric tons of production to achieve that. IATA's assessments of global feedstock availability, technology readiness and regional suitability result in an estimate that global SAF production could reach 400 million metric tons by 2050. Bridging the 100-million-metric-ton gap "is possible but would require both securing greater access to sustainable biomass feedstocks and an urgent and accelerated scaling up of novel SAF technologies," the organization said.

Jain said a system of prioritizing hard-to-abate sectors such as aviation for the available feedstock needs to be better defined.

Referring to the industry's overall 2050 net-zero target, Walsh said: "I think the challenge that we're facing now is even greater than we expected, without making the progress that we had anticipated in terms of SAF production. I haven't changed my view that it's going to be extremely challenging, and it's going to be expensive. I still believe it's possible." 🌐

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IndiGo Confronts Fallout From December Cancellation Crisis

- > GOVERNMENT ORDERS INQUIRY AS WELL AS CUTS TO SCHEDULE
- > AIRLINE ADMITS IT MISJUDGED CHANGES TO DUTY-TIME RULES

Adrian Schofield

India's largest airline, IndiGo, has hit a major stumbling block in its growth trajectory. The carrier is facing the most intense regulatory scrutiny in its 20-year history following a network meltdown in early December.

Officer Isidre Porqueras, requiring an explanation as to why enforcement action should not be taken against them.

The government also has appointed a panel to conduct a high-level inquiry into the disruptions that will "deter-

schedules efficiently," the DGCA said.

Revised flight duty-time rules came into effect in two stages: the first phase on July 1 and the second on Nov. 1. The November changes aimed to reduce fatigue risks through measures such as increasing weekly rest hours, cutting the number of night flights that pilots can operate and expanding the hours regarded as night flights.

These changes would have effectively required more pilots to operate the same schedule. IndiGo has admitted to "misjudgment and planning gaps" in implementing the second phase and underestimating the number of pilots needed to cover its schedule.

The primary cause of the operational disruptions was a failure to make adequate arrangements to account for the revised rules, the DGCA said in its show-cause notice. "Such large-scale operational failures indicate significant lapses in planning, oversight and resource management."

Mass flight cancellations at its New Delhi hub brought IndiGo's operations there to a standstill.

Naidu also has pointed out that the timing of the two phases has been known since a high court ruling in April. He said IndiGo had given assurances that it could comply with the new rules and confirmed its ability to operate its winter schedule.

However, IndiGo said it had been "engaging with the DGCA regarding challenges in implementing the [flight duty-time changes] and was seeking variations, exemptions or extensions."

After the cancellation crisis, the DGCA has agreed to a temporary reversal of the November rule changes for IndiGo, although pilot groups have objected to such a reprieve.

With the network disruption largely resolved, attention now turns to the investigations and their findings.

One factor that is being examined is IndiGo's growth rate compared with its workforce and fleet. Questions have also arisen as to whether regulators were overseeing IndiGo adequately.

IndiGo grew its systemwide seats 15-27% annually in the seven years through 2019, data from CAPA – Centre for Aviation and OAG shows. The airline's capacity recovered to 2019 levels in 2022 following the COVID-19 pandemic and was up 24% year over year in 2023 and 13% in 2024. 🌐



IndiGo and its leaders must answer to government investigations and public anger over the cascading cancellations that stranded thousands of passengers at Indian airports. The low-cost carrier has had to pull back its growth plans, and is likely to be subjected to penalties and broader questions over whether its workforce and processes are adequate for its rapid expansion.

The disruption began on Dec. 2, building up to hundreds of flight cancellations per day. Cancellations peaked at more than 1,000 on Dec. 5, when the airline was forced to halt operations at its main New Delhi hub and other airports to reboot its schedule and recover. The carrier declared operations were normalized by Dec. 10.

IndiGo said the major problem was adjusting to new pilot duty-time rules that stretched its workforce. Computer system glitches and adverse weather exacerbated the situation.

The Indian government issued a show-cause notice on Dec. 6 to IndiGo CEO Pieter Elbers and Chief Operating

mine accountability . . . and recommend measures to prevent similar disruptions in the future."

IndiGo can expect to face "strict and appropriate action" from the government, Civil Aviation Minister Ram Mohan Naidu said in Parliament on Dec. 9. "No airline, however large, will be permitted to cause such hardship to passengers through planning failures, noncompliance or nonadherence to statutory promises," Naidu said.

As an initial step, the Directorate General of Civil Aviation (DGCA) ordered the carrier on Dec. 8 to trim its schedule by 5% and focus reductions particularly on routes with high frequencies. The cuts were doubled to 10% a day later.

This move will reverse some of the airline's recent schedule growth. IndiGo had increased its departures by nearly 10% in the current winter schedule season versus the same period last year, the DGCA said. The increase was 6% compared with the 2025 summer season. "The airline has not demonstrated an ability to operate these

Airbus and Embraer Make Inroads in Latin America With Small Jet Orders

➤ LATAM AND FLYBONDI PLACE ORDERS WITH BOTH OEMs

➤ ABRA GROUP'S SMALL NARROWBODY EVALUATIONS CONTINUE

Lori Ranson Bogota

Embraer's E2 and Airbus' A220 made major gains this year in Latin America, with LATAM Airlines Group and Flybondi opting to add smaller narrowbodies to their fleets. But South American airline group Abra is adopting a more measured approach to adding a smaller type to its aircraft portfolio, signaling no rush to make a decision.

LATAM Airlines Group's order for 24 E195-E2s was a significant achievement for Embraer, given that Airbus accounts for roughly 79% of its fleet, according to the CAPA – Centre for Aviation Fleet Database.

Deliveries of LATAM's new E-Jets are scheduled to start with 12 in the fourth quarter of 2026, and the remainder are slated to arrive in 2027. The group is initially deploying the aircraft in Brazil, enabling the company to expand into "under-penetrated regions and destinations that are not currently served by the group," executives said during a third-quarter earnings discussion in November. For 2026, LATAM plans to open eight new destinations and 16 new routes with its E2s.

After LATAM's landmark agreement with Embraer, Airbus won its first A220 order from a Latin American operator: Argentinian low-cost carrier Flybondi opted for 15 A220-300s in a deal announced Dec. 1 that also included orders for 10 Boeing 737-10s. The airline currently operates nine Boeing 737-800s and two Airbus A320neos and has seven inactive 737-800s, according to the Aviation Week Network Fleet Discovery database.

The Abra Group—parent to Colombia's Avianca and Brazil's GOL—considered smaller aircraft options before the recent orders emerged in Latin America, and its reviews of those jets continue, the group's CEO Adrian Neuhauser explained during an Avianca press conference in Bogota on Dec. 10.

"It's always a balance, right?" he remarked. "Adding additional aircraft adds complexity." But introducing

more fleet types also adds optionality, allowing for service to markets that are too small and uneconomical for larger aircraft, he added.

"We think we are very well provided for in terms of our narrowbody aircraft order," Neuhauser said. Abra added 50 Airbus A320neos and five A330-900s to its orderbook in October

Before LATAM placed its E-Jet order, CEO Roberto Alvo highlighted the choice between using existing aircraft and opting for a new fleet type. During the CAPA Airline Leader Summit Latin America & Caribbean on Sept. 9 in Lima, Peru, he said that South America is still underdeveloped, with a lot of "white space."

Alvo said regional jets are one way of tackling that "white space," but not the only way. "We can do this as well with our [Airbus] A319s," he said, noting that LATAM has a relatively large fleet of that type, and "they're pretty much fully depreciated, which gives us the flexibility to deploy them pretty much wherever we want."



ROBIN GUESS/ALAMY STOCK PHOTO

Avianca and GOL parent Abra Group have no pressing plans for small jet orders.

for a total of 138 aircraft scheduled for delivery by 2032. The company also has 96 737 MAX narrowbodies scheduled for delivery by 2030.

Avianca operates Airbus single-aisles, Boeing 787s and Airbus A330-200 freighters, while GOL is an all-737 operator. Abra also has a strategic investment in Spanish wet-lease and charter operator Wamos Air, which has an operating fleet of four A330-300s and a single A330-200, as well as one inactive A330-300, according to Fleet Discovery data.

"We're not in a rush to add an additional fleet type just to add capacity," Neuhauser noted. Pointing out Abra's analysis of smaller jets, he added: "Obviously, when we have news to announce there, we will."

Alvo said in September that no decision regarding smaller jets had been made, adding: "We'll see if it makes sense in the next few months." Roughly two weeks later, LATAM announced its E-Jet order.

More broadly, although Latin America remains an emerging market, the region continues to mature. Azul, a long-standing E-Jet operator, has proved that smaller aircraft can open up and build new markets in its home country of Brazil.

As more small jets emerge in Latin America, it is natural for operators to evaluate those aircraft and monitor their performance. The next two years should offer clues as to whether the latest orders are isolated occurrences or the start of an emerging trend. 🌐

Pentagon Acquisition Reform Moves Ahead as Budgets Grow

➤ PENTAGON PRESSES ITS CASE FOR LAWMAKER SUPPORT

➤ WHITE HOUSE CONSIDERS ANOTHER RECONCILIATION PLAN

Brian Everstine Simi Valley, California

The Pentagon is entering an era of sustained budgets above \$1 trillion, bolstered by congressional support, as it looks to overhaul its acquisition structure to make weapon purchases more efficient.

fiscal 2026 National Defense Authorization Act, which authorizes a top line of \$900.6 billion inclusive of defense nuclear programs, up from the Pentagon's request of \$892 billion. Coupled with the almost \$150 billion outlined in

Congress on this," he told reporters on the sidelines of the event. "We need to create a story, have that conversation with the Congress."

The Pentagon already has created two new major roles in direct reporting program managers (DRPM). Space Force Gen. Michael Guetlein serves as one for the Golden Dome missile defense program. Air Force Lt. Gen. Dale White has been nominated to oversee major programs for that service, including Boeing's F-47 and VC-25B Air Force One replacement and Northrop Grumman's LGM-35A Sentinel ICBM and B-21 Raider. The DRPMs report daily to Deputy Defense Secretary Steve Feinberg and serve on an oversight board with Duffey and top service secretaries.

Duffey described the new oversight approach as "removing layers" of bureaucracy. He noted that the DRPM model is effective for the Golden Dome, which brings together many different efforts across services and agencies.

Acquisition reform will be a prolonged effort, playing out in stages. Duffey said that shortly before the forum he signed on the initial implementation guidance. Two days later, he convened the first meeting of a group to identify programs to be accelerated. However, only the Army has a confirmed acquisition leader.

At the same time, the Pentagon and the broader Trump administration are working on budget requests for fiscal 2027. The administration appears likely to take the same approach as it did for fiscal 2026: using reconciliation to add to the overall spending level.

Russ Vought, director of the Office of Management and Budget, said at the forum that there would not be a "budget hole" following the passage of the One Big Beautiful Bill Act for fiscal 2026. He stated that reconciliation is a way to keep priorities like the Golden Dome, shipbuilding and nuclear modernization funded outside of the typical appropriations process, which relies on bipartisan support. "We'll continue to do that," Vought said.

During a keynote address, Hegseth piled on, stressing that the budget will grow, and declining to endorse the Reagan-era military spending level of 6% of GDP. Hegseth said President Donald Trump is committed to funding the military and supporting the defense industrial base. 🇺🇸



Defense Secretary Pete Hegseth told an industry crowd at the Reagan Defense Forum that higher budgets are coming to improve the defense industrial base.

Still, the steps to do this will take some time and convincing, the department's acquisition leader says.

"I don't think we're going to achieve this in the fiscal 2026 cycle, so I look at the fact that we're going to get these reforms underway over the next year," Michael Duffey, undersecretary of defense for acquisition and sustainment, said at the annual Reagan National Defense Forum here on Dec. 6. "I think we will benefit from this additional time to show that we're making strides in acquisition reform."

Duffey and other Pentagon leaders outlined strategy and acquisition goals at the forum, about some five weeks after Defense Secretary Pete Hegseth laid out a new approach to acquisition reform.

Two days after the forum, the House and Senate Armed Services Committees released the final version of the

the One Big Beautiful Bill Act passed over the summer, defense spending of well over \$1 trillion is authorized.

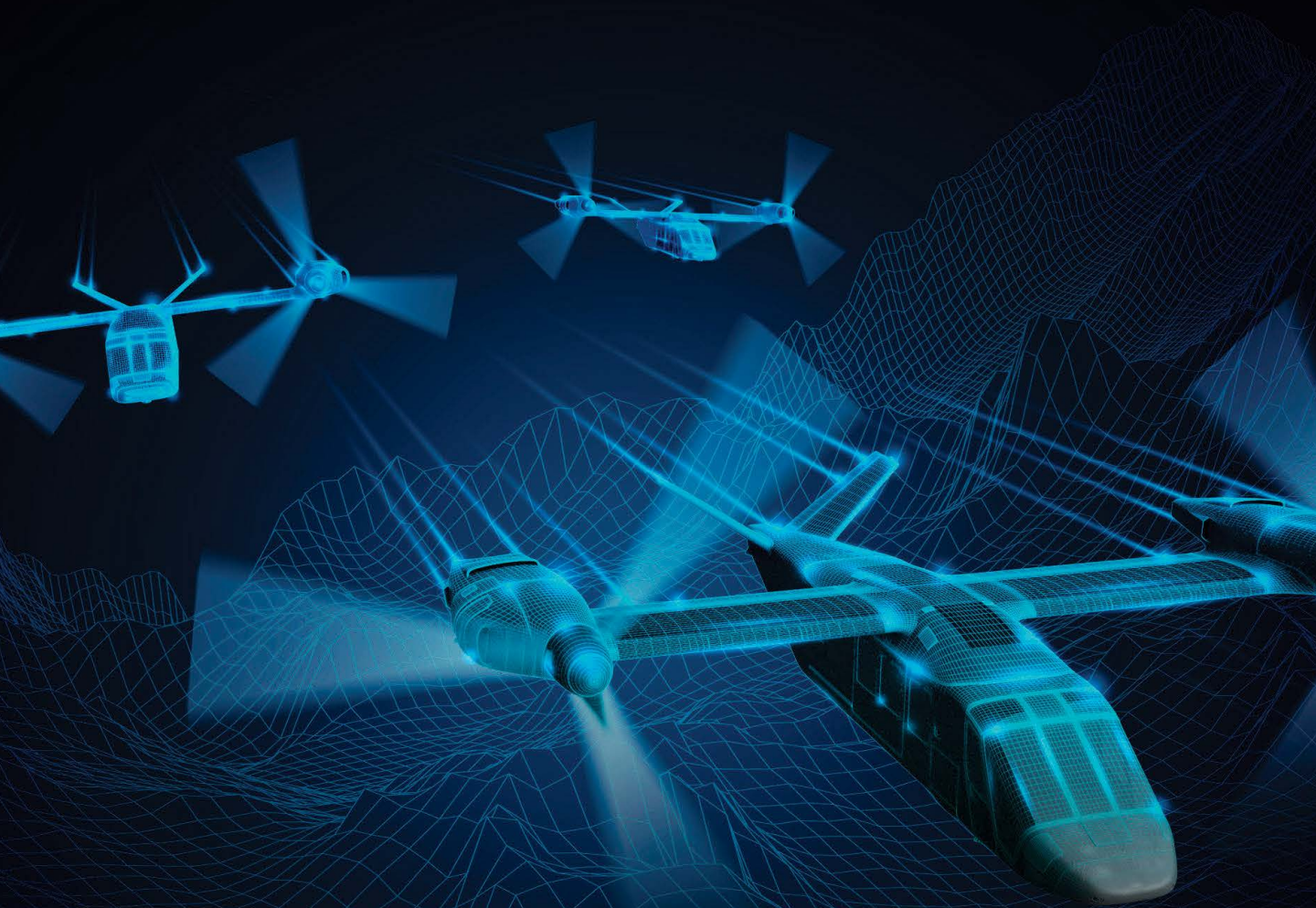
The proposal adopts some acquisition reform plans, including expanded multiyear authorities for procurement, but the reform plan is just beginning.

The new approach, for example, creates new positions called program acquisition executives to replace the typical individual program executive office approaches by consolidating groups of programs under one leader who has expanded authority to move funding and adjust schedules. Moving funding typically requires congressional approval, and changing this might be an uphill battle, as Congress is usually hesitant to give up authorities, Duffey conceded.

"It's not without challenge—we certainly recognize that we have to sell

STAFF SGT. MADELYN KEECH/U.S. AIR FORCE

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How the U.S. Space Force Aims To Avoid a Second Sputnik Moment

- RUSSIA AND CHINA ARE DEMONSTRATING NEW ASSETS IN ORBIT
- THE PENTAGON IS MOVING QUICKLY TO FIELD SATELLITES FOR MOVING-TARGET INDICATION

Vivienne Machi Orlando, Florida

China destroyed one of its own satellites on Jan. 11, 2007, creating thousands of pieces of debris in orbit while revealing its capabilities—and plans—for the space domain.

That moment signaled the end of what many considered a period of relative calm in space after Operation Desert Storm, recalled U.S. Space Command Commander Gen. Stephen

entering a new space race with Russia and China, alluding to the Soviet Union's 1957 launch of Sputnik 1 and the subsequent U.S. start of the Apollo program. "That is what we all need to focus on, to make sure that there is not another Yuri Gagarin, that there is not another Sputnik," he said, referencing the Soviet cosmonaut who became the first human to enter outer space in 1961.

LeoLabs and Slingshot Aerospace.

Countries around the world are making strides in space as the domain becomes more affordable and accessible. The U.S. Space Force has built momentum, fielding new space domain awareness assets, integrating automation into operations and exponentially increasing launch rates, Meink said.

The young service will benefit from structural acquisition changes proposed by Defense Secretary Pete Hegseth to empower leaders and accelerate timelines, Meink said, explaining that the department is shifting from a program executive officer model to "portfolio acquisition executives" that would have "authorities, resources and talent to execute some of the most technical programs." The transition should be complete within 60-90 days, he told reporters.

The Pentagon's pivot from using airborne platforms for ground- and air-moving-target indication (MTI) to spacecraft could be among the first programs to benefit from the new model. The Department of the Air Force is moving quickly to award multiple competitive contracts for space-based MTI assets to track ground targets first and then air targets, Meink said.

Both missions are important for the Space Force to accomplish in the near-to-midterm, but the service partnered with the National Reconnaissance Office earlier for ground MTI and is thus "further down the road in pulling those systems together," Chief of Space Operations Gen. Chance Saltzman said. Because targets move more slowly on the ground than in the air, "we're just ahead of the game" on ground-based MTI, he said.

As the Space Force is known for missile warning and tracking capabilities, MTI from space will soon become the next major "brand" of capability for the service, new Combat Forces Command Commander Lt. Gen. Gregory Gagnon told reporters Dec. 10.

Combat Forces Command was known as Space Operations Command until Nov. 17, when it was redesignated to reflect a shift in forces toward integrated space defense and combat readiness. Gagnon assumed command after serving as deputy chief of space operations for intelligence.

"Our goal is to make [MTI] just like missile warning," he said. "No one ever questions missile warning. It's the best in the world." 🇺🇸



U.S. AIR FORCE

Whiting during a fireside chat at the Space Force Association's Spacepower Conference Dec. 10-12 here. "That period of calm was deceiving," he said.

As the Space Force celebrated its sixth birthday in December, China and Russia are creating new dynamics for the U.S. to counter in the domain, service officials said at the conference. Those space-based threats are advancing "staggeringly fast," Air Force Secretary Troy Meink said in a keynote speech. His appearance marked the first by a service secretary at the three-year-old conference, signaling the growing prioritization of space in U.S. defense strategy.

In his prior roles in the intelligence community, Meink watched China develop weapon systems "at about half the timelines of the U.S.—even worse, in some cases," he said.

Meink warned that the U.S. risks

China is now the pacing threat, with Russia not far behind. Beijing, Moscow and Washington have regularly engaged in a cat-and-mouse game, "sort of stalking each other" in orbit, said Chief Master Sgt. Ron Lerch, senior enlisted advisor to the deputy chief of space operations for intelligence.

In the past year, that has evolved to "more of a hide-and-seek game" in low Earth orbit (LEO), Lerch said. The activities of China's three Shiyang-24 satellites in LEO suggest progress with "a decades-long plan and research to potentially use some stealth applications in space," he said.

Meanwhile, Russia has debuted its experimental, low-visibility Mozhayets satellite in medium Earth orbit, Lerch said. Slides presented during his speech credited information on Shiyang-24 and Mozhayets to space situational awareness companies

Stratolaunch Targets Boeing 747 and Roc Hypersonic Test Rate Ramp

> 747 FLIES DRY-RUN TESTS OVER WHITE SANDS AND PACIFIC

> UPCOMING FLIGHTS INCLUDE FIRST HADLEY ROCKET REUSE TEST

Guy Norris Colorado Springs

Hypersonic test company Stratolaunch plans to attempt back-to-back flights faster than Mach 5 of two rocket-powered Talon-A aircraft in January using its Roc carrier platform and newly modified Boeing 747-400.

dence that's never been done with reusable hypersonic vehicles," Stratolaunch President and CEO Zachary Krevor says. "We are continuing to put those vehicles through their paces. We go out and test; we see how close we are to being ready to launch and

and match," Krevor says. "That's the key to bumping up the cadence and making sure that these hypersonic vehicles can fly with whatever carrier aircraft. For example, if one mission is particularly complex, we can keep up the launch cadence with the other hypersonic vehicle and move those airplanes to whatever mission location is needed by the customer."

In addition, one of the January flight attempts will be powered for the first time by an Ursa Major-built Hadley rocket motor that has flown on a previous Talon flight. "It's gone through its paces on the ground," Krevor says. "The Ursa and Stratolaunch teams have been working to achieve that level of rigor so that to all of us, it seems just like a brand-new engine."

Stratolaunch is unable to comment, but the company is thought to have so far completed four launch and recovery hypersonic test flights with the TA-2, all of which have landed at Vandenberg. Most, if not all, are believed to have been undertaken for the Pentagon's Multi-Service Advanced Capability Hypersonic Test Bed (MACH-TB)

STRATOLAUNCH PHOTOS



Designed to carry the Talon-A beneath the forward fuselage, Stratolaunch's 747 is on track to launch its first hypersonic vehicle in January.

The two flights, if achieved, will represent a record cadence for hypersonic testing with reusable vehicles from multiple launch platforms—and a major step toward meeting the Pentagon's goal of 50 hypersonic test flights per year.

The attempt follows an intensive buildup period during which Stratolaunch's 747-400 flew a 3-hr. 51-min. practice launch mission with the Talon TA-3 test vehicle over the Vandenberg SFB Western Range on Nov. 22 and a similar 5-hr. 37-min. mission with the TA-2 over White Sands Missile Range, New Mexico, on Dec. 9. At the same time, the company's six-engine Roc carrier aircraft returned to flight with two crew training missions in December following a two-month maintenance period.

"We are going to demonstrate a ca-

work out any kinks. Then we are getting ready to start 2026 with an exciting flight demonstration series."

Although externally identical to the TA-2, the latest Talon vehicle is "at least 5% lighter on a dry-weight basis" than its predecessors, Krevor says. "We made a few improvements, and she's lost a bit of weight compared to TA-2, which, obviously, we have turned into performance." In addition, the TA-3's flight on the 747 over the Vandenberg SFB's controlled test range was flown at 41,000 ft., about 6,000 ft. higher than the Roc's usual highest launch altitude.

The back-to-back flights were conducted using both the TA-2 and TA-3 "because we want to be able to mix



Stratolaunch's Talon TA-2 hypersonic vehicle is thought to have flown four missions, the last two in September.

program. One of the early missions planned for the 747 with the TA-3 is for the U.S. Missile Defense Agency.

"Although we're the only ones who continue to fly reusable hypersonic flights, the MACH-TB program is having a lot of success," Krevor says. "There's a lot of flights from a number of providers." Beyond Stratolaunch, key program members include Corvid Technologies, Dynetics, Firefly Aerospace, Koda Technologies, Kratos, Leidos and Rocket Lab.

"It's great that the overall capacity of the nation's hypersonic flight capability is starting to increase, and I think 2026 is going to be a banner year for the MACH-TB program," Krevor adds. 🇺🇸

PRATT'S NEXT CENTURY



Guy Norris Colorado Springs

PART TWO One hundred years after Pratt & Whitney founder Frederick Rentschler watched nervously as the manufacturer's first reciprocating engine fired into life, he would undoubtedly be astonished at what his company has become.

Now a global powerhouse, Pratt & Whitney has transformed beyond all recognition since developing its first breakthrough air-cooled R-1340 Wasp radial prototypes—an achievement accomplished in a drafty former Connecticut auto plant with just six engineers and 20 shop personnel in only nine months.

But heading into the second half of the 2020s, the world is a very different place. Now part of the RTX aerospace conglomerate, Pratt & Whitney and its prolific Pratt & Whitney Canada (P&WC) division face intense and growing domestic and international competition in every sector—from the highest-thrust military engine to the smallest turbine and turboprop.

The company is fighting to rebuild its once dominant commercial engine position with the geared turbofan (GTF), and its defense arm is rapidly innovating to fend off challengers across its military portfolio.

So as Pratt & Whitney enters its second century, where will it be in 2125, and how will it get there? While nobody can know the future, the company's fundamental belief in the gas turbine remains unshaken. For the foreseeable future, Pratt sees ample runway ahead for the air-breathing jet engine and the Brayton thermodynamic cycle at its core.

But Pratt & Whitney, like all engine-makers, is seeking ways to optimize the thermodynamic and propulsive efficiency of gas turbines further. At the same time, the company is exploring hybrid propulsion, alternative fuels such as hydrogen and new cycles—particularly the potentially game-changing gains offered by constant-volume combustion (CVC) systems such as rotating detonation engines (RDE).

Inspired by the saying “the best way to predict the future is to invent it,” the engine-maker is embracing new

tools and processes to help it along the way. In the near term, Pratt plans to make greater use of modeling and simulation, artificial intelligence (AI) and advanced materials as well as improved manufacturing and assembly techniques to stay ahead of the pack.

Through these tools, the engine-maker aims to reinforce its current products and make breakthroughs into new areas of disruptive propulsion technology. These range from low-cost manufacturing and high-speed military engines to electrified propulsion and new fuels for improved efficiency and decarbonization.

“AI will help us direct the way we make and design engines, and it is also going to have a significant impact in how we overhaul and monitor engines,” Rick Deurloo, president of Pratt & Whitney's Commercial Engines unit, says. “That's an example of something we're looking at today that has an incredible opportunity long-term. The same goes for our manufacturing process—as we're looking at inspecting hardware, AI is going to be a significant benefit.”

Model-based design is already playing a role in the creation of Pratt's fu-

ture GTF for next-generation single-aisle aircraft, while AI “has incredible potential” for better management of fleets, forecasting engine status and scheduling removals, Deurloo says.

Pratt & Whitney’s modeling and simulation suite, which is being used to develop future propulsion systems for all aircraft classes—civil and military—includes greater use of high-performance computing, graphics processing units and multiphysics, multidisciplinary, multiscale analysis and optimization tools.

“Machine learning and artificial intelligence will be very important,” Irewole Orisamolu, associate director for advanced concepts and technologies at Pratt, said at the American Institute of Aeronautics and Astronautics’ Aviation and Aeronautics Forum in July. “The use of those in combination with multiphysics models and multidisciplinary optimization algorithms allow you to select the best designs, and to optimize whatever your objective function will be.”

On the defense side, AI is already “shaping how we design and manufacture [through] the entire life cycle,” says Jill Albertelli, president of Pratt’s Military Engines unit. “I view it—and digital, which are different components—as the price of entry in today’s defense landscape.

“We’re building digital ecosystems,

changing how we work with our suppliers and customers,” Albertelli continues. “The boundaries are not traditional; it’s much more collaborative and integrated.”

She cites the ongoing development of the XA103 three-stream engine under the Next-Generation Adaptive Program (NGAP) as an example. “We’re able to work directly with our customers, letting them see what we’re doing as we’re working,” Albertelli explains. “It allows us to refine the capabilities, and we’re starting to see that we’re able to deliver parts of the process faster than ever before.

“[On NGAP], we’re able to deliver very detailed information twice as fast as we used to,” Albertelli adds. “It enables rapid design, allows for iterations, lets you integrate with suppliers and other systems at a faster pace and be ready for manufacturing. It’s true integration, understanding best practices and enabling it to be a great manufacturing process and not just a great design.

“Pratt alone has invested \$30 million in 2025 to further develop our model-based environment, which significantly improves the accuracy of propulsion design, including XA103,” Albertelli says. “It’s enabling us to work faster—engineers and the customer having insight into what we’re doing. We have over 100 domestic

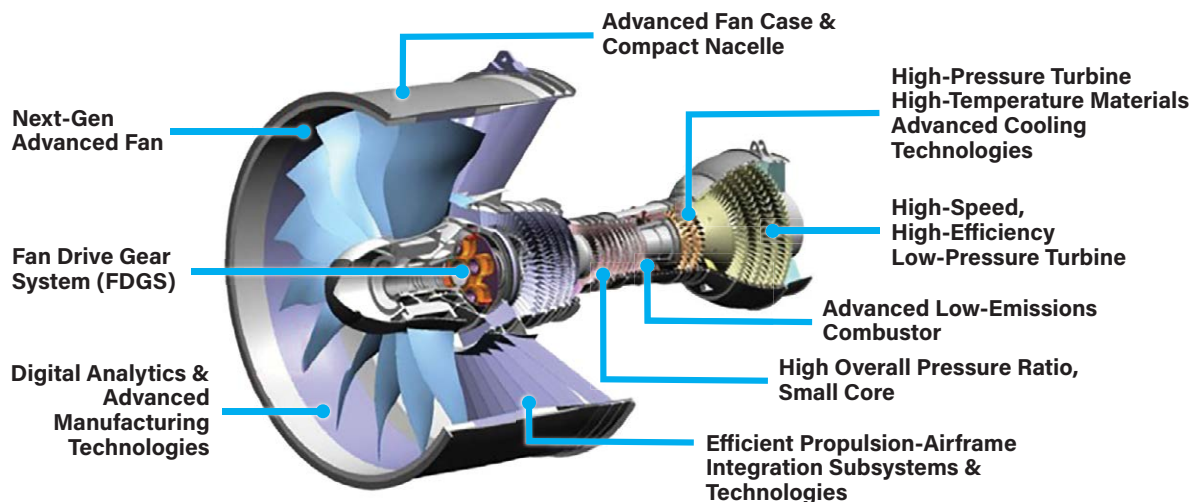
suppliers that we’re working with on this program.” The company passed the digital design review milestone in 2025. “Now we are collaborating using a digital environment and cutting metal and making parts,” she says.

Digital and model-based design mean speed and agility to Albertelli. “But it is also for trying something very different and seeing if it fits in a subsystem,” she notes. “Now when you test your product, you can roll that data into your model and see more easily what other development or iteration changes you want to make. You can also do that to ensure you’re enabling sustainment in the future and creating something that’s easily accessed by the maintainers. It’s about the entire life cycle.”

AI could also play a key role in developing a new generation of advanced alloys with thermal stability, strength and corrosion resistance beyond today’s nickel- and titanium-based materials. “One of the things that we sacrificed on the base GTF engine was we did everything for fuel burn, and we made the core as small as possible to deliver that low fuel burn—including in that were life-limited parts,” Deurloo says. “We don’t have a material invented today that could do all that, but someday we’ll get there, and I think AI will help with that.”

Advanced materials research at

Future Generation GTF Engine



Pratt & Whitney’s future geared turbopfan for next-generation single-aisles could also provide a steppingstone to a larger version for future widebody airliners later in the 21st century.

Source: Pratt & Whitney

Pratt is aimed at further development of a novel class of high-entropy alloys that, unlike current superalloys with a single major constituent metallic element, include five or more principal elements for high strength and low density. Building on earlier RTX work, Pratt is also studying the use of high-temperature ceramic composite materials with capabilities of operating at more than 3,000F, as well as smart materials for adaptive and multifunction structures.

As part of RTX, Pratt & Whitney enters its second century on a stronger technical and financial footing. Noting that the whole is greater than the sum of the parts, Deurloo says the engine-

developer Hermeus, hybrid-electric propulsion startup VerdeGo Aero and Swiss electric propulsion company H55.

Faced with higher production demands than in the past—be they for monthly production of hundreds of single-aisle civil engines or thousands of low-cost attritable military engines—Pratt is also developing advanced manufacturing processes. These include more robotic manufacturing and assembly processes as well as greater use of additive manufacturing.

Additive techniques have been tested and developed for the TJ150 turbojet used on the Miniature Air-Launched Decoy and Dynetics Black

and create space for additional fuel, sensors and payloads.

“We’ve completed a series of tests that have been very successful at our RTX Research Center, and we’re working on something very quick and very simple to get it into the hands of our customer,” Albertelli continues, noting that RDEs are “focused on the munitions arena.” However, as CVC technology advances, Pratt has not ruled out the potential for integrating larger RDEs into combined-cycle propulsion systems beyond missile applications to reusable high-speed vehicles such as the U.S. Air Force’s Next-Generation Responsive Strike aircraft.

RDEs or other compact, pressure-gain combustion systems may also feature at the heart of future commercial engines. For now, the nearer-term focus is on new fuel and electrified aircraft propulsion. “These give us additional knobs we can turn to make sure we improve efficiency in other ways, rather than improving the specific fuel consumption of the gas turbine itself,” Orisamolu said.

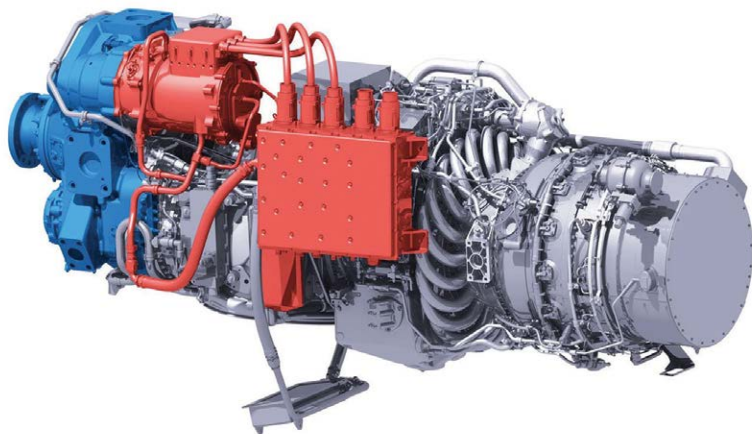
Much of this development work is undertaken by P&WC which, because of its testing agility and smaller-engine expertise, has often been at the forefront of new propulsion system innovations ranging from small, rugged engines such as the PW600 to the GTF.

“We have pioneered aviation by certifying over 200 engines and accumulating over 1 billion flying hours since we first opened our doors in 1928, maintaining and assembling the Wasp engine,” P&WC President Maria Della Posta says. “That’s really where it all started.

“By building on decades of expertise and leveraging close collaborations within RTX and across the industry, we are driving innovations in areas including hybrid-electric propulsion across a variety of demonstrator programs—from helicopters to large regional turboprops,” Della Posta adds.

Working with Collins, P&WC is developing a hybrid-electric demonstrator based on the PW127XT, fitted with a 250-kW electric motor drive system under the European Clean Aviation’s Powerplant Hybrid Application Regional Segment research project. The company is also working with modification specialist Aerotec to convert a De Havilland Canada Dash 8-100 turboprop into its long-planned Hybrid-Electric Propulsion flight demonstrator.

RTX/PRATT & WHITNEY CANADA



Pratt & Whitney Canada is leading the company’s hybrid-electric propulsion demonstrator developments, including the PW127XT-based Powerplant Hybrid Application Regional Segment research project.

maker is poised to take advantage of the conglomerate’s broader capabilities as airframe-engine integration increases. “We are the only aerospace defense company that really owns everything from the propulsion system to the pylon on down—if you include engine controls and aerostructures at Collins Aerospace,” he remarks. “I’d like to see how we can leverage that breadth of scale like never before.”

The company’s venture capital arm, RTX Ventures, is helping guide Pratt’s propulsion trajectory, Deurloo says. “They’re out there looking at cutting-edge technology, whether it’s AI, [sustainable aviation fuel], hydrogen or concepts like the blended wing developer JetZero,” he adds. “We’re a technology company and we’re putting our money where our mouth is.” Propulsion-related RTX Venture investments include hypersonic aircraft

Arrow cruise missiles. “We demonstrated where we’ve taken a complex assembly of over 50 parts and focused on unitization making it into one part,” Albertelli says. “We’ve also been able to additively manufacture some complex components like rotating parts and rotors for that engine.”

Building on this technology, Pratt & Whitney plans to begin tests in 2026 of the first of a new family of scalable small engines targeting collaborative combat aircraft and cruise missiles.

Beyond gas turbines, Pratt & Whitney is increasingly enthusiastic about novel new cycles—particularly for RDEs, which offer high thermal efficiency and performance in a relatively compact form factor. “Gas turbines will always play some role; they won’t play the only role,” Albertelli says. “RDEs, for example, are highly efficient, power-dense, compact in size

In addition, P&WC is working with European startup Maeve Aerospace on a hybrid-electric propulsion system for Maeve's planned M80 80-seat regional aircraft as well as with Montreal-based Evio on development of a hybrid-electric PT6 to power the company's proposed 76-seat EVIO 810 regional transport (page 14).

A modified PW127XT is also at the center of research into the use of hydrogen fuel under the Canadian government-funded Hydrogen Advanced Design Engine Study project. Initially focused on rig tests with its single fuel nozzle and combustor adapted for hydrogen, the work follows Pratt's Hydrogen Steam-Injected, Intercooled Turbine Engine project—a novel hybrid engine configuration that combined the advantages of the fuel's cryogenic properties with the thermodynamic benefits of steam injection.

The work could pave the way for a range of new powerplants, Pratt says, including radically more efficient commercial geared turbofans with zero carbon emissions. The studies also indicate the concept could minimize emissions of nitrogen oxides, a greenhouse gas produced as a byproduct of hydrogen's higher combustion temperatures. To ease the transition to hydrogen, which Pratt considers a potential mainline fuel for regional and single-aisle aircraft by the 2040-50s, the company is also studying a multi-fuel concept under which regular jet fuel is housed in existing wing tanks and hydrogen is housed in the fuselage.

In this concept, the propulsion system is designed to be capable of switching fuels midflight to provide operational versatility and lower overall emissions. Pratt says a multifuel aircraft would be able to take off and land at any airport on any fuel, could perform regional missions on hydrogen with synthetic jet fuel as a reserve and would enable the growth of hydrogen use as infrastructure expands.

"I hope Frederick Rentschler looks back on everything we're doing today and is happy," Albertelli says. "We still have the same focus 100 years later and probably will for the next 100: upholding the legacy of safety and innovation." 🎧

Check 6 Revisits Pratt & Whitney President Shane Eddy and Aviation Week editors discuss the company's first 100 years: [AviationWeek.com/Check6](https://www.aviationweek.com/Check6)

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LEADERBOARD

Graham Warwick Washington

America celebrates its 250th birthday in 2026. Its leading aerospace and defense companies are more than 100 years old, or closing in on that milestone, but face intensifying competition, domestically and internationally, from younger players.

China's aircraft industry is just 75 years old, but over the past two decades it has moved rapidly from building and adapting Soviet aircraft and copying Western models to developing unique designs. Two stealthy fighters first seen in December 2024—the Chengdu J-36 and Shenyang J-50—have no known equivalents in the West and have been developed at a pace the U.S., and even more so Europe, cannot match.

Domestically, Boeing, Lockheed Martin and Northrop Grumman are being challenged by companies such as Anduril Industries and ShieldAI that are not even a decade old and are privately held, with “build it fast, build it commercially and they will come” business models.

Europe's aerospace giants also can trace their origins back to the beginnings of aviation, but, while the region's startup ecosystem is less robust than that in the U.S., they similarly face growing competition from new entrants such as Helsing and Quantum Systems.

If the suggested SpaceX initial public offering in 2026 proves true and achieves the \$1.5 trillion valuation the company reportedly seeks, it would dwarf even the biggest of the existing players. GE Aerospace at \$300 billion and Airbus and Boeing at around \$150 billion would be left in the dust, despite their much higher revenues.

The newcomers are likely to be aided by Pentagon acquisition reforms that will favor the rapid, iterative fielding of good-enough systems that leverage commercial technologies over traditional, lengthy programs of record. Established primes are already responding by working to reduce the cost and increase the pace of new products.

The flagship for this trend is the collaborative combat aircraft (CCA) market, a term coined in the U.S. but spreading globally. The first CCA are in flight testing in Australia, Turkey and the U.S. and on the fast track to operational fielding in 2-3 years. Industries are also preparing to mass-produce low-cost cruise and ballistic missiles as well as hypersonic glide vehicles.

**“Build it fast,
build it commercially
and they will come.”**

Another potential poster child for reform is the Golden Dome for America homeland air and missile defense program, under which more than 1,000 companies have received contracts in the initiative's early stages. But commercial technologies can only help so much as the Pentagon tries to compress into years something that would traditionally take decades.

Pressure to move “at the speed of Trump” to field something within the remainder of President Donald Trump's term in the White House is also driving the effort to modernize the U.S. air traffic control system. The program offers a potential springboard for U.S. companies to compete in a global air traffic management market dominated by European technology.

In commercial aviation, Boeing's 737 series lost its long-held lead to the Airbus A320 family in October when the European airframer delivered the 12,260th A320-series aircraft. But Boeing's recovery continues while Airbus hit a temporary delivery headwind at the year's end. Pressure on narrowbody output continues to be

intense, but competition is heating up in the widebody market as new, fast-growing airlines launch and pent-up demand for replacement and growth materializes.

As delivery rates pick up, closing an aircraft capacity and capability gap that started to open with 2019's 737 MAX grounding, some of the underlying trends that boosted commercial maintenance, repair and overhaul in recent years are changing. The ramp-up will keep the pressure on parts providers, however.

In the advanced air mobility market, Europe ceded any lead in 2025 as Lilium went bankrupt and Volocopter was sold to China's Wanfeng, while the UK's Vertical Aerospace continues to fight for investor credibility.



Archer Aviation, Beta Technologies and Joby Aviation in the U.S. lead the industry but face a strong challenge from China's startups in the race to certification and the launch of air taxi service.

In space, the atmosphere is one of intensifying competition: between the U.S. and China to land humans on the Moon, between SpaceX and Blue Origin to enable a U.S. return to the lunar surface and between the U.S. and every country that realizes it is time to act to gain a share of the emerging orbital economy. This is particularly true of Europe, which also needs to boost its security in space in the face of Russian aggression. ☼



Check 6 *Nine Aviation Week editors discuss the biggest surprises of 2025 and their top predictions for 2026:*
[AviationWeek.com/Check6](https://www.aviationweek.com/Check6)

Boeing and the Royal Australian Air Force fired an AIM-120 air-to-air missile from the MQ-28 Ghost Bat in December as the collaborative combat aircraft moves closer to operational fielding.



KEY INTEL

📈 Data 📷 Galleries

PREDICTIONS

In defense (*page 46*), space (*page 55*), commercial aviation (*page 70*), business aviation (*page 80*) and maintenance repair and overhaul (*page 100*).

📈 📷 DEFENSE

National security is turning inward, space-based interceptors are coming, collaborative combat aircraft are advancing, but demand for traditional airpower is showing no signs of diminishing (*pages 32-43*).

📈 📷 SPACE

SpaceX continues to drive the space industry, but competitors are emerging as crucial government and commercial milestones loom on the journey back to the Moon and beyond to Mars (*pages 48-54*).

📈 📷 COMMERCIAL AVIATION

Certification finish lines and production rate increases are in sight for commercial aircraft manufacturers. European carriers are the most profitable, but the Asia-Pacific region outpaces the rest of the world in growth (*pages 58-66*).

📈 📷 BUSINESS AVIATION

Business aircraft flight hours and demand for new deliveries remain high, while industry efforts to improve sustainability continue. Plus, a look at the market's latest jets and turboprops (*pages 72-78*).

📷 PROPULSION

After supply chain turbulence, commercial engine-makers are hoping for a smoother 2026. Existing and new players are targeting the emerging collaborative combat aircraft powerplant market (*pages 82-85*).

📈 📷 ROTORCRAFT

Commercial demand for helicopters is strong while certification hurdles continue to hold back new models. Europe and China move to catch up with the U.S. on advanced military rotorcraft (*pages 86-89*).

📈 📷 ADVANCED AIR MOBILITY

China's emerging low-altitude economy is driving the development of large uncrewed logistics aircraft that have no equivalents in the West. SMG Consulting's Reality Index ranks the leading developers (*pages 90-92*).

📈 MAINTENANCE, REPAIR AND OVERHAUL

Fewer than expected new deliveries mean older aircraft and engines will continue to drive demand for aftermarket services, but the gap between supply and demand is beginning to close (*pages 94-99*).

📈 DATA CENTERS

Combat aircraft and military transports (*pages 44-45*), space launch vehicles (*pages 56-57*), commercial aircraft (*page 68*), business aircraft (*page 79*) and rotorcraft (*pages 87-88*).

WATCHPOINTS

From Moon launches to autonomous combat aircraft and vertical-lift advances, what to keep a lookout for in 2025 (*pages 30-31*).

PEOPLE TO WATCH

In defense (*page 37*), space (*page 54*), commercial aviation (*page 62*), business aviation (*page 74*) and maintenance repair and overhaul (*page 96*).

*Aerospace & Defense 2026 incorporates data from the Aviation Week Intelligence Network.
For more information, visit awin.aviationweek.com*

Contact Melissa Crum at +1 (913) 284-2951 melissa.crum@aviationweek.com

Destination Moon

A race to the Moon is on. Blue Origin's Blue Moon Mark 1 cargo lander is scheduled to fly to the lunar surface in early 2026, boosting competition with SpaceX, which is planning Starship V3 long-duration flight and in-space propellant transfer tests tied to its NASA Human Landing System program.



BLUE ORIGIN

WHAT TO WATCH FOR IN 2026

Industry will be hoping for a year of progress, putting behind it the production challenges and certification delays of recent years and accelerating the transition to new technologies and faster development and procurement cycles.

Graham Warwick Washington

Certifying eVTOL

Western startups face the challenge of delivering on their hopes of certifying their passenger-carrying electric vertical-takeoff-and-landing (eVTOL) air taxis by the end of 2026. China is driving to achieve the same milestone ahead of the U.S., having already certified the first winged cargo eVTOL in 2024.



AEROFUGIA

Tilting Forward

The U.S. Army has accelerated the Future Long-Range Assault Aircraft program, with Bell's first YMV-75A prototype now planned to fly by the end of 2026. The Army's new goal is to launch production in 2027 and have the first unit equipped with the advanced tiltrotor transport by 2030.



BELL

China's JSF

First deliveries of the Shenyang J-35 stealth fighter to the People's Liberation Army Air Force and Navy are expected in 2026, as well as potentially to first export customer Pakistan, giving China and its client nations an equivalent to the Lockheed Martin F-35 Joint Strike Fighter (JSF).



AIRBUS



PEOPLE'S REPUBLIC OF CHINA NATIONAL DEFENSE MINISTRY

Cargo Changeover

Airbus is targeting the third quarter of 2026 for the delayed first flight of the A350F, its first new-build freighter since the A330F flew in 2009. Boeing, meanwhile, has begun construction of the first 777-8F, its replacement for the 777F, set to be the bestselling large freighter when its run ends in 2027.

Lunar Loop

NASA's second Artemis lunar mission, the first with crew, is planned for April 2026.

The Space Launch System is to send four astronauts on a 10-day flight around the Moon to confirm all the Orion spacecraft's systems operate as designed with crew aboard in the environment of deep space.



NASA

Finish Line

Unprecedented delays in the certification of new aircraft by major manufacturers across the industry have occurred in recent years. Will 2026 at long last bring FAA approvals for the Bell 525 helicopter, Leonardo AW609 tiltrotor, single-turboprop Beechcraft Denali and Boeing's final MAX family members, the 737-7 and -10? 🏁



BELL

Autonomous Combat

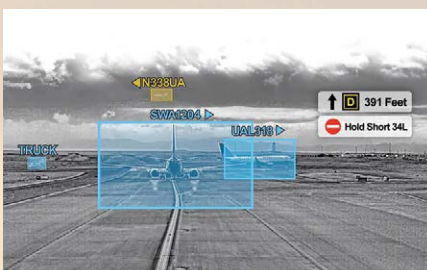
With an expected Increment 1 production decision and Increment 2 requirements release, the U.S. Air Force's Collaborative Combat Aircraft initiative is expected to move forward in 2026 as the U.S. Army, Navy and Marine Corps follow similar paths to augment crewed aircraft with autonomous platforms.



U.S. AIR FORCE

Cockpit Intelligence

With the first applications advancing toward certification, the European Union Aviation Safety Agency is set to release its first rulemaking on artificial intelligence (AI) in 2026, deploying a regulatory framework for high-risk AI systems in aviation that addresses trustworthiness, assurance, human factors and ethics.



UNIVERSAL AVIONICS

People to watch **p. 37** Data center **p. 40** Aircraft competitions to monitor **p. 42**
 Combat and transport aircraft data **p. 44** Predictions for 2026 **p. 46**

HOME DEFENSE

➤ SECURITY TURNS TOWARD
NATIONAL INTERESTS

➤ COMPLEX BARRAGES OF MISSILES
AND DRONES DRIVE CHANGES
TO OFFENSE AND DEFENSE

➤ BUDGETS EXPAND GLOBALLY AS SPENDING
PRESSURE GROWS IN THE U.S.

The U.S. demonstrated its new aggressive Western Hemisphere posture with deployment of the USS Gerald R. Ford Carrier Strike Group in the Caribbean Sea in mid-November.

PETTY OFFICER 3RD CLASS TAJH PAVNE / U.S. SOUTHERN COMMAND

Steve Trimble and **Brian Everstine** Washington and **Tony Osborne** and **Robert Wall** London

A comparison of global headlines between December 2024 and 2025 speaks to a changed world. A year ago, reports focused on rising tensions in the South China Sea, sparked by clashes between the Chinese Coast Guard and Filipino fishing boats. Twelve months later, U.S. air strikes on alleged drug smugglers in the Caribbean Sea dominate the news as a new government in Washington violently raises the pressure on Nicolás Maduro's regime in Venezuela.

That temporal juxtaposition heralds the new global trend: National security is turning toward interests perceived as closer to home. International alliances are being maintained, but troops are more likely to be deployed in 2026 to their own country's cities than to the borders of a foreign partner. Investment in offensive capabilities is continuing amid a broader spending surge, but funding is increasingly diverted to erecting elaborate, nationwide "shields" or "domes" meant to protect various national homelands from air and missile attacks.

Underlying this policy shift is a revolution in the technology of warfare. As the second half of the 2020s begins, prototypes of space-based interceptors are close to being demonstrated, the still-nascent category of collaborative

combat aircraft (CCA) continues a brisk march to operational fielding in 2-3 years, and industries are preparing to churn out cruise missiles, ballistic missiles and hypersonic glide vehicles at a scale never before seen. All are driven by recent breakthroughs in propulsion, autonomy and digital engineering and manufacturing.

Meanwhile, demand for the traditional platforms of air-power—the crewed fighter, bomber and rotorcraft—is not diminishing. In 2026, the world could see the Sukhoi Su-75 Checkmate fighter take flight in Russia and the first Bell MV-75 tiltrotor rushed into flight tests for the U.S. Army. The U.S. Navy still awaits a promised approval to launch development of a new F/A-XX carrier-based fighter, pending the outcome of industrial readiness reviews.

These weapons are being developed in a world framed by the new threat of the modern era: sustained and coordinated barrages involving multiple types of conventional, precision-guided weapons ranging from drones to cruise missiles and from ballistic missiles to hypersonic, maneuvering weapons. Such campaigns have spurred investments in offensive stockpiles vast enough to sustain similar attacks over months or years, as well as the grand, multilayer architectures needed to thwart them.

Defense of the homeland thus becomes the new pole star for industry. The trend lines have been developing for several years, but the policies and actions in the first year of U.S. President Donald Trump's second term have clarified and accelerated the shift from defense to offense.

Higher spending levels so far have blunted the impact on

legacy programs. Most NATO members are racing to meet a newly established goal of raising defense spending to match 5% of GDP, which dates back to Trump's first term and is reemphasized in the newly released U.S. National Security Strategy. The goal is also driven by overt pressure from the Trump administration.

"We expect our allies to spend far more of their national . . . GDP on their own defense to start to make up for the enormous imbalances accrued over decades of much greater spending by the United States," the National Security Strategy document states.

But the shift also reflects a new urgency felt almost uniformly across NATO. After all, a major war in Europe is raging, with the potential to spread beyond the embattled borders of Ukraine. A series of Russian drone incursions and reckless air-to-air intercepts in NATO airspace underscore the pressure on European members of the alliance.

Indeed, countries in Europe—largely in step with a succession of U.S. administrations—once pursued wars of choice in the Balkans, Iraq, Afghanistan and West Africa's Sahel for decades. But home bases were treated as a sanctuary, perceived to be out of harm's way. Russia's doctrine of unconventional warfare, however, means the front line is now at home. Moscow is believed to be behind countless murders and arsons across Europe. Russia has funded right-wing political groups that have divided societies and even launched drone and balloon flights that—in addition to rampant jamming of satellite-based navigation signals—have disrupted commercial air traffic and tested NATO's response. Russian naval activity—on missions both unambiguous and ambiguous—is increasing.

A similar dynamic continues to play out in the Indo-Pacific region with China's relentless acquisition of powerful new military capabilities. Since December 2024 alone, Beijing has allowed official and unofficial sightings of two new stealth fighter prototypes, multiple CCA, a high-altitude surveillance uncrewed aircraft system, two different tiltrotor designs, a wing-in-ground effect vehicle and a high-speed rotorcraft featuring a coaxial rotor and pusher-propeller. With an acknowledged stealth bomber program still under wraps and a defense industry running at peak levels, one can only guess what China has in store to reveal before the end of 2026.

Alongside North Korea's modernization campaign, China's military surge has triggered a skittish region. Taiwan plans to begin implementing a \$40 billion plan to upgrade its military capabilities in 2026 even while already absorbing upgraded Lockheed Martin F-16s and long-sought General Atomics Aeronautical Systems Inc. MQ-9Bs. Japan and South Korea are stockpiling drones, missiles and modern military aircraft with an emphasis on finding roles for proven domestic industries.

In the U.S., the Trump administration is seeking to redefine the country's relationship with allies, partners, competitors and adversaries. The National Security Strategy emphasizes a newly aggressive posture in the Americas, redeploying troops, aircraft and naval platforms to counter alleged drug smugglers, illegal migration and regimes such as Venezuela. At the same time, the U.S. wants to preserve its leadership on the global stage even as it scales back its military presence in certain regions and lowers the threshold to intervene in affairs outside the Western Hemisphere.

In the next 12 months, the Trump administration plans

Selected Aircraft Milestones Expected in 2026

Australia

Boeing MQ-28 The initial batch of Block 2 variants expected to be delivered, pending program go-ahead decision by Australian government by the end of 2025.

Brazil

Embraer KC-390 Embraer expects to complete studies for a potential maritime patrol variant.

Canada

Lockheed Martin F-35 The country expects to receive its first of 16 F-35As it has ordered, but follow-ons for all 88 in the program of record remain subject to ongoing review by Prime Minister Mark Carney.

China

Shenyang J-35 The first deliveries to People's Liberation Army Air Force and People's Liberation Army Navy aircraft carrier wing are expected.

Fujian China's third aircraft carrier is expected to be fully operational.

France

Dassault Rafale Development of the French front-line fighter's F5 standard is expected to commence.

India

Advanced Medium Combat Aircraft The Indian government expects to finalize selection of industry partners in midyear and roll out the first of five prototypes by year-end or early 2027.

Tejas Mk. 1A Hindustan Aeronautics Ltd. is expected to deliver the first batch of the Mk. 1A variant to the Indian Air Force.

Tejas Mk. 2 Rollout of first Mk. 2 variant is scheduled in early 2026, and first flight is planned before year-end.

NATO

Next-Generation Rotorcraft Capability Firm requirements are due to be set by July.

Pakistan

J-35 The first batch of Chinese stealth fighters are reportedly scheduled to be delivered.

Russia

Sukhoi Su-75 Checkmate A first flight is scheduled in early 2026.

South Korea

Korea Aerospace Industries KF-21 The Block 1 variant is to enter service with the Republic of Korea Air Force in 2026 after first delivery in late 2025.

Taiwan

F-16V The first upgraded F-16s are set for delivery to the air force.

MQ-9B The first two of medium-altitude, long-endurance aircraft are scheduled to arrive in 2026.

Turkey

Turkish Aerospace Industries Kaan Delivery of the second prototype of the new fighter is scheduled for the spring of 2026.

Bayraktar Kizilelma The uncrewed combat air vehicle (UCAV) is scheduled for delivery to the Turkish Air Force.

Turkish Aerospace Industries ANKA-3 The UCAV is expected to enter service.

Hava The country's first standoff jammer aircraft, based on the Bombardier Global 6000, is slated for delivery.

Ukraine

Saab Gripen Ukraine plans to begin training pilots and maintainers for its future Gripen E fighter fleet, pending financing deals for aircraft acquisition.

United Arab Emirates

Rafale Dassault plans to deliver the first of 80 F4s to the country.

Jeniah The homegrown UCAV prototype developed by Edge Group is slated to complete its first flight.

U.S.

F-35 The U.S. government plans to certify full capability of Technology Refresh-3 avionics that underpin future Block 4 upgrades.

Bell MV-75 Accelerated first flight of the new tiltrotor is planned in 2026, following completion of the critical design review.

Northrop Grumman B-21 Two more flight-test aircraft are expected to be delivered in 2026, completing the test fleet during the development phase.

Collaborative Combat Aircraft (CCA) The U.S. Air Force is expected to release requirements for Increment 2 and award production contracts for Increment 1, the Marine Corps aims to award the contract for the first lot of Kratos XQ-58s, and the Army plans to launch a vertical-takeoff-and-landing CCA program.

Boeing MQ-25 The autonomous refueler is scheduled to begin operating from a Navy aircraft carrier.

Lockheed Martin E-130J Phoenix II Delivery of the first aircraft for the Take Charge and Move Out mission is scheduled.

Boeing KC-46 The Remote Vision System 2.0 upgrade for the tanker expected to be cleared for operational tankers in late 2026.

Boeing T-7A First delivery of the production version of the advanced training jet is expected. 🌐

to clarify the financial resources against the new strategy in the Pentagon's five-year spending plan for fiscal 2027-31. The drafting of that plan faces an unusual problem, though, since Congress approved a budget reconciliation package in July that added \$156.2 billion to the Pentagon's top line and with it, multiyear financial commitments on programs such as the Northrop Grumman B-21, Boeing F-47 and Golden Dome missile defense plan.

As the fiscal 2027 budget process plays out in Washington, the administration will need to decide whether to raise the defense top line by an equivalent amount or make compensatory spending cuts. It could also look to lawmakers for another reconciliation package, but that would risk legislating an unpopular spending proposal in a midterm election year.

Demands on the U.S. defense budget are only growing. Following the spring announcement of Boeing's win in the competition to build the U.S. Air Force's F-47, the fighter world has fixated on the fate of the Navy's F/A-XX competition. While a downselect between finalists Boeing and Northrop Grumman also was expected in the spring, the program has been delayed and its future is uncertain—the Pentagon is trying to push back the effort while Congress looks to force the department's hand and move forward. A downselect appears likely, but the program timeline is not clear.

Boeing has little schedule margin in which to meet the Pentagon's goals on the F-47, as the first flight is expected in 2028. The first test article is being manufactured, and the service plans to spend \$2.6 billion in fiscal 2026 on the program.

Northrop Grumman is also ending 2025 awaiting movement on an increase to the production of its marquee B-21 Raider bomber. The Air Force has long said it wants to raise production beyond the current program of 100 bombers, and Northrop CEO Kathy Warden said in October that a decision on the ramp was coming soon, although it was delayed by the fall government shutdown. The One Big Beautiful Bill Act included \$4.5 billion for the effort.

While the Navy's aviation community is fixated on the fate of F/A-XX, the service is also looking to progress on a new trainer to replace the aging T-45 Goshawk. The Navy originally expected a formal request for proposals for the Undergraduate Jet Training System in December, but that was pushed into 2026 by the government shutdown, the service said in a notice to industry. An award is now anticipated in early 2027.

The largest fighter procurement program ongoing, the Lockheed Martin F-35, has suffered continued delays to its modernization effort that have in turn caused the Pentagon to drop its procurement levels. The Technology Refresh 3 (TR-3) hardware update needed for the overall major Block 4 program has been pushed back, and now Lockheed expects to begin delivering fully combat-capable aircraft with TR-3 in 2026—a three-year delay. According to the Government Accountability Office, full Block 4 completion is now expected in 2031.

The U.S. Army's biggest modernization effort, the MV-75, is accelerating with a creative adjustment to its acquisition schedule targeted for faster fielding. The service is expecting an overall critical design review in 2026, but it has handed over review authority for subsystems to keep the effort progressing. Bell is beginning production on major components including rotor blades, yokes, drive system,



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fuselage and other major components as design continues. The Army plans a Milestone C decision in 2028, although it expects to have 20 aircraft built before then.

Arguably, the most dynamic programs in the U.S. defense budgets in 2026 will be the multiple CCA initiatives. Over the next 12 months, the Air Force plans to launch production for their Increment 1 design and the long-delayed competition for Increment 2 prototypes. The Marine Corps intends to start taking deliveries of the next batch of Kratos XQ-58A Valkyries, which have been selected as its CCA. The Army plans to start developing requirements for a vertical-takeoff-and-landing CCA to augment MV-75s and Boeing AH-64 Apaches. And more may be revealed about the Navy's more secretive interests in CCA.

a record €131 billion (\$153 billion) in funding for defense and space in what it bills as a fivefold increase, while the Security Action for Europe initiative is making available up to €150 billion in loans for countries to acquire new equipment, with a preference for buying in Europe.

Much of the bloc's activity focuses on plugging air and missile defense gaps. Germany has begun introduction of the Israel Aerospace Industries Arrow 3 system, which enables it to intercept ballistic missiles outside the atmosphere. UK Royal Air Force Chief of Staff and Air Chief Marshal Harvey Smyth said London's plan to spend upward of £1 billion (\$1.3 billion) on Integrated Air and Missile Defense would focus on command and control, sense and warn missile defense systems and other elements rather than interceptors.

The interest in safeguarding skies against everything from low-cost drones to hypersonic threats is also driving a proliferation of "dome" concepts, echoing the Pentagon's Golden Dome that itself was inspired by Israel's Iron Dome. Turkey is stepping up its effort to establish its Steel Dome after awarding Aselsan and Roketsan a combined \$6.5 billion in contracts to develop the system.

Leonardo CEO Roberto Cingolani is proposing a similar modular, scalable, multidomain kill web called the Michelangelo Dome. Cingolani said the market for such networked systems in Europe alone could be worth up to €300 billion over the next 10 years. And Taiwan has earmarked about \$40 billion to support programs such as the T-Dome air and missile defense system to start in 2026.

Washington's pivot is spurring European demand elsewhere, including in boosting support assets such as intelligence, surveillance and reconnaissance capabilities, air-to-air refueling and other activities. Germany, for example, is defining plans for airborne electronic attack, NATO faces

a decision on its Boeing E-3 Sentry airborne early warning aircraft replacement, and Poland is looking to firm up plans for tankers.

After a year in which European NATO members committed to higher spending targets and unveiled planned budget increases, those promised funds should start showing up in investment accounts in 2026. Procurement accounts alone should rise about 15%, according to the Aviation Week Network Defense Market Analyzer data.

Given the strong demand signal, many European defense companies are mulling increases in production capacity, in some cases on top of boosts in output they had previously adopted. Safran, for instance, says it may raise the production rate for missile engines, after already increasing output by a factor of five. Hensoldt boosted output 8.5% on the TRML-4D air defense radar but is considering another hike.

The enthusiasm to ramp up is also fed by overseas demand. Saab is considering a third Gripen E final assembly site on top of those in Sweden and Brazil, given the growing appetite for the single-engine fighter. Dassault Aviation and Eurofighter are ramping up at their existing locations.

European countries' ambitions around CCA should be clarified in the coming months. While many air forces have expressed interest in the technology, few have noted exactly what they want, beyond adding combat mass to augment their fighter fleets. Germany has begun looking for such a



The CCA paraded in Beijing in September are part of a wave of aerospace systems China has unveiled since December 2024.

The U.S. coined the term "collaborative combat aircraft," but the concept has spread internationally. Turkey's Bayraktar Kizilelma and Australia's Boeing MQ-28 Ghost Bat have already fired the first air-to-air missiles. Turkey plans to win a global race to field the first CCA operationally in 2026; the MQ-28 is slated to follow in 2027. Meanwhile, U.S. and European companies are jockeying to respond to demand for CCA throughout Europe and Asia, fueling an emerging market for a new class of dedicated propulsion systems, sensors and weapons.

But still, the U.S. policy shift toward homeland defense is reverberating elsewhere—perhaps nowhere as much as in Europe, where Washington has turned from a security guarantor to an at times bellicose counterpart. New political realities are driving changes both at the European Union level and at national levels.

The EU plans to kick off in earnest in 2026 work on several flagship initiatives to fill gaps in its defenses by 2030. Those include the European Air Shield, European Drone Defense Initiative, Eastern Flank Watch and European Space Shield. The Eastern Flank Watch and European Drone Defense Initiative are due to launch before the end of March, aiming to field first capabilities by year-end.

Brussels also is looking to put the finishing touches on its next multiyear budget plan that would begin in 2028. The European Commission, the bloc's executive arm, is seeking



The U.S. Marine Corps plans to start producing QX-58 Valkyries, which it intends to pair up with F-35Bs on strike missions.

is playing out in other areas, too. The UK plans to award a contract in 2026 for an autonomous collaborative platform to use on its AH-64E Apache attack helicopters, while Airbus is in talks with A400M airlifter users to tap the transport as a launch platform for drones and missiles.

Fighter fleets in Europe also are set for an injection of new equipment. Germany is due to take delivery of its first F-35 and Poland its first Joint Strike Fighters following training operations in the U.S. At one point, European combat aircraft manufacturers worried the inflow of F-35s would spell doom. But those fighters are now arriving as backlogs for the Rafale, Typhoon and Gripen are at near historically high levels, showing the region's appetite for increased combat capability—Germany,

Italy and Spain are acquiring additional Eurofighters, and France is buying more Rafales. 🌐

Gallery See more about developments in the defense sector in 2025: [AviationWeek.com/defense2025](https://www.aviationweek.com/defense2025)



system to introduce around the end of the decade, and the UK wants to fly an autonomous collaborative platform from its Queen Elizabeth-class carriers in 2026 as well as with a Eurofighter Typhoon in 2027.

The use of uncrewed aircraft to augment crewed systems

People To Watch



Selçuk Bayraktar

Baykar Chairman and Chief Technology Officer
Haluk Bayraktar
Baykar CEO

The brothers behind Turkish uncrewed aircraft systems developer Baykar are pushing forward with the development of the Kizilelma uncrewed fighter aircraft to build on export success with the TB2 and Akinci designs.



Gen. Michael Guetlein

U.S. Space Force
Director of Golden Dome
Guetlein faces a tight timeline in 2026 to turn into reality the Golden Dome missile defense architecture he set in recent months, and he will have to juggle multiple development projects in parallel to deliver a first capability before noon on Jan. 20, 2029.



Brig. Gen. Robert Lyons III

U.S. Air Force
Program Executive
Lyons, program executive officer of the Armament Directorate, inherited the Weapons Capacity Task Force, which rapidly developed a family of low-cost cruise missiles. Those weapons must be scaled up to unprecedented levels in the next 12 months.



Brian Schimpf

Anduril CEO
It is starting to be show-me time for Anduril to demonstrate there is more to the startup than glitzy designs and an in-vogue narrative.



Sanjiv Singh

Near Earth Autonomy CEO
The company's technology to automate aircraft is gaining traction, with demonstration milestones ahead.



Lt. Gen. Jamie Speiser-Blanchet

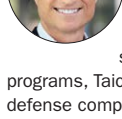
Royal Canadian Air Force Commander

Canada's first female air chief is leading the Royal Canadian Air Force through the beginning of the largest modernization effort in its history and at a time of tension with its neighbor to the south.



James Taiclet

Lockheed Martin CEO
After losing the competition to provide the U.S. Air Force its next fighter and financial losses on several classified and unclassified programs, Taiclet needs to demonstrate that the defense company has not lost its way.



Éric Trappier

Dassault Aviation CEO

After stirring controversy in the European Future Combat Air System program, Trappier needs to chart Dassault's path forward while also ramping up production of the Rafale, developing a French uncrewed combat aircraft and solidifying the company's spaceplane ambitions.



Lt. Gen. Dale White

U.S. Air Force
Portfolio Manager

White, currently military deputy in the office of the Air Force assistant secretary for acquisition, technology and logistics, has been nominated to become the direct reporting portfolio manager for critical major weapon systems for the Air Force. In that role, he would oversee the service's flagship programs, such as the Boeing F-47 fighter development and Northrop Grumman's B-21 bomber and Sentinel ICBM effort.



Marco Zoff

Edgewing CEO

The first leader of the Edgewing joint venture of BAE Systems, Leonardo and Japan Aircraft Industrial Enhancement Co., Zoff is tasked with conducting the aircraft's first flight demonstration in 2027 and putting the program on pace to achieve its 2035 in-service target date. 🌐



John Meyer
Senior Director, Marketing
at Regal Rexnord
Aerospace Solutions



Julian Del Campo
Senior Business
Development Manager
at Regal Rexnord
Aerospace Solutions

Learn How Regal Rexnord Leverages Cross-Industry Experience to Accelerate AAM Development

Aviation Week Network spoke with John Meyer and Julian Del Campo of Regal Rexnord Aerospace Solutions (RRX) to learn how the company is leveraging its aerospace expertise and industrial capabilities to meet the challenges of the emerging eVTOL and Advanced Air Mobility markets.

Q Aviation Week: How do the emerging eVTOL and AAM markets impact the aerospace industry?

A John Meyer: AAM is revitalizing the industry, ushering in a new era. We're seeing the development of 20 to 30 new airframes, innovative propulsion systems, and all-electric flight controls that are replacing traditional hydraulic systems. It's a flood of new technologies arriving in a short span — transformative for the supply chain and how suppliers operate. It's the most exciting and dynamic period I can remember.

A Julian Del Campo: There's a need for new technical solutions and automation—at a scale aerospace hasn't seen. There are also infrastructure needs like vertiports and new MRO approaches. A Deloitte study projected the market to exceed \$100 billion by 2035 and create close to 280,000 new jobs. It has implications far beyond aerospace.

Q Aviation Week: What challenges do you foresee for suppliers in the AAM market?

A JM: It's a disruptor requiring transformative approaches. You're either a traditional aerospace supplier with low-volume, high-mix business, or a traditional industrial supplier experienced in high volumes.

Traditional aerospace must pivot to high volumes, with automation, new facilities,

and reimagined sub-tier strategies. Industrial suppliers must instill AS9100 processes and change their culture to meet quality systems required for aircraft that fly with passengers.

A JDC: It's about understanding market risk and where to engage. There's uncertainty about timing and which aircraft will enter service successfully.

With 26 OEMs in the SMG AAM Reality Index, how do you pick winners? You can either spread resources too thin going after too many or miss out on the successful one. Plus, there's new electromechanical fly-by-wire technologies and regulatory issues adding to timing uncertainty.

Q Aviation Week: How does RRX's experience in commercial and military aerospace translate to the AAM Market?

A JDC: We believe the best path combines influences to solve this complex problem. We have extensive aerospace and defense history, along with industrial and robotics experience that brings faster development cycles and cost-effective methods.

Also, we can leverage methodologies from other markets to balance aerospace solutions and industrial approaches, making modifications to materials and coatings to make designs suitable for aerospace requirements.

A JM: Our aerospace pedigree means we're familiar with development milestones, technical requirements, and regulatory standards—that's our DNA. Through recent acquisitions, we have a tremendous portfolio of existing designs from multiple divisions, all previously tested to rigorous aerospace environmental standards.

We build electric components and mechanical systems already used in fly-by-wire aircraft. The alignment to all-electric airplanes is a perfect match.

Q Aviation Week: How does RRX support the AAM market regarding FAA regulations?

A JM: We've actively engaged with regulators and lawmakers, meeting regularly with the FAA. The ultimate message is that the United States must prioritize AAM and eVTOL to be the global leader in these technologies and market overall.

A JDC: The 2024 Reauthorization Act and powerlift category creation were great first steps. But there's also a grassroots approach needed. With nine AS9100 facilities in the U.S., and 13 around the world, we can support broader acceptance of additional aircraft in our airways, especially for Urban Air Mobility where local support is key.

Q Aviation Week: How does RRX Aerospace Solutions serve the AAM market?

A JDC: We have one industrial division that builds 60,000 actuators per year on a single line with takt times as low as four minutes. These processes aren't a direct fit for aerospace but can help streamline it. Combining A&D certified AS9100 divisions with high-volume process expertise puts us in a unique position to support aggressive project timelines.

A JM: We're an engineering company providing engineered solutions direct to OEMs or major tier one suppliers. Our global AS9100 facilities can serve customers directly with electric motors, brakes, sensors, and mechanical products. And we've integrated our certified components into complete electromechanical actuators. Since these aircraft are fly-by-wire and we have certified, proven components, designing them into actuators is straightforward.

Recently, we hosted a Kaizen event with 68 team members from all divisions. We spent a week together, combining experts who understand high-volume processes with those who understand aerospace requirements. It's an ongoing process to better align our designs and manufacturing to this market.

About the Experts

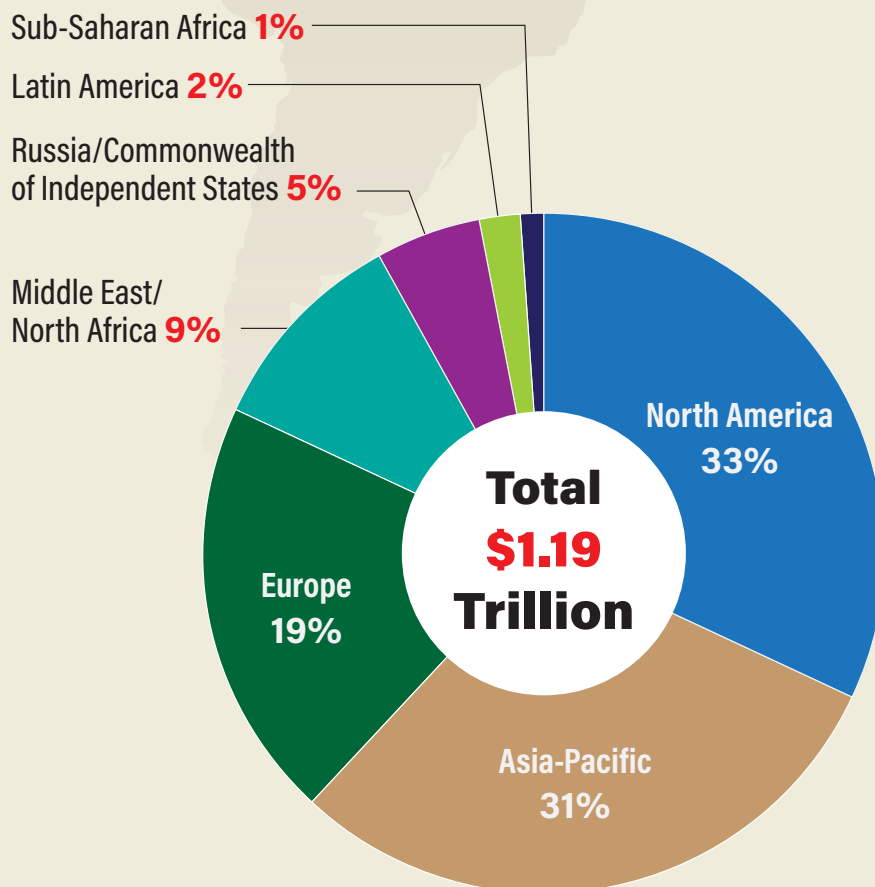
John Meyer is Senior Director, Marketing at Regal Rexnord Aerospace Solutions, leading the Aerospace Vertical Market and overseeing Business Development, Global Strategic Accounts and Program Management. With 39 years of aerospace and defense experience, he now focuses on electric aircraft certification and service entry.

Julian Del Campo is Senior Business Development Manager at Regal Rexnord Aerospace Solutions, developing the strategic roadmap for Electro-Mechanical Actuators and driving vertical integration across divisions. His background spans Engineering and Product Management in both industrial and aerospace markets.

BOOMING BUDGETS

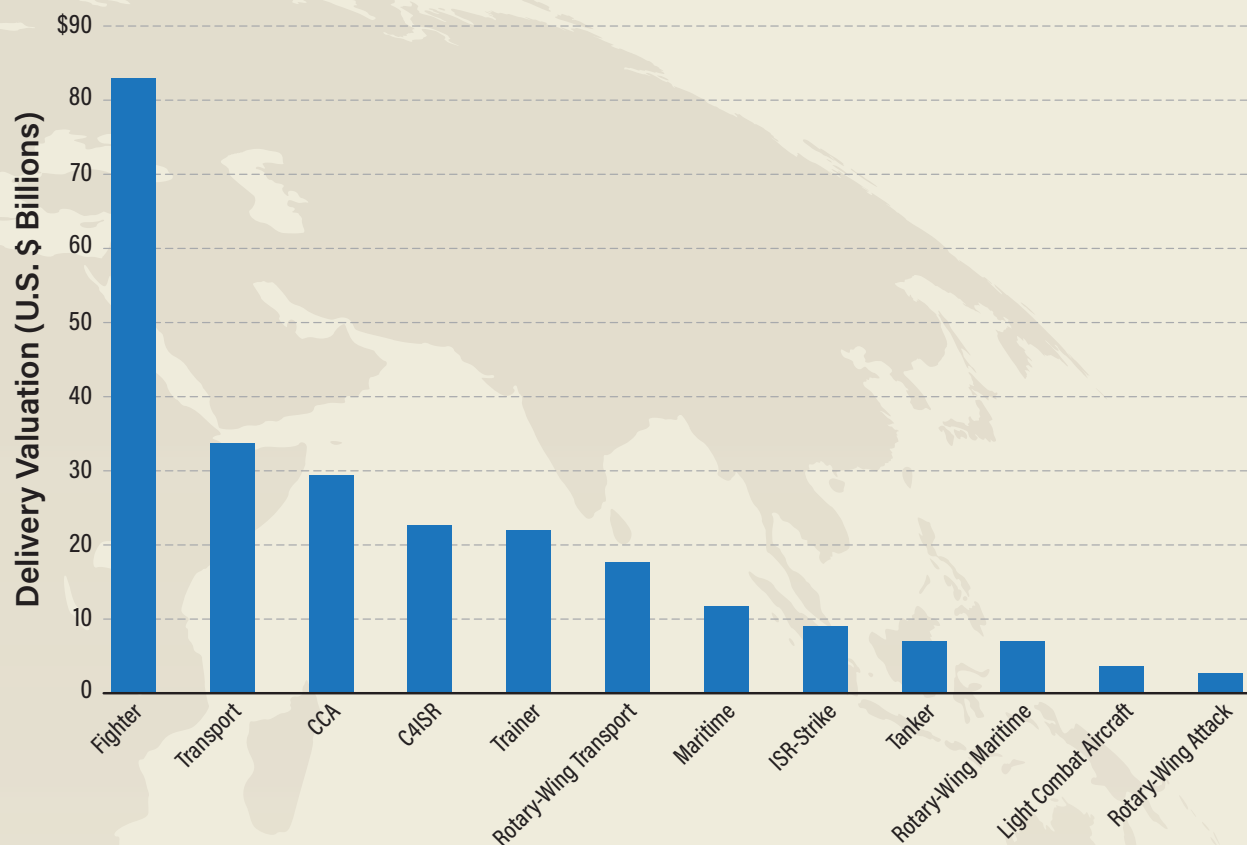
Elevated global defense spending continues to drive a robust market for military aircraft, particularly in Europe and East Asia, with more than \$1.19 trillion expected to be spent on new and upgraded military aircraft during the next 10 years. Modernization plans have been accelerated, and the increase in resources is allowing air forces to assess where capabilities could be expanded further. In Europe, concerted efforts are addressing gaps in capabilities currently filled by the U.S. within the NATO construct. Those efforts are leading to development of strategically independent European airpower. The U.S. continues to be the biggest supplier in the market and is expected to deliver at least \$480 billion worth of military aircraft over the next decade, more than 30% of which represents export sales. The fastest-growing market segment by far is collaborative combat aircraft (CCA), for which there are open opportunities to supply more than 1,700 aircraft worth in excess of \$29 billion over the next 10 years.

Value of Military Aircraft Deliveries, 2026-35

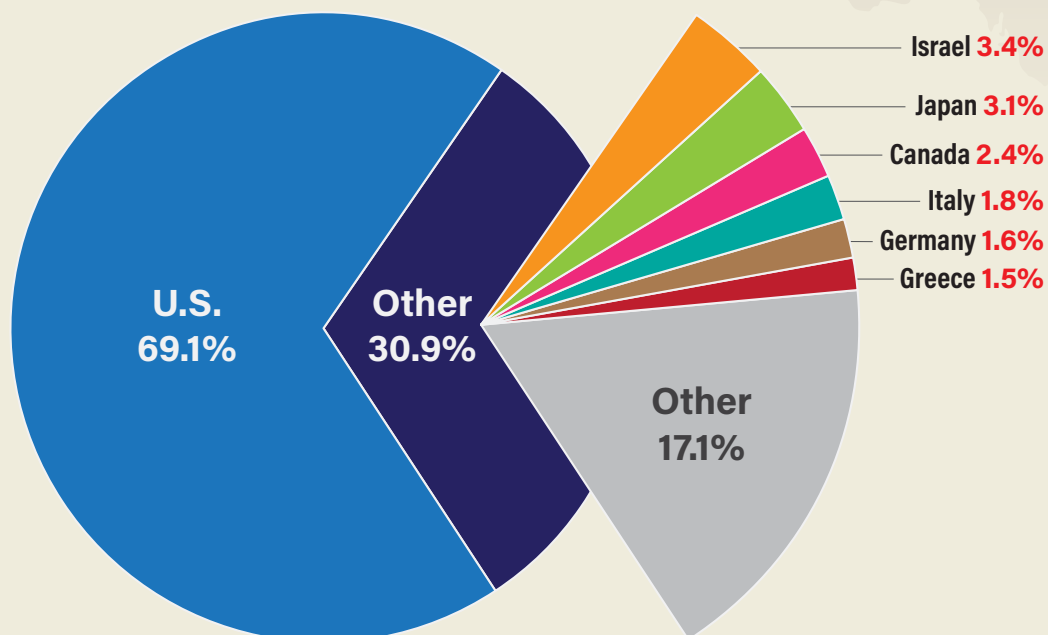


Source for all charts: Aviation Week Network 2026 Military Fleet & MRO Forecast

Open Opportunities by Mission Segment, 2026-35



Destination of U.S. Military Sales, 2026-35



COMPETITIONS TO WATCH

The Aviation Week Intelligence Network is tracking \$250 billion in open opportunities for military aircraft in the next decade. During that period, **armed forces are poised to field more than 19,046 new aircraft.**

Matt Jouppi



FIGHTERS

Competitions for fighter aircraft represent an \$83 billion market opportunity in the next decade. The Middle East remains the biggest market for potential deals, accounting for \$27 billion.

EGYPT

Cairo could be in the market for 64 aircraft to replace aging Mikoyan MiG-29s and Dassault Mirage 2000s. Egypt has also long been frustrated with the limitations the U.S. has placed on its F-16s. China has offered the Chengdu J-10CE, and Egypt has expressed interest in additional Dassault Rafales and other twin-engine types such as the Eurofighter Typhoon.

TANKER/TRANSPORT

The market for these support aircraft is set to top \$40 billion over the next decade, driven heavily by demand in the Asia-Pacific region.

ITALY

The country is seeking six tankers after rejecting a sole-source acquisition of Boeing KC-46As, following its purchase of Boeing KC-767s. Airbus plans to offer the A330 Multi-Role Tanker Transport.



TRAINER/LIGHT COMBAT AIRCRAFT

Governments are likely to spend \$26 billion on these types in the next 10 years, and Japan is looking to be among the biggest buyers.

BRAZIL

The **Brazilian Air Force** has expressed interest in replacing its fleet of AMX A-1 light combat aircraft. Options range from light fighters to full multirole fighters. The service is already seeking to expand its Saab JAS 39 Gripen E/F buy, but the extended delivery timelines and funding difficulties may give other providers an opportunity.

INDIA

Following clashes with Pakistan in May, the **Indian Air Force** may accelerate its Multi-Role Fighter Aircraft tender, and the Rafale may be in the pole position. Tata is already

looking at local production of two Rafale fuselage sections per month in 2028. However, India may also be reexamining Russia's offer of the Sukhoi Su-57.

SAUDI ARABIA

U.S. President Donald Trump announced in November that he had approved the sale of Lockheed Martin F-35s to Riyadh, but a contract still needs to be finalized. The **Royal Saudi Air Force's** need to replace its Panavia Tornado and Boeing F-15C/D fleets could leave the door open for other manufacturers to secure orders. Contenders include the Eurofighter Typhoon, Rafale F4, F-15EX and Turkish Aerospace Industries Kaan.



PAKISTAN

Islamabad wants to replace aging secondhand Lockheed C-130B/Es that are set to reach the end of their useful lives by the 2030s. However, the **Pakistani Air Force** is expected to prioritize further recapitalization of its fighter and airborne early warning fleets. Potential airlift options include the Shaanxi Y-9, Lockheed C-130J, Embraer C-390 and Airbus A400M.

JAPAN

Tokyo issued a request for information for new advanced trainers in October 2024. Options for the tender include modified Boeing T-7s, Leonardo M-346s or a domestic alternative proposed by Mitsubishi Heavy Industries. The M-346 could gain traction as Japan-Italy defense ties strengthen around the Global Combat Air Program with the UK.

U.S.

The **U.S. Navy's** Undergraduate Jet Training System seeks 145-200 advanced jet trainers to replace the Navy's deteriorating T-45s. The service has delayed contract award to fiscal 2028. Competitors include the Korea Aerospace Industries-Lockheed Martin TF-50N, Boeing T-7B, Leonardo-Textron M-346N and Sierra Nevada Corp. (SNC) Freedom Trainer.



ROTARY-WING AIRCRAFT

The market for rotary-wing transports is set to reach \$18 billion in the next 10 years, with attack and scout models reaching \$3.4 billion. Europe could be one of the biggest spenders.

ALGERIA

The North African country maintains an aging fleet of Soviet-built Mil Mi-24 attack helicopters that increasingly need replacement. While it has shown a preference for Russian suppliers, Algerian officials have engaged with Leonardo, registering interest in the AW249.

SPECIAL MISSION AIRCRAFT

Demand for these aircraft—including maritime patrol, intelligence-gathering and airborne early warning systems—should reach \$23 billion.

GERMANY

The **German Air Force** is looking to field a standoff jammer platform as part of the LuWES Electronic Attack system of systems as early as 2029. Platforms such as Airbus' A400M and A321XLR as well as business jets are reportedly being considered for what could be a 10-aircraft fleet.

NATO

The alliance had selected the Boeing E-7 Wedgetail as its initial option to replace its fleet of Boeing E-3 airborne warning and control systems but said in November that the competition is open again after the U.S. pulled out of the program.



SAUDI ARABIA

U.S. Air Force officials confirmed in August 2022 that Saudi Arabia had expressed interest in the E-7A. The **Royal Saudi Air Force** is undertaking a two-phase E-3 upgrade program worth \$2 billion. However, global E-3 operators, such as the U.S. and UK, have opted to phase theirs out due to high operating and support costs.



UNCREWED AIRCRAFT

The market for uncrewed aircraft is booming and is projected to reach \$50 billion in the coming decade—almost double last year's forecast—as more governments express a desire to field collaborative combat aircraft (CCA) and other systems.

GERMANY

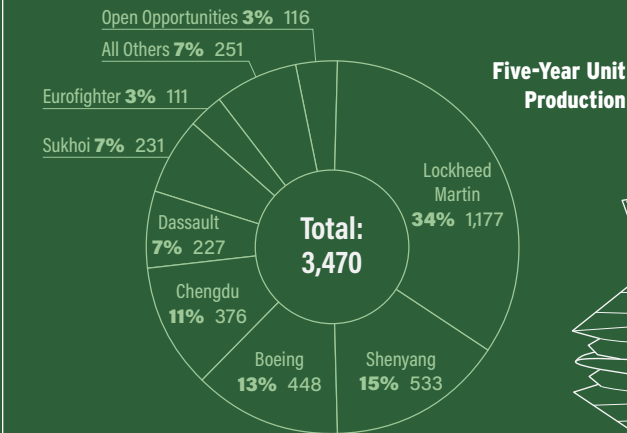
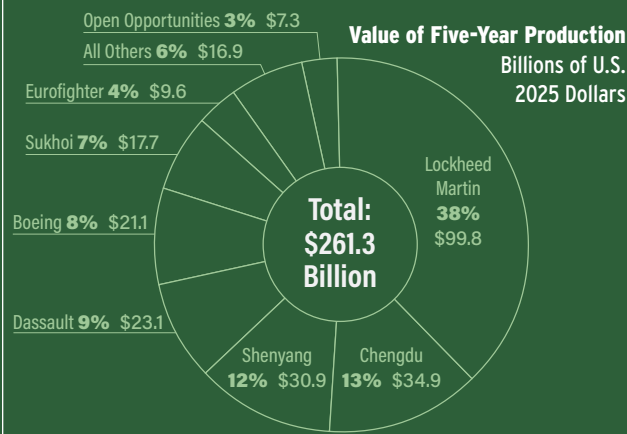
Germany is in the market for as many as 400 CCA to add combat mass to the **German Air Force** by the end of the decade. Rheinmetall has said it is in talks with Anduril, Boeing and Lockheed Martin to provide them. Airbus has teamed with Kratos around the latter's XQ-58 Valkyrie, General Atomics Aeronautical Systems

Inc. is in the running with its Gambit, and Helsing is using its Grob acquisition to provide an offering.

U.S.

The **U.S. Air Force, Army, Navy and Marine Corps** have signaled they want to field a large number of CCA. The Marines, for instance, plan to field them in five-year cycles. The initial buy of Kratos MQ-58Bs under the CCA program's Increment 1 is to inform force development and operational concepts for later efforts. The CCA would augment the Marines' 280 Lockheed Martin F-35Bs and could take on roles such as suppression of enemy air defenses. 🌐

Fighter/Attack Aircraft Forecast, 2026-30

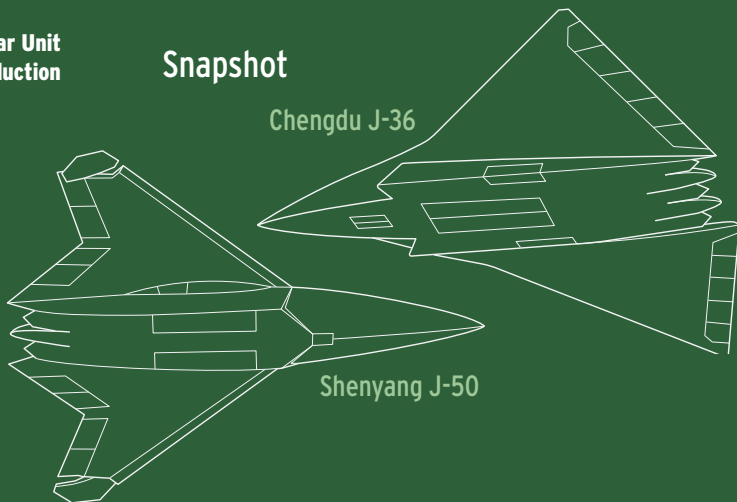


Source: Aviation Week Network
2026 Military Fleet & MRO Forecast.
All numbers and percentages rounded.

J-36 and J-50: China's New Stealth Fighters

Not one but two tailless combat aircraft appeared for the first time in China on Dec. 26, 2024. A large, three-engine, diamond-delta-wing aircraft was photographed in flight in Chengdu and dubbed the J-36, while a smaller, twin-engine, lambda-wing design was captured flying in Shenyang and christened the J-50 or J-XDS. The intended roles of the two aircraft are not clear. With side-by-side seating for two crew, Chengdu Aircraft's J-36 may be a regional bomber and the single-seat Shenyang Aircraft J-50 a fighter. Lacking vertical tails, the J-36 uses split ailerons for lateral control while the J-50 has swiveling wingtips. Both aircraft have since been spotted on separate occasions at China's secret flight-test base at the Lop Nur nuclear test site. A second J-36 was photographed in flight in September with changes that include redesigned landing gear as well diverterless inlets and vectoring nozzles as already featured on the J-50.

Snapshot

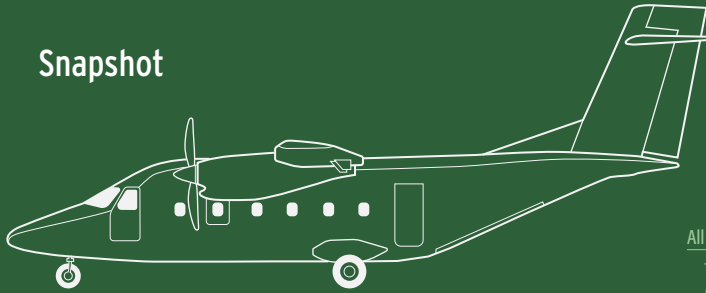


COMBAT AIRCRAFT TO WATCH

MODEL/ DESIGNATION	WING- SPAN (ft.)	MAX. LENGTH (ft.)	MAX. HEIGHT (ft.)	WING AREA (ft. ²)	EMPTY WEIGHT (lb.)	GROSS WEIGHT (lb.)	ENGINES (no./type)	THRUST (afterburning)	SPEED	LOADING	EIS
BOEING											
F-15EX Eagle II	42.8	63.8	18.5	608	—	81,000	2 X GE F110-229	29,000 lb. ea.	M 2.5+	12 air-to-air 24 air-to-ground	2023
DASSAULT AVIATION											
Rafale F4	35.8	50.2	17.4	492	22,000	54,000	2 X Safran M88-4E	16,860 lb. ea.	M 1.8	21,000 lb. external	2022
EUROFIGHTER											
Typhoon Tranche 4	35.1	52.4	17.4	538	24,250	51,600	2 X Eurojet EJ200	20,000 lb. ea.	M 2	16,535 lb. external	2025
KOREA AEROSPACE INDUSTRIES											
KF-21 Boramae	36.7	55.4	15.6	—	—	56,400	2 X GE F414-400K	22,000 lb. ea.	M 1.81	17,000 lb. external	2026
LOCKHEED MARTIN											
F-16 Block 70/72	31	49.3	16.7	300	20,300	48,000	1 X GE F110-229 or P&W F100-129	29,000 lb.	M 2+	17,000 lb. external	2023
F-35A Lightning II	35	51.4	14.4	460	29,300	70,000	1 X P&W F135-100	43,000 lb.	M 1.6	18,000 lb. external/internal	2016
SAAB											
JAS 39E Gripen	32.4	49.9	14.8	323	17,640	36,300	1 X GE F414G	22,000 lb.	M 2	13,200 lb. external	2021
TURKISH AEROSPACE INDUSTRIES											
Kaan	46	69	20	67	—	>60,000	2 X GE F110 (early) 2 X TEI TF3500 (later)	29,000 lb. ea. 35,000 lb. ea.	M 1.8	6 AAM internal 6 stations external	2029

Military Transport Aircraft Forecast, 2026-30

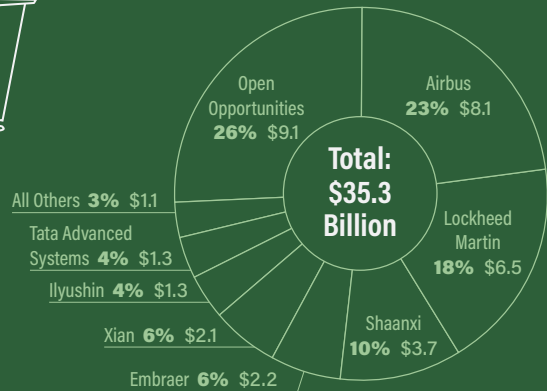
Snapshot



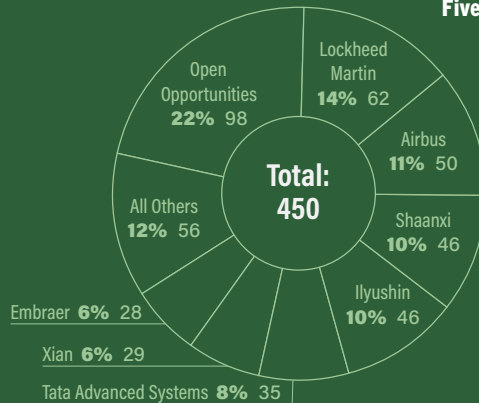
EEA Aircraft LUS-222

The Portuguese Air Force has joined the program to develop the country's first indigenous aircraft, the LUS-222 light transport. To be produced by EEA Aircraft, the LUS-222 is intended to compete with Cessna's 408 SkyCourier. Powered by two Pratt & Whitney Canada PT6A turboprops, it is designed to be reconfigurable between 19 passengers or 2,700 kg (6,000 lb.) of cargo, with a range of up to 2,100 km (1,140 nm). The LUS-22 is unpressurized, has a rear loading ramp and is also suitable for airdrop missions; its fixed landing gear is designed for short and unpaved runways. First flight is targeted for late 2027 or early 2028.

Value of Five-Year Production Billions of U.S. 2025 Dollars



Five-Year Unit Production



Source: Aviation Week Network
2026 Military Fleet & MRO Forecast.
All numbers and percentages rounded.

MILITARY TRANSPORTS TO WATCH

MODEL/ DESIGNATION	CREW	WING- SPAN (ft.)	MAX. LENGTH (ft.)	MAX. HEIGHT (ft.)	WING AREA (ft. ²)	EMPTY WEIGHT (lb.)	GROSS WEIGHT (lb.)	POWERPLANT (no./type)	POWER (SHP) or THRUST (lb.)	SPEED	PAYLOAD/ RANGE
AIRBUS											
A330 MRTT+	2 + 2	198	193	57	3,897	—	514,000	2 X Rolls-Royce Trent 7000	68,000-72,000 lb.	M 0.86	99,000 lb./ 8,700 nm
A400M Atlas	2+1	139.1	148	48.3	2,384	169,000	310,850	4 X EPI TP400-D6	11,000 shp ea.	M 0.7	66,140 lb./ 2,450 nm
C-295	2+1	90.5	80.3	28.5	—	—	51,150	2 X P&WC PW127G	2,645 ea.	260 Kt.	13,200 lb./ 2,000 nm
ANTONOV											
An-178	2	100.3	108.1	33.3	—	—	—	4 X Progress D-436-148FM	—	405 kt.	22,046 lb./ 2,160 nm
BOEING											
KC-46A Pegasus	3-15	157.8	165.5	52.8	3,050	—	415,000	2 X P&W PW4062	62,000 lb. ea.	M 0.86	207,670 lb. (fuel transfer)
EMBRAER											
C-390 Millennium	2	115	115.4	38.8	1,513	—	178,570	2 X IAE V2500-E5	31,330 lb. ea.	M 0.80	50,700 lb./ 1,520 nm
LEONARDO											
C-27J Spartan	2+1	94.2	74.5	31.6	882.6	38,581	70,107	2 X R-R AE2100D3	4,637 shp ea.	325 kt.	22,046 lb./ 1,000 nm
LOCKHEED MARTIN											
C-130J-30 Super Hercules	3	132.6	112.8	38.8	1,745	87,667	164,000	4 X R-R AE2100D3	4,637 shp ea.	355 kt.	36,000 lb./ 1,700 nm

ANDURIL



1 | Tech M&A Gains Pace

Contractors will pick up the cadence of technology portfolio additions with targeted acquisitions to adapt to changing market expectations.

EOS



2 | Lasers Proliferate

Laser weapons will gain wider adoption as companies promote technology for everything from counterdrone to countermissile to counterspace applications.

EUROPEAN UNION



3 | European Defense Surges

Concerns about the threat from Russia and antagonism from the Trump administration will drive growth in European defense spending, which will top that of the U.S.



AIRBUS

4 | Airbus Expands MRTT+

The Royal Thai Air Force launched the Multi-Role Tanker Transport (MRTT+) program with an order for one aircraft. The coming year should see a more meaningful boost to program backlog.

PREDICTIONS FOR 2026

Defense developments
to watch
in the coming year



BOEING

5 | U.S. Air Force Drops E-7

After staging a behind-the-scenes stand in 2025 to defend the Boeing E-7 program from threatened cancellation, a new Air Force leadership will decide in 2026 to surrender the once-promising airborne early warning and control program, choosing instead to fight other battles with Pentagon bureaucracy.



BOEING

6 | T-7 Gathers Momentum

Boeing's T-7 trainer program has largely focused on delivering the first aircraft to the U.S. Air Force. Now the company will start gaining traction in efforts to expand the aircraft's customer base and is set to emerge as the front-runner for the Navy's Undergraduate Jet Training System program.



U.S. DEFENSE DEPARTMENT

7 | Jam Tomorrow

More air forces will commit to fielding electronic attack aircraft after seeing demonstrated in Ukraine the importance of being able to jam radars and control the electromagnetic battlespace more broadly to deliver weapon effects.



FRENCH DEFENSE MINISTRY

8 | Space Joins the Forces

As military establishments realize that the high ground in battle is now outside the atmosphere, more air forces will embrace the shift by becoming air and space forces. 🚀



PRECISION LAUNCHED EFFECTS

L3Harris' Wolf Pack of Launched Effects multi-role vehicles — Red Wolf and Green Wolf — deliver an unfair fight by combining speed, extended range, and lethality through kinetic and non-kinetic effects. They are quickly integrated and launched from air, ground, or sea-based platforms to conduct precision strikes and to detect and jam enemy threats across domains. They're smart, connected, affordable and ready to hunt.



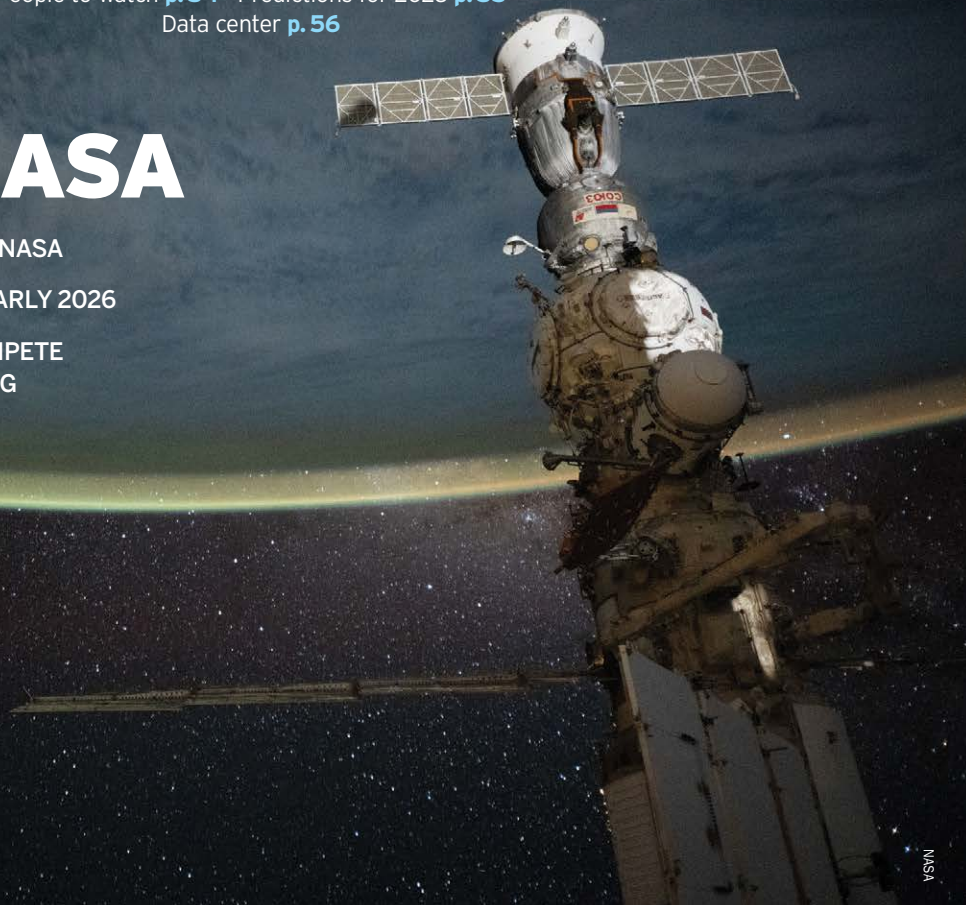
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A NEW NASA

- > ISAACMAN IS POISED TO LEAD NASA
- > ARTEMIS II IS ON TRACK FOR EARLY 2026
- > SPACEX AND BLUE ORIGIN COMPETE FOR ARTEMIS III MOON LANDING



Irene Klotz Cape Canaveral, **Vivienne Machi** Los Angeles, **Robert Wall** London,
Garrett Reim Seattle and **Mark Carreau** Houston

Five years ago, SpaceX was in the midst of its first crew rotation mission to the International Space Station. Blue Origin was 13 flights into a 15-flight program to test its suborbital New Shepard system without crew before owner Jeff Bezos and guests would become its first passengers.

At the same time, Boeing was one year into what became a 2.5-year effort to find and fix all the issues that prevented its CST-100 Starliner from reaching the International Space Station (ISS) on its first orbital flight test.

Meanwhile, NASA was hard-charging toward a goal of landing U.S. astronauts on the Moon in 2024 under marching orders from the first Trump administration. At the time, the deadline coincided with what President Donald Trump had hoped would be his second term, should he win the 2020 election. Since Trump's 2024 reelection, the administration's new goal is to return U.S. astronauts to the lunar

surface before China, which is eyeing a crewed landing on the Moon in 2030.

As 2025 drew to a close, SpaceX was in the midst of its 11th ISS crew-rotation mission, developing a new transportation system to land astronauts on the Moon and preparing to expand Starship-Super Heavy launch and landing operations to the Eastern Range in Florida. The world's busiest spaceport was on track to close the year with 110 launches in 2025. Five years ago, that number was 31.

In addition to flying NASA and partner astronauts to the ISS, SpaceX has flown seven private astronaut missions, made 33 cargo runs to the

One focus for NASA in 2026 will be preparing to pivot from the ISS (pictured in part in the foreground) to at least one commercially owned and operated space station after the ISS is retired at the end of the decade.

station—all but one successfully—and launched more than 1,400 small satellites into orbit on 19 dedicated Falcon 9 rideshare missions.

The company also revolutionized satellite communications with its Starlink broadband constellation offering direct-to-consumer internet services. Since SpaceX's first Starlink deployment mission in November 2019, the company has devoted more than 335 Falcon 9 flights to build the network, which included more than 9,100 satellites as of Dec. 8. SpaceX says it has more than 8 million Starlink customers worldwide.

SpaceX also parlayed Starlink tech-

nology to provide the National Reconnaissance Office and other national security agencies with the Starshield, a network of satellites designed to provide secure communications, Earth observation capabilities and payload hosting. And in April, the company displaced United Launch Alliance (ULA) as the military's primary National Security Space Launch (NSSL) partner.

It is difficult to overestimate the effect SpaceX has had on the space industry. The company's Falcon rockets flew 134 times in 2024, delivering more than 3.5 million lb. of payload to orbit—84% of the global 4.2 million lb. total. The majority of the rockets carried Starlink satellites, but even without those missions, SpaceX conducted 26% of the world's launches and delivered 46% of the total mass to orbit, the American Enterprise Institute wrote in a January 2025 report.

In 2025, SpaceX surpassed its record 2024 annual launch rate in mid-November and was on track to complete 170 orbital flights, delivering 90% of the world's global payload mass to orbit. The company also set records for booster reuse, with its fleet leader flying 32 times.

If SpaceX's aspirations come to fruition, its achievements during the first part of the decade will be eclipsed by what it envisions for the rest of the 2020s. That includes flying an uncrewed Starship to Mars, potentially during the next planetary launch window in late 2026. For that to happen, "a lot needs to go right," founder, CEO and Chief Technology Officer Elon Musk wrote on X.

More likely, Starship's first flight to Mars without humans will be during the next launch window, which opens in late 2028, followed by the first crewed flight to Mars between February and April 2031, Musk added. Earth and Mars align about every 26 months for the most direct interplanetary flight.

Musk founded SpaceX in 2002 with the goal of establishing a self-sustaining human colony on Mars.

Meanwhile, the company is eager to begin deployments of its larger, next-generation Starlink satellites on Starships, with each launch expected to add 60 Tbps to network capacity—20 times more than what a Falcon 9 load of the current Starlink V2 Mini satellites provides. Along

with flight tests of the Starship-Super Heavy Version 3 system, SpaceX plans to begin using the Starship for Starlink deployment missions in 2026.

The newly rebranded Amazon Leo, which is developing a rival satellite broadband system, aims to pick up the pace of deployment missions as it faces a Federal Communications

surface. Having missed the first Trump administration's 2024 deadline for the Artemis III landing, the agency's new orders are to accomplish the Moon landing ahead of China.

"China is progressing at a breakneck pace to overtake our space infrastructure and beat us back to the Moon," Sen. Tim Sheehy (R-Mont.),



The Expedition 73 crew marked 25 unbroken years of human habitation aboard the ISS in November. Fewer than eight increment crews remain before the planned end of operations in 2030.

Commission deadline to have half of its constellation—1,618 satellites—deployed and operational by July 2026.

Challenging SpaceX's Starlink cellular service, AST SpaceMobile plans to launch its new 2,400-ft.² BlueBird satellites in 2026, with launches every 1-2 months, putting as many as 45-60 satellites in orbit by year-end for continuous coverage across the U.S. and select markets. Also trying to compete with SpaceX's Starlink, but on the front of laser communications relays, is Kepler Communications, which plans to launch its first batch of 10 laser-relay satellites in January.

Another milestone on SpaceX's 2026 calendar is the expansion of the Starship program from its southern Texas Starbase complex to Florida, with launches possible by mid-year, U.S. Space Force Col. Brian Chatman, director of the Eastern Range, said in November.

NASA is interested in SpaceX's Starship-derived Human Landing System (HLS) to shuttle astronauts to and from lunar orbit and the lunar

said during a Dec. 3 hearing to vet—for a second time—Trump's nomination of entrepreneur and private astronaut Jared Isaacman to lead NASA.

"If we don't focus our efforts and commit to victory now, we will find ourselves going to bed under the glow of a red Moon," Sheehy told colleagues on the Senate Commerce, Science and Transportation Committee.

Artemis III remains on NASA's calendar for mid-2027, but acting Administrator Sean Duffy, concerned about delays with SpaceX's HLS, said in late October he wanted to reopen the competition for Artemis III landing services.

SpaceX holds an HLS contract for that as well as the Artemis IV landing, while Blue Origin was awarded a contract to fly crew on Artemis V. "Our internal goal—and we've not missed a milestone yet—is to hit the original Artemis V date, which was late 2028, so that's where our teams are marching to," Blue Origin CEO Dave Limp tells Aviation Week.

NASA said it is working with both



SpaceX launched booster reuse, but one company does not an industry make. Blue Origin became the second commercial operator to land an orbital-class rocket in October.

SpaceX and Blue Origin to evaluate schedules for upcoming developmental milestones. The agency noted that the lander systems require NASA certification prior to cargo and crewed demonstration missions.

"I don't think it was lost on either one of those organizations that the first company capable of delivering a lander to take American astronauts to the lunar surface and back is the one that this nation is going to go with," Isaacman said during his Senate hearing.

"Competition is fantastic," he added. "The best thing for SpaceX is a Blue Origin right on their heels and vice versa. We need competition for the vendors that support NASA's critical mission. Competition among world powers is actually a really good thing—just as long as we don't lose."

Blue Origin plans to kick off 2026 with the launch of its cargo-version lunar lander known as the Blue Moon Mark 1. The demonstration mission, delayed from late 2025, is intended to land near Shackleton crater at the Moon's south pole. The crater's interior, which is permanently shadowed, may harbor water ice and other volatiles that could be resources for future lunar missions. NASA is flying two payloads on the Blue Moon Mark 1's first flight and has purchased a second mission to deliver its Volatiles Investigating Polar Exploration Rover to the

lunar south pole in 2027 to search for ice and other resources.

Blue Origin, founded by Bezos in 2000—two years before SpaceX—has evolved slower than Musk's company, using its New Shepard suborbital system to test technologies and perfect operations for orbital flight. Blue Origin ended 2025 with a successful second launch of the New Glenn orbital rocket, its first payload deployments and its first booster landing.

Following inspections and refurbishment, the company plans to refly the New Glenn rocket, possibly in early 2026. Ultimately, Blue Origin wants to reduce turnaround time between booster reflights to less than 30 days, the company says. By way of comparison, SpaceX in March set a record for the shortest span between launches of the same Falcon booster—nine days.

On the heels of New Glenn's second flight on Nov. 13, Blue Origin unveiled a series of upgrades that will roll out beginning with Flight 3 in early 2026, as well as a future heavier-lift variant, known as the New Glenn 9x4, named for the number of engines on each stage. The current New Glenn is configured with seven methane-fueled BE-4 first-stage engines and two liquid-hydrogen-fueled BE-3U upper-stage engines.

The New Glenn 9x4 is designed to deliver 77 tons to low Earth orbit (LEO), more than 15 tons to geosynchronous orbit and more than 22 tons to translunar injection. The 9x4 also features a 29-ft.-dia. payload fairing, compared with the 23-ft.-dia. fairing for the current New Glenn.

NASA is counting on SpaceX, Blue Origin and other super-heavy-lift launch service providers to wean its Artemis lunar exploration initiative from the government-owned and -operated Space Launch System (SLS) rocket and the Orion deep-space capsule. Both programs were to be axed after Artemis III under Trump's proposed fiscal 2026 budget, but the fiscal 2025 reconciliation bill, which Trump signed on July 4, 2025, funds both programs through Artemis V. Congress has not yet passed a 2026 budget.

The 2025 budget reconciliation One Big Beautiful Bill Act includes a \$10 billion supplement for NASA that also funds the Gateway lunar-orbiting station, which the White House's 2026 budget plan cancels. Overall,

the Trump administration proposed a 24% cut to NASA's \$25 billion annual budget, with the bulk of the reductions affecting the agency's science and technology programs. Budget proposals pending in Congress would restore most of the agency's funding.

Two programs loom large on NASA's radar in 2026: the Orion's first crewed flight and public-private partnerships to ensure at least one commercially owned and operated space station will be available to carry on U.S. microgravity research and astronaut training missions after the ISS is retired at the end of the decade.

"We will never accept a gap in capabilities again, not with our space station's presence in low Earth orbit nor our ability to send American astronauts to the Moon," Isaacman said, referring to the nine-year gap between the end of the space shuttle program in 2011 and the start of SpaceX crewed



BEN SMIEGELSKI/NASA

After more than two decades of development, NASA's Orion spacecraft is being prepared for its first crewed flight test.

flights in 2020 that left the U.S. dependent on Russia to fly astronauts to and from the ISS.

Artemis II follows the Nov. 16-Dec. 11, 2022, uncrewed Artemis I mission. The Orion returned from its test flight around the Moon with unexpected wear on its heat shield, delaying the planned crewed Artemis II follow-on flight from May 2024, to September 2025 and then to April 2026. As of December 2025, NASA

was looking to move up that date to no earlier than Feb. 5.

NASA astronauts Reid Wiseman, Victor Glover and Christina Koch, along with the Canadian Space Agency's Jeremy Hansen, are expected to become the first people to travel into deep space since the final Apollo Moon mission in 1972.

Following launch aboard the SLS, the crew will orbit Earth twice for Orion system checkouts. If the spacecraft is in good health, it will conduct a translunar injection burn to put itself on a trajectory toward the Moon. It will then fly around the far side of the Moon, passing roughly 5,600 mi. from the lunar surface—the farthest distance humans have ever traveled in space.

During the flight, scheduled to last about 10 days, NASA will assess Orion life support, navigation, communications and performance in deep space. Artemis II payloads include human tissue samples, known as organoids, for radiation studies.

Using the gravity of Earth and the Moon, the Orion will then make a free-return trajectory, which requires minimal propulsion and ensures a safe return to Earth even if systems fail. The mission will conclude with the Orion's parachute-assisted splashdown in the Pacific Ocean.

NASA's other focus in 2026 will be on the ISS and successor programs. The agency delayed release of a planned 2025 solicitation for commercial space station partners while it reviewed comments to a revised plan that delays full-time crew occupancy requirements. Instead, NASA proposed a 30-day, four-member crewed demonstration mission prior to certification.

During his Senate confirmation hearing, Isaacman emphasized the importance of prioritizing ISS research and payloads during the station's final years that will build a stronger financial foundation for aspiring commercial station operators. That includes crew and cargo transportation services from Boeing and Sierra Space, respectively, which have fallen behind schedule.

Boeing recovered from the initial problems that nixed the Starliner's first test run to the ISS in 2019 and flew a successful uncrewed demonstration in 2022. The company then dealt with unrelated technical con-

cerns over wire harnesses and potentially flammable tape aboard the Starliner, further delaying the Crewed Flight Test from mid-2023 until 2024. That also did not go as planned, prompting NASA to return the vehicle without its crew due to safety concerns over its propulsion system.



Despite budget uncertainties, NASA's Nancy Grace Roman Space Telescope is on track for a launch possibly as early as next fall.

In November, NASA halved the number of ISS crew-rotation missions it will buy from Boeing to three and added a precursor cargo-only flight as part of Starliner certification requirements. That flight, along with a free-flying demonstration mission by Sierra Space's delayed Dream Chaser cargo spacecraft, are targeted for 2026.

Beyond the ISS, about a half-dozen in-space service missions—including debris removal, refueling, inspection and life-extension operations—are planned in 2026. They include a mission by Astroscale's UK subsidiary to fly an ELSA-M servicer to a Eutelsat OneWeb satellite, dock using a magnetic docking plate and deorbit the spacecraft into Earth's atmosphere for disposal. In addition:

■ Astroscale's U.S. subsidiary is developing the Refueler mission to conduct two hydrazine refueling operations on a U.S. Defense Department geostationary (GEO) satellite, demonstrating rendezvous and proximity operations, docking, inspection and refueling above GEO.

■ Northrop Grumman's Space-Logistics unit, a pioneer of in-space servicing, plans to use its Mission Robotic Vehicle's robotic arm to install Mission Extension Pods—essentially propulsion “jet packs”—onto existing GEO communications satellites, including the Optus D3.

■ Starfish Space plans to dock its Otter spacecraft with an Intelsat satellite in GEO and use the Otter's propulsion to extend its life.

■ Thales Alenia Space, leading an Italian In-Orbit Servicing mission with Leonardo, Telespazio, Avio and D-Orbit, aims to demonstrate a robotic servicer capable of refueling, component repair or replacement, orbital transfer and controlled atmospheric reentry.

Meanwhile, the national security space sector is girding for continued growth in 2026, as the Pentagon anticipates a rise in launch opportunities amid plans to leverage emerging capabilities from the commercial sector for on-orbit mobility and domain awareness.

The U.S. Space Force is rapidly expanding its NSSL Phase 3 Lane 1 program, established in 2024 as an annual on-ramp for new launch providers that plan to fly by the end of each year, to carry more risk-tolerant payloads.

The Lane 1 roster now includes five vendors: Blue Origin, Rocket Lab, SpaceX, Stoke Space and ULA. More companies could qualify to compete for task orders in the next on-ramp, anticipated to be announced in the spring of 2026. Northrop Grumman and Firefly Aerospace are targeting a 2026 launch for the jointly developed Eclipse medium-lift launch vehicle, while Relativity Space says its Terran R reusable rocket could also fly in 2026.

To date, SpaceX has secured the majority of Lane 1 task orders, as its Falcon family of vehicles remains the workhorse for U.S. government and commercial missions alike. But ULA's Vulcan rocket and Blue Origin's New Glenn vehicle began flights in 2025, projecting hope that the longtime launch bottleneck may finally ease in 2026.

The Space Force needs new launchers online quickly as it fields multiple proliferated constellations across domain awareness; position, navigation and timing; and satellite communications. The additional launch capacity also could help the service support new mission areas as it moves from

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10-Year
Outlook

Aircraft Storage

Aircraft Family

Retirements

Regions

Trends

Deliveries

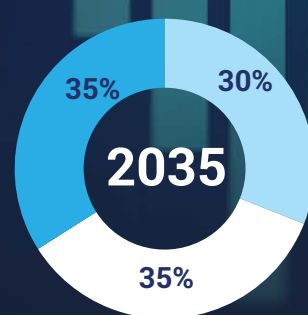
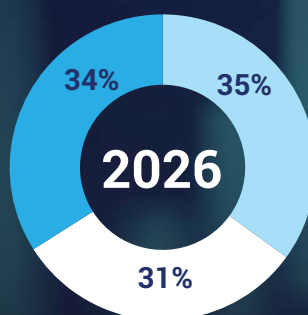
MRO

Demand

Engine Family

In-Service Fleets

In-Service Fleet by Region



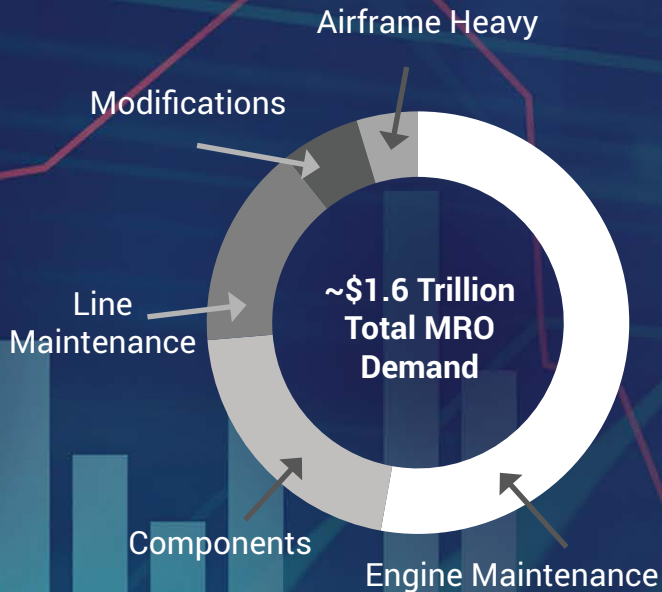
■ Americas

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MRO Demand by Expense Category



Deliveries

✈️ 📈 **21,000**

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✈️ 📉 **10,000**

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**AVIATION
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People To Watch



Jeff Bezos
Amazon Founder

The Amazon and Blue Origin founder faces a pivotal year as he intensifies his competition with Elon Musk and SpaceX.

While Blue Origin's New Glenn launches ramp up, Amazon Leo deployments are slated to gain pace.



Hao Chun
China Manned Space Agency Director

As the race between China and the U.S. heats up, Hao is central to China's push to put the first taikonauts on the lunar surface.



Sarah and Andrew Duggleby
Venus Aerospace Cofounders

The company's Rotating Detonation Rocket Engine (RDRE) technology is gaining traction, and Venus is focusing on demonstrating in flight an RDRE-powered vehicle to a top speed of Mach 5 or more.



Max Haot
Vast CEO

Vast's plan to leapfrog the competition to replace the International Space Station with a commercially operated outpost

will be put to the test during a demonstration run aboard its Haven station, expected to launch in mid-2026.



Jared Isaacman
NASA Administrator Nominee

A political novice no more, entrepreneur and private astronaut

Jared Isaacman returned to the good graces of the Trump administration, which renominated him to lead NASA. Isaacman has two main goals: returning U.S. astronauts to the Moon ahead of China and ensuring that the space agency maintains a crewed presence in low Earth orbit after the International Space Station is retired. ☼

airborne platforms to migrate above the atmosphere, such as moving-target indication.

Senior service leaders have designated space domain awareness as a top priority. The Space Force is developing new constellations for surveillance and reconnaissance of on-orbit activities, leveraging commercial investment to do so.

New and nontraditional companies

are answering that call. Blue Origin is leading what it calls the "first fully commercial space domain awareness mission," in which its Blue Ring maneuverable spacecraft will host optical sensors built by Scout Space and Optimum Technologies as part of an inaugural mission set to launch in 2026.

Commercial companies also are accelerating the service's focus on in-space mobility, with demonstrations under its tactically responsive space Victus program. During the next mission, called Victus Haze, satellites built by True Anomaly and Rocket Lab will perform red team-blue team maneuvering and surveillance operations, while orbital transfer vehicle startup Impulse Space is supplying two of its Mira spacecraft for Victus Surgo and Victus Salo. All three missions are expected to launch in 2026.

The increasing capabilities of commercial offerings are changing international space programs as well. Ahead of its ambitious Gaganyaan human spaceflight program, India trained two astronauts and flew one on an Axiom Space private mission to the ISS in June.

The China National Space Administration is inviting the country's commercial space enterprises to "go global" and help developing countries build satellite-application industries. With more than 500 companies, China's commercial space market was expected to exceed 2.5 trillion yuan (\$348 billion) in 2025, according to China's State Council Information Office.

Europe is pivoting toward greater autonomy in 2026, with members of the European Space Agency (ESA) agreeing to contribute a total of €22.1 billion—about \$26 billion—for 2026-29.

An early stress test for Europe's ambition is poised to unfold over the first couple of months of 2026, when government and industry stakeholders review progress on the IRIS² secure satellite communication program. The roughly \$11 billion effort involves deployment of a proliferated LEO and medium-Earth-orbit constellation of close to 300 satellites through a public-private partnership.

IRIS² has become a flagship for European efforts to avoid dependence on foreign systems, such as SpaceX's Starlink, and establishing close links between the European Union and ESA.

Lessons from IRIS² could inform how Europe proceeds with its next

big project to build an autonomous, high-resolution, high-revisit-rate Earth-observation system under what ESA calls its independent European Resilience from Space initiative.

Also on the agenda for Europe's autonomy push is deployment in the coming months of two LEO positioning, navigation and timing satellites to support the development of a larger system after 2030 that augments the Galileo system—Europe's GPS counterpart—in the face of increasing jamming and spoofing of such signals.

The collective European activities come on top of multiple efforts at national levels to boost the region's military space capabilities, such as the Franco-German partnership to deploy a ballistic missile warning system, Poland's deployment of a military Earth-observation system and Austria's planned deployment of a navigation satellite.

Europe's launch ambitions face another critical year. After restoring its launch independence in 2024 with the first flight of the Ariane 6 rocket and return to flight of the Vega-C, Europe's efforts to scale up launch rates have stuttered. Now it is looking to 2026 not only to boost flight cadence, but also diversify its launch options. ESA plans to sign framework contracts under its European Launcher Challenge effort to support new, homegrown launchers from companies such as Isar Aerospace, MaiaSpace, Orbex, PLD Space and Rocket Factory Augsburg.

Europe also may adjust several initiatives developed in connection with the U.S. due to changing priorities of the Trump administration. NASA has committed to support ESA's ExoMars mission, which was left in the lurch after its partnership with Russia folded in the wake of Russia's invasion of Ukraine. But the multispacecraft, joint NASA-ESA campaign to retrieve samples from Mars was tabled due to cost and schedule issues. ESA is exploring if it can convert its Earth Return Orbiter into a stand-alone mission.

"Every crisis brings its share of opportunities," said Dorothee Bär, Germany's minister for research, technology and space. "And over the last few years, things have changed a lot." ☼

Gallery See more about developments in the space sector in 2025:

[AviationWeek.com/space2025](https://www.aviationweek.com/space2025)



1 | IPOs Gain Pace

The boom in military space, enthusiasm about the space economy and recent initial public offerings will cause more startups to seek to go public.



SEAN PAVONE/ALAMY STOCK PHOTO



YODA/FONE

5 | D2D Chases Spectrum

The burgeoning direct-to-device (D2D) market will drive further adjustments in business plans for incumbents and newcomers in the commercial satellite communications business.

PREDICTIONS FOR 2026

Developments to watch
as the global
space race picks up

2 | Launch Offerings Expand

After a year of challenges for rocket startups to fly their designs, several of them should make it to orbit in the coming year.



PLD SPACE



AMAZON

3 | Amazon Markets Leo

The e-commerce giant's Leo space communications business that is racing to meet a regulatory deadline to deploy satellites will also lean on the company's heft to win market share.



SPACEX

4 | SpaceX Demos Refueling

SpaceX will demonstrate in-orbit refueling of its Starship spacecraft, a key milestone for future space exploration missions.



U.S. DEFENSE DEPARTMENT

7 | Maneuverables Pushed

The Pentagon is getting serious about maneuverable spacecraft, as evidenced by the Geosynchronous Space Situational Awareness Program's replacement satellites—the proposed RG-XX program—and hints of a new geostationary-orbit-based surveillance constellation in solicitations.

8 | More Euros for Space

Fearing the loss of U.S. space access and seeking growth, European governments, militaries, investors and the European Space Agency will boost investment in space companies. However, national competition could hinder effectiveness, as it has in the past.



EUROPEAN UNION

9 | Going Private

A cadre of scientists and engineers working for NASA will find second careers in the private sector, accelerating innovation in ways they might not have with the agency. Some may even start companies that will make a significant impact on the sector.



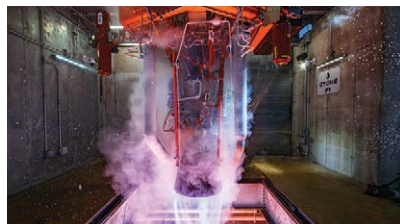
NASA/ESA



NASA/ESA

6 | U.S. Space Science Stalls

The U.S. space science and exploration community will muddle through, as some funding cuts by the Trump administration are restored by Congress and individual scientists do not follow through on threats to move to Europe. China will catch up in key areas as the U.S. stalls.



STOKE SPACE

10 | Reusable Rockets Ramp

Blue Origin, Rocket Lab and Stoke Space begin reusable rocket operations. China also demonstrates it is in the game as Europe makes slow progress to keep pace. 🌐

LAUNCH VEHICLES TO WATCH

- LEO

Low Earth orbit
- SSO

Sun-synchronous orbit
- GEO

Geosynchronous orbit
- TLI

Translunar injection
- GTO

Geosynchronous transfer orbit

SMALL

MANUFACTURER (COUNTRY) VEHICLE	PAYLOAD (kg)	STAGES (Propellant)	FAIRING DIAMETER (m)	LAUNCH
AGNIKUL COSMOS (INDIA)				
Agnibaan	100 to LEO	2 (kerosene)	1.5	—
ASTRA SPACE (U.S.)				
Rocket 4	600 to LEO	2 (kerosene)	1.8	2026
CALT (CHINA)				
Jeilong 3	1,500 to SSO	4 (solid)	3.35	2022*
CAS SPACE (CHINA)				
Kinetica 1	2,000 to LEO	4 (solid)	3.35	2022*
DEEP BLUE AEROSPACE (CHINA)				
Nebula-1	2,000 to LEO	2 (kerosene)	5	—
FIREFLY AEROSPACE (U.S.)				
Alpha	1,030 to LEO	2 (kerosene)	2.2	2023*
GALACTIC ENERGY (CHINA)				
Ceres-1	400 to LEO	4 (1-3 solid)	1.4	2020*
Ceres-2	1,600 to LEO	4 (1-3 solid)	2.9	2025†
GILMOUR SPACE TECHNOLOGIES (AUSTRALIA)				
Eris	215 to SSO	3 (1-2 hybrid)	1.5	2026
INTERSTELLAR TECHNOLOGIES (JAPAN)				
Zero	1,000 to LEO	2 (methane)	1.7	2027
ISPACE (CHINA)				
Hyperbola-1	300 to LEO	4 (solid)	1.4	2019*
ISAR AEROSPACE (GERMANY)				
Spectrum	1,000 to LEO	2 (propane)	2	2025†
ISRO/HINDUSTAN AERONAUTICS LTD. (INDIA)				
SSLV	500 to LEO	4 (1-3 solid)	2	2023*
ORBEX SPACE (UK)				
Prime	180 to LEO	2 (propane)	1.45	2027?
PLD SPACE (SPAIN)				
Miura 5	540 to SSO	2 (kerosene)	2	2026
PERIGEE AEROSPACE (SOUTH KOREA)				
Blue Whale 1	200 to SSO	2 (methane)	1.6	2026
ROCKET FACTORY AUGSBURG (GERMANY)				
RFA One	1,300 to SSO	3 (kerosene)	2	2025†
ROCKET LAB (U.S.)				
Electron	300 to LEO	3 (kerosene)	1.2	2018*
SKYROOT AEROSPACE (INDIA)				
Vikram-1	350 to LEO	2 (solid)	1.7	2025†
SKYRORA (UK)				
Skylark XL	315 to LEO	3 (kerosene)	2.2	2026
SPACE ONE (JAPAN)				
Kairos	250 to LEO	4 (1-3 solid)	1.5	2025†
SPACE PIONEER (CHINA)				
Tianlong-2	2,000 to LEO	3 (kerosene)	3.35	2023

MEDIUM

MANUFACTURER (COUNTRY) VEHICLE	PAYLOAD (Metric tons)	STAGES (Propellant)	CONFIGURATION	FAIRING DIAMETER (m)	LAUNCH
AVIO (ITALY)					
Vega C	2.3 to LEO	4 (1-3 solid)	—	2.18	2022*
CALT (CHINA)					
Long March 8/8A	5/7 to SSO	2.5 (1-2 hydrogen)	2 boosters	4.2/5.2	2020*
Long March 10A	14 to LEO	2 (kerosene)	1st reusable	5	2026
CAS SPACE (CHINA)					
Kinetica 2	12 to LEO, 8 to SSO	2.5 (kerosene)	2 boosters + 1st reusable	4.2	2025†
DEEP BLUE AEROSPACE (CHINA)					
Nebula-2	25 to LEO	2 (kerosene)	1st reusable	5	—
FIREFLY AEROSPACE (U.S.)					
Eclipse	16.3 to LEO, 3.2 to GTO	2 (kerosene)	—	5.4	2026
GALACTIC ENERGY (CHINA)					
Pallas-1	17.5 to LEO for 3-stage	2 (kerosene)	1st reusable	4.2	2025†
ISPACE (CHINA)					
Hyperbola-3	8.5 to LEO	2 (methane)	1st reusable	4.5	2025†
KARI/HANWHA AEROSPACE (SOUTH KOREA)					
Nuri	3.3 to LEO, 2.2 to SSO	3 (kerosene)	—	3.5	2022*
LANDSPACE (CHINA)					
Zhuque-3	21 to LEO	2 (methane)	—	4.5	2025
ORIENSPACE (CHINA)					
Gravity-1	6.5 to LEO, 4.2 to SSO	3.5 (solid)	Sea launch	4.2	2024*
SPACE PIONEER (CHINA)					
Tianlong-3	17 to LEO, 14 to SSO	2 (kerosene)	1st reusable	4.2	2025†
SRC PROGRESS (RUSSIA)					
Soyuz-5	18 to LEO, 5 to GTO	3 (kerosene)	—	4.1	2025†
ROCKET LAB (NEW ZEALAND)					
Neutron	13 to LEO	2 (methane)	1st reusable	5	2026
SAST (CHINA)					
Long March 6C	4.5 to LEO, 2.4 to SSO	2 (kerosene)	—	3.35	2024*
Long March 12	12 to LEO	2 (kerosene)	—	3.8	2024

*First successful orbital launch.
†Launch expected by year-end.

Sources: Aviation Week Network and manufacturer data



Nuri 3,300 kg to LEO



SSLV 500 kg to LEO

Snapshot

Privatized Launch Vehicles

In bids to boost their commercial space industries in 2025, both India and South Korea signed deals to transfer to the private sector the technology for government-developed launch vehicles. The Korea Aerospace Research Institute signed an agreement in July with Hanwha Aerospace to manufacture and launch the Nuri, South Korea's first indigenously developed satellite launcher, through 2032. The three-stage, all-liquid Nuri has flown twice, in 2022 and 2023, and is slated for up to four more launches by 2027 during the transfer period. The Indian Space Research Organization (ISRO) selected winning bidder Hindustan Aeronautics Ltd. (HAL) in September to privatize its Small Satellite Launch Vehicle (SSLV). The three-stage, all-solid SSLV has flown twice, in 2023 and 2024. ISRO plans to help HAL build two prototype rockets over the next two years, after which the company is expected to produce 12-20 per year, depending on demand.



HEAVY

MANUFACTURER (COUNTRY) VEHICLE	MODEL	PAYLOAD (Metric tons)	BOOSTER CONFIGURATION	STAGES (Propellant)	OPERATION	FAIRING DIAMETER (m)	FLIGHT
ARIANESPACE (EU)							
Ariane 6	AR62	7.2 to SSO, 4.5 to GTO	2 solid	2 (LH ₂)	—	5.4	2024*
	AR64	11.5 to GTO, 5 to GEO	4 solid	2 (LH ₂)	—	5.4	2025
BLUE ORIGIN (U.S.)							
New Glenn	—	45 to LEO, 13 to GTO	—	2 (1st methane, 2nd LH ₂)	1st reusable	7	2025
CALT (CHINA)							
Long March 9	—	150 to LEO, 50 to TLI		2 (methane)	Reusable	10	2033
Long March 10	—	70 to LEO, 27 to TLI	2 liquid	3 (1-2 methane, 3rd LH ₂)	—	5	2026
ISRO (INDIA)							
LVM3	—	8 to LEO, 4 to GTO	2 solid	2 (1 UDMH, 2 LH ₂)	—	5	2017*
NGLV	NGLV	20 to LEO, 9 to GTO	—	3 (2 methane, 3rd LH ₂)	1st reusable	5	2031
	NGLV-H	30 to LEO, 12 to GTO	2 solid	3 (2 methane, 3rd LH ₂)	1st reusable	5	
KRUPNICHEV (RUSSIA)							
Angara	A5	24.5 to LEO, 7.5 to GTO	4 liquid	3 (1-2 kerosene)	—	4.35	2014*
MHI (JAPAN)							
H3	H3-22S	4 to GTO	2 solid	2 (LH ₂)	—	5.2	2024*
	H3-24W	16 to LEO	4 solid	2 (LH ₂)	—	5.2	2025
NASA (U.S.)							
SLS	Block 1	70 to LEO, 27+ to TLI	2 solid	2 (LH ₂)	—	—	2022*
RELATIVITY SPACE (U.S.)							
Terran R	—	23.5 to LEO, 5.5 to GTO	—	2 (methane)	1st reusable	5	2026
SPACE X (U.S.)							
Starship	Block 3	100 to LEO	—	2 (methane)	Reusable	—	2026
UNITED LAUNCH ALLIANCE (U.S.)							
Vulcan	VC2S	19 to LEO, 2.6 to GEO	2 solid	2 (1st methane, 2nd LH ₂)	—	5.4	2024*
	VC6L	27.2 to LEO, 6.5 to GEO	6 solid		—	5.4	—

IT'S ALL ABOUT EXECUTION

The 737-10 has to complete required flight testing before it can earn FAA certification.



JOE WALKER

- > AIRBUS AND BOEING AIM FOR HIGHER PRODUCTION AND NEW DERIVATIVES
- > BOEING EXPECTS 737-7 AND 737-10 CERTIFICATION IN 2026
- > AIRBUS FOCUSES ON RATE INCREASES ACROSS THE BOARD

Jens Flottau Frankfurt and **Guy Norris** Colorado Springs

For Boeing and Airbus, the past several years have largely been about managing constraints and informing unhappy customers of late aircraft deliveries. But both large airframers are hopeful that some limitations will ease in 2026, allowing them to assess what their industrial systems can deliver—and whether investment in further capacity is justified.

The recent Dubai Airshow provided great reassurance that the market for new aircraft continues to be strong, despite the many factors in politics and trade that might impede growth of international air travel. Airlines are looking farther and farther ahead in fleet planning, locking in production slots well into the 2030s and sometimes even into the early 2040s—more than 15 years out. For now, the world's two large aircraft manufacturers can safely assume that whatever they build, they will sell easily.

Driven by strong demand in emerging markets, low-cost carriers and—in some cases—new hybrid airlines

taking over some flying from their legacy parents, the pressure on maximum narrowbody output has been intense for some time. Increasingly, that is also the case for widebodies, as new, fast-growing airlines launch and pent-up demand materializes for replacement and growth. While decisions about adding in-house production capacity have been made for narrowbodies, Airbus in particular must ask if its proposed widebody rates are sufficient to keep pace with Boeing's ambitious plans for the 787 and eventually the 777X, now envisaged to arrive in 2027.

Boeing's turnaround under CEO

Kelly Ortberg seems set to continue into 2026, with rising production rates, improved supply chain stability and optimism that positive free cash flow will grow with increased deliveries of single- and twin-aisle aircraft.

It has been a tough slog, but achieving these key metrics are major milestones on Ortberg's strategic road map for Boeing's recovery from the devastating fallout from the 737 MAX accidents in 2018 and 2019, as well as other safety issues and the COVID-19 pandemic.

Certification of the long-delayed final pair of 737 MAX derivatives—the 737-7 and -10—is particularly significant for the company going into 2026. Approval of the two versions, paced primarily by the redesign and testing of a new engine anti-ice system, would mark not only the start of a valuable extra revenue stream but also a reset of Boeing's troubled relationship with regulators.

Now the airframer envisions FAA certification of its 737-10 “later” in 2026, while the 777-9 remains on its recently adjusted schedule that sees FAA approval in time to start deliveries in 2027, Chief Financial Officer Jay Malave said.

“We’ll be building [737-10s] next year,” Malave said at the UBS Industrials and Transportation Conference on

Dec. 2. “We’re expecting certification of that aircraft to be later in the year.”

Boeing is working with the FAA to win approval of a redesigned engine anti-ice system that both the 737-7 and -10 must have before they are certified. The 737-10 also has FAA-required flight testing to complete before earning approval.

The 737-7 first flew in March 2018 and wrapped up formal FAA flight testing in late 2021. But the variant’s certification program has been prolonged by new FAA requirements and the engine anti-ice issue. It is expected to earn certification before the 737-10.

More signs that the relationship with the FAA was on the mend came in October, when the agency approved Boeing’s request to increase 737 MAX production to 42 aircraft per month. Production had been capped at 38 per month in the aftermath of the Alaska Airlines 737-9 door plug blow-out in January 2024 while Boeing addressed systemic production quality and safety issues.

Boeing expects to reach the 42-rate milestone consistently in the first quarter of 2026 and aspires to make the next rate break to 47 per month later in the year.

The news is less good for the 777-9,

however. Described by Ortberg as a “game-changing platform,” the type’s service entry is more than five years behind schedule and now not expected until 2027. Boeing has attributed the latest holdup to the sheer volume of certification work remaining to be processed rather than any technical issues with the aircraft itself, prompting Ortberg to criticize the slowness of the regulatory procedures.

News of the additional delay emerged in September, along with a related \$4.9 billion charge, but the company acknowledged at the Dubai Airshow that flight tests had moved to Phase 3 of FAA Type Inspection Authorization—an essential prerequisite for eventual certification.

Despite the latest holdups, Boeing remains confident in the 777X family. With a record backlog of more than 620 aircraft across the 777-8, -9 and -30ER freighter models, the airframer has begun studies of a stretched -10X variant at the behest of Emirates, the model’s largest single customer. Boeing’s feasibility study will cover proposed -10 configurations ranging from a relatively modest stretch, like that of the 777-300ER to the -9, to longer extensions, like the original leap from the baseline 777-200 to the 777-300/300ER.

To increase maximum seating capacity to 470, or the 50-plus additional passengers targeted by Emirates, the 251-ft.-9-in.-long 777-9 would notionally be accommodated with a stretch of around 16 ft. This would take the -10’s overall length to about 268 ft. While the 777X’s electronic tailskid protection system would protect the aircraft from overrotation with the existing main landing gear, Boeing says takeoff performance will be an overriding design consideration for the study.

Aside from the 777-10X stretch study, there are no signs of active future product development projects underway at Boeing—at least not publicly. Although low-level studies into a future single-aisle 737 replacement and an updated new midmarket airplane continue, none of the preconditions Ortberg set out for a full-scale new project launch have been met. These are namely market demand, technology readiness and Boeing’s financial health.

Instead, the company continues to focus on stabilizing production of its existing products and developing upgrades and higher capability where possible. For instance, Boeing plans to introduce in 2026 the long-anticipated

Production issues at Spirit AeroSystems are slowing rate increases for A220 final assembly.



Flight tests of the 777-9 continue, but deliveries are not expected to start until 2027.



787 Increased Gross Weight (IGW) offering for the higher-capacity 787-9 and -10.

Originally studied in the late 2010s for operators requesting additional capability on longer-range transpacific routes to North America and Northern Europe, the IGW increase on the -10 variant is larger than expected. The increase in maximum takeoff weight (MTOW) for the 787-9 is 10,000 lb., and raises the maximum permitted design weight at brake release to 571,500 lb. from the current 561,500 lb. The 787-10 MTOW increases 14,000 lb. to 574,000 lb. from 560,000 lb.

Although maximum usable fuel for both versions will remain at 223,773 lb., the additional MTOW capacity will permit higher fuel loads, enabling greater ranges. These are expected to be between 300 nm and 500 nm for the 787-9 and -10, respectively. Boeing has not released details of the structural configuration changes required for the IGW upgrade, but these are expected to be largely restricted to landing gear forging gauges and strengthening of associated components.

Meanwhile, production of the 787 is moving to higher rates, underpinned by a \$1 billion expansion of Boeing's facility in North Charleston, South Carolina. The work will pave the way for the airframer to increase production to as many as 16 aircraft per month sometime in 2026 from its current target of 10 per month.

Charleston produced a maximum of seven aircraft per month at its previous peak. That site, combined with the now-terminated line in Everett, Wash-

ington, had produced a high of 14 aircraft per month before the COVID-19 pandemic and the related production downturn. Boeing's backlog of more than 1,050 787s represents almost nine years of 10-per-month production.

At Airbus, 2026 will mark the end of an era. After more than 40 years with the company, Christian Scherer is retiring. The longtime strategist, later sales chief and commercial aircraft CEO is being succeeded by former MTU Aero Engines CEO Lars Wagner, who has his own long history as an Airbus executive. Unlike Scherer, Wagner is an aerospace engineer by training and will likely focus on execution, production and supplier management.

A leader with such a background could not arrive at a more appropriate time, as Airbus is working through a myriad of supply chain issues that impede its ability to raise output as quickly as planned. The latest issue emerged in early December, forcing Airbus to cut back its 2025 delivery target to 790 aircraft from 820. At the heart of the problem are out-of-tolerance forward fuselage panels for the A320neo family produced by Spanish supplier Sofitec Aero. Airbus must check 628 aircraft, including 168 already delivered, and repair a yet unidentified number.

The good news: There is no need for immediate repairs. But deliveries will take longer because of the additional checks of aircraft still in the factory and the expected negotiations with customers.

In addition, Pratt & Whitney geared turbofan durability issues continue to

constrain engine supply to the A320 and A220 final assembly lines. That shortage appears to be easing somewhat, although many operators must still park a considerable portion of their fleets as they wait for spares.

Airbus also urgently needs to fix A220 production once it has full control of the Spirit AeroSystems sites, a transaction expected to be finalized by year-end. Turning the sites around will be the precondition for higher output. In October, the company slowed the A220 rate to 12 a month from 14 a month by the end of 2026, admitting that previous plans were simply unachievable. The move also means Airbus will still not make money on the program in 2026, eight years after it took a majority stake in the former Bombardier C Series project.

The Spirit problems also could delay a decision to launch the A220 Stretch. Airbus has told the market for years that it will build the longer A220 version, which would come close to the A320neo in passenger capacity. Some key customers, such as Air France-KLM and Delta, have told the airframer that they want the aircraft as soon as possible.

The A350 program, too, continues to be a major headache for Airbus despite strong demand for the aircraft. The airframer managed to deliver only 40 of the most modern widebodies to airlines and lessors through October, an average delivery rate of just four aircraft per month.

The poor performance has several root causes. The most important constraints are production delays at

The background of the advertisement features three Arrow drones in flight against a dramatic sunset sky. The largest drone is in the foreground, angled towards the viewer. Two smaller drones are positioned further back, one to the left and one to the right. The sky transitions from a deep orange near the horizon to a pale blue at the top, with silhouettes of mountain ranges visible in the distance.

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Spirit's site in Kinston, North Carolina, which builds A350 fuselage panels, among other components.

Other widebody suppliers have caused additional delays through the year, including for lavatories, seats and other cabin equipment. Production of a large number of "heads of versions," the first aircraft delivered to a new customer, are making it even more difficult to build the widebodies.

Airbus has reverted to continued ramp-up of the final assembly line in spite of the constraints and is parking many incomplete aircraft at Toulouse-Blagnac Airport, waiting for missing parts to be installed and then to be delivered to customers.

The aircraft-maker still aims to raise the A350 rate to 12 aircraft per month in 2028, a tripling of the output as measured by deliveries, although the internal production growth needed is smaller. In the longer term, Airbus must ask itself whether 12 is enough, given that Boeing plans to move the competing 787 to Rate 14

and bring the 777X online in 2027.

Airbus achieved a rate of 10 A350s per month in 2019 but was forced to curtail output during and after the COVID-19 pandemic. The airframer does not disclose the capacity of its final assembly line, but conversations over the years with suppliers indicate that the current industrial system can handle around 13-14 aircraft per month. Any higher rates would likely require substantial investment in tools and infrastructure.

One trigger for such spending could be the launch of an A350-2000, a further stretch of the A350-1000 that an increasing number of Airbus customers are requesting. The manufacturer is not yet near a launch decision, but 2026 will certainly be a key year for finalizing design studies and preparing the move in greater detail.

The A330neo, too, has seen considerable momentum in sales, driven in part by its earlier availability. Etihad Airways said it would not have decided to take 15 of the aircraft if the A350

had been available earlier. The carrier has found some A330neos on lease from Avolon that should arrive in 2027.

Yet A330neo deliveries are weak, averaging just over two per month. Airbus has said it wants to move up to four by the end of 2026. As with the A350, demand would probably justify a higher level of production. But that might not be possible because of space constraints in Toulouse and other higher-priority issues.

At Embraer, the focus in 2026 will be on a further production increase—particularly of the E2 family, now that the second-generation E-Jets have gained sales momentum over the last year. Embraer has not yet given guidance for 2026 production, but the company is not likely to reach pre-pandemic levels for some years. ✴

—With Sean Broderick in Washington

Gallery See more about developments in the commercial sector in 2025: [AviationWeek.com/commercial2025](https://www.aviationweek.com/commercial2025)



People To Watch



Roberto Alvo

LATAM Airlines Group CEO

Under Alvo's leadership, LATAM Airlines Group is poised to deliver a record financial performance this year while expanding premium offerings. Another milestone is scheduled for 2026, when LATAM takes delivery of its first Embraer 195-E2, enabling further expansion in the growing Latin American market.



Nasaruddin Bakar

Malaysia Aviation Group CEO

Bakar will take over as president and CEO of Malaysia Airlines parent Malaysia Aviation Group in January after a major transformation period. There is still much to do, and he will be in charge of executing the carrier's new network strategy, solidifying profitability, building the fleet and preparing for an eventual relisting.



Dave Davis

Spirit Airlines CEO

Appointed president and CEO in April, Davis is leading Spirit through its repeat restructuring, pointing out that there is "much more work to be done" and he intends to "double down" on certain efforts this time around. As the carrier shrinks to survive, 2025 has presented its own unique headwinds.



Bob Jordan

Southwest Airlines CEO

Southwest's multiyear transformation plan includes the debut of assigned and extra-legroom seating in 2026—a departure from its hallmark open boarding and single-class layout. Pursuing change with newfound agility, Jordan has hinted at more to come, evaluating offerings such as lounges and future long-haul international flying.



Martin Nüsseler

Maeve Aerospace Chief Technology Officer

The Dutch startup has redesigned its planned hybrid-electric aircraft to align better with regional jet replacement needs. The company has secured an equity investment from U.S. regional carrier SkyWest and a collaboration agreement with Delta Air Lines. It plans to complete the concept design phase by early 2026.



Stephanie Pope

Boeing Commercial Airplanes President & CEO

From production increases to multiple certification programs, Boeing's Commercial Airplanes division will be busy in 2026. Pope is expected to lead the business unit through what industry and Wall Street analysts anticipate will be its first full year of routine progress following a long stretch of setbacks.



József Váradi

Wizz Air Founder & CEO

Since 2003, Váradi has grown the low-cost carrier into a large point-to-point specialist in Europe. However, headwinds include Pratt & Whitney engine issues, the closure of an Abu Dhabi base and having to reduce capacity in Israel. To reassure financiers about Wizz's future, Váradi's reasoning hinges on the Airbus A321neo, which he views as the most efficient narrowbody.



Lars Wagner

Airbus Commercial Aircraft CEO

Returning from MTU Aero Engines, Wagner will become CEO of Airbus' commercial aircraft business in January. He faces the challenges of fixing Airbus' operational issues—including supply chain oversight and starting a long-sought-after production ramp-up. Wagner will also lead the design studies of Airbus' planned next single-aisle aircraft.



Campbell Wilson

Air India CEO

Air India is advancing its fleet upgrade program following Tata Group's acquisition of the carrier in 2022. Wilson expects new aircraft deliveries to ramp up and a large proportion of widebody cabin retrofits to be completed in 2026. Meanwhile, the investigation into the crash of Air India Flight 171 shortly after takeoff from Ahmedabad Airport in Gujarat, India, last June will likely be making headlines. ✴



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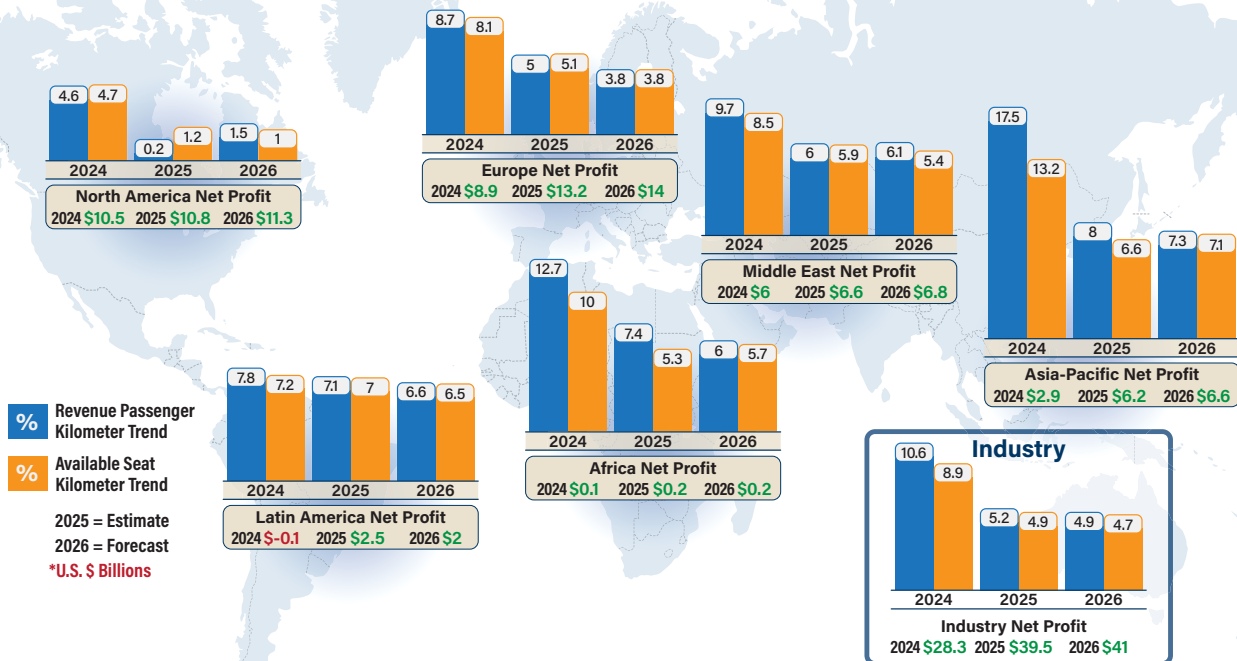
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Airline Capacity, Demand and Net Profit by Region*



Source: IATA

THE BIG SHIFT

> THE AIRLINE INDUSTRY'S EASTWARD MOMENTUM ACCELERATES

> EUROPEAN AIRLINES TO GENERATE HIGHEST PROFIT

> U.S. TO FALL BEHIND AS TARIFFS AND IMMIGRATION POLICIES AFFECT DEMAND

Jens Flottau Geneva

At the beginning of 2025, Marie Owens Thomsen feared that some of her worst nightmares would become reality. The chief economist of the International Air Transport Association wondered if U.S. President Donald Trump's tariffs would make the world economy collapse—and if they did, whether that would pull down the airline industry as well.

For sure, there have been fundamental changes in world trade after the Trump administration introduced tariffs on most imported goods, and some countries—China in particular—retaliated. There have also been serious changes for airlines, especially in the cargo business, which had to adapt to big shifts in trade flows out of China.

The International Air Transport Association (IATA) is clear that it considers tariffs a bad idea. But Owens Thomsen's nightmares did not come

“The Asia-Pacific continues to be the fastest-growing airline region,

with capacity expansion expected to reach 7.1% in 2026.”

true. In fact, IATA upped its estimate for the industry's 2025 performance in its most recent guidance, published Dec. 9. And the global airline industry

body believes that 2026 will see the sector edge up a little bit more.

IATA's first look into 2026 forecasts the industry's net profit to rise to \$41 billion from an estimate of about \$39.5 billion in 2025. With revenues also increasing by 4.5% year over year to \$1.05 trillion, the sector's profit margin is projected to remain at a slim 3.9%. For airlines, that is not too bad, since the highest margin they achieved since IATA started releasing the figure was around 5% in the good old days of 2017.

Passenger numbers are forecast to reach 5.2 billion, up 4.4% from this year, with growth in air cargo volumes at a slower 2.4%. Capacity as measured in available seat kilometers is expected to grow by 4.7%, with demand in revenue passenger kilometers

outpacing this at 4.9%. With demand this robust, airlines should be able to fill an average 83.8% of their seats.

Of course, the situation is different depending on region and individual carrier. What stands out is that North America, dominated by the large U.S. airlines, lost its position as the industry's top profit generator in 2025. That trend should only continue in 2026, when U.S. (and Canadian) airlines are expected to generate \$11.3 billion in profits, compared to \$14 billion in Europe, where airlines are recovering further. In terms of profit margin, North American carriers are projected to reach only one third (3.4%) of the top performers in the Middle East (9.3%) and to fall behind the global average (3.9%).

Why? IATA cites "stagnating overall growth and a domestic market contraction in the face of policy uncertainty around tariffs, tighter immigration enforcement dampening both inbound and domestic travel, and a lengthy government shutdown." The association adds to the list of reasons "capacity constraints, pilot shortages, engine reliability issues and rising labor costs."

Within the U.S., those more exposed to the domestic market and a lower-income customer base, such as low-cost carriers (LCC), are in deeper trouble. Airlines such as Delta Air Lines and United Airlines that bet on the premium segment and have large international networks are better off. The lower price of fuel will continue to benefit the entire sector: IATA predicts a fall in fuel costs as capacity increases.

Of all the regions, the Middle East is performing the strongest. IATA notes favorable regulation and close cooperation between airlines and airports as well as strong demand for international long-haul travel in the Eastern hemisphere that the Gulf superconnectors are harvesting. Emirates Airline is the single most

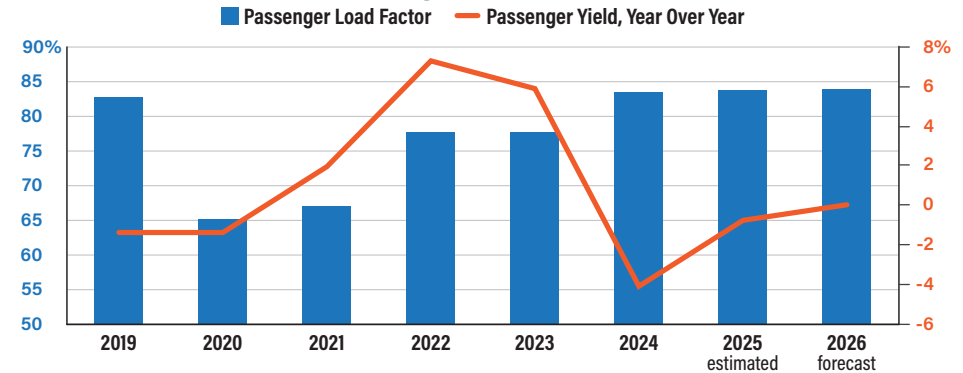
profitable airline globally in absolute numbers. LCC Air Arabia, albeit a much smaller operator, came up with even higher margins. And if recent orders by Emirates, Etihad Airways and FlyDubai announced at the Dubai Airshow are anything to go by, that trend will only continue. Governments are expected to ensure there is plenty of airport capacity.

Europe is an interesting case. In spite of slow economic growth and a continuing recession in a big country like Germany, demand for leisure

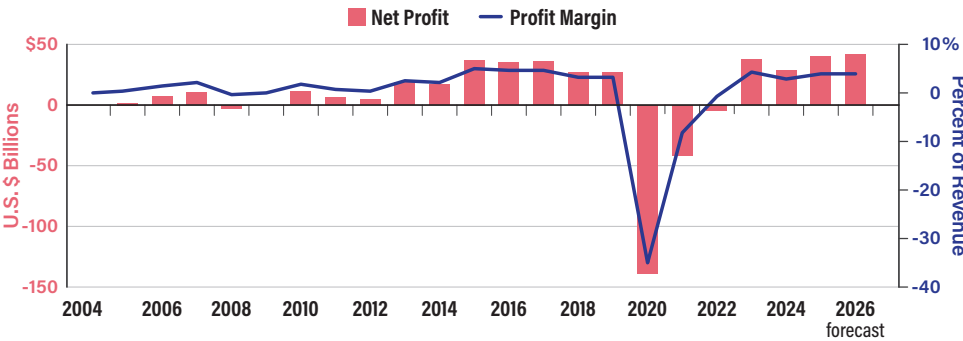
flying remains strong as customers prioritize travel over other expenses. That translates into good growth and margins, in particular for LCCs and intra-European traffic expansion. Legacy airlines are seeing a need to up their premium cabin offerings but not the demand their U.S. counterparts are enjoying.

The transatlantic market remains in slow growth mode in spite of tariffs and the escalating political divorce between the U.S. and European Union. Traffic is clearly weighted toward the

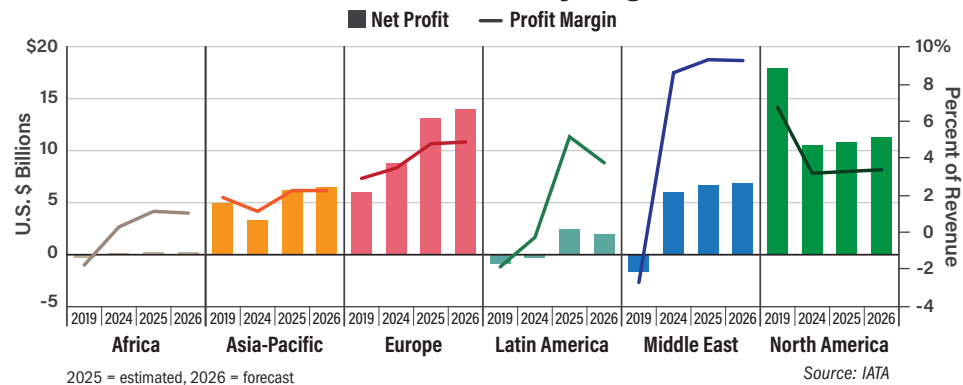
Passenger Load Factor



Global Airline Net Profit



Airline Net Profit by Region



U.S. point of sale, which is in part counterintuitive, given that the weaker dollar is making trips abroad more expensive. For the industry as a whole, a 1% weakening of the dollar against global currencies “may lift global airline profits by 1%,” IATA has calculated.

The Asia-Pacific continues to be the fastest-growing airline region, with capacity expansion expected to reach 7.1% in 2026, down just slightly from the 7.3% IATA estimates for the current year.

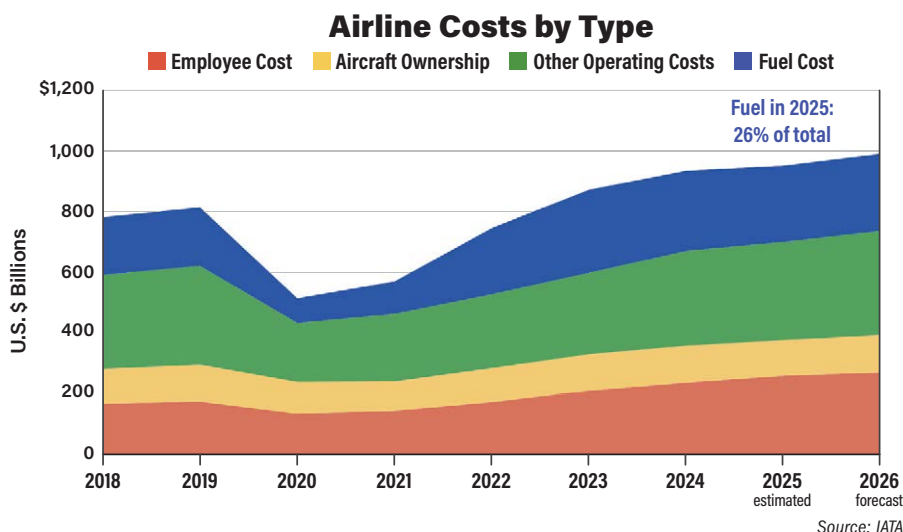
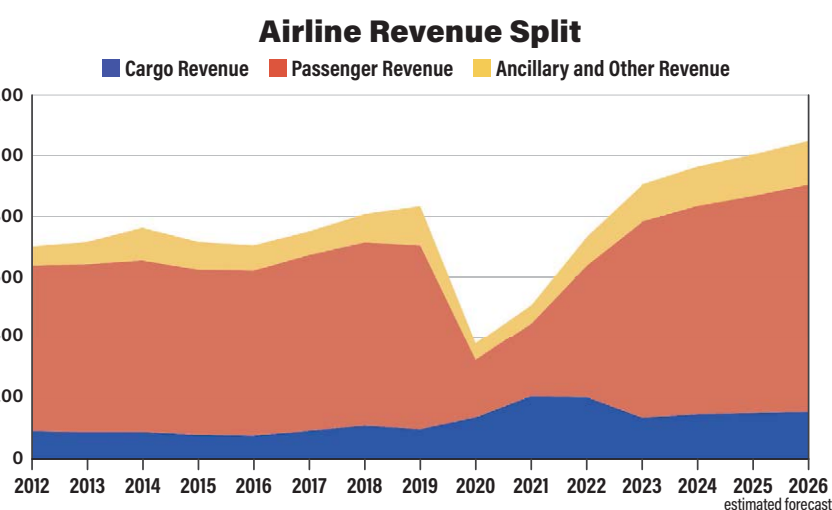
While air cargo is forecast to grow overall, there are clear shifts visible—a direct result of the U.S. effort to decouple from world trade. Chinese exporters have redirected their goods to other markets, partly in Asia but also in Europe, where local manufacturers are witnessing increased competitive pressure as a result.

Industry’s biggest frustration probably remains the inability of its supply chain to recover delivery performance while reaching high profit margins. In a recent study, IATA concluded that airlines are incurring more than \$11 billion in additional costs annually because of late deliveries of aircraft, engines and components.

“The people who are causing the problems are improving their margins,” IATA Director General Willie Walsh said at the association’s recent Global Media Day. “This is unacceptable, and it has to stop. They are doing an absolute s-t job at producing their products.” IATA is still evaluating whether there is a promising way forward for legal action at the industry level, although the limitations to which airlines are subjected in sharing competitive information is making that a delicate operation.

IATA estimates that 5,340 aircraft airlines had ordered since 2019 have not been delivered. The average age of the in-service fleet has risen to just more than 15 years, up from 13.4 years in 2019, a reflection of airlines keeping their aircraft longer as wait times for replacements are extended.

The firm order backlog is now 60% of the active fleet; it is normally 40%. Airlines and lessors have to wait at



least six years for delivery after they have placed an order. And while Walsh applauded Boeing for becoming much more reliable in sticking to delivery dates (at least for the 737 MAX and the 787), Airbus is falling behind.

“Boeing’s performance has significantly improved, people have more confidence [in its commitments], and people are having less confidence in Airbus,” Walsh said. “Boeing is delivering on the commitments now that they have made. Airbus needs to reflect on the problems that Boeing has gone through and get their act together.”

Airlines have a backlog of more than 17,000 aircraft on firm order, up from 13,000 in 2019. In addition, 5,000 remain in storage, many of them waiting for engines, spare parts or simply an appointment in a maintenance shop.

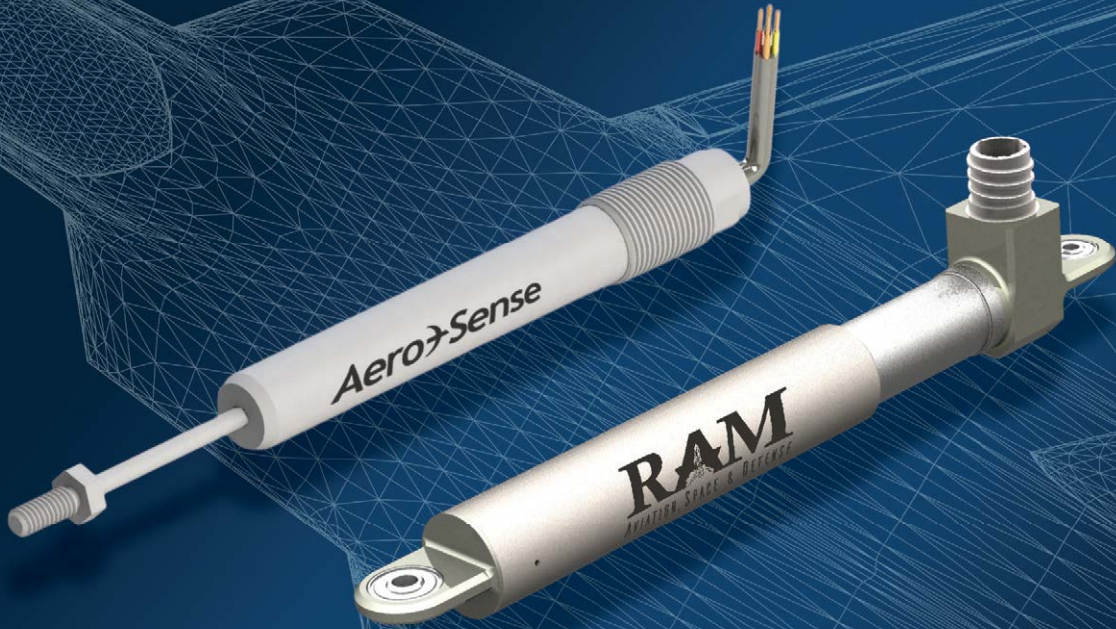
That Airbus is falling short of its

original target for 2025 deliveries is “disappointing, but no great surprise,” Walsh said. As one of his concerns, he pointed to a “disconnect between airframe and engine manufacturers.”

One of the biggest “choke points” is seats, with certification of new models having become a lot more complicated and consequently a much longer process. Several carriers, including American Airlines and Lufthansa, have parked completed new aircraft waiting for seats to be delivered and installed.

IATA does not anticipate the situation will improve quickly. “The backlog in aircraft orders is expected to continue to grow,” the association predicts, and the “growth-constraining impact of supply chain challenges remains a drag on airline profitability.” Constraints will “persist well beyond the near term,” IATA says. 🌐

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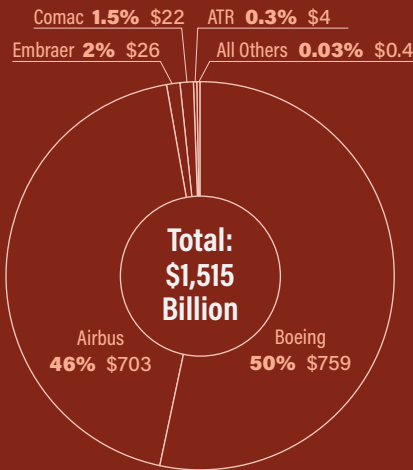
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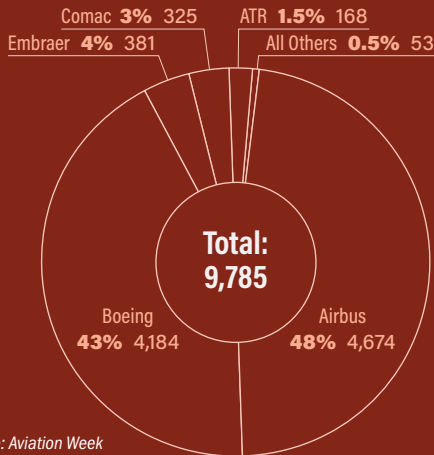
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Commercial Aviation Forecast, 2026-30

Value of Five-Year Production
Billions of U.S. 2025 Dollars



Five-Year Unit Production



Source: Aviation Week
Network 2026 Commercial
Aviation Fleet & MRO Forecast.
All numbers and percentages rounded.

Snapshot



Maeve Aerospace MJ500

At the Paris Air Show in June, Dutch startup Maeve Aerospace unveiled a redesigned hybrid-electric regional aircraft, the 76-100-seat Maeve Jet (MJ). The aircraft is designed to carry 90 passengers up to 950 nm powered by a pair of hybrid-electric powerplants with open rotors. Maeve is targeting service entry by 2033. When configured as a 76-seater to comply with U.S. pilot scope-clause limits, the MJ500 would fly 1,450 nm, cruising at Mach 0.75 and 35,000 ft. while burning 30-40% less fuel than the regional jets it is designed to replace. Operating costs would be reduced about 20%, Maeve says. Bombardier CRJ program owner MHI RJ Aviation is providing engineering services to Maeve, and Pratt & Whitney Canada would supply the hybrid-electric open-rotor powertrain. SkyWest has become an equity investor in Maeve, gaining launch customer rights. Delta Air Lines and Japan Airlines have partnered with the startup to advance development of the Maeve Jet.

Wing Span: **104.3 ft.**

Length: **105.3 ft.**

Max. Takeoff Weight: **74,960 lb.**

Range (90 pax.): **950 nm**

Max. Cruise: **M 0.78**

Ceiling: **37,000 ft.**

Commercial Aircraft To Watch

MODEL/ DESIGNATION	PAX/ PAYLOAD	WING- SPAN (FT.)	WING AREA (FT. ²)	MAX. LENGTH (FT.)	MAX. HEIGHT (FT.)	EMPTY WEIGHT (LB.)	GROSS WEIGHT (LB.)	POWERPLANT (NO./TYPE)	MAX. SPEED	CRUISE SPEED	RANGE (NM)
AIRBUS											
A321XLR	244	117.4	1,324	146	38.6	—	222,250	2 X CFM Leap-1A or P&W PW1100G	M 0.82	M 0.78	4,700
A350F	244,700 lb.	212.4	4,770	232.3	56.1	—	703,400	2 X RR Trent XWB	M 0.89	M 0.89	4,700
BOEING											
737 MAX 10	188-230	117.8	1,370	143.8	40.3	99,360	194,700	2 X CFM Leap-1B	—	—	3,215
777-9	400-425	235.4/ 212.7	5,025	251.8	64.5	362,000	775,000	2 X GE GE9X-105B	—	—	7,285
COMAC											
C919	156-172	117.5	1,390	127.6	39.2	92,815	159,835/ 170,400	2 X CFM Leap-1C	—	M 0.785	2,200/ 3,000 (ER)
EMBRAER											
E175-E2	80-90	101.7	—	106.3	32.7	—	98,120	2 X P&W PW1715G	M 0.82	—	2,000
YAKOVLEV											
MC-21-310	163-211	117.8	—	138.6	37.6	—	187,400	2 X Aviadvigatel PD-14	M 0.82	—	2,820



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BOEING



1 | Boeing Certification

At least one Boeing program—the 737-7—should achieve long-sought FAA certification. But industry should not be shocked if the 737-10 joins the 777-9 as a 2027 certification candidate.

S. VERGER/AIRBUS



2 | Still Off Peak

Airbus and Boeing will not return to the delivery levels of 2018, their peak production before the COVID-19 pandemic. Supply chain constraints, particularly seats and engines, will slow down expansion.

F. LANGELOT/AIRBUS



3 | Airbus Derivatives

Airbus will launch a stretched version of the A350 to meet demand. An A220 stretch will remain undecided as the planned production increase—and profitability—are pushed out further.

JOE RAEDLE/GETTY IMAGES



4 | Spirit-Frontier Saga

Spirit Airlines and rival Frontier Airlines will finally agree to terms, ending a long-running merger saga. Frontier will fold Spirit into its operations.



KOOL399/GETTY IMAGES

5 | Worsening U.S. Demand

Main cabin revenues among domestic U.S. airlines will slump amid a “K-shape” economy. International traffic will plummet as travelers balk at new U.S. travel authorization requirements, while other countries respond with reciprocal policies.

PREDICTIONS FOR 2026

Commercial aviation
developments to watch
in the coming year



PHILIPPE STORPPY/CFM

6 | Leap Milestone

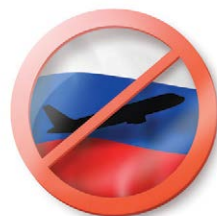
CFM International, the GE Aerospace-Safran joint venture, will finally pass the 2,000-deliveries benchmark for the Leap-1 engine for the first time in 2026, marking a milestone first targeted for 2020 but delayed by the COVID-19 pandemic, Boeing setbacks and supply chain problems.



JOE PIESAMATION.NET

7 | Air France-KLM TAP Buy

The Franco-Dutch group will strike a deal to buy into TAP Air Portugal, enabling it to make the most of TAP's strong route network to Latin America, in particular Brazil from its Lisbon hub.



ARTIAZZ/ISTOCK

8 | Ongoing Overflight Ban

Russian airspace will remain off limits to most airlines well into 2026. Even if a Russia-Ukraine ceasefire is declared, it will take some time before insurance companies are willing to cover carriers flying over Russia.



NATS

9 | Fewer Flight Delays

Eurocontrol and air navigation service providers will reap the fruits of developing new approaches and tools. One or two serious weather events will disrupt the peak summer season, but overall punctuality will continue to improve.



BOEING

10 | Consolidation Climb

Manufacturing mergers and acquisitions will surge in 2026 as demand for greater capacity combines with lower interest rates for loans and a desire by owners to enter or exit certain business lines. Private equity investors also will be looking harder to offload some long-held assets and roll up new ones. 📈

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BUSINESS AVIATION

People to watch **p. 74** New aircraft **p. 75** Emerging connectivity models **p. 76**
Data center **p. 79** Predictions for 2026 **p. 80**

WILL IT KEEP PACE?



MARK WAGNER/AVIATIONIMAGES

Attendees visited the static display during the 2024 European Business Aviation Conference & Exhibition in Geneva.

➤ BUSINESS AVIATION OUTLOOK FOR 2026 PREDICTS GROWTH

➤ FLIGHT HOURS SURGE WITH DEMAND

➤ 100% DEPRECIATION RETURN PROVIDES BOOST

Molly McMillin Wichita

The introduction of new models, return of 100% bonus depreciation, increased flight hours and otherwise solid demand for new and pre-owned business aircraft are driving a robust market.

Flight hours by corporate, fractional, charter and privately operated business aircraft continued to soar in 2025 and are predicted to be steady in 2026. Manufacturers' order backlogs, which extend 18-24 months, have brought them better pricing along with a boost to buying decisions.

"We're sold out on every product we make," Textron Aviation President and CEO Ron Draper said in October. "We're trying to increase production—carefully—to meet that demand."

Business aviation continues to attract new entrants at higher numbers, although the figures are down from the record levels during the COVID-19 pandemic.

"It's notable to us that right after COVID—when the entire industry saw a demand none of us have seen before, including quite an influx of new buyers—some of the high-

est numbers you saw on a percentage basis [that] were as much as 40% were new to aviation," says Todd Simmons, president of customer experience at Cirrus Aircraft. After declining to about 25%—still about double pre-pandemic figures—that number has ticked up to as much as 35% over the past 12 months.

"I'm not a politician, but I think there's been some settling with the current administration, whether that's with tariffs [or] that's with policy," Simmons says. "If there was any hesitancy with the initial part of the administration, I think now you've just seen customers say, 'At some point, this is all going to shake out.'"

Corporate buyers are refocusing on their businesses and adding aircraft, or in cases of personal usage, moving forward with the purchase of an aircraft, he says.

Both flight hours and new deliveries are higher than in 2024 and up dramatically from pre-pandemic levels. Fractional flight hours rose 12% during the third quarter of 2025 compared with the same period a year ago, and were up 71% over 2019, according to the Aviation Week Network's Tracked Aircraft Utilization data. Corporate flight hours rose 5% year over year and 16% compared with 2019, while

private owners flew 4% more in the third quarter compared with a year ago and 37% more than in 2019.

During the first nine months of 2025, manufacturers delivered 787 business aircraft, including 557 business jets and 228 turboprops, up from 751 in the first nine months of 2024 and 545 during the same period in 2000, according to Aviation Week data.

Looking ahead, Aviation Week Network analysts project manufacturers to deliver more than 9,000 new business jets over the next 10 years, an average of 900 jets per year and up from an average of about 700 per year in 2017-25. They also forecast deliveries of more than 2,600 turboprops during the next decade for a total of 11,300 aircraft valued at \$289.9 billion.

Small jets are expected to make up 31% of the business jet market over the next 10 years, followed by large and ultra-large jets with 24% and midsize and super-midsize jets with 22%, the forecast says.

North America is expected to remain the dominant market for business aviation and account for 69% of all projected deliveries during the next decade. Western Europe comes in second with 13% of all deliveries, followed by Latin America with 10% and the Asia-Pacific region with 3%, the forecast says.

The global in-service business aviation fleet, meanwhile, is projected to grow to more than 35,730 aircraft in 2026 to more than 40,500 by the end of 2035—the last year of the forecast period—with a 1.4% compound annual in-service growth rate.

About 80% of new Cirrus Vision SF50 jets are sold in the U.S. But markets outside the U.S. have shifted in the past 24 months, something not unique to Cirrus, Simmons says. “We now see Brazil as a country being almost as strong as the entire European continent,” he notes.

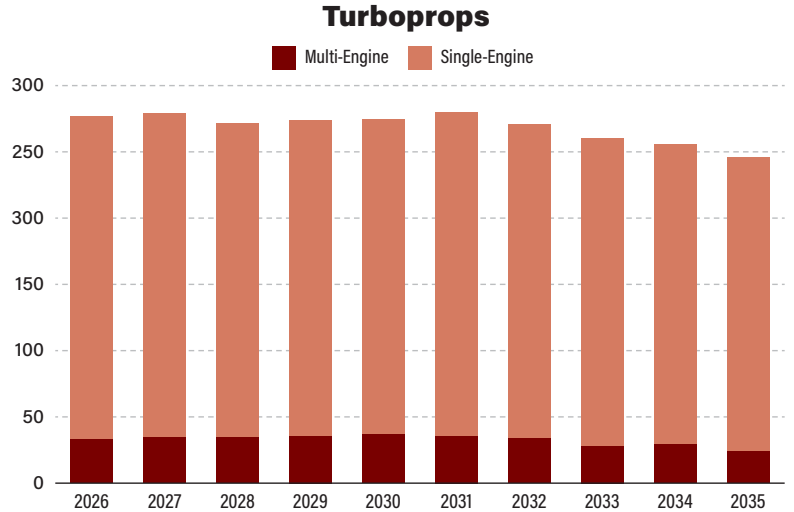
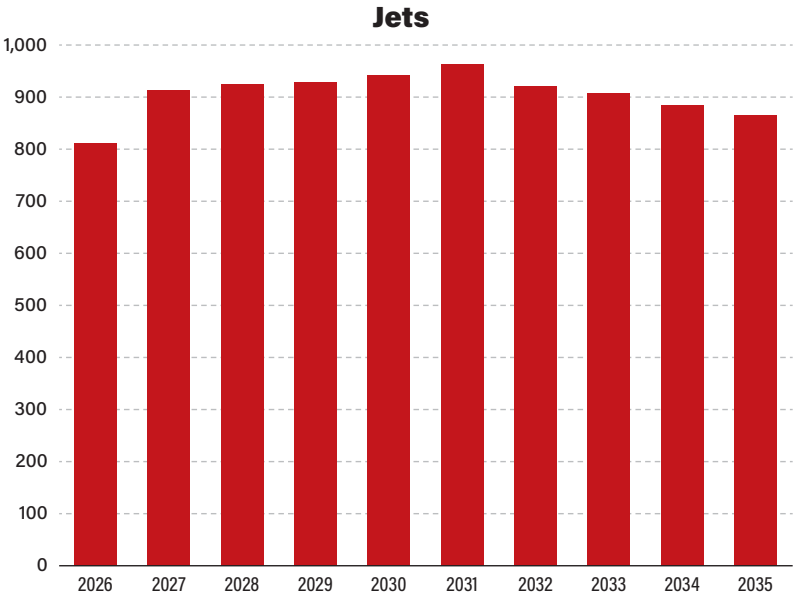
Brazil has stabilized somewhat socio-politically, Simmons says, and the country has fewer environmental and sustainability pressures than Europe.

“In Europe, that’s a real issue,” he says, arguing that pressures will continue until the region recognizes the value of general aviation to the economy, small businesses, humanitarian efforts, search and rescue, law enforcement and other areas. “I think Europe’s got to figure that out.”

Passage of the One Big Beautiful Bill Act (OBBBA) by the U.S. Congress reinstated 100% depreciation for qualified new and used business aircraft, which allows owners to deduct a large portion of the purchasing cost of certain assets the year they are put into operation, as long as they are used for business purposes at least 50% of the time. This

incentive is giving the industry a boost. However, with long waits for new aircraft deliveries, Draper does not expect the change to spur sales in that segment. But he notes that it will drive more activity in the pre-owned market, especially

Forecast Average Annual Business Aircraft Deliveries 2026-35



Source: Aviation Week Network 2026 Business Aviation Fleet & MRO Forecast

for younger aircraft, where inventory is already tight. “So it’s a very, very healthy market right now,” he says.

Supply chain issues have improved, although bottlenecks and capacity constraints continue, manufacturers report. “Everybody’s been saying, ‘Well, it’s better than it was three years ago, two years ago,’” Draper says. “That’s true. . . . It still takes 100% of the parts to build an airplane, so it’s 80% better. And when we drive upstream into why some subtler

People To Watch



Lisa Atherton

Textron President and CEO

Atherton will become president and CEO of Textron effective Jan. 4. She has served as president and CEO of Textron's segment Bell for the past eight years and has held a variety of roles during her 18 years with the company. She headed Textron Systems before joining Bell. She replaces Scott Donnelly, who is retiring.



Jim Currier

Honeywell Aerospace CEO

Currier, who has led Honeywell's Aerospace Technologies business since 2023, will take on the role of president and CEO when Honeywell Aerospace is spun off as an independent, publicly traded company in 2026. As a standalone company, Honeywell Aerospace will have more than \$15 billion in sales and leading positions in engines, avionics and auxiliary power systems.



Lor Izzard

Gulfstream Senior Vice President of Customer Support

Izzard started in this role in early 2025, overseeing service center operations, government programs, field support and sales support at a time of big fleet growth and aftermarket facility services expansion. The OEM is now producing ultra-long-range G700s and G800s, as well as long-range G400, G500 and G600 aircraft. Gulfstream opened new maintenance facilities in Mesa, Arizona, and Fort Worth, Texas, and a new Technical Training Center began operating in Mesa in 2025.



Stephen Maiden

West Star CEO

Maiden leads the company at a time of great demand for maintenance, repair and overhaul and long lead times and as the company has a new owner—Greenbriar Equity Group. After the acquisition in May, 2025, Maiden said West Star is "poised for this new era of growth and innovation and looks forward to enhancing its capabilities and expanding its reach within the business aviation market."



Chris Moore

Gogo CEO

Moore was named CEO of inflight connectivity provider Gogo in December 2024 after Gogo acquired the privately owned Satcom Direct, where Moore was president. He is leading Gogo through the launch of Galileo, its new satellite broadband service for business aviation, as well as a new 5G air-to-ground network that has been delayed from its planned service entry in 2021.



Bill Papariella

Bond Chairman and Group CEO

Serial startup executive Papariella plans to start operating Bond's Bombardier super-midsize Challenger and large-cabin global fractional fleet in 2027, focusing on "exclusivity over scale." Bond is the mystery buyer of the Bombardier deal announced in June valued up to \$4 billion. Papariella formerly launched charter Jet Edge and financing company Aero Ventures.



Stuart Simpson

Vertical Aerospace CEO

Simpson provides strategic direction that helped the startup become an emerging leader in the electric vertical-take-off-and-landing vehicle space. He helped formulate the Flight-Path 2030 strategic plan that spelled out ambitious milestones for the next half-decade. Making efficient use of capital, he has overseen the flight envelope expansion campaign with a pre-production prototype to the beginning of transition flight testing. With plans to develop a conforming aircraft in 2026, Vertical appears on track to certify its VX4 air taxi with the UK Civil Aviation Authority by 2028. 🚀

suppliers are struggling, it often comes down to labor and capacity in their facility. . . . There's still some choke points, and we just work through them."

Those constraints may have the upside of discouraging manufacturers from overproduction.

This year started off slowly. "The consumers and the trade alike waited out 2024 because of it being an election year with high hopes for the installation of the now current administration and what comes with that," explains Janine Iannarelli, founder and president of brokerage Par Avion. "The expectation was tax benefits for the aviation industry."

What was unexpected at the start of 2025, however, was the delay in the return of 100% depreciation, Iannarelli noted. It was included in the OBBBA, which was signed into law on July 4.

Inventory of pre-owned business aircraft tightened in the third quarter of 2025, and the supply of younger, high-demand models was particularly scarce, the International Aircraft Dealers Association reports. In the third quarter, dealers signed 171 new acquisition agreements, more than a year ago, the group says, noting that dealers are forecasting stable or increased demand in 2026.

In the fractional ownership business, demand remains strong, with no signs of decline, although a "big slowdown" in the business occurred in the first quarter, Airshare CEO John Owen tells Aviation Week. "I think that was all centered around political and economic uncertainty, and we kind of sat around going, 'Uh-oh, what's going on?' And then in April, it's like the switch flipped again, and everything was back to normal."

Meanwhile, the charter industry also remains steady, despite challenges such as increased market competition, taxation and tariffs, and talent acquisition and retention. The segment has normalized following a robust post-pandemic spike, says Ryan Waguespack, a U.S. board member with the Air Charter Association. "Now you're actually having to sell," he remarks. "And you've got a generation of sales teams that really have never had to. Now they're like, 'Whoa.'"

Post-pandemic, there has been a new generation of charter customers who are more price-driven, says Kirti Odedra, director of sales for Planet 9 Private Air, which operates ultra-long-range aircraft. There is less flying by investment banks and larger corporations doing site visits, she says. Today, the majority of transatlantic flying is for leisure.

Demographically, fractional and charter customers as well as buyers are becoming younger. "There's just a lot of wealth out there," says Lannie O'Bannon, senior vice president of sales and flight operations at Textron Aviation. "Our sales teams are out working those relationships and making sure all of these customers who may not have owned a jet or a turboprop are familiar with who we are."

Business aviation remains committed to reaching the target of net-zero emissions by 2050, National Business Aviation Association President and CEO Ed Bolen says. The use of sustainable aviation fuel, which can reduce an aircraft's life-cycle carbon emissions by as much as 80% over traditional fuels, is a key part of the plan, the organization says.

"Sustainable aviation fuel is a key element of our industry's long-term strategy to reduce emissions," Bolen says. Book-and-claim and carbon offsets will also play a role. 🌱

Gallery See more about developments in the business aviation sector in 2025: [AviationWeek.com/bizav2025](https://www.aviationweek.com/bizav2025)



Busy Year for New Business Aircraft

As the business aviation industry comes to the close of a new-product development cycle that has redefined the large-cabin, long-range jet as well as the single turboprop, **a new wave is coming for the middle of the market.**

Graham Warwick Washington

Landed

Certified in March, the Pilatus PC-12 Pro features a cockpit redesigned around the Garmin G3000 Prime integrated flight deck, including the Autoland autonomous emergency landing function and electronic stall and stability protection.

Gulfstream's G800 was certified in April with performance exceeding projections. The 8,200-nm range at Mach 0.85 beat expectations by 200 nm, maximum operating speed increased to Mach 0.935, and takeoff and landing distances decreased.



Pilatus PC-12 Pro Garmin 3000 Prime cockpit

On Approach

Certification of GE Aerospace's 1,300-shp Catalyst engine in February boosted hopes for FAA approval of the single-turboprop Beechcraft Denali, now expected in 2026 but planned for 2019 when the program was launched in 2016.

The Cessna Citation CJ4 Gen3, now in flight testing and planned to enter service in 2026, introduces G3000 Prime avionics, including

autothrottles and emergency autoland. A Gen3 upgrade for the company's M2 and CJ3 is planned in 2027.

First flight of Dassault's ultra-long-range Falcon 10X has slipped into 2026, having originally been planned for 2024. Service entry for the 7,500-nm-range aircraft, powered by two Rolls-Royce Pearl 10Xs, is scheduled for late 2027.

HondaJet's HA-480 Echelon, slated to fly in 2026 and receive certification in 2028, features a larger cabin with increased passenger capacity and 2,625-nm range compared with the current HA-420 HondaJet Elite II.

Launched

Startup Otto Aerospace launched the Phantom 3500 in September with the promise of super-midsize comfort and performance at a midsize price, plus a standup cabin and 3,500-nm range thanks to natural laminar flow aerodynamics. Certification is planned for 2030.

Gulfstream G300



The super-midsize Gulfstream G300, unveiled in November and developed with Israel Aerospace Industries to replace the G280 in 2027, offers 3,600-nm range at Mach 0.80 with a longer cabin, trademark Gulfstream oval windows and a cabin altitude of 4,800 ft. at 41,000 ft. ☼

TEXTRON AVIATION



Cessna Citation Ascend

Epic Aircraft received certification in July for the E1000 AX, an upgrade of its high-performance turboprop single with increased full-fuel payload and a Garmin G1000 NXi avionics suite including autothrottle and emergency autoland.

Certified in October, the Cessna Citation CJ3 Gen2 features Garmin's G3000 touch-screen flight deck with autothrottles and an optional enhanced vision system as well as more pilot legroom and a customizable cabin.

Bombardier's Global 8000 was certified in November with an increased maximum speed of Mach 0.95, a range of 8,000 nm at Mach 0.85 and a new benchmark for reduced cabin altitude in a business aircraft—2,691 ft. at 41,000 ft. It entered service on Dec. 8 after Bombardier delivered the first 8000.

The latest iteration of Cessna's 560XL series, the Citation Ascend, was certified in November with Garmin's G5000 flight deck including autothrottle, increased performance from uprated engines and an upgraded flat-floor cabin.

Connectivity Providers Move to Multi-Orbit Models

> GOGO'S GALILEO ENTERS SERVICE

> VIASAT PLANS LEO OFFERING BY 2028

Bill Carey Boston

Legacy providers of inflight connectivity to business aviation are adapting to meet the challenge posed by new entrants to the market and an expanding bandwidth landscape spanning radio frequency bands and domains.

"It's always about pushing the envelope," Gogo CEO Chris Moore says. "One thing that's happened with disruptive new market entrants is [that] industry needed a level of change anyway. I think it's a positive."

September 2021, Viasat's acquisition of London-based Inmarsat was slowed by regulatory hurdles before closing in May 2023. Both companies came to the union with plans to develop multi-orbit networks—Inmarsat's Orchestra concept envisioned a network combining GEO, LEO and highly elliptical orbit satellites with terrestrial 5G communications.

Gogo, a legacy provider of air-to-ground (ATG) cellular communications, once supplied K_u-band satellite connectivity to airlines using capacity from multiple satellite operators before selling its commercial aviation business to Intelsat in 2020. The Broomfield, Colorado-based company has reentered the fray for satellite broadband with its bizav-focused Galileo service, using the Eutelsat OneWeb constellation of LEO K_u-band satellites positioned 746 mi. above the Earth.

Throwing down the gauntlet to Starlink, Gogo has partnered with Hughes Network Systems to manufacture two flat-panel electronically steerable antennas for Galileo service: the HDX for small and midsize jets and the larger FDX for midsize and large-cabin business jets.

In December 2024, Gogo expanded its portfolio with the acquisition of Satcom Direct, an inflight connectivity service provider, reseller and equipment manufacturer. Satcom Direct and Germany's Qest had developed two tail-mounted, mechanically steered Plane Simple antenna systems to access, respectively, Intelsat's FlexExec K_u-band and Viasat's Jet ConneX K_a-band services, both based on GEO satellite networks.

Satcom Direct had also developed an electronically steerable antenna with Israel's Gilat Satellite Networks to access the OneWeb LEO network. Gogo calls this the Plane Simple electronically steerable LEO variant and is eyeing government, special mission and VVIP operators for the Gilat system.

By absorbing Satcom Direct, Gogo says it is the only multi-orbit, multi-band inflight connectivity provider serving business aviation as well as military and government mobility markets.

Gogo's portfolio includes a new 5G ATG network expected to enter service in the U.S. in 2026, five years later than planned due to multiple delays including a chip design error revealed in 2023. The company announced the completion of a nationwide, 150-tower ground infrastructure for the network in October 2022.

On Nov. 5, a federal jury in Delaware found that Gogo infringed on patents held by former ATG rival SmartSky Networks and awarded SmartSky \$22.7 million in damages. Gogo indicated that it planned to appeal and said the verdict has no impact on its operations.

"What separates us from our competition is we're a multi-orbit satellite communications and air-to-ground-based business, very different from what Gogo was over 12 months ago," says Moore, who was Satcom Direct's president until Gogo's acquisition. "With the Satcom Direct acquisition, it really became a true satellite business and air-to-ground business globally very quickly."

At the National Business Aviation Association (NBAA) an-

The ViaSat-3 F2 ultra-high-capacity broadband satellite lifted off Nov. 13 from Cape Canaveral SFS aboard an Atlas V rocket.



UNITED LAUNCH ALLIANCE

SpaceX entered the aviation market with its Starlink offering in 2022, delivering inflight internet via a low-profile Aero Terminal with an electronically steered, phased array antenna that mounts to the top of a fuselage. The service accesses SpaceX's constellation of several thousand low-Earth-orbit (LEO) satellites operating primarily in K_u-band.

With download and upload speeds comparable to cable internet on the ground (about 100-250 Mbps and 10-25 Mbps, respectively), Starlink outperforms geostationary orbit (GEO) satellite networks on latency—the time delay between when an aircraft transmits a signal to a satellite and receives a response. The advantage is due to the physics of its LEO satellites orbiting at about 345 mi. above the Earth versus GEO satellites at more than 22,000 mi.

Starlink's declared latency of under 99 millisecond, compared to about 500-550 millisecond (0.5+ sec.) for GEO spacecraft, favors its use by passengers for real-time interactive applications such as video conferencing, financial trading systems and online gaming.

Starlink arrived amid the planned unification of Viasat and Inmarsat, legacy providers of broadband connectivity to aviation using GEO K_a-band satellites. Announced in No-



Gogo displayed its top-fuselage-mounted HDX antenna (circled) for Galileo service at the National Business Aviation Association conference in Las Vegas in October.

nual conference in Las Vegas in October, Gogo displayed a full suite of its connectivity hardware, including the top-mounted HDX antenna for Galileo service, dual bottom-mounted MB13 multi-band antennas for 5G and legacy 4G reception, and the latest-generation Avance LX5 router platform. The LX5 box integrates 5G and Galileo services and automatically switches between terrestrial and satellite networks.

“We can actually sell bundled services to give consistency,” Moore says. “It’s quite clear that LEO is a very important orbital position which really revolutionized our industry. We can now compete head-to-head with Starlink but also utilize other networks such as Viasat or our own air-to-ground network.”

MULTI-ORBIT STRATEGIES

Also exhibiting at the NBAA conference was Carlsbad, California-based Viasat, promoting its new JetXP service for business aviation. JetXP combines Viasat’s K_a-band network with that of the former Inmarsat as one brand.

With the new offering, Viasat announced a fivefold increase in data transmission capacity for inflight connectivity and premium benefits including service plans with “uncapped” or non-limited speeds, network prioritization to guarantee consistent performance for premium customers and dynamic reallocation of capacity based on demand—capabilities enabled by satellite spot-beam technology.

Viasat also introduced Inflight Quality of Experience (iQe), a new rating system it is proposing as an industry standard. The system applies artificial intelligence and advanced analytics to monitor a range of network performance metrics—such as latency, jitter, packet loss and satellite terminal availability—in real time to assign a score. Viasat plans to make iQe measuring available for JetXP customers as both a mobile app and in a web browser in early 2026.

“The pragmatic path forward isn’t abandoning foundational metrics, but strategically augmenting them with experience-oriented measurements that capture what passengers and crew actually need from connectivity,” states

a Viasat-commissioned report by Michael Schrage, a research fellow at the Massachusetts Institute of Technology’s Sloan School of Management. “Measuring [quality of experience] means understanding not just what the network delivered, but whether users could accomplish their intended objectives without technical friction.”

Traditional service plans that emphasize peak network speeds are outdated, Viasat argues. Rather, the passenger’s overall experience during a flight matters more.

“The notion of peak megabits per second—rubbish,” Schrage said during a presentation at the Corporate Jet Investor conference in Miami Beach in November. “Speed is a decent proxy metric, but it is not inherently or necessarily translated into better customer experience. My view is we’re just at the beginning of designing and deploying the metrics that matter in

flight and on the ground as to what quality of experience means and what people should be entitled to and expect for the prices they pay.”

Viasat is agnostic in terms of the equipment that can access its K_a-band network. JetXP will be available to aircraft fitted with Viasat’s own GAT-5510 (G-12) system, Gogo’s Plane Simple K_a variant or Honeywell’s JetWave and JetWave X satellite terminals—all tail-mounted, mechanically steered antenna systems.

Honeywell originally provided JetWave terminals as an equipment supplier and value-added reseller for Inmarsat before that company’s merger with Viasat. It expects to start shipping new JetWave X terminals in the first quarter of 2026.

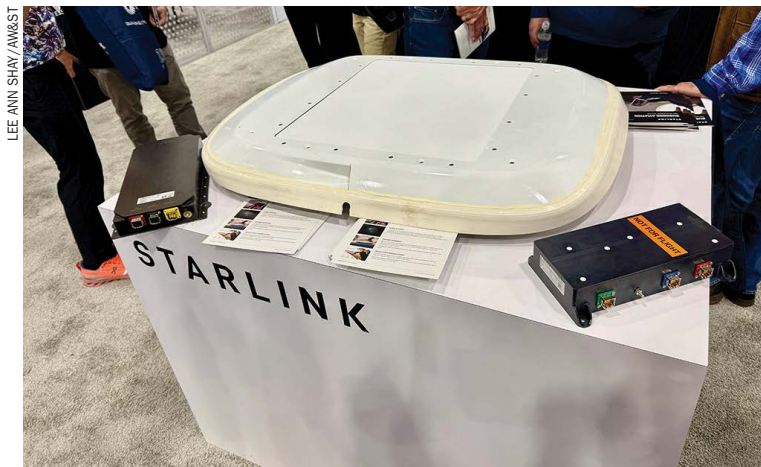
The latest-generation JetWave X terminal features advanced data control routing software that supports data transmission using K_a-band frequencies over both GEO and LEO satellite networks. The software directs traffic over the optimal link based on application requirements. For latency-sensitive applications like video conferencing, traffic is routed through the lower-latency LEO network. The software enables “packet duplication” over both links, ensuring continuity of service if one connection is interrupted.

Honeywell’s idea behind JetWave X is that operators of large-cabin business jets will increasingly equip their aircraft with multiple, disparate systems to ensure the quality and continuity of the inflight connectivity experience—a trend the company already sees, says Jason Wissink, Honeywell president of services and connectivity.

“Our goal there was knowing that both the operators and the installers are moving to a much more complex world of multiple options, multiple systems—how do we build in some capability to be very flexible?” he asks. “We know that this whole space is just going to keep evolving super rapidly.”

Honeywell will offer an “economical upgrade path” to JetWave X for the operators of about 2,000 business aircraft with legacy JetWave terminals, Wissink says. The avionics manufacturer has agreements with Bombardier, Dassault and Gulfstream and is working through OEM service centers to develop supplemental type certifications “for pretty much every super-midsize-and-above platform,” he says.

JetWave terminals operate in the K_a frequency range. Currently, there are no dedicated K_a-band LEO network



SpaceX's Starlink Aviation unit displayed its top-fuselage-mounted Aero Terminal at NBAA.

options for inflight connectivity. Nearing commercial operations are Amazon Leo (formerly Project Kuiper) and Telesat Lightspeed, both of which are planned to provide K_a-band services from LEO.

In April, Viasat signed an agreement with Ottawa-based satellite operator Telesat to integrate K_a-band LEO capacity from Telesat Lightspeed in its multi-orbit network road map. Viasat announced in November that it aims to bring to mar-

ket a flat-panel electronically steerable antenna to access the LEO capacity for its JetXP offering by 2028. Plans call for the new antenna to work seamlessly with JetXP's tail-mount antenna options.

"The LEO component gives us enhanced capability from the aspect of providing a better experience for latency- and jitter-sensitive applications," says Claudio D'Amico, Viasat vice president of strategic market engagement for business aviation. "It gives us a whole new redundancy layer on top of the high-capacity GEO satellites that we have available."

Viasat is scaling the capacity of its GEO network. On Nov. 13, the company's ViaSat-3 F2 ultra-high-capacity broadband satellite lifted off from Cape Canaveral SFS, Florida, aboard a United Launch Alliance Atlas V rocket. Once it reaches its geostationary orbital location in the next few months, the F2 spacecraft is expected to add 1-terabit-per-second data throughput capacity to Viasat's network over the Americas.

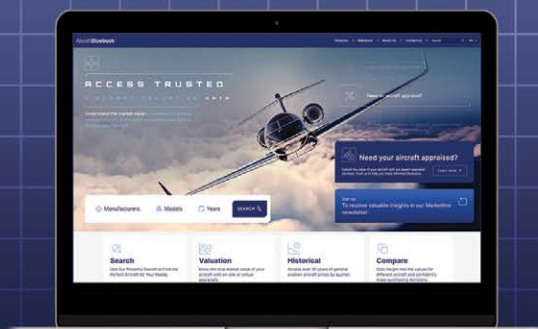
The ViaSat-3 F2 launch originally was scheduled for Nov. 5, when it would have been part of a Cape Canaveral doubleheader with SpaceX, carrying 29 Starlink V2 Mini satellites to LEO aboard a Falcon 9 rocket. SpaceX got the jump; its Starlink mission lifted off from Space Launch Complex-40 at 8:31 p.m. EST. Viasat's later planned launch from Space Launch Complex-41 was scrubbed due to a faulty liquid-oxygen tank vent valve. 

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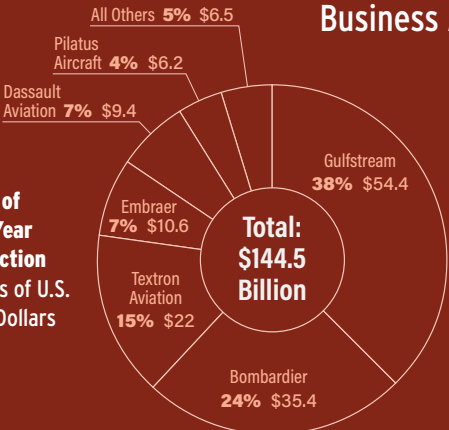


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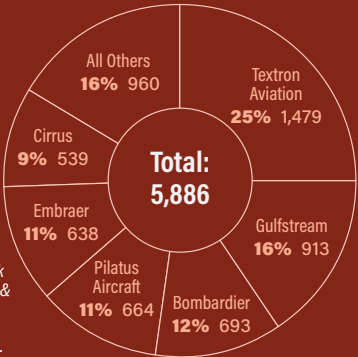
**AVIATION
WEEK**
NETWORK

Business Aviation Forecast, 2026-30

Value of
Five-Year
Production
Billions of U.S.
2025 Dollars

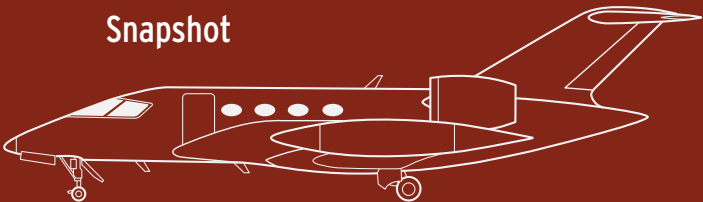


Five-Year
Unit
Production



Source: Aviation Week
2026 Business Fleet &
MRO Forecast.
All numbers and
percentages rounded.

Snapshot



Beyond Aero BYA-1

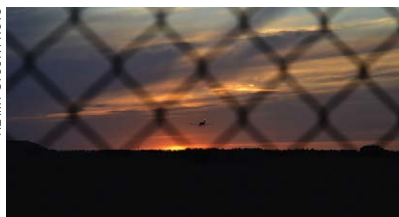
Founded in 2020, French startup Beyond Aero is developing a hydrogen-electric-powered light business jet, the BYA-1, aiming for service entry in 2030. The 6-8-seat aircraft is powered by four 400-kW fuel cells driving two electric ducted fans, using 250 kg (550 lb.) of gaseous hydrogen stored at 700 bar (10,000 psi). Design range with six passengers is 800 nm at a cruise speed of 310 kt. and altitude of 26,000 ft. In February 2024, Beyond Aero flew a piloted hydrogen-electric technology demonstrator—a G1 Aviation SPYL-XL ultralight retrofitted with a 45-kW fuel cell and 40-kW battery and flying on 1.2 kg of hydrogen. The startup demonstrated a full-scale hydrogen-electric powertrain in October in an integrated laboratory equipped with three fuel cell channels producing a total of 1,200 kW using 700-bar hydrogen.

Wingspan: **55.8 ft.** Height: **20.1 ft.**
Length: **61 ft.** Max. Weight: **19,000 lb.**

Business Aircraft To Watch

MODEL/ DESIGNATION	WING- SPAN (FT.)	MAX. LENGTH (FT.)	MAX. HEIGHT (FT.)	MAX. CABIN WIDTH (IN.)	MAX. T/O WEIGHT (LB.)	MAX. LANDING WEIGHT (LB.)	POWERPLANT (NO./TYPE)	THRUST (LB.)	MAX. SPEED	MAX. RANGE (NM @ SPEED)	OPERATING ALTITUDE (FT.)
AIRBUS											
ACJ TwoTwenty	115.1	114.8	37.7	128	139,000	—	2 X P&W PW1500G	24,000 ea.	M 0.82	5,650 (8 pax @ M 0.78)	41,000
BOMBARDIER											
Challenger 3500	69	68.75	20	86	40,600	34,150	2 X Honeywell HTF7350	7,323 ea.	M 0.83	3,400 @ M 0.77	45,000
Global 8000	104	111	27	96	—	—	2 X GE Passport	18,920 ea.	M 0.94	8,000 (8 pax @ M 0.85)	51,000
DASSAULT AVIATION											
Falcon 6X	85.1	84.3	24.5	102	77,460	66,190	2 X P&W PW812D	13,000-14,000 ea.	M 0.9	5,500 @ M 0.8	51,000
Falcon 10X	110.25	109.6	27.6	109	115,000	—	2 X RR Pearl 10X	18,000 ea.	M 0.925	7,500 @ M 0.85	51,000
GULFSTREAM											
G300	63	68.6	21.3	83	39,750	32,700	2 X Honeywell HTF7250G	7,624 ea.	M 0.85	3,600 (4 pax @ M 0.80)	45,000
G400	86.3	86.25	25.3	91	69,850	60,000	2 X P&W PW812GA	13,496 ea.	M 0.90	4,200 @ M 0.85	51,000
G800	103	99.75	25.5	98	105,600	83,500	2 X RR Pearl 700	18,250 ea.	M 0.925	8,000 @ M 0.85	51,000
HONDA AIRCRAFT											
HondaJet Echelon	56.7	57.8	15.9	61	17,550	—	2 X Williams FJ44-4C	3,450 ea.	450 kt.	2,625 (4 pax)	47,000
OTTO AEROSPACE											
Phantom 3500	—	—	—	90	c19,000	—	2 X Williams FJ44-4 QPM	c3,500 lb. ea.	M 0.80	3,200 (4 pax @ M 0.80)	51,000
TEXTRON AVIATION											
Beechcraft Denali	54.25	48.75	15.25	63	—	—	1 X GE Catalyst	1,300 shp	285 kt.	1,600	31,000
Cessna Ascend	55.7	52.7	17.3	66	20,500	18,700	2 X P&WC PW545D	4,213 ea.	441 kt.	1,900	45,000

SVITLANA TYTSKY/
ALAMY STOCK PHOTO



1 | Aircraft Privacy

The conflict between protecting private aircraft ownership and flight tracking and listing an owner in the FAA's registry will become more public as legal issues arise over titles and ownership during aircraft transactions.

BOND

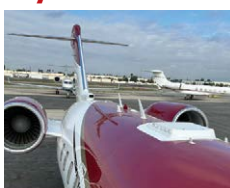


2 | Luxe Flying

Demand for the next level of luxury service is a growing niche for fractional and charter providers. For instance, startup fractional Bond is focusing on "exclusivity over scale," Magnifica Air is launching as a "private class" charter, and Flexjet is expanding its exclusive lifestyle offerings and bespoke aircraft interior options.

3 | Connectivity

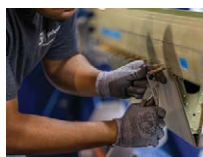
After a years-long head start, Starlink will face direct competition for broadband inflight connectivity as Gogo's low-Earth-orbit Galileo system enters service, while manufacturers and aftermarket providers complete supplemental type certifications for numerous aircraft types (page 76).



GOGO

4 | Backlogs at Bay

Supply chain shortages, while improving, are expected to carry over into 2026. While these continue to cause delays, they also keep manufacturers with long backlogs from overproducing aircraft (page 72).



TEXTOR AVIATION



PAUL SVEBY/ALAMY STOCK PHOTO

5 | Shadow Charter

Charter brokers will organize to develop licensure requirements to prevent unlicensed seat selling over the internet. The FAA will ramp up oversight of Part 135 operators.

PREDICTIONS FOR 2026

Ten trends anticipated
for business aviation
and advanced air mobility



WEST STAR AVIATION

6 | Maintenance Demand

Demand will still exceed maintenance slot supply, requiring more advanced planning for upgrades, including connectivity. At the same time, Bombardier and Gulfstream have been building up their maintenance, repair and overhaul facilities to accommodate expanding fleets and to grow life-cycle support revenue, putting pressure on independent aftermarket providers to innovate.



CALUMET

7 | Sustainability

Production of "neat" or pure sustainable aviation fuel will continue to grow, and an increasing proportion will be made in the U.S., as airlines use more sustainable fuel and new production facilities come on line.



SIGNATURE AVIATION

8 | FBOs and eVTOLs

The first fixed-base operators in the U.S. will be ready to accommodate advanced air mobility vehicles, including with battery-charging infrastructure. This is a key step for operations in urban areas such as Miami.

9 | First FAA-Certified Electric Aircraft

Beta Technologies is on track to be the first manufacturer to receive FAA certification for an electric aircraft. The company's CX300 Alia CTOL version is set to be certified by the end of 2026, likely followed by its Alia eVTOL version—which is in active development—in 2027 or 2028.



BETA



AUTOFLIGHT

10 | First eVTOL Certification

China will be the first to certify a passenger-carrying, winged, electric vertical-takeoff-and-landing vehicle with either the Aerofugia AE200 or the AutoFlight Prosperity. No U.S. company is close to certifying an eVTOL in 2026. 🇨🇳

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New and established engine-makers vie for booming CCA market [p. 85](#)

CFM Leap-1B deliveries are expected to grow in 2026 in lockstep with increased Boeing 737 production rates.



CFM

LEVELING OFF

➤ BUOYANT MARKET PROSPECTS LOOK GOOD FOR ENGINE-MAKERS

➤ CFM TARGETS CLOSE TO 2,000 LEAP-1 DELIVERIES IN 2026

➤ ROLLS PUSHES THE TRENT 1000XE FOR BOEING 787 MARKET GAIN

Guy Norris Colorado Springs

Six years after the onset of the COVID-19 pandemic and a stop-start recovery slowed by waves of regulatory, reliability and supply chain challenges, the commercial engine business looks as if it might finally stabilize in 2026.

The signs are encouraging. After a positive 2025 with rising deliveries, steadier production and progress with durability and development programs, the scene is set for a strong rebound across both widebody and narrowbody propulsion sectors. Recovery has not come easily and builds on years of industrial investment, including the support and fostering of a supply chain that remains vulnerable in places.

GE Aerospace, in partnership with Safran through their CFM International joint venture, continues to dominate the commercial market and

expects to build on expanded production volumes in 2026. Engine deliveries increased 33% by the end of the third quarter of 2025, the bulk of these being CFM Leap-1s for the Airbus A320neo and Boeing 737 MAX. Leap production was up 40% year over year, and almost 1,700 units were forecast for delivery by year-end.

According to Aviation Week's 2026 Commercial Aviation Fleet & MRO Forecast, some 23,706 Leap-1s are expected to be delivered between 2026 and 2035—equating to more than half of the 42,000 commercial turbo-

fans projected to be produced over the decade.

In addition to increased deliveries, 2026 will see further durability improvements rolled into the Leap-1, many of them building on the improved Leap-1A high-pressure (HP) turbine blade and nozzle kit already in production and undergoing fleetwide retrofit installation following FAA and European Union Aviation Safety Agency (EASA) certification in December 2024. Certification for the equivalent durability kit on the Leap-1B is expected in the first half of 2026.

An improved Leap-1B fuel nozzle is also poised for introduction in early 2026, following approval of the upgraded system for the -1A in 2023. More than 90% of the Leap-powered fleet is expected to be retrofitted with

the new fuel nozzle by 2028 while the HP turbine durability kit retrofits are set to be completed around 2030.

Work is also planned in 2026 to further improve the durability of the Leap-1 against premature wear, tear and damage caused by ingestion of dust and other pollutants. Together with the HP turbine improvements, CFM says time on wing for low-thrust Leap-1As in harsh environments has grown from about 1.5 years to the first shop visit to around four years, or approximately 8,000 cycles.

CFM's Revolutionary Innovation for Sustainable Engines (RISE) technology initiative, which targets development of an open fan propulsion system for next-generation single aisle successors for the A320 and 737, is likely to be busy in 2026. Since the effort was launched in 2021, it has completed more than 350 tests. The scale and complexity of technologies being tested are growing following completion of a critical design review in 2025.

Recent work includes dust ingestion tests on new HP turbine blades and nozzles at the center of the future small-core design, as well as blade endurance cycle testing and ground tests of a hybrid-electric architecture based on a modified Passport business jet engine.

At the upper end of GE's commercial engine power range, preparations also continue toward the commercial debut of the GE9X on the Boeing 777-9. Although this has been delayed to 2027, preservice cyclic and dust ingestion tests are underway while production also ramps up to support initial aircraft deliveries through the end of the decade. Aviation Week's forecast predicts 1,784 GE9Xs will be delivered to support the growing 777X fleet through 2035.

GENx-1B delivery rates also are expected to remain brisk in line with Boeing's planned 787 production rate increase to as many as 16 aircraft per month sometime in 2026 from its current target of 10 per month. Nearly 80% of the 787's firm backlog of almost 1,050 aircraft is scheduled to be powered by the GENx-1B. Aviation Week forecasts 2,600 GENx-1Bs will be delivered between 2026 and 2035.

Rolls-Royce, meanwhile, is stepping up efforts to regain 787 market share with an improved version of the Trent 1000, dubbed the XE. The UK manufacturer says its hopes have

been boosted by better-than-expected in-service results from a durability upgrade on the Trent 7000 sister engine powering the Airbus A330neo.

The first 787-9 with the upgraded HP turbine at the core of the XE package was delivered to Lufthansa in November. Rolls views this milestone, together with news that time on wing has now tripled for some operators of the Trent 7000 durability enhancement (DE) package, as a turning point in its ongoing campaign to restore operator confidence in the engine's improved durability.

The revised HP turbine blade in both engines has 40% additional cooling flow

tion. Aviation Week forecasts around 3,084 Trent engines will be delivered by 2035, of which 77% will be made up of XWB models.

The coming year also will see Rolls accelerate next-generation geared engine work with further tests of a rebuilt 80,000-lb.-thrust UltraFan demonstrator and continuing development of a lower-thrust derivative aimed at the next-generation single-aisle market under its 30,000-lb.-thrust UltraFan 30 project.

The smaller geared turbofan (GTF) will leverage technology being developed under the Rolls-Royce-led Ultra Novel and Innovative Fully Integrated



Rolls-Royce's Trent 1000XE, which has improved durability, builds on upgrades to the Trent 7000.

which, along with a revised cooling hole pattern, enables the blade to survive considerably longer. Rolls is now focused on incorporating the DE package through the Trent 1000 TEN fleet, and has expanded its maintenance, repair and overhaul (MRO) capacity to expedite the process. With an additional phase of the enhancement package due to be added in 2026, Rolls plans to transition the entire Trent 1000 TEN fleet to XE standard by the end of 2027.

Durability upgrade work is also underway on the Trent XWB-97, which, along with the lower-thrust XWB-84, is the exclusive powerplant for the A350 family. Following initial evaluation of an improved HP turbine blade design, further testing in 2026 will focus on blade cooling patterns, as well as flight tests of the updated configura-

Engine Demonstrations (Unified) UltraFan test program—a European Clean Aviation initiative aimed at ground testing of a midthrust class technology demonstrator for future narrowbody aircraft.

Although Unified officially will begin in early 2026, with ground tests planned for 2028, Rolls is well advanced with design of the demonstrator, which was frozen by mid-2025. Combining the core of a Pearl 10X with a new low-pressure system and a gear-driven, variable pitch fan with a diameter of at least 90 in., the UltraFan 30 initiative is the company's first step toward Rolls CEO Tufan Erginbilgic's strategic goal from late 2023 of returning to the narrowbody sector in the 2030s.

Deliveries of the first A320neos

powered by Pratt & Whitney's upgraded PW1100G Geared Turbofan Advantage (GTFA) derivative are expected in 2026, too. As the first major block change improvement for the highest-thrust version of the PW1000G family, the delivery will mark a major milestone for Pratt, which pioneered the introduction of medium-thrust geared engines in the civil market in the 2010s.

Development of the GTFA follows a troubled early service history for the baseline family, mostly related to durability and material issues. Pratt's

and a revised No. 3 bearing compartment. Designed to provide up to 95% of the GTFA's time-on-wing improvement, the first HS+ packages will be available as a MRO retrofit in 2026.

Upgrades to the smaller PW1000G family members—the PW1500G and PW1900G—are in development as well, and Pratt is confident that, together with delivery improvements and investment in the company's MRO network, aircraft-on-ground incidents on the Airbus A220 and Embraer E2 fleets will be reduced to near zero by the end of 2026.

Pratt says it has orders and commitments for more than 13,000 engines. Aviation Week forecasts that almost 8,600 PW1000Gs are to be delivered in 2026-35.

Startup supersonic aircraft developer Boom, meanwhile, is on track to test the core of the Symphony—the 40,000-lb.-thrust engine for the project—in early 2026. Tests of the high-pressure core and later the full engine will take place at a refurbished hypersonic engine test site in Watkins, Colorado.

In the regional jet and large turbo-prop sector, production will continue on stalwart engine lines including GE's CF34 for the Embraer ERJ and Comac C909 and Pratt & Whitney Canada's (P&WC) PW100 and PT6A for the ATR42/72 and Indonesian-built N219 and Textron Sky Courier, respectively. Aviation Week forecasts that as many as 1,256 CF34-8E/-10As will be delivered in 2026-35, while deliveries of PW100s and PT6As for regional applications are expected to reach 642 and 202 over the same period, respectively.

With an eye to the future, P&WC plans to ramp up work with RTX sister company Collins Aerospace on a hybrid-electric demonstrator based on the PW127XT fitted with a 250-kW electric motor drive system. In development under the European Clean Aviation's Powerplant Hybrid Application Regional Segment research project, the work could pave the way for future hybrid propulsion systems for the ATR family. ATR and P&WC are exploring future power options for the ATR Evo concept under an agreement announced at the Paris Air Show in June.

Pratt is also working with modification specialist AeroTEC to convert a De Havilland Canada Dash 8-100 turboprop into its long-planned hybrid-electric propulsion flight demonstrator. The aircraft will incorporate a 2-megawatt parallel hybrid-electric powertrain system in place of one of the Dash 8's two PW120-class turboprops. In addition to a 1-megawatt thermal engine, the system will include a 1-megawatt, 1-kilovolt electric drive from Collins Aerospace and a battery system supplied by Swiss startup H55. ☛



Pratt & Whitney's newly certified GTF Advantage is interchangeable with the current PW1100G geared turbofan.

GTFA initiative and a related Hot Section Plus (HS+) retrofit option are designed to reset operator confidence in the long-term dependability of the PW1000G family.

Changes incorporated in the Advantage include increased airflow in the core to lower operating temperatures and an improved hot section, which aims to double time on wing. Airbus expects to begin delivering GTFA-powered A320neos in the first half of 2026, and Pratt plans to achieve 100% new production-standard builds by late 2027 or early 2028.

Flight tests of the HS+ package on Pratt's Boeing 747SP flying testbed continue in pursuit of FAA Federal Aviation Regulations Part 33 engine certification, which is expected in early 2026. Incorporating 35 part numbers from the GTFA hot section, the HS+ package includes the improved combustor, optimized HP turbine first-stage blade with improved coatings

Production increases also underway are expected to meet demand from Pratt's main customer, Airbus, the engine-maker says. The aircraft-on-ground issue that particularly affected the PW1100G-powered fleet is also expected to see considerable improvement in 2026, Pratt says. Following the discovery of flawed powdered metal parts made in 2015-21, Pratt was forced to induct hundreds of additional engine shop visits, with a turnaround time of 300 days. Off-wing times are coming down to 250 days or less, the company says. GTF in-shop turnaround times, once as high as 160 days on average, are also expected to shorten to around 110 days.

Despite the issues, demand for the GTF continues to be strong, Pratt says. A decade on from its debut, with more than 2,500 GTF-powered aircraft delivered and an in-service fleet almost as large as that of the preceding International Aero Engines V2500,

Gallery See more about propulsion developments in 2025: [AviationWeek.com/Propulsion2025](https://www.aviationweek.com/Propulsion2025)



Power Proliferation

The U.S. Air Force plans to invest \$3.1 billion in Collaborative Combat Aircraft research in 2029 and develop an **international loyal wingman UAS market** estimated at \$2.3 billion through 2031, intensifying the competition to power this emerging market.

Guy Norris Colorado Springs

At the smallest end of the thrust scale, such companies as Argive, a UK startup, are developing additively manufactured small turbine engines to power small and medium-size uncrewed aircraft, including loitering munitions, otherwise known as one-way effector drones. Argive has flight-tested a 66-lb.-thrust engine dubbed the A300 and ground-tested a 240-lb.-thrust A1110 intended for larger platforms.

Colorado startup Beehive Industries aims to begin flight tests in 2026 of its additively manufactured 200-lb.-thrust Frenzy engine following recently completed altitude evaluations at the U.S. Air Force Research Laboratory. Covering the 100-300-lb.-thrust range, the company plans tests of a 100-lb. version later this year. Beehive also is working on an engine



Beehive Industries Frenzy

missiles. Ranging from 500 lb. to 1,800 lb. in thrust, the engine series is derived from the additively manufactured TJ150 and builds on lessons learned from development of the GatorWorks FJ700 small turbofan. Pratt is also testing low-cost derivatives of its PW300 and PW500 business jet engines for 2,000-7,000-lb.-thrust CCA applications.

French engine-maker Safran revealed in June that it is also planning a range of new, low-cost CCA powerplants dubbed the M15, M30

and M50. Few details have been revealed, although the designations imply the initial series will cover the 3,300-, 6,600- and 11,000-lb.-thrust ranges, respectively.

Rolls-Royce is offering the 7,000-9,500-lb.-thrust AE3007 for large CCA-UAS applications. The engine-maker provided versions of this family to power the Northrop Grumman RQ-4 and Boeing MQ-25. For lower-thrust CCA and UAS applications, Rolls-Royce is also offering a new family of smaller engines based on its recently developed Orpheus demonstrator.

Light business jet and cruise missile propulsion provider Williams International has so far cornered the early market for large CCA prototypes in the U.S. and Australia. Versions of the 3,600-lb.-thrust FJ44-4 power the Anduril YFQ-44

GE-Kratos GEK800



with more than 1,000 lb. thrust called the Rampart for collaborative combat aircraft (CCA) applications.

Czech-based PBS Group, a long-established microjet company that opened a U.S. facility in Georgia in 2025, has developed a family of small turbojets for uncrewed aircraft system (UAS) applications, including the 500-lb.-thrust TJ200 turbojet, the most powerful in its portfolio.

Honeywell has meanwhile emerged as the latest major engine OEM to compete in the market by unveiling plans to develop the HON1600, a scalable, low-cost engine family covering the 800-1,600-lb.-thrust range. Offering both turbojet and turbofan variants, Honeywell says a core engine has been demonstrated at rated thrust.

GE Aerospace and Kratos Turbine Technologies are developing the 800-lb.-thrust GEK800 and 1,500-lb.-thrust GEK1500 turbofans for cruise missiles and CCA under a joint venture established in June. Separately, GE Aerospace is also developing a small turbofan engine family that generates at least 3,000 lb. thrust for midsize CCA.

Pratt & Whitney plans to begin tests in 2026 of the first of a new family of scalable engines targeting CCA and cruise



Williams International FJ44s

and the General Atomics Aeronautical Systems Inc. YFQ-42. The 3,000-lb.-thrust FJ33 engine also powered the first prototypes of the Kratos XQ-58 Valkyrie. Other Williams-powered applications appear to include the recently unveiled Northrop Grumman Scaled Composites Model 444 Project Talon as well as the Boeing Australia MQ-28 Ghost Bat. ☛



The H145 has become one of Airbus' top sellers thanks to its popularity with military customers as a utility and light attack platform.

CARA IRINA WAGNER/FOTO HIRSCH

RETURN TO GROWTH

> THE MARKET SURGES, BUT FLAGSHIP INNOVATIONS FACE DEVELOPMENT AND CERTIFICATION HOLDUPS

> BELL 525 AND LEONARDO AW609 STILL AWAIT APPROVALS

> U.S. ARMY AIMS TO CONTRACT FLIGHT SCHOOL NEXT PROGRAM IN 2026

Tony Osborne London

With orders flowing in and deliveries going out the door, the rotorcraft industry appears to be in a steady state of growth. After the doldrums of the COVID-19 pandemic, helicopter manufacturers' backlogs are swelling, buoyed by military spending on new fleets, increased demand from offshore oil and gas operators and growing opportunities as countries invest in enhanced parapublic capabilities, such as law enforcement and emergency medical services.

Service and support revenues are on the up, too, driven by demand for increased flying hours—particularly from the military, but also from the oil and gas sector. Together, these are generating the revenues manufacturers have sought in order to look at expanding and modernizing their product portfolios. The welcome launch of two new light helicopters in 2025 included Airbus' H140 twin-engine light rotorcraft and Robinson's R88 single-engine platform. The latter was the OEM's first major new

development in more than 15 years.

Yet other long-awaited products that could bring a technological shift to the market appear to be stuck in certification or development limbo.

Bell's twin-engine, super-medium, fly-by-wire 525 appears to be constantly in the final throes of FAA certification, as does Leonardo's AW609 commercial tiltrotor. Both have struggled to make the final hop over the finish line, raising questions about whether the market is ready for them. The 525 also needs European Union Aviation

Safety Agency approvals to secure its first firm orders from Norway.

Another Leonardo product, the AW09 single-engine light rotorcraft, is closing in on regulatory approval after an epic 17-year-long development cycle that has spanned three companies. And then there is the UK's Hill Helicopters, which promises to revolutionize the general aviation market but has been held back by work on an engine it has decided to develop entirely in-house.

The company's customers have remained patient even as the rotorcraft has missed several deadlines for engine start and first flight. A first engine run is now planned in April, and the HC/HX50 helicopter is due to fly that December.

Current order intakes are therefore being sustained by existing products. Airbus says its H125 Ecureuil/Astar secured 73% of the single-engine helicopter market in 2024, and the air-

framer has outlined plans to produce the rotorcraft in India. In addition, the company's new five-blade H145 has made its mark in the military market as a light utility and attack helicopter. Ireland has ordered the aircraft, Germany made a top-up in November, and sizable orders from Brazil and Spain are in the offing. Airbus also performed the first flight of its H160M Guepard in July and is ramping up production for military and civil markets, envisaging 60 per year.

Leonardo's AW139 flagship twin-engine medium continues to sell well. The company is expected to reveal a new version, the AW139 Mk.2, at the Verticon helicopter industry event in March in Atlanta, according to several operators at the Dubai Airshow. The new model is likely to feature a reduced empty weight and an avionics suite

more aligned with Leonardo's other products. Meanwhile, the AW169 intermediate twin-engine helicopter continues to secure military sales—particularly in Italy, where it is the backbone of rotorcraft modernization for both the military and law enforcement agencies to streamline training and support.

U.S.-made light helicopter offerings, including Bell's 505 Jetranger X and Robinson's R44 and R66 platforms, continue to sell well, and Robinson is ramping up production rates. Enstrom is ready to return to the U.S. market, now that its crash-resistant fuel tanks—mandated by the FAA in 2019—have been certified.

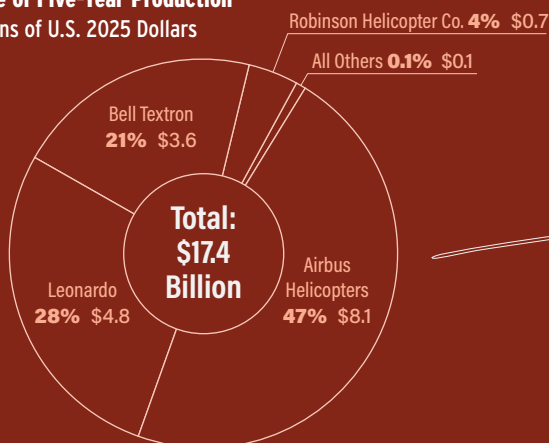
Light helicopter manufacturers are also awaiting the next steps in the U.S. Army's Flight School Next initiative, which looks set to introduce a single-engine light rotorcraft to re-

place the Airbus UH-72 Lakota in the service's Initial Entry Rotary-Wing course at Fort Rucker in Alabama. A call for proposals was delayed by the U.S. government shutdown but finally issued in December, and the Army is expected to make an award decision before the end of fiscal 2026. The program probably will require 200-225 helicopters within 4-5 years, an integrated training system and more than two decades of support. Bell, Enstrom, Leonardo, MD Helicopters and Robinson are proposing platforms, while incumbent Airbus has been lobbying to keep the relatively young fleet of Lakotas in daily operation.

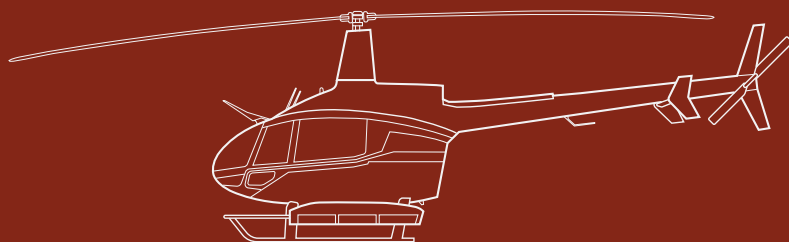
Newcomers to the helicopter market are also making inroads. Korea Aerospace Industries delivered the first export Surion twin-engine medium helicopter to Iraq's Interior Ministry

Civil Rotorcraft Market Share, 2026-30

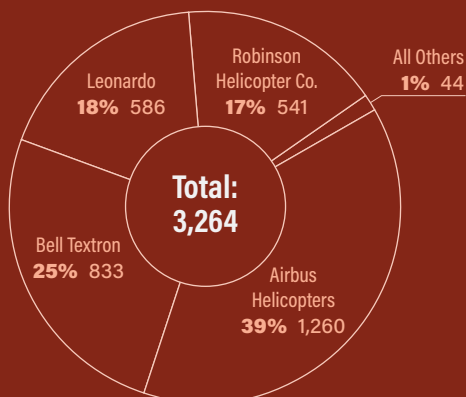
Value of Five-Year Production Billions of U.S. 2025 Dollars



Snapshot



Five-Year Unit Production



Robinson R88

Robinson Helicopter Co. unveiled the R88 in March, the company's largest rotorcraft yet and its first all-new model since 2007. Retaining Robinson's trademark teetering two-blade rotor and powered by a 1,000-shp Safran Arriel 2W turboshaft, the 10-seat R88 is planned to fly in 2026, aiming for certification by the end of the decade. With a full-fuel payload of more than 1,800 lb. and a maximum internal payload exceeding 3,000 lb., the \$3.3 million R88 has a range of more than 350 nm and endurance exceeding 3.5 hr. The cockpit features Garmin G500H TXi displays and touch-screen GTN navigators as well as a four-axis autopilot and dual-redundant hydraulic flight controls.

Source: Aviation Week Network 2026 Military Fleet & MRO Forecast.
All numbers and percentages rounded.

in October, while Turkish Aerospace Industries' T-625 Gokbey helicopter has secured an order backlog of more than 80 aircraft from Ankara's military and government agencies. Many of the T-625 Gokbeys will feature the domestically developed TUSAS Engine Industries TS1400 turboshaft engine as an alternative to the Honeywell/Rolls-Royce LHTEC T800 engine.

Sikorsky, meanwhile, continues to find new operators for its Firehawk variant of the S-70 Black Hawk and is building a limited number of S-92s, mainly for VIP and search-and-rescue missions. Supply chain issues that affected S-92 operations, particularly those in oil and gas support that had ramped up flight operations, have improved, operators say.

On the dedicated military rotorcraft side, Bell and the U.S. Army are

working to speed up the fielding of the MV-75 Future Long-Range Assault Aircraft by the first units to 2030, with a first prototype to be delivered by the end of 2026. Airbus, Leonardo and Fokker, industrial partners in the NHIndustries joint venture, are optimistic about securing more sales of the NH90 despite decisions by several countries to remove the type from service early due to availability and cost of operations. NHIndustries has a backlog of 80 NH90s to produce for existing customers and sales prospects for as many as 100 more, company officials say, and the program has a road map for further development and modernization of the fleet.

This comes as NATO begins to consider the path forward in its Next-Generation Rotorcraft Capability, a project that the alliance hopes will

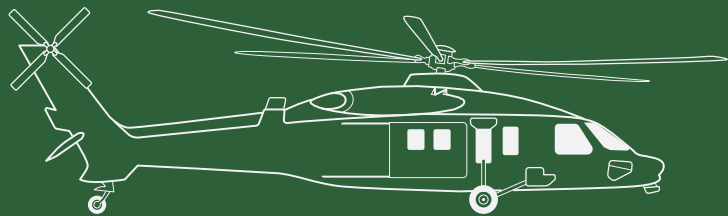
spawn new battlefield transport and naval helicopters. Detailed requirements are due to be drawn up in 2026 to inform a concept design phase that could identify a preferred solution for development in the 2030s.

Europe and the U.S. are not the only countries advancing rotorcraft capabilities. Chinese industry flew a pair of advanced rotary-wing platforms in 2025: a tiltrotor developed by Harbin Aircraft Industry Group and a coaxial-rotor compound from Changhe Aircraft Industries Corp., in a significant leap from the adaptation of French and Russian designs that had largely sustained the country's rotorcraft industry. In addition, a new Chinese Apache-like attack helicopter, dubbed the Z-21, has been photographed on several occasions during flight testing.

Russia, too, is looking to develop

Military Rotorcraft Market Share, 2026-30

Snapshot



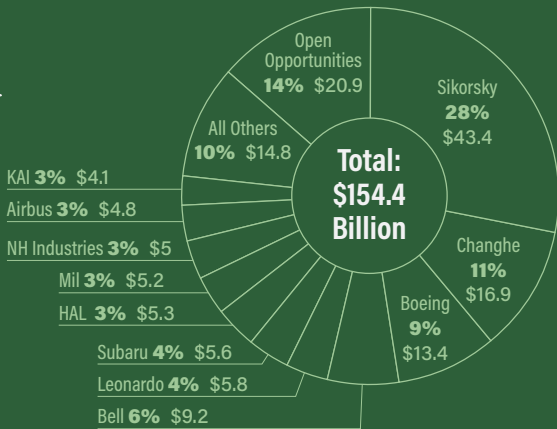
Harbin Z-20

New versions of China's Harbin Aircraft Z-20 medium-lift utility helicopter emerged in 2025. Closely resembling the Sikorsky UH-60 Black Hawk, the Z-20 first flew in 2013 and has been produced in land- and ship-based variants. A Z-20T armed assault version appeared in September in a military parade in Beijing and performed flight displays in October at a helicopter show in Tianjin. At the same show, a model of the Z-20J naval assault transport variant was displayed. Resembling the MH-60R Seahawk, the armed Z-20J has folding rotors and tail for shipboard operation. Satellite imagery emerged in November of an apparent stealth version of the Z-20 similar to the MH-60X Silent Hawk used by U.S. special forces in the 2011 raid on Osama bin Laden's compound. Images appeared on Chinese social media in 2024 of a heavy attack helicopter derivative of the Z-20, tentatively designated the Z-21.

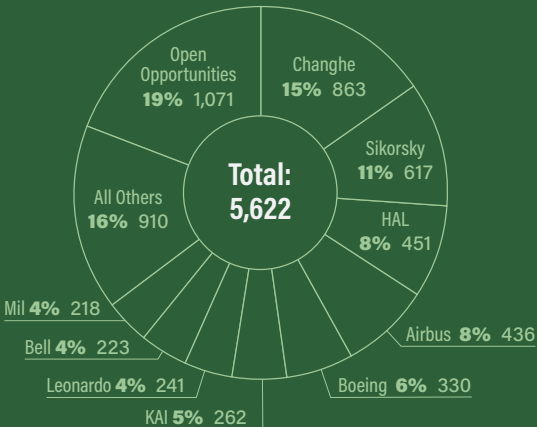
Rotor Diameter: 52.6 ft. Cruise Speed: 160 kt.

Max. Takeoff Weight: 22,000 lb. Range: 300 nm

Value of Five-Year Production
Billions of U.S. 2025 Dollars



Five-Year Unit Production



Source: Aviation Week Network 2026 Military Fleet & MRO Forecast.
All numbers and percentages rounded.



RUSSIAN HELICOPTERS

After heavy losses of Kamov Ka-52s on the Ukrainian battlefield, the Russian military is fielding the updated Ka-52M while parent company Russian Helicopters is looking to develop a new-generation attack helicopter under the PAK-AA program.

new rotorcraft based on the experience of its military campaign in Ukraine. The country has launched the PAK-AA, a combat rotorcraft intended to combine higher cruise speed and range with more autonomous weapons. And Russian Helicopters' Mil Design Bureau has reportedly started work on a successor to the legendary Mi-8/17 family of helicopters under the designation Mi-80. How-

ever, both efforts may be hampered by Moscow's more immediate push to produce and modernize existing, proven platforms to sustain its war effort. Mil is working to localize its supply chain; several helicopters, such as the Kazan Ansat, relied on Western engines and other components.

Back in Western Europe, Leonardo has yet to fly its AW609-based Next-Generation Commercial Tiltro-

tor Technology Demonstrator. Airbus' Racer compound high-speed rotorcraft continues to make progress, reaching 240 kt. in April and proving some military capabilities, including landing on a slope and climb rate performance. The next steps are to give the Racer an eco-mode system, allowing one of the two Safran Aneto 1X engines to be shut down for more economic cruise flight. 📷

Gallery See more about developments in the rotorcraft sector in 2025: [AviationWeek.com/rotorcraft2025](https://aviationweek.com/rotorcraft2025)



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Graham Warwick Washington

As China continues its drive to build a low-altitude economy, one aspect sets Beijing's push apart from Western efforts to establish advanced air mobility as a new mode of transportation: its focus on developing large uncrewed cargo aircraft.

There are as yet no European or U.S. equivalents to the autonomous logistics aircraft already being tested by Chinese companies—both startups

and established manufacturers. The West's focus so far has been on developing the autonomous flight systems that would allow aircraft such as the Cessna Caravan to fly without an on-board pilot in today's complex airspace.

The reason lies in China's wider definition of the low-altitude economy than that used for advanced air mobility (AAM). China encompasses the use of altitudes below 3,000 ft. for

a range of missions flown not only by drones and electric vertical-takeoff-and-landing (eVTOL) vehicles but also helicopters and small aircraft.

Within that definition, logistics distribution plays a large role. China's economic growth has been fueled by industrialization and urbanization, but that growth has been slowing, and the Beijing government sees the nascent low-altitude economy as an engine for

MAKING PROGRESS China's Large Uncrewed Cargo Aircraft

	Subscale Component Testing	Full-Scale Component Testing	Subscale Prototype First Flight	Subscale Prototype Full Envelope	Full-Scale Prototype First Flight
AeroOne Aviation Technology ES-1000					
Air White Whale W5000					
AVIC HH-100					
AutoFlight CarryAll					
CASC CH-YH1000					
EHang EH-216L					
Starair SA750U					
Tengden Technology D18					
United Aircraft T1400					
United Aircraft R6000					
Vertaxi M1B					
Yitong UAV System TP500					
Yitong UAV System TP1000					

AAM REALITY INDEX China's Cargo UAV Developers

renewed economic growth through the fostering of innovations in logistics, e-commerce and transportation.

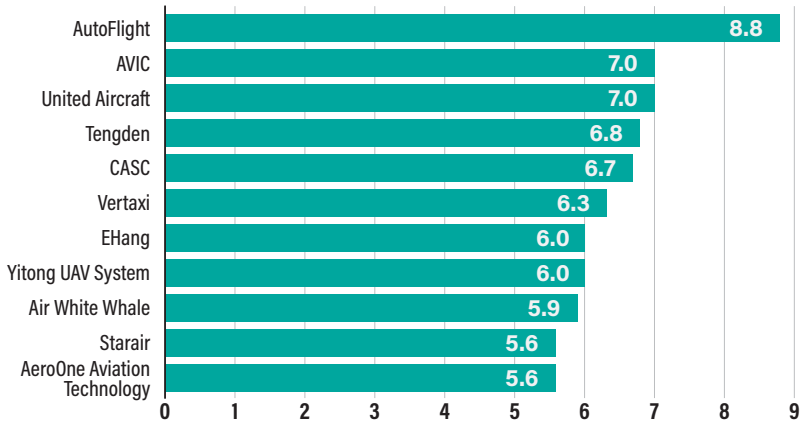
This focus on finding fast and efficient ways of moving goods around the vast country and within its megacities is the driver behind the development of large uncrewed cargo aircraft.

In a bid to measure the emerging sector's progress and rank the companies involved, SMG Consulting has produced a version of its AAM Reality Index specific to China's uncrewed cargo aircraft developers.

The new index ranks 11 companies using five criteria: the funding received, the team assembled, the technology readiness and certification progress of their vehicle and the production readiness toward full-scale manufacturing.

A notable feature of this market is the greater involvement of legacy aerospace companies compared with China's eVTOL sector, which is dominated by startups, says SMG Managing Partner Sergio Cecutta. AVIC and CASC, China's largest state-owned aerospace companies, rank in the top five.

Another characteristic, which has been seen in China's eVTOL sector, is that companies developing large cargo UAVs are able to roll out full-



Source: SMG Consulting

scale prototypes quickly, Cecutta says. The industry is gravitating toward fixed-wing aircraft with conventional powerplants because of the range and payload advantages, he says.

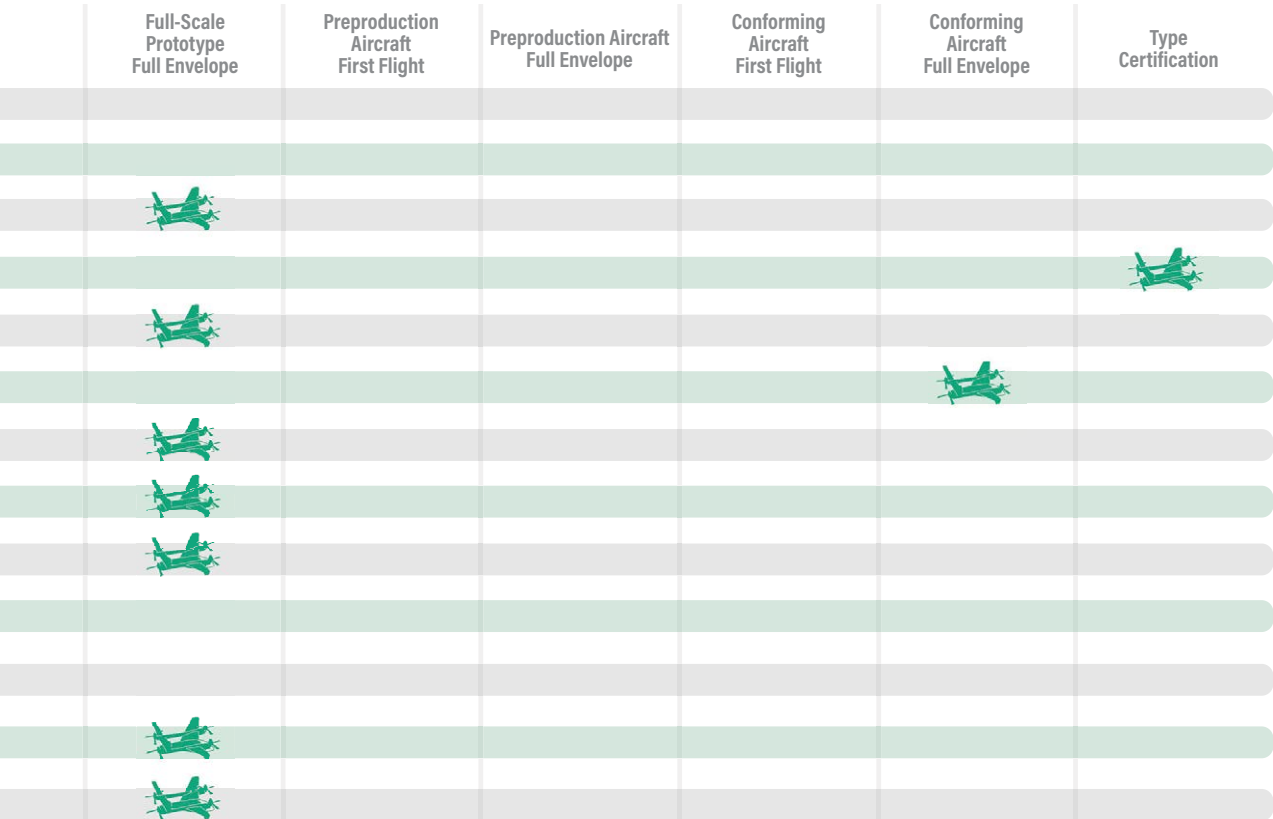
Establishing type certification dates has proved difficult, according to Cecutta, who says many of these vehicles could enter service ahead of certification in specific use cases.

Leading the new China Cargo UAV Reality Index is Shanghai startup AutoFlight, which is backed by China's largest electric-vehicle battery manufacturer, CATL. AutoFlight received type certification from the Civil Aviation Administration of China (CAAC)

for its V2000CG CarryAll large uncrewed cargo eVTOL in March 2024. The aircraft can carry a 400-kg (880-lb.) payload 200 km (125 mi.).

Tied for second is AVIC with its HH-100, a twin-engine, fixed-wing cargo UAV that first flew in June 2024. The piston-powered HH-100 is designed to carry a 700-kg payload 520 km. AVIC has also worked with private Chinese company Yitong UAV System, which ties for sixth in the index. Yitong has flown both the single-engine, 500-kg-payload TP500 and twin-piston, 1,000-kg-payload TP1000.

Ranked second alongside AVIC is United Aircraft Group, which man-



Source: SMG Consulting

RANKING CHINA'S CARGO UAV LEADERS
By the Numbers

OEM		ARI	Funding (U.S. \$ Millions)	Vehicle Type	Propulsion	Vehicles	First Flight	Certification	Service Entry
1	AutoFlight	8.8	\$200	Lift + Cruise	Electric	V2000CG CarryAll	2023	2024	2025
2	AVIC	7.0	Corporate backed	Conventional	Conventional	HH-100	2024	—	—
2	United Aircraft	7.0	\$450	Helicopter/ Vectored Thrust	Conventional/ Conventional	T1400/ R6000	2025/ —	2026/ 2026	2026/ 2026
4	Tengden	6.8	\$230	Conventional	Conventional	D18	2022	—	2025
5	CASC	6.7	Corporate backed	Conventional	Conventional	CH-YH1000	2025	—	—
6	Vertaxi	6.3	\$55	Lift + Cruise	Electric	M1B	2023	2025	2025
7	EHang	6.0	\$262	Multicopter	Electric	EH216-L	2020	—	2021
7	Yitong UAV System	6.0	\$14.2	Conventional	Conventional	TP500/ TP1000	2022/ 2025	2026/ 2026	—
9	Air White Whale	5.9	\$28.3	Conventional	Conventional	W5000	—	2026	2026
10	Starair	5.6	—	Conventional	Conventional	SA750U	2024	—	—
10	AeroOne Aviation Technology	5.6	\$30	Augmented Lift	Hybrid	ES-1000	2025	—	—

SMG Consulting's Advanced Air Mobility Reality Index (ARI) scores each market entrant on a scale of 0 to 10: 0 is a company considering to enter the market with little or no financing, of which there are many; 10 is a company with a commercial product in high-volume production, of which there are none—so far.

Source: SMG Consulting

ufactures a range of uncrewed aircraft, including the tandem-rotor T1400 cargo UAV and R6000 tiltrotor. Designed to carry up to 650 kg, the T1400 made its first flight in October. The first tethered hover flight of the 2,000-kg-payload, 4,000-km-range R6000 followed in November.

(Rainbow) series of surveillance and strike platforms, ranks fifth in the Reality Index and is developing the CH-YH1000. The fixed-wing, twin-engine cargo UAV, designed to carry a 1,200-kg payload over a range of 1,500 km, made its first flight in May. Ranked sixth, Shanghai startup

to be type-certified in October 2023, and the cargo version is in the final stages of testing for CAAC certification. Ranked ninth, Changzhou-based startup Air White Whale is developing the largest cargo UAV yet to emerge in China, the twin-turboprop, fixed-wing W5000. Designed to carry a payload of 5,000 kg up to 2,600 km, the W5000 was rolled out in October 2023. The aircraft is undergoing ground tests.

Tied for 10th, Starair is a Hunan-based startup that is developing the SA750U, which closely resembles the Cessna Caravan and is powered by a single Aero Engine Corp. of China AEP100 turboprop—China's answer to the Pratt & Whitney Canada PT6A. Designed to carry a 3,200-kg payload 2,200 km, the SA750U made its first flight in August 2024.

Also tied for 10th in SMG's first AAM Reality Index specifically for China's emerging cargo UAV industry is AeroOne Aviation Technology. The Beijing-based startup is developing one of most advanced cargo UAVs in China. Designed to carry a 1,800-kg payload 1,200 km, the ES-1000 features distributed electric propulsion blown lift to provide ultra-short-takeoff-and-landing capability. 🌐



Resembling a scaled-down Boeing Chinook, United Aircraft's T1400 can lift 1,400 lb.

UNITED AIRCRAFT

Placing fourth is another established manufacturer of uncrewed aircraft, Sichuan-based Tengden Technology, which is developing a cargo variant of its Twin-Tailed Scorpion series of large twin-boom UAVs. First flown in August, the four-engine D18 is designed to fly up to 600 km with its maximum payload of 1,800 kg and has a modular fuselage that can switch rapidly between cargo transport, airdrop and other missions. CASC, one of China's leading UAV producers with the widely used CH

Vertaxi is entering the market by first certifying an uncrewed cargo version of its planned five-passenger eVTOL—the route already taken by AutoFlight. First flown as the M1 in 2023 and subsequently upgraded to the M1B, the cargo version is in flight testing for CAAC certification. Tied for seventh with Yitong is China's eVTOL pioneer, EHang, with the EH216-L cargo version of its pilot-less two-seat air taxi. The passenger-carrying EH216-S was the first eVTOL

Gallery See more about developments in the advanced air mobility sector in 2025: [AviationWeek.com/aam2025](https://www.aviationweek.com/aam2025)



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MAINTENANCE, REPAIR & OVERHAUL

People to watch **p. 96** Global engine demand **p. 98**
Predictions for 2026 **p. 100**

MORE, MORE, MORE

- > OPPORTUNITIES AND CHALLENGES ARE SET TO CONTINUE
- > MACRO FACTORS ARE CHANGING SLOWLY
- > COST GROWTH, LABOR AND MATERIALS ARE MAIN WATCH ITEMS

Sean Broderick and **Lee Ann Shay** Washington,
Lindsay Bjerregaard Chicago and **James Pozzi** London

Looking for a sure bet in 2026? Put your money on the commercial aftermarket's continued strong growth.

From heavy airframe maintenance to parts sales, aftermarket service providers expect to be very busy in the coming year, as they have been for the last few. Overall commercial maintenance, repair and overhaul (MRO) sales growth in the high single digits is well within reach, and the engine market is trending even stronger. Older aircraft will continue to need work that was not forecast a few years ago as passenger demand remains strong, and the gap created by delivery shortfalls, while closing, remains large.

But some of the underlying trends that have boosted commercial MRO in the post-downturn years are changing. Aircraft production rates and deliveries are picking up, closing a capacity and efficiency upgrade gap that opened with the 2019-20 Boeing 737 MAX grounding and related delivery halt. This recovery is expected to help push some older aircraft out of service, which should bolster used serviceable materials (USM) stock. Overall maintenance demand is expected to ease as newer aircraft, which require minimal to no significant scheduled maintenance during their first few years, replace midlife and older models.

None of this will happen overnight—or over 12 months. But signs of shifting macro factors are there.

Boeing came close to 450 737 deliveries in 2025—the airframer's highest total since 2018's 580. Output from the 787 program is rising as well, and the long-awaited 777-9 is expected to be close to service entry by 2027.

Airbus revised down in early December its full-year delivery target for all commercial models to around 790. While not quite a record—the company has hit 800 twice—it would be an improvement on 2024's 766.

Retirements should steadily increase, although the consensus is that the near-term peak will not come until the end of the decade. The proportion being retired is projected to top out at around 3% of the global fleet, equivalent to



Pratt & Whitney is in the third year of inspecting and upgrading its PW1000G engines.

MTU

1,200 airframes, Aviation Week's latest forecast shows.

Production rate ramp-ups, increased deliveries and related initial spare parts provisioning, a slow reduction in older aircraft and a slower buildup of USM stock add up to one familiar theme: sustained pressure on part providers.

PART SUPPLY & COSTS

Material-driven supply chain constraints have been one of the biggest headaches for the aviation aftermarket in recent years. That will not change in 2026. The constraints are loosening, but as one problematic part is crossed off the hard-to-procure list, another one is added.

Airlines, MROs, OEMs and suppliers are implementing new tactics to ameliorate inventory problems and gain operational resilience.

"The first thing is to map your supply chain, Tier 1 to Tier 4, and then analyze the risk and from there take proactive measures to qualify other suppliers," Thyssenkrupp Materials Business Unit Solutions CEO Patrick Marous advises.

Boeing's part distribution business, which supports both the company's aircraft manufacturing and the broader civil and defense aftermarket, adopted this approach. "There are still a lot of categories where there is a single source," says William Ampofo, senior vice president of parts and distribution and supply chain at Boeing Global Services. Because of that, a key part of the company's strategy is introducing new capacity and alternative sourcing. "We're trying to double down on it," he says.

The single-source supplier is one of the biggest pain points for airlines, says Rohit Singh Tomar, VietJet Air's director of finance and supply chain, noting that recent supply chain consolidation "has not improved the cost base."

He points to a significant price difference between parts for mature aircraft versus new-generation ones. "On aver-

age, we are spending about a 35% premium on spare parts to maintain new-gen aircraft, which, if you start adding up components, engines and [auxiliary power units], becomes a significant number on a total operating cost basis,” Tomar says. Determining the right suppliers, “being able to identify what risk we can undertake and what is the cost to that risk” is the low-cost carrier’s biggest pain point, he adds.

Vietnam-based VietJet merged its material planning and procurement departments to make the whole process more efficient and to be more proactive in its supply chain.

Spanish carrier Vueling has grouped its 200 suppliers into three categories, based on functionality and spending level, to streamline its complex ecosystem of small suppliers, local providers, OEMs and MROs. “This helps evaluate [a supplier’s] real impact on operations,” says Leonardo Bruno, head of maintenance vendor management, noting that it “highlights the top and worst performance.”

Airline executives grumbling about MRO costs is nothing new. Post-downturn spare part price increases have given them even more reason to speak up. Many suppliers pointed to inflation as justification for heavy annual (in some cases, semi-annual) catalog price increases. Just as prevalent was the enticing opportunity to offset red ink elsewhere by leveraging must-have assets—spare parts for the most efficient and sought-after aircraft in the global fleet.

But the cost escalation is not limited to new parts and platforms. Engine MRO is projected to account for 53% of 2026’s total aftermarket revenue of \$139 billion, compared with 49% in 2025 and 46% in 2024. Labor cost escalation explains part of the steady increase; the post-downturn labor shortage has forced airlines and MRO providers to hire and pay aggressively, and the nagging shortage of qualified technicians suggests this is more of a new reality than a short-term trend.

But the problem goes beyond shop floor staff. Overall MRO spending is up a projected 40% this year compared with 2019, while airline capacity is just 10% higher, AeroDynamic Advisory calculates (*Inside MRO* November, p. 41). The consultancy puts half of MRO spending on new material—the same inventory subject to annual price boosts. “For decades, MRO labor and material inflation was not a core issue for airlines,” AeroDynamic Principal Jonas Murby wrote in *Inside MRO*. “That has shifted—higher costs appear to be here to stay.”

ENGINE MRO

Among the calming headwinds is engine shop capacity. Some analysts expect the start of the worst of an engine MRO capacity crunch in 2026, particularly on popular models such as the CFM International CFM56 and International Aero Engines V2500. But narrowbody engine MRO suppliers are not forecasting a peak as much as a plateau.

CFM sees annual CFM56 shop visit volume topping out in 2026 at around 2,500 but does not expect it to fall much through the end of the decade. This reflects the enduring value of older variants of these engines, their V2500 counterparts and certain widebody models that have proved popular with operators looking to maximize engine life cycles. Combined with this, increasing numbers of newer-technology engines, such as the CFM International Leap and Pratt & Whitney PW1000 geared turbofan (GTF) models, are going in for shop visits earlier than anticipated.

OEM-led plans to address engine durability fixes will continue throughout the year and bring additional work to already-busy shops. At CFM, these include a high-pressure

turbine durability kit and reverse bleed system to address fuel nozzle coking, or carbon deposit buildup, in the Leap-1A. The reverse bleed system has been installed on more than 50% of the affected fleet and will continue to roll out. Similar upgrades for the Leap-1B are expected to be available in 2026.

Pratt & Whitney is entering its third year of undertaking several upgrades to affected GTF engines. Its PW1000G-series contaminated powder metal fleet management program continues. More than 300 aircraft are expected to be grounded on any given day while engines undergo required inspections.

Meanwhile, Pratt is rolling out its Hot Section Plus upgrade for PW1100Gs. The kits, expected to be available in 2026, upgrade more than 30 parts to the soon-to-be standard GTF Advantage configuration, which is nearing production readiness.

The overall picture on engine lead times is mixed. While slightly improved as industry adjusts to supply chain woes, slot availability in shops could remain a challenge as airlines continue to outsource engine MRO to third-party providers. Independent specialists with quick-turn and hospital shop capabilities could benefit from some of this overspill of work. A shortage of much-sought-after spare engines in the market is also expected to continue in 2026.

After picking up speed over the past two years, 2026 should see further advancements in engine aftermarket networks across both the narrowbody and widebody segments. In the narrowbody sector, GE Aerospace and Safran, which form the CFM International joint venture, will play significant roles in growing current- and new-generation engine programs.

GE Aerospace will continue expanding and upgrading multiple MRO and component repair facilities, while Safran’s planned Leap engine facility in Morocco is slated to come on stream by 2026. Once operational, the site is expected to handle around 150 Leap engines annually. Safran’s Leap MRO shop in Hyderabad, India, is slated to come online in the new year, after opening on Nov. 26 following a €200 million (\$232.6 million) investment. Once fully ramped up, the facility will target 300 engines annually, a mix of Leap-1A and -1B variants.

For widebodies, the year will start fresh off December’s opening of Rolls-Royce’s new engine joint venture with Air China in Beijing, operating as Beijing Aero Engineering Services Co. The site is the first facility on the Chinese mainland focused on the Trent engine and will service Trent 700s, XWB-84s and 1000s. The UK OEM has expanded capacity at its internal shops in Europe and its aftermarket joint-venture network, including a support facility in Derby, England, where it performs durability enhancements for the Trent 1000; modifications are set to continue in 2026-27.

WORKFORCE DEVELOPMENTS

New shops coming online while current ones are booked to capacity will keep pressure to find qualified aviation maintenance technicians (AMT) high. Airbus and Boeing expect the global MRO sector to need more than 700,000 new technicians by 2044, with demand particularly high in the Asia-Pacific region amid continuing growth. CAE says 416,000 new AMTs will be needed by 2034 as 83% of technicians retire or leave the industry in that period.

In the U.S., the Aviation Technician Education Council’s latest data shows AMT school enrollment grew in 2024 compared with the prior year. But the total number of graduates decreased by 5%, and the FAA issued 4% fewer new mechanic

certificates. Stakeholders report that FAA workforce development initiatives are being sidetracked by governmentwide purging of advisory committees and the administration's efforts to remove diversity, equity and inclusion from federal funding initiatives that help feed many programs.

Despite slow progress on closing the gap, companies continue to expand training partnerships and infrastructure to make a dent in the shortage. JetBlue Airways, United Airlines and others are growing career pathway programs. Several new Part 147 programs have launched over the last year, and Wichita-based WSU Tech invested \$45 million to expand its aviation training center. Hawaiian Airlines, which has faced challenges due to a lack of local training infrastructure, partnered with local stakeholders in 2025 to develop new AMT training programs for high school and college students.

In Latin America, Embraer recently launched an MRO training program that it hopes to extend to other locations. During MRO Latin America 2025, executives of providers in the region predicted that Washington's anti-immigration actions could draw AMTs recruited by U.S. MROs back to their home countries, which could boost the regional workforce.

Across the Pacific, major training investments are following the rapid growth of India's aviation sector. Airbus and Boeing are supporting new training schools and programs, and Air India plans to open a new maintenance training organization in Bengaluru by mid-2026.

Farther east, Hong Kong and Japan have launched government initiatives to allow foreign nationals with MRO experience to join the domestic workforce. And Korea Aerospace University partnered with the U.S. Aviation Academy last year on a training course that allows its students to study abroad in Texas to prepare for FAA certification.

MROs in Europe continue to expand apprenticeship programs and tap international talent. However, stakeholders in the UK report that Brexit has created challenges in recruiting skilled AMTs from abroad. Interestingly, British Airways recently started a program in the U.S. to recruit students to train at its UK facilities before going on to work at the airline's U.S. stations. Another European MRO leveraging international training cooperation is Vallair, which is working with the Cameroon Civil Aviation Authority to host bilateral student exchanges and collaborative training programs. Students also have started graduating from Namibia's first aviation maintenance training school, launched by Signa Aviation Services and Westair Aviation in 2023, and the venture should help the country boost its domestic MRO labor pool. Vallair is working on a potential Saudi Arabia joint venture as well that would likely include a training school.

Middle East MROs continue to build up domestic training capacity. Saudia Technic's long-term expansion plans in Jeddah, Saudi Arabia, include establishing an on-site training academy as part of an MRO village, and the company is partnering with Lufthansa Technik to develop a joint training program. Etihad Engineering and Joramco opened new technical training academies in recent years. At the Dubai Airshow in November, Etihad Engineering, GE Aerospace and Lufthansa Technik Middle East signed a deal to develop comprehensive maintenance training programs to boost the United Arab Emirates' aviation workforce. 🌐

Gallery See more on developments in the aftermarket in 2025: [AviationWeek.com/mro2025](https://aviationweek.com/mro2025)

People To Watch



David Chaimovitz

Setna iO CEO

Chaimovitz expects to quadruple the company's MRO earnings by the end of 2026 and is leading the charge on the expansion strategy, which has included recent acquisitions of component repair specialist Zulu Global and Landing Gear Technologies, a landing gear systems repair and overhaul provider. Setna iO continues to invest in new and expanded facilities, new product lines, and airframes and engines, which should grow its MRO and part portfolios.



Nicole Jenkins

GE Aerospace Chief Manufacturing Engineer

Increasing overhaul shop efficiency and technical capabilities is on every engine manufacturer's 2026 to-do list. Jenkins plays a central role in GE Aerospace's efforts. As chief manufacturing engineer for MRO, she leads the company's advanced repair development and is instrumental in transforming the recently opened Services Technology Acceleration Center into an indispensable resource.



Dany Kleiman

AAR Corp. Senior Vice President of Strategic Operations

Kleiman is overseeing AAR's integration of HAECO Americas, which it purchased for \$78 million on Nov. 3. That process entails incorporating 12 hangars in North Carolina and Florida, along with 1,600 employees, and implementing AAR's processes, technology and training to mesh the businesses, including their cultures.



Carroll Lane

MROH Group CEO

Lane became CEO of MROH Group (formerly MRO Holdings) this year, replacing Greg Colgan, who led the company through considerable expansion—to 91 lines of airframe maintenance. With Bain Capital's investment, Lane is poised to take the MRO provider to the next step. He has a long history with United Technologies, including serving as president of Pratt & Whitney Commercial Engines in 2020-22.



Denise Mangan-Fahy

Shannon Engine Support CEO

Mangan-Fahy became CEO of Shannon Engine Support (SES), a CFM engine lessor specialist, in July. She is leading the company at a time of high demand for narrowbody engines, especially the ones in SES' portfolio—the Leap-1A, Leap-1B, CFM56-5B and CFM56-7B. As operators scramble for engines, lease extensions happen frequently.



Jennifer Radtke

Boeing Director and Functional Chief Engineer for Product Support Engineering

Radtke, an airframe and powerplant mechanic and strong advocate for the field, has risen through various maintenance engineering jobs, including chief mechanic in product development for Boeing. She was promoted in 2025 to her current role, in which she leads a team responsible for design, production and modification of commercial, defense and space products.

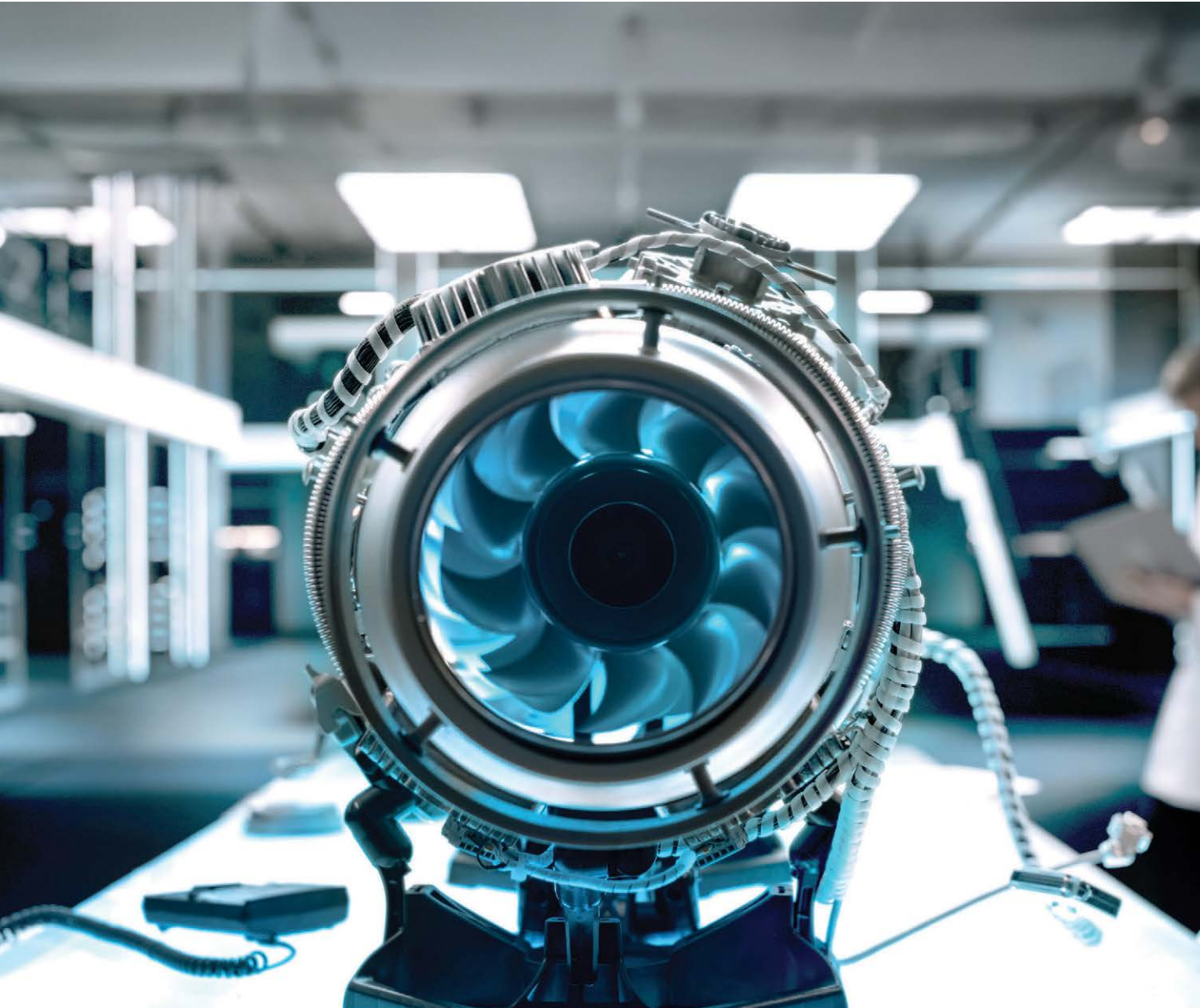


Ashish Rajvanshi

Adani Defense & Aerospace CEO

As India's aviation sector accelerates, Rajvanshi is positioning the company to hold a considerable chunk of the country's independent MRO capabilities. In 2025, Adani Group acquired AAR-Indamer Technics, an MRO joint venture between AAR Corp. and Indamer Aviation. The company also acquired a majority stake in third-party MRO provider Air Works, which has both commercial and defense capabilities. 🌐

PHOTO CREDITS FROM TOP: SETNA IO; GE AEROSPACE; AAR CORP.; MROH GROUP; SHANNON ENGINE SUPPORT; BOEING; AND ADANI DEFENSE AND AEROSPACE



Take Your Career to New Heights

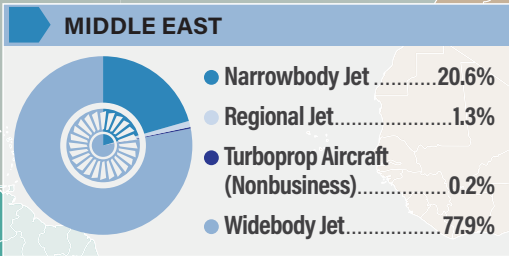
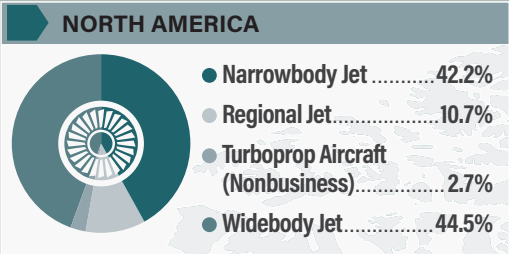
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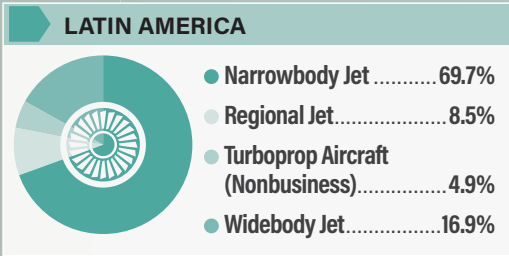
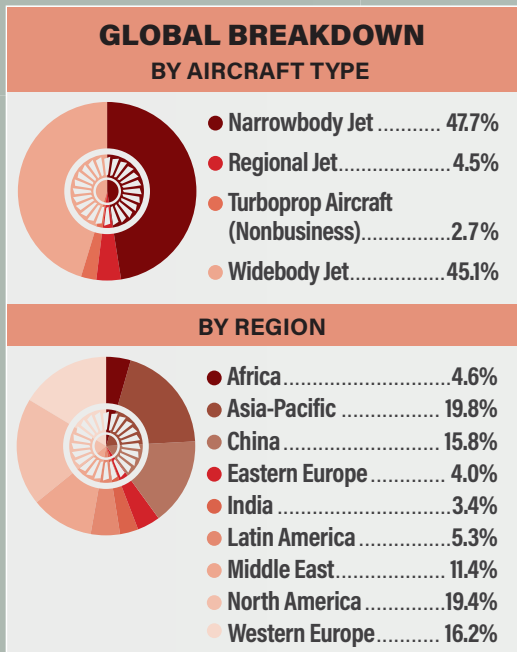
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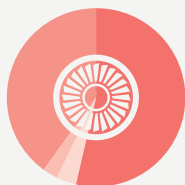
Learn About Private Training



Global Engine MRO Demand 2026

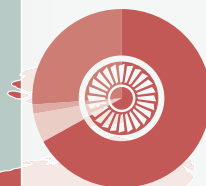


WESTERN EUROPE



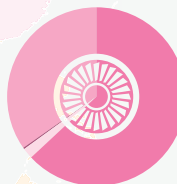
● Narrowbody Jet	53.8%
● Regional Jet	3.6%
● Turboprop Aircraft (Nonbusiness)	2.6%
● Widebody Jet	40.0%

EASTERN EUROPE



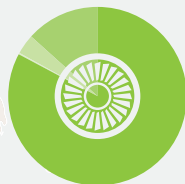
● Narrowbody Jet	67.1%
● Regional Jet	5.3%
● Turboprop Aircraft (Nonbusiness)	1.7%
● Widebody Jet	25.9%

CHINA



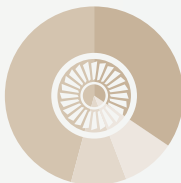
● Narrowbody Jet	63.3%
● Regional Jet	1.7%
● Turboprop Aircraft (Nonbusiness)	0.1%
● Widebody Jet	34.9%

INDIA



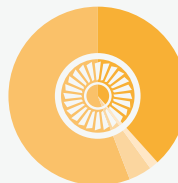
● Narrowbody Jet	82.9%
● Regional Jet	0.3%
● Turboprop Aircraft (Nonbusiness)	3.6%
● Widebody Jet	13.2%

AFRICA



● Narrowbody Jet	34.5%
● Regional Jet	9.8%
● Turboprop Aircraft (Nonbusiness)	10.0%
● Widebody Jet	45.7%

ASIA-PACIFIC



● Narrowbody Jet	38.6%
● Regional Jet	1.5%
● Turboprop Aircraft (Nonbusiness)	4.1%
● Widebody Jet	55.8%

Note: These numbers do not include the 2026 new-generation engine technical upgrade events.

Source: 2026 Commercial Aviation Fleet & MRO Forecast, Aviation Week Network

OLEKCI MACH/ALAMY



1 | Market Consolidation

Geopolitical and macroeconomic uncertainties in 2025 slowed some investors, but the fragmented aftermarket will see consolidation grow in 2026 as investors seek to increase scale, close portfolio gaps and expand capacity for MRO providers.

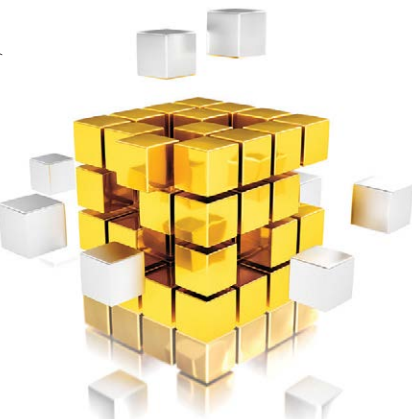
ELENABS/ALAMY



2 | Leveraging Data

MROs that leverage data analysis and artificial intelligence will streamline turnaround times, manage supply chain constraints better and bridge knowledge gaps for less experienced staff. This is key to addressing capacity and workforce constraints.

DMITRY RUKHLENKO/ALAMY



3 | Supply Resilience

Improvements are underway, but because the next several years will likely still include constraints, airlines and MROs are focused on resilience. That can mean holding more inventory, forging new collaborations and bringing new capabilities in-house.



AERPIN

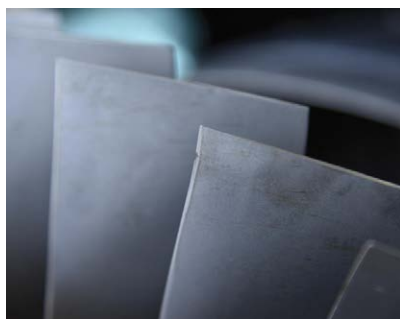
4 | Teardown Pause

Ongoing engine durability issues will extend into 2027, keeping older aircraft in service, despite the increase in new aircraft deliveries. That will cause operators' hope for more teardowns to slide to 2027. Expect a similar number of aircraft retirements—600—as in 2025.

PREDICTIONS FOR

2026

Eight trends
anticipated for the
aviation aftermarket



AP FOOTAGE/ALAMY

5 | Engine Part Costs

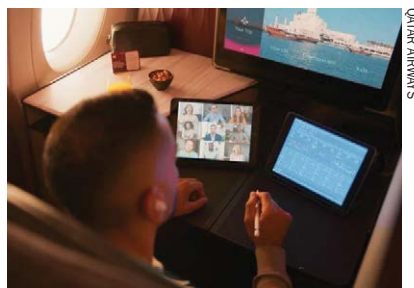
Airlines push back on part price escalation from engine OEMs. Given the constrained powerplant market and limited availability of used serviceable material and parts manufacturer approval options for blades, airline costs for engine MRO will increase.



BOEING

6 | Boeing's Comeback

Aircraft production will accelerate, performance targets will improve and aftermarket revenue will grow as internal and external stakeholders gain confidence that the big company has turned a corner.



QATAR AIRWAYS

7 | Connectivity

Demand for the latest inflight connectivity will stay high, so installation services will remain strong. As flyers continue to demand terrestrial-quality Wi-Fi, expect services through low-Earth-orbit satellites to be most popular. Related to this, cabin refresh programs will accelerate.



EMIRATES

8 | Airline In-House MRO

Airlines around the world will build MRO and sometimes limited manufacturing capabilities in-house to enhance operational resiliency. For instance, prolonged supply chain and maintenance capacity constraints recently prompted Emirates to forge deals with Rolls-Royce to undertake Trent 900 repairs and with Safran Seats to manufacture seats in Dubai. 🌐

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- **Custom iOS App Integration:** Personalized workflows with geotagging, photo documentation, and inspection notes for comprehensive reporting
- **Corrosion Mapping:** Accurately profiles wall thickness and identifies pitting or erosion in airframe structures
- **Portable Precision:** Lightweight, rugged design ideal for hangar, line maintenance, and field inspection environments



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By **Graham Warwick**

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GoAero Prize Round 2 Winners

The \$2 million-plus GoAero Prize to create vertical-takeoff-and-landing emergency response aircraft has awarded \$320,000 to eight winning teams that flew representative prototypes during Stage 2 of the competition, which is sponsored by NASA, RTX and Honeywell.

TU MUNICH



TU Munich is developing a multicopter eVTOL designed for quick assembly.

The teams will advance to a competitive fly-off planned for Feb. 5, 2027, at NASA Ames Research Center at Moffet Field in the San Francisco Bay Area. Teams do not need to win a stage to advance to the next round, however, and GoAero says more than 201 teams globally are developing vehicles.

The eight prototype winners are CraneAero at the UK's Cranfield University; Elevate at the Delft Technical University in the Netherlands; Harmony at Texas A&M University; Horyzn at the Technical University of Munich; Lift Aircraft with Team Aerial Robotics at the University of Texas at Austin; Rescue Pack at North Carolina State University; Soteria at Penn State University; and the Vehicle Systems, Dynamics and Design Laboratory at Auburn University.

The three-year GoAero Prize was established to develop safe, portable and autonomy-enabled aircraft to rescue people in natural disasters, medical emergencies and humanitarian crises. All eight winners of Stage 2 are developing electric vertical-takeoff-and-landing (eVTOL) aircraft of various configurations.

The final fly-off event features three separate scored missions to be flown with a 125-lb. manikin stand-in for the human occupant to test specific rele-

vant capabilities that are applicable to a wide variety of real-world scenarios, GoAero says.

These include demonstrating quick deployment of the system then making multiple trips to move as much payload as possible; taking off and landing on sandy, sloped and unsurveyed surfaces in rain and wind; and maneuvering through a slalom course while avoiding obstacles to make a spot landing.

The aircraft are intended to be autonomy-enabled to reduce the workload and training required so that first responders can remain focused on their mission instead of vehicle operation, GoAero says.

The best performer in each mission will win \$150,000, while the best aggregate performance will earn the \$1,000,000 top prize. Additionally, a \$100,000 RTX Disruptor Prize and \$100,000 Autonomy Prize are planned to be awarded.

Passive Sensors Cut Wind Farm Effects

A UK company has demonstrated a distributed passive sensor array that could help mitigate radar interference caused by wind turbines.

LiveLink Aerospace worked with offshore wind provider Vattenfall and the UK's Offshore Renewable Energy Catapult technology incubator to test its Air Intelligence System sensor suite at a commercially operating wind farm.

The trials are part of an ongoing effort to balance the UK's push to meet climate targets by installing larger and more capable offshore wind turbines without affecting the UK Royal Air Force's (RAF) ability to perform airspace surveillance with ground-based radars.

Returns from spinning turbine blades can dramatically degrade the surveillance picture provided by air defense radars and could reduce the range and time available for military to react to an aggressive act.

The RAF—with the UK's Department for Energy Security and Net Zero and Defense Science and Technology Laboratory—has been exploring several possible mitigations options from industry.

LiveLink's approach is to put its passive sensors—including electronic surveillance measures, electro-optical cameras and acoustic sensors—onto the wind turbine nacelles to eliminate gaps in radar coverage.

No single system will solve the wind



VATTENFALL

LiveLink tested a passive sensor array at an offshore wind farm.

farm clutter issues, however. Funding is also supporting work to reduce the radar cross-section of the turbines through shaping of the blade and adding radar-absorbent materials. Companies are also exploring the use of multistatic radars and radar processing to filter out the returns caused by the turbine blades.

—Tony Osborne in London

JAL Adds 787 to Contrail Program

Japan Airlines (JAL) has expanded the aircraft-based atmospheric observation program known as the Comprehensive Observation Network for Trace Gases by Airliner (Contrail) to its Boeing 787-9 fleet, enabling data collection across additional regions.

The project—jointly led by the JAL Foundation, the Meteorological Research Institute of the Japan Meteorological Agency, the National Institute for Environmental Studies and supplier JAMCO—includes the installation of continuous CO₂ measuring and automatic air sampling equipment on a 787-9.

The modified aircraft will measure greenhouse gas concentrations and isotope ratios in the upper atmosphere at wide spatial scales with high frequency. JAL says it is the first airline to conduct continuous upper-atmosphere CO₂ measurements using commercial aircraft.

JAL has been conducting Contrail observations since 1993 using Boeing 747-400s and 777-200ER/300ERs, amassing 30,000 atmospheric data points from roughly 22,000 flights across 84 airports worldwide as of April.

A total of five 787-9s are scheduled to be fitted with the equipment during Japan's fiscal 2025, which ends March 31, 2026. Addition of the 787 fleet to the program will expand data collection to the Indian subcontinent and equatorial regions and, for the first time, over the Middle East. ☼

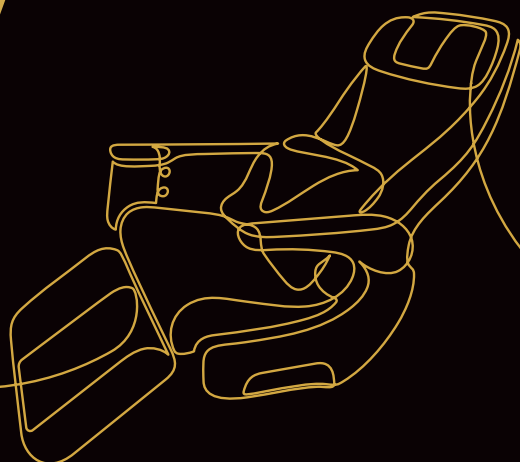
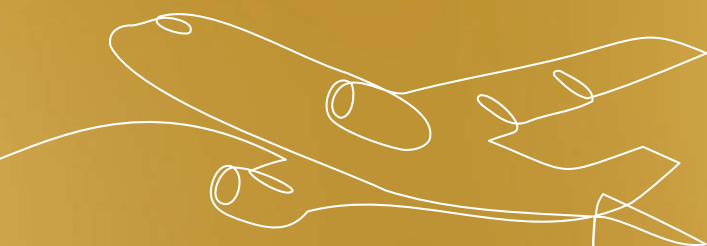
—Chen Chuanren in Singapore



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ADVERTISERS IN THIS ISSUE

Air Shunt.....	6
Arrow Electronics.....	61
Aviation Week Events	
AeroEngines Americas.....	17
MRO Middle East.....	103
Aviation Week Network	
Aircraft Bluebook.....	78
Aviation Week	
Intelligence Network.....	3rd Cover
Defense Market Analyzer.....	27
Fleet & MRO Forecasts.....	52-53
Fleet Discovery.....	71
Market Briefings.....	5
The Ultimate Holiday Gift.....	104
Tracked Aircraft Utilization.....	89

Click Bond.....	9
Embraer.....	4th Cover
Israel Aerospace Industries.....	7, 93
L3Harris.....	47
Parker Meggitt Defense Division.....	69
Ram Aviation, Space & Defense.....	67
Rexnord Aerospace.....	38-39
RTX.....	2nd Cover
SAE International.....	97
Siemens Digital Industries Software.....	35
Sierra Nevada Corp.....	21
Singapore Airshow.....	81
Thomas Instrument.....	5
Toray Composite Materials America.....	63
Waygate Technologies.....	101

Can NASA Stay Ahead?



Jared Isaacman, President Donald Trump's pick to lead NASA, has a blunt warning about China's rapid advances in commercial and military space. "We are in a great competition with a rival that has the will and the means to challenge American exceptionalism across multiple domains, including the high ground of space," he told a Senate panel at his confirmation hearing in early December. "This is not the time for delay but a time for action, because if we fall behind, if we make a mistake, we may never catch up."

NASA, under the Artemis lunar exploration initiative, is preparing the Orion capsule for its first flight with a crew in early 2026—after 22 years of development. Isaacman knows that if the storied but bureaucratic U.S. space agency continues to operate at that pace, it will be left in the dust. "I'm here to bring urgency and extreme focus to the mission," the 42-year-old high-school dropout-turned-billionaire-entrepreneur told lawmakers at his confirmation hearing. Such urgency is, frankly, decibels higher than what Aviation Week editors heard when we sat down with NASA's last full-time administrator, Bill Nelson, 14 months ago (*AW&ST* Oct. 14-27, 2024, p. 35).

Widely expected to win Senate confirmation, Isaacman will face momentous challenges, starting with making sure that the U.S. returns to the Moon ahead of China's first crewed landing there. That return was first proposed by President George H.W. Bush when Isaacman was six years old. Simultaneously, NASA must prepare for the decommissioning of the 25-year-old International Space Station, figure out how to bring to Earth samples from Mars to help answer the question if life exists beyond Earth and lay the foundation for human expeditions to Mars, which will require leaps in human space physiology. And how will NASA fit into the new orbital economy as Elon Musk, Jeff Bezos and others race ahead with billions of dollars of investment?

Then there are his bosses in the White House, who proposed a massive reduction to NASA's budget—which so far has largely been stymied by Congress—and angered international partners with

heavy-handed cancellations of joint space projects that were supposed to last for years. Can the entrepreneur convince this go-it-alone administration that supporting NASA and leveraging international partnerships in civil space are essential for America's future?

Isaacman's path to lead the civil space agency has been bumpy. He was first nominated in December 2024 with strong backing from then-Trump advisor Musk, only to see Trump yank the nomination on May 31 in

the wake of a nasty public feud between the president and Musk. Isaacman took the high road, declining to complain or criticize Trump (*AW&ST* June 30-July 13, p. 40). That paid off with his renomination by the president on Nov. 4.

Like Nelson, Isaacman, who at age 28 earned a bachelor's degree in aeronautics from Embry-Riddle Aeronautical University, has flown in space. In 2021, he commanded the first all-civilian orbital spaceflight on a SpaceX Dragon capsule (*AW&ST* Sept. 27-Oct. 10, 2021, p. 22). During a second Dragon charter in 2024, he became the first private citizen to conduct a spacewalk. His initial plans for NASA, drawn up during his first nomination, call for focusing the agency on three core missions: human deep-space exploration, building the orbital economy and replacing flagship science programs with cheaper but more numerous missions that yield data more quickly.

Can he succeed? Early in my career, I covered NASA Administrator Dan Goldin, who also had bold dreams about space. His vision to "darken the skies with spacecraft," articulated more than 30 years ago, is coming true: 43,000 satellites are projected to be launched during the coming decade, three times what we have seen in the last 10 years.

But many of the more revolutionary advances that Goldin pursued in the 1990s have yet to be realized, and China has morphed into a challenger with dogged technology pursuits in hypersonics, launch and on-orbit maneuvering. The U.S. does not have another 22 years to turn Isaacman's visions into reality, and he knows it. There is no time to waste. ☛

—Joe Anselmo, Editor-in-Chief



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