AerospaceDaily & DEFENSE REPORT

AVIATION WEEK Intelligence NETWORK

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Inside:

Progress Launched

Russia's MS-28 Progress resupply mission is on course for an automated docking with the Russian segment of the International Space Station (ISS) following its Aug. 15 launch atop a Soyuz 2.1a rocket from Baikonur Cosmodrome, Kazakhstan. Docking with the aft port of the ISS' Zvezda Service Module is scheduled for 1:56 a.m. EDT on Aug. 17, which will allow for the delivery of 2.8 tons of food, water, crew supplies and propellant. The on-time MS-28 Launch under an overcast Kazakh sky occurred on Aug. 15 at 8:20 a.m. local time. Separation of the space freighter, designated as Progress 89 by NASA, from the Soyuz's third stage occurred just more than 9 min. after liftoff.

Daily Briefs

BOEING has $248.1m U.S. Navy contract for repair of F/A-18 E/F landing gear.

GENERAL DYNAMICS promoted Mark Rayha to president of submarine-making subsidiary **ELECTRIC BOAT**, from senior vice president and chief operating officer. He succeeds Kevin Graney, who is retiring Dec. 1.

STANDARD AERO INC. has $44.8m U.S. Navy contract for depot repair of T56-A-427A engines for E-2D Advanced Hawkeye aircraft.

SCOUT SPACE INC. (space security) joined NATO's newly launched SPACENET program, designed to foster collaboration between NATO member states and commercial space enterprises to enhance space security/resilience.

URSA MAJOR appointed former **DIGITAL GLOBE** president Daniel Jablonsky as CEO, succeeding founder Joe Laurienti.

BUSINESS

Lockheed Martin To Take Terran Orbital Private In $450M Deal

MATTHEW FULCO, matt.fulco@aviationweek.com

Lockheed Martin said on Aug. 15 that it would take troubled satellite manufacturer Terran Orbital private in a $450 million deal well below its initial unsuccessful $600 million bid for the company.

Lockheed is both a key investor in Terran, with a 28.3% stake in the company, and its largest customer. Lockheed accounted for about 81% of Terran Orbital's revenue in 2023 and 76% in 2022.

Lockheed uses Terran's satellites for its work with the U.S. Space Development Agency's Transport and Tracking Layer programs and in several of its self-funded technology demonstrations. "Their [Terran's] capabilities, talent and business momentum align with Lockheed Martin Space's strategic plans," Robert Lightfoot, president of Lockheed Martin Space, says in an announcement.

The acquisition comes as Terran teeters on the brink financially. The small satellite bus manufacturer said in an Aug. 13 filing with the U.S. Securities and Exchange Commission (SEC) that it has just $15 million in cash reserves. It also reduced its backlog of sales from $2.7 billion down to $312.7 million by removing the unpaid portion of its ill-fated contract with Rivada Space Networks to develop and manufacture a low-Earth-orbit communications satellite constellation.

LOCKHEED, P. 2

PROGRAMS

U.S. Navy Installs MQ-25 Control System On First Carrier

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The first-ever carrier-based ground control station for Boeing MQ-25 Stingray and future naval Collaborative Combat Aircraft (CCA) is now installed on the CVN-77 USS George H.W. Bush aircraft carrier ahead of at-sea trials early next year, Naval Air Systems Command (NAVAIR) said Aug. 15.

The installation of the unmanned air warfare center features the MD-5E ground control station, which is powered by the Lockheed Martin Skunk Works' Multi-Domain Combat System, NAVAIR said in an announcement.

At-sea testing of the control system is scheduled to kick off early next year, allowing air vehicle pilots from the MQ-25 fleet readiness squadron, VUP-10, to handle the operational networks of the MD-5E aboard CVN 77 carrier. The U.S. Navy previously tested a simulated control system in January aboard the CVN 72 USS Abraham Lincoln.

During the trials, the MD-5E operators at sea will link to a simulated air vehicle created by a laboratory at Naval Air Station Patuxent River, Maryland.

"These systems will initially support the MQ-25, but also future unmanned systems such as Collaborative Combat Aircraft that comprise the Air Wing of the Future," says Capt. Daniel Fucito, the Navy's program manager for Unmanned Carrier Aviation.

A released picture of the MD-5E reveals two workstations, each equipped with 10 monitors, a keyboard and two recessed compartments on either side of the keyboard. Six of the displays have stickers showing they are TUF Gaming VG259QM monitors, which are manufactured by the U.S. arm of Taiwan's Asus.

The Navy plans to launch operations with the MQ-25 in 2026. In the meantime, more MD-5E systems will be installed starting next year on three more carriers—the CVN 70 USS Carl Vinson, CVN 71 USS Theodore Roosevelt and CVN USS Ronald Reagan.

LOCKHEED, from P. 1

Terran has not lived up to the lofty expectations investors had when it listed on the New York Stock Exchange (NYSE) in March 2022 at a $1.8 billion valuation and with $200 million in outstanding orders. Terran listed amid a trend of ambitious space companies—also including Virgin Galactic, Rocket Lab and Astra—going public through special purpose acquisition company (SPAC) deals. Because they do not require the same comprehensive due diligence of a traditional initial public offering (IPO), SPACs can allow startups to go public faster. But that same reduced transparency can also lead to overly sunny earnings forecasts and ultimately disappointed investors.

Ironically, Terran CEO Marc Bell said at the time of the company's market debut that it would not err as others had. "We look at a lot of these space SPACs that have gone out and a lot of them weren't businesses that should have gone public," he told CNBC in March 2022. "We, on the other hand, have real revenues, real pipeline, real backlog, real customers."

Terran's relationship with its most important customer dates to 2017. It was then that Terran joined the Lockheed Martin Ventures (LM Ventures) portfolio, a fund that invests in emerging technologies the defense prime sees as promising. Following that initial investment, LM Ventures invested two more times in Terran—in 2020 and 2022—bringing its overall stake to 28.3%. This deal marks the first time Lockheed has sought to acquire an LM ventures company since the fund was established in 2007.

The acquisition process began March 1 when Lockheed submitted a bid that valued Terran at just less than $600 million. The nonbinding proposal would have seen Lockheed acquire Terran Orbital's outstanding common stock at $1 a share in cash, take on the company's then $313 million in outstanding debt and pay $70 million for its outstanding warrants.

But three days later Terran effectively rebuffed that bid by adopting a shareholder "rights agreement," otherwise known as a poison pill, "to protect the company and its stockholders from coercive or otherwise unfair takeover tactics."

In response, Lockheed said in an April 30 letter to Terran that it was withdrawing its bid, according to a U.S. regulatory filing.

This time, however, Terran seems more receptive to Lockheed's offer—reflecting its increasingly unfavorable financial situation. Terran's stock has fallen about 74% since early May to $0.24.

Under the terms of the deal, Lockheed will acquire Terran Orbital for $0.25 in cash for each outstanding share of common stock and retire its existing debt. The transaction also provides for Lockheed Martin and other current Terran creditors to establish a new, $30 million working capital facility. Lockheed says it has "been put in place as of signing."

The transaction is expected to close in the fourth quarter of 2024 and is subject to both regulatory and Terran stockholder approvals. When the deal closes, Terran will remain a commercial merchant supplier to industry.

Terran CEO Bell struck a bullish tone in the announcement. "This move will open new opportunities for growth and innovation, and we couldn't be more excited about the future," he said.

PROGRAMS

Yakovlev Aims To Fly Yak-130M Light Combat Jet In 2025

AVIATION WEEK NETWORK STAFF

Russia's Yakovlev aims to start flight trials of its Yak-130M light combat jet in the first half of 2025, the CEO of the company's Irkutsk aviation facility told journalists at the Army 2024 defense show in Moscow Aug. 13.

Alexander Verpev showcased the program, which hopes to expand the combat capabilities of the Yak-130 advanced jet trainer, for the first time at the show.

Verpev confirmed that the facility has begun cutting metal for the new aircraft.

"We plan to assemble the first fuselage by the end of November, the second one in December," Verpev says, as cited by TASS newswire.

The twin-engine Yak-130 entered service with the Russian Air Force in 2010 as a trainer for the Su-30 family of fighters. The baseline variant can carry up to 3,000 kg (6,600 lb.) of weapons, but it was limited only to R-73 (AA-11 Archer) short-range, air-to-air missiles, camera-guided and free-falling bombs, and unguided rockets.

The -130M variant receives the Tikhomirov NIIP BRLS-130R radar, which will be mounted in the nose cone, and a strap-on pod with laser and thermal SOLT-130 sighting systems. Shvabe Holding derived the latter from the SOLT-25 sighting system initially developed for the Sukhoi Su-25SM3 ground attack aircraft.

This new equipment will enable the Yak-130M to operate around the clock and in any weather conditions, Yakovlev says.

According to the type's deputy chief designer, Dmitry Popov, the Yak-130M will be able to carry four gun pods or up to 16 100-kg bombs under its wings. Other improvements include the President-S130 suite for protection against guided missiles and the KSS-130 communications system.

Prototype aircraft

The aircraft displayed at Army 2024 was a Yak-130 prototype that was used to test elements of the upgrade package.

"We have already started assembling Yak-130M prototypes at the Irkutsk aviation facility," Yakovlev CEO Andrey Boginsky said. The manufacturer plans to roll out three prototypes, with the first to be ready in the first quarter of 2025.

Flight trials of the new aircraft will be completed within three years, Yakovlev reports at the show.

The development effort was not ordered by the Russian military, which prefers heavy fighters, but instead by the country's Ministry of Industry and Commerce, and is aimed at attracting foreign customers.

Russian arms export agency Rosoboronexport estimates the Yak-130M could garner roughly 40 orders from customers in Asia and Africa. The potential market for upgrading Yak-130 trainers to the -130M variant is estimated at around 60 jets.

The type's foreign operators are Algeria, Bangladesh, Belarus, Iran, Laos, Myanmar and Vietnam, which have a total fleet of about 80 trainers.

FUNDING & POLICY

U.S. Clears Germany To Restock PAC-3 Arsenal

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U.S. government officials cleared Germany on Aug. 15 to import up to 600 Lockheed Martin Patriot Advanced Capability (PAC)-3 Missile Segment Enhancement (MSE) interceptors, the largest such authorization in nine years.

A notification sent to Congress estimates the total cost of the proposed export package at $5 billion, or roughly $8.33 million per PAC-3 MSE missile.

The deal, which matches a 2015 authorization for 600 PAC-3 Cost Reduction Initiative interceptors for Saudi Arabia, still requires approval and a contract signing from the German government.

Germany previously ordered up to 50 PAC-3 MSEs under an earlier authorization announced by the U.S. government in 2019. Lockheed tested a PAC-3 MSE interceptor for the first time in May 2023 from a German-modified Patriot M903 launch system.

In response to the 2022 Russian invasion, Germany donated three Patriot systems and hundreds of interceptors from its own arsenal to Ukraine.

The authorization comes as the U.S. works to increase Patriot missile deliveries. The U.S. Army funded Lockheed to deliver 550 interceptors this year and created a plan to increase output to 650 annually in three years.

In another potential export, Italy won approval to buy up to six more General Atomics Aeronautical Systems Inc. MQ-9 Block 5 Reaper uncrewed aircraft systems (UAS), according to an Aug. 15 notification from the Defense Security and Cooperation Agency. The proposed deal is worth up to $738 million.

FUNDING & POLICY

CAA Approves BVLOS Drone Pathfinder Trials

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LONDON–The UK's aviation regulator has approved a new round of uncrewed aircraft systems (UAS) trials that could pave the way for their use for deliveries, infrastructure inspection and emergency services support.

The UK Civil Aviation Authority (CAA) announced Aug. 15 that it had approved Amazon's Prime Air, Airspection, the UK's National Police Air Service (NPAS), and National Air Traffic Services (NATS) for the trials to prove safe flying of UAS beyond visual line of sight (BVLOS).

Amazon Prime Air will trial drone delivery as it has done during previous trials.

Airspection will use UAS to inspect offshore wind farms, NPAS will test UAS for use in policing, and NATS will explore the use of UAS for inspections in the North Sea.

Two separate projects will perform flights in the Orkney Isles from Kirkwall Airport in conjunction with Highland and Islands Airports, while Project Lifeline will prove out the potential of UAS medical deliveries, including for critical equipment such as defibrillators, EpiPens and anti-bleeding kits.

The CAA says the trials will gather safety data on how the UAS will detect and avoid other aircraft, as well as the UAS' own electronic conspicuity, and support the regulator's development of policy for integrating UAS into UK airspace.

"By supporting projects ranging from consumer deliveries to critical infrastructure inspections, we are gathering essential data to shape future policies and regulations," says Sophie O'Sullivan, director of future of flight at the CAA.

"Our goal is to make drone operations beyond visual line of sight a safe and everyday reality, contributing to the modernization of UK airspace and the incorporation of new technology into our skies," O'Sullivan adds.

Ahead of the approval, the CAA invited organizations to bid to participate in an innovation sandbox to validate and test their concepts, supporting the development of BVLOS capabilities.

BUSINESS

Curtiss-Wright Sees Strong Defense, Commercial Aero Demand

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Curtiss-Wright posted better-than-expected results in the second quarter on the back of robust demand for its defense and commercial aerospace products.

Revenue increased 11% year-on-year in the June quarter to $785 million while earnings per share jumped 24% to $2.67, well ahead of a consensus estimate of $2.30.

Investors reacted positively to the earnings report and the company's share price rose more than 6% in trading to $284.51 by midafternoon on Aug. 8.

In an earnings call, CEO Lynn Bamford said Curtiss-Wright achieved strong mid- to high-teens growth across all its aerospace and defense markets.

She emphasized that the company experienced robust demand in its naval defense businesses supporting aircraft carrier and submarine programs as well as increased aircraft handling equipment orders from both the Pentagon and direct foreign military customers.

In its commercial aerospace business, the company recorded low-teens OEM sales growth supporting increased production of narrowbody and widebody jets. Curtiss-Wright now forecasts full-year sales growth in the segment of 13% to 15%, with one caveat:

"We continue to expect higher OEM production on narrowbody and widebody aircraft while maintaining a conservative view, specifically as it relates to the 737 MAX program," Chief Financial Officer Christopher Farkas says.

Auguring well for the Davidson, North Carolina-based company is an improving supply chain situation. Bamford says that for the most part, "the major disruptions are largely behind us, and we see good stability across our supply chain."

Lead times have broadly improved for components, but in certain cases they are still long. In Defense Electronics, for instance, lead times have fallen from 52 to 40 weeks. "I think that is just the new norm for those," Bamford says.

In terms of the company's future growth, Bamford says that Defense Electronics "is probably the top priority across our defense markets."

Curtiss-Wright also sees an opportunity to boost its aftermarket capabilities as the U.S. ramps up naval ship construction amid a broader effort to revitalize the defense industrial base.

Finally, given brisk international growth, the company's management expects increased direct foreign military sales that will benefit each of its defense end markets.

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PROGRAMS

Lockheed Martin Tech Demo Satellite Passes Testing Milestone

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Lockheed Martin's experimental satellite technology program has reached a new milestone ahead of a planned 2024 launch.

The company recently completed environmental testing for its Tactical Satellite (TacSat) spacecraft at its facilities in Littleton, Colorado. The TacSat initiative will demonstrate a range of on-orbit capabilities in low Earth orbit (LEO) meant to help military operators retrieve data from space more quickly and with lower latency.

The satellite will host payloads for on-orbit processing, 5G communications, and infrared (IR) search and track capabilities, says Paul Koether, program director for global target engagement at Lockheed Martin Space.

The TacSat initiative was launched in 2021, as the company identified key technologies that would provide greater connectivity for the warfighter and support mission sets like long-range precision fires, Koether tells Aviation Week in an Aug. 5 interview.

TacSat leverages Lockheed Martin's spacecraft design for the Space Development Agency's (SDA) Transport Layer, which will provide assured, low-latency military data and connectivity to a range of military platforms. The company contracted Terran Orbital to build more than 100 satellite buses for its work across the SDA's Proliferated Warfighter Space Architecture.

"We took advantage of that, and bought another [bus] for ourselves," Koether says. Lockheed Martin is a prime contractor for the SDA's Tranche 0 and 1 Transport layers, and for both the Transport and Tracking satellites for the forthcoming Tranche 2 layers.

Lockheed switched out several payloads compared to the 10 Tranche 0 satellites currently on orbit. For example, the Link 16 payload on the Transport layer satellites was replaced by a "5G.mil" payload, as well as a software-defined radio and S-band antenna that will test alternate waveforms, Koether says. TacSat features the same optical cross links that are stationed on the Tranche 0 satellites, allowing for the possibility of cross-satellite tests in the future.

The 5G.mil payload includes a non-terrestrial network satellite base station that would allow users to bypass more vulnerable ground-based networks if necessary. It is compliant with the industry-wide Third Generation Partnership Program (3GPP) standards, with several modifications that allow for low probability of intercept and detection. The satellite will be able to connect to Lockheed Martin's more bespoke space systems—"any platform, really, that may have the right user equipment or receiver," Koether says.

Lockheed Martin also added the LowRider IR search and track payload built by its Missiles and Fire Control segment for use on other platforms. The sensor will provide IR data from the TacSat satellite for post-processing analysis that can be used to support future missile warning, missile tracking and fire control capabilities from space, the company said.

The goal is to launch TacSat via rideshare by year's end, Koether says. It will be stationed in LEO around an altitude of 900 km, (559.2 mi.) in a similar orbit to the company's SDA Tranche 0 satellites.

TacSat is one of several internal Lockheed Martin investments meant to demonstrate joint all-domain operations in space. In March, SpaceX's Transporter-10 launched the Pony Express 2 mission, which will provide mesh networking and tactical communications on orbit with four Lockheed Martin payloads on two 12U Terran Orbital Renegade-class space

DEMO, P. 8

TECHNOLOGY

Aerospace Corp. Plans Rendezvous Test Satellites Launch In '26-27

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LOGAN, Utah–Aerospace Corp. plans to launch two small satellites as technology testbeds for formation flight and rendezvous and proximity operations (RPO) in 2026 or 2027.

The Edge Node satellites will carry a variety of RPO sensors onboard and software to be tested for future cubesat-scale satellites, said Darren Rowen, director of the small satellite department within the Aerospace Corp., at the Small Satellite conference on Aug. 6.

"It will have an array of advanced sensors for close-in inspection and a cluster of GPU computing onboard," he says. "The idea is that, whether it be commercial, academic or government, users can test out algorithms in a real environment. In addition, we can prove out some low-cost sensors as well."

The two identical 6U cubesats are being used as a "community testbed," Rowen says. Aerospace Corp. wants to see how sensors and computer chips designed for use on Earth perform in low Earth orbit.

The Edge Node demonstration is designed to "test the limits of autonomous decision-making to support future missions where control with a ground operator in the loop is not possible," Rowan writes in a research paper presented at the conference.

The satellites will test sensors from the automotive industry—including Cepton Lidar, which is used for autonomously driving cars—in space. A Texas Instruments millimeter-wave, 60-GHz radar that can track objects up to 30 m away and a laser range finder, as well as long-wave-infrared, stereo-visible and polarized cameras also will be tested.

The demonstration aims to test how different sensors perform in the same environment and to figure out how to deal with anomalies.

"You may get different answers from different ones," Rowan says. "How do you deal with that?"

OPERATIONS

NASA's InSight Lander Data Points To Subsurface Liquid Water On Mars

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HOUSTON—Findings from NASA's Mars InSight lander suggest that much of the water that covered the red planet's now desert-like surface more than 3 billion years ago currently resides in liquid water-saturated pores of the planet's mid-crust.

If InSight's findings at Elysium Planitia, an equatorial plain, translate beyond its landing zone, Mars could host enough ground water to cover the entire planet to a depth of between 1 and 2 km (0.6 and 1.2 mi.).

The findings, "Liquid water in the Martian mid-crust," were published Aug. 12 in the Proceedings of the National Academy of Sciences.

The nearly $1 billion InSight primary mission launched on May 5, 2018, and landed at Elysium Planitia on Nov. 28, 2018, with three primary instruments for the first studies of the rocky planet's mysterious interior.

The mission, which included European contributions, ended in 2022 after a struggle by its operations and science teams to keep Martian dust from inhibiting power generation by the lander's solar arrays.

"Our results have implications for understanding Mars' water cycle, determining the fates of past surface water, searching for past or extant life, and assessing in situ resource utilization for future missions," says the study effort, led by the Scripps Institution of Oceanography and University of California, Berkeley.

Past research and studies of the Martian geology suggest that water once existed as a liquid on the Mars surface in the form of rivers, lakes, oceans and aquifers.

That changed as the atmosphere and a potentially habitable environment on Mars were stripped away by solar wind and radiation, which was proceeded by the loss of the planet's protective magnetic field.

InSight's findings are helping to address the long-running mystery of how those losses affected Martian water, whether it was incorporated into minerals, buried as ice, sequestered as a liquid in deep aquifers or lost into space.

While InSight's findings suggest Martian water was not blown into space in its early history, the researchers note that the presence of liquid water in the rock pores at mid-crust depths of the subsurface require sufficient permeability and warmth at shallow depths to facilitate exchanges between the surface and greater depths.

The water now resides in the mid-crust at approximate thermally conducive depths of 11.5 to 20 km (7.1 to 12.4 mi.), the findings show.

"While available data are best explained by a water-saturated mid-crust, our results highlight the value of geophysical measurements and better constraints on the mineralogy and composition of Mars' crust," the researchers note.

FUNDING & POLICY

Sweden Eyes Defense Procurement Office In Ukraine

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The Swedish government is working to establish a field office for its defense procurement agency in Ukraine, amplifying the Scandinavian country's support for Kyiv's efforts to repel Russia.

Sweden's Defense Material Administration, known as FMV, could have personnel in Ukraine this fall, Swedish Defense Minister Pa Jonson said at an Aug. 15 press briefing. FMV plays a role in buying equipment for Ukraine and to manage the supply of donated equipment, the defense ministry says.

Sweden says it has provided more than $4 billion in military support to Kyiv in 16 packages. In May, for instance, the country said it was donating two ASC890 Erieye radar-equipped Saab 340-based airborne early warning aircraft to Kyiv. Sweden has also considered donating Gripen fighters to Ukraine, but paused the effort to let the embattled country focus on fielding donated F-16s from other Western countries. In May, Sweden pledged that its military support to Ukraine from 2024-2026 would total more than $7 billion.

At the briefing, Jonson also said a Defense Cooperation Agreement signed with the U.S. late last year has now entered into force.

OPERATIONS

NASA Starliner Fate Assessment Continues

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NASA continues to assess the Boeing CST-100 Starliner's propulsion system issues and the risks associated with either returning the Crew Flight Test-1 (CFT) astronauts to Earth via the Boeing-built capsule or awaiting an opportunity to return them aboard a SpaceX Crew Dragon.

The timing for a final decision awaits a NASA Program Control Board session planned for the middle or end of next week and followed by an agency Flight Readiness Review envisioned for the end of next week or early the following week. "We don't have any major announcements today, but we did want to spend some time with you today going through our process for how we make flight readiness decisions," Ken Bowersox, NASA associate administrator for the Space Mission Operations Directorate, told an Aug. 14 news media teleconference.

"Our technical experts are all busy diving into the data that has been generated over the past few weeks and going through the feedback of the new propulsion system experts that we have brought in, looking at planning for our return options and preparing for some decision points that are ahead at the Program Control Board and eventually a Flight Readiness Review.

There are two options for the return to Earth of Starliner CFT commander Barry "Butch" Wilmore and pilot Sunita "Suni" Williams. They launched June 5 on what was anticipated as an eight-day roundtrip to the International Space Station (ISS) dto complete NASA's certification of the Starliner to join the SpaceX Crew Dragon in providing the regular transportation of astronauts to and from the orbital lab.

As an alternative, NASA could reduce from four to two the number of astronauts it plans to launch on its upcoming Crew-9 Dragon mission to the ISS, enabling Wilmore and Williams to return to Earth aboard the SpaceX crew transport in February 2025.

Most recently, Bowersox and those at NASA involved in the decision-making have reached out to personnel at the agency's Glenn Research Center, Goddard Space Flight Center and Jet Propulsion Laboratory with expertise in the propulsion systems of uncrewed spacecraft on deep-space science missions. They are providing additional insight into the analysis of Starliner's post-launch reaction control system thruster issues obtained by ground tests at NASA's White Sands Test Facility and aboard Starliner while it is docked to the ISS.

The actual Starliner propulsion hardware of concern is aboard the capsule's service module, which will be jettisoned prior to Starliner's deorbit whether the two astronauts are on board or not. The thruster hardware, which seems to have experienced thermal Teflon seal damage, cannot be retrieved while the capsule is docked to the ISS.

"The kind of information we are getting is that a lot of folks out there have worked with similar thrusters and seen similar issues. So we have gotten feedback on what we are seeing, and a lot of it is confirming what we thought were sending the signatures we were observing on orbit," Bowersox said.

"It's really tough when you don't have the actual hardware to look at when it's up in space. So we brought in the robotics community. They are used to analyzing propulsion systems when spacecraft are millions of miles away and have provided some useful input to us.".

If Starliner were to return to Earth without Wilmore and Williams ahead of the Crew-9 Dragon launch, there would be a brief period of time during which if there was some kind of ISS emergency, the two astronauts would have to board the four-person Crew-8 Dragon, which delivered its crew to the ISS in March to depart without SpaceX spacesuits.

In order to lower that risk, NASA is working to reach a decision on Starliner's future by the end of August, Bowersox says.

FUNDING & POLICY

Business Models Present eVTOL Certification Challenges: Regulator

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PORT ERIN, Isle of Man–Certification of electric vertical-take-off-and-landing (eVTOL) and advanced air mobility (AAM) platforms is progressing well, but will only be a part of the challenges that manufacturers face as they seek to bring these new classes of aircraft to market, an experienced regulator says.

It may prove difficult, he argues, to square commercial expectations with safety requirements.

Speaking during a new technologies panel during the recent Isle of Man (IoM) Aviation Conference here, Colin Gill, deputy director of civil aviation at the Isle of Man Civil Aviation Administration, explained that his organization's aircraft registry does not expect to be adding any eVTOL platforms to the M register in the foreseeable future. "We could theoretically register [eVTOLs] when they're certified," he says. "But our choice is we're not going to go near it. Not because it's not safe, [but because] it's not international GA [general aviation] to established Annexe Six, Seven, Eight standards." He was referring to the International Civil Aviation Organization's standards and recommended practices documents covering operation of aircraft, aircraft nationality and registration marks, and airworthiness of aircraft.

The IoM Registry, established in 2007, has become a popular third-country registry with owners and operators, in part because of what it argues is its "flexible and pragmatic approach." Gill says the Registry's intention is to remain competitive when international GA aircraft are looking for a registration domain, but that "we're not going to be putting an M on the side of eVTOLs flying down the high street in Rio De Janeiro" because "it's not appropriate.

"It's not unforeseen that we'll be registering hydrogen, hybrid or electric aircraft on the M reg," he says. "But eVTOLs are a different beast entirely, and they need local safety management and safety regulation. Where are you going to let them fly? [Should a regulator require] equivalence to helicopter rules, so they can fly away? How do you address battery depletion that isn't linear? All of these factors, we strongly believe, should be addressed by the state of operation, as the state of registry, as a local regulator. It's not appropriate for an offshore registry of international GA to get into that area."

Of particular concern, Gill argues, is the impact that the business models utilized by eVTOL operators will have on regulators' decision-making, even though these may not come under the direct purview of a registry or a safety regulator. Asked by the panel's chair, Peter Coles, a partner in aviation law firm HFW, where he feels the greatest risks lie among emerging aerospace technologies, Gill singles out artificial intelligence (AI), autonomy, and eVTOLs. The latter is included not because of inherent safety concerns, but because of the lack of a robust business model for operations, he says. "Why are we not flying [Robinson] R44s on these routes right now?" Gill asks. "They're cheaper to fly, cheaper to operate." Many eVTOL OEMs, he suggests, have "a business model that wants unqualified crew, pushing the boundaries of battery technology, with no ability to fly anywhere else and hold. That business [and] finance pressure indicates safety red flags to a regulator. We don't regulate finance—but [a business] that's in financial distress, we would be looking very closely at it, because the first thing that goes aside is safety."

Gill, a former UK Royal Air Force air traffic controller who spent nine years with the UK CAA before taking up his current role in 2016, believes the certification framework being established for eVTOLs by the European Aviation Safety Agency (EASA) is "very credible." But he warns that there may be considerable distances that eVTOL OEMs will need to travel between design certification and operational approval.

"It's relatively easy to certify anything—you've got to say in what given flight context," he says. "An open piece of sky over the sea, or down the Thames into Battersea Heliport?"

The Isle of Man CAA is in a unique position. The island is a self-governing dependency of the British Crown. But it is not part of the UK, and did not join the European Union when the UK did. So the withdrawal agreement that the UK signed after leaving the EU—which imposes restrictions on some aspects of UK CAA work—does not apply to the IoM CAA or the Registry. Gill says that, in the case of eVTOL certification and registration, his organization would follow EASA rules. This gives the territory a clear path forward on eVTOLs, but the question of an operator's business model will still be an issue.

"EVTOL operation, if it's done within EASA rules, great. But the EASA rules won't allow the eVTOLs to work within a business model that is actually the way they want to go," he says. "I don't know why people are putting money into these things, because I can't see the investment return on it yet."

DEMO, from P. 5

vehicles. The payloads include a tactical communications system, a Ka-band crosslink and mesh network, precision relative ranging and time synchronization across the satellites, and a high-end processor, the company says. Together, the TacSat and Pony Express 2 satellites will form an on-orbit testbed meant to demonstrate real-time battle management command and control, intelligence, surveillance and reconnaissance tasking, mission data processing at the edge, and direct downlink capabilities.

Aviation Week Forecasts

Israeli Fighter Consolidation Takes Shape With New F-15 Approval

[Editor's Note: For more information on Aviation Week Network's 2024 Military Fleet & Maintenance, Repair and Overhaul forecast visit https://pgs.aviationweek.com/Fleet-Forecasts.]

On Aug. 13, the Pentagon's Defense Security Cooperation Agency (DSCA) sent notification to Congress approving the possible sale of up to fifty new-build F-15IA fighters as well as 25 mid-life update modification kits to upgrade the existing Israeli fleet of F-15I jets to the I+ standard.

The deal, which is valued at nearly $19 billion, follows a string of recent approvals and sales to Israel as the nation works to consolidate its fighter fleets in the face of widening regional conflict. Observers can expect Pentagon approvals to continue in Israel's favor as it navigates an increasingly complicated strategic landscape.

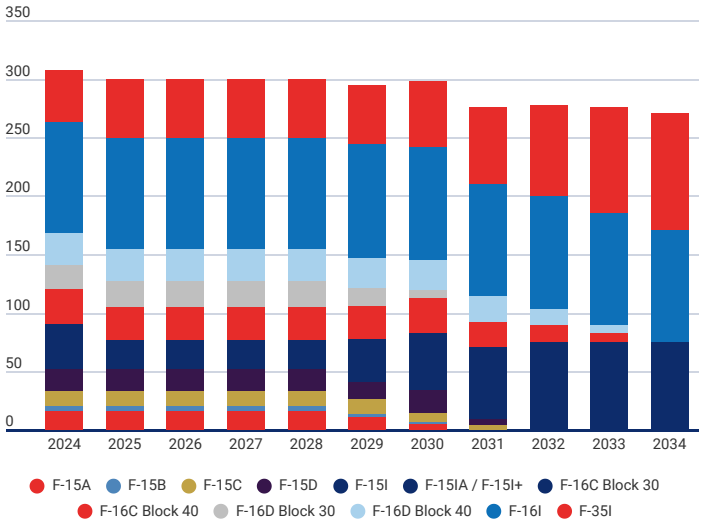
According to Aviation Week Intelligence Network's Fleet Discovery Military tool, Tel Aviv began the decade with a mix of F-15s, F-16s, and F-35s accumulated over multiple decades. The Israeli Air Force received multiple deliveries of F-15s including the A, B, C, and D variants. Israeli F-16s also are diverse, with Block 30 and 40 versions of both the C and D types still in service today alongside Israel's newer fleet of 96 F-16Is. When Israel's first F-35Is began arriving in 2016, they became one of twelve fighter types in Israeli service at the time.

Since then Israeli officials have made moves to modernize and consolidate these types, culminating in a force that by 2024 will be anchored by a 100-strong fleet of F-35I Adirs in addition to Israel's most advanced F-15s and F-16s. The recent DSCA notification outlines a delivery schedule for the new and remanufactured F-15s beginning in 2029 and likely ending in the mid-2030s.

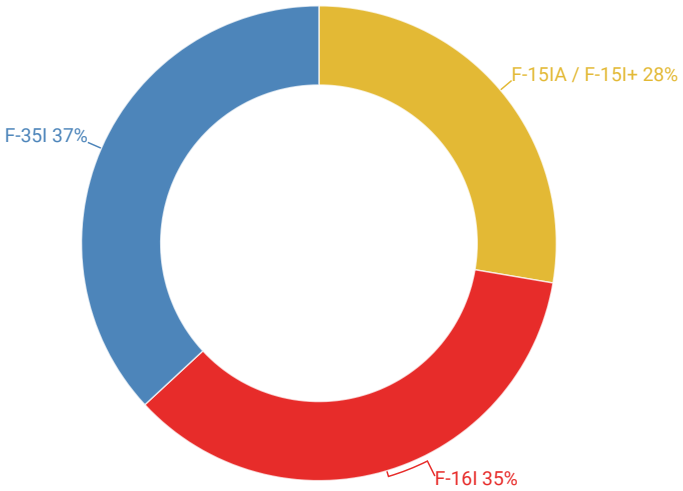
Israel's aging F-15 A, B, C, and D fleets as well as the F-16C and -D fleets are expected to begin their retirements around the same time, ushering out the legacy platforms as the new jets arrive.

By 2034, its expected that Israel's fighter force will be split nearly evenly between the F-35I (100 tails), F-15IA and I+ (75 tails), and F-16I (96 tails). The F-35 will form the backbone of the fleet while regular software and hardware upgrades keep the F-15s and F-16s near the cutting edge for the foreseeable future.

Israeli Air Force Fighter Consolidation 2024-2034



Israeli Air Force Fighter Fleets 2024



Source: Aviation Week Intelligence Network (AWIN) 2024 Military Fleet & MRO Forecast. For more information about the 2024 Forecast and other Aviation Week data products, please see https://pgs.aviationweek.com/forecast

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