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Inside:

Daily Briefs

BIDEN ADMINISTRATION threatened veto of House Appropriations Committee's markup of the fiscal 2025 defense spending bill, citing reduced funding for the VC-25B and expansion of the C-40 fleet, among other issues. House Rules Committee will take up the measure June 25.

SAFRAN entered exclusive discussions to acquire **PRELIGENS** (artificial intelligence for aerospace and defense, €23m in 2023 revenue for €220m ($236m). Closing expected in Q3 2024.

RAYTHEON/COLLINS AEROSPACE has $264.6m U.S. Air Force contract for DB-110 and MS-110 Reconnaissance Pod program sustainment.

U.S. AIR FORCE Brig. Gen. Jason E. Bartolomei will assume command of the Air Force Research Laboratory during a July 10 change of command ceremony at the National Museum of the United States Air Force's Hangar 2 at Wright-Patterson AFB, OH.

SKYNOPY (satellite connectivity startup) closed $3.1m funding round, supporting development of its turnkey connectivity service for LEO satellite operators.

The Debrief

PROGRAMS

Pivotal Month For NGAD Program Takes Unexpected Turn

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For more than a year, the month of June promised to mark a turning point for the secretive U.S. Air Force Next Generation Air Dominance (NGAD) program. In comments and budget documents, Air Force leaders planned to award a contract by the end of the third quarter of fiscal 2024, a period that ends on June 30.

After a decade-long series of studies, flight demonstrators and—most likely—classified prototypes, the contract award to either Boeing or Lockheed Martin would finally launch the NGAD program into the engineering and manufacturing development (EMD) phase. The result would be a new crewed combat aircraft intended to fight for air superiority for decades to come—and in a way that would reinvent the concept behind the "fighter" designator forever.

But then June came, and something else happened. The month still proved to be pivotal for the NGAD program, but possibly in the opposite direction. Preparations for a contract award may still be afoot, but Air Force officials now warn that resource constraints and shifting requirements put the program's existence at risk.

Instead of moving forward with the EMD phase, the Air Force may be going back to the drawing board on the NGAD program.

Air Force Secretary Frank Kendall told my colleague Brian Everstine that the "need for air dominance, obviously, is not going to go away. But what mix of systems and how we do that, I think, is something we can take another look at."

The Air Force's new open-mindedness on the future of air superiority comes at an awkward moment in the NGAD program's history. Less than 14 months ago, Boeing, Lockheed and Northrop Grumman received a request for proposals (RFP) for the EMD contract. By the end of July, Northrop executives announced their decision to withdraw from the competition and focus resources on the Navy's NGAD program. For the last

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PROGRAMS

Space Command Preparing Data Fusion Pilot Program

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U.S. Space Command (SPACECOM) wants to launch a pilot program that can parse out and fuse together data coming off of commercial and government remote sensing assets, its commander said June 24.

Still in its planning phase, the pilot program would focus on one key SPACECOM mission area, with the goal of building a product that puts all of the relevant data onto "one pane of glass," Gen. Stephen Whiting, the command's chief, said during a Mitchell Institute-sponsored event.

"We have a fair amount of data that washes around in our system," he said. "Now, today, unfortunately, I don't have a single common operational picture that I can point to, to bring us all that data in a coherent manner."

Whiting and his team began discussing this data fusion pilot program last month. It has not been formally approved yet, and details including the cost, timeline, and specific mission area still need to be finalized, he noted. The program should be confirmed within the next few months.

Once the program gets the green light, Whiting envisions using commercial data fusion applications both to gather the pertinent information and present it in a way that is the most helpful to command leadership. "It's not about building a new satellite system, but it's taking the data we have and using it better," he added.

When SPACECOM is looking out at the threat landscape, it is focused on addressing the immediate two to three years ahead. A new data fusion pilot program is the kind of "value-add" that the command should be able to deliver within that time frame, Whiting added.

He emphasized that SPACECOM is currently fulfilling its responsibilities without that common operational picture. "But we want to do better," he said.

U.S. Space Command was established in 2019 as a unified

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The Week Ahead

On Tuesday a SpaceX Falcon Heavy is scheduled to launch the final spacecraft in the National Oceanic and Atmospheric Administration's next-generation geostationary weather satellite series, GOES-U, from Kennedy Space Center's LC-39A launchpad, in a mission delayed from previous dates in April and May. At midnight Eastern time on Wednesday evening, Firefly Aerospace is due to launch eight cubesats for NASA's Education Launch of Nanosatellites (ELaNA) program on the fifth flight of the company's Alpha rocket, lifting off from Vandenberg Space Force Base, California.

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several months, Boeing and Lockheed have participated in the intense, final steps of the source selection process, expecting a contract award as scheduled by the end of June.

Now, the program's future appears uncertain. Much could depend on the outcome of the fiscal 2026 Future Years Defense Program (FYDP). The public will not see the details of the FYDP until next winter or spring. But the first drafts of the five-year spending plan are now being developed inside the Pentagon. The impact of the Fiscal Responsibility Act of 2023, which imposes strict spending limits on the executive branch, and rising costs of nuclear modernization make the outlook for the next defense budget difficult.

"There are a lot of things that we probably might not have contemplated a few years ago, we're taking a hard look at," Kendall said in the exclusive interview.

What is less clear are the Air Force's real intentions. Is this a ploy to increase public pressure on the Biden administration and/or Congress to come to NGAD's rescue? Or has the Air Force detected a change in the threat or the readiness of the available technology?

Either way, the costs of an abrupt pivot on NGAD would be high. Since 2019, Congress approved more than $7 billion through the end of fiscal 2024 for the Air Force to spend research, development, test and evaluation (RDT&E) for the NGAD program. More may be appropriated in classified budget lines. The Air Force also received nearly $1.5 billion in outlays for RDT&E on the Next Generation Adaptive Propulsion (NGAP) program, with more than $3 billion more already spent on the underlying three-stream fan technology since 2007.

Since the NGAD development program started five years ago, Air Force leaders also controversially retired hundreds of tactical aircraft, including Boeing F-15s, Lockheed Martin F-16s and Fairchild Republic A-10s. The fleet cuts partially created additional room in the budget for NGAD, NGAP and the Collaborative Combat Aircraft fleet. Those capabilities—even if outdated or unfit—are now gone, and the future of NGAD is uncertain.

PROGRAMS

DARPA Reveals Designation, Size Of Shepard X-Plane

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A large, hybrid-electric-powered flying wing aircraft designed by Northrop Grumman now boasts a military designation number, even as the uncrewed aircraft system (UAS) moves closer to a delayed first flight event later this year, project sponsor DARPA said June 24.

Four years after launching as the Series Hybrid Electric Propulsion AiRcraft Demonstration program, also known as Shepard, DARPA says the aircraft is now designated as the XRQ-73.

The Shepard program received a unique hybrid electric propulsion system developed for the preceding Northrop XRQ-72 Great Horned Owl demonstrator.

The latter lacks a survivable airframe, so Northrop developed a stealthy flying-wing structure with the goal of making the XRQ-73 rapidly fieldable.

Although most of the aircraft's features remain secret, DARPA now describes the XRQ-73 as a 1,250-lb. aircraft, which falls on the high end of the Defense Department's Group 3 category for UAS. Such aircraft typically are sized at 55 lb. - 1,320 lb., and operate below 18,000 ft. and slower than 250 kt.

"The Shepard program is maturing a specific propulsion architecture and power class as an exemplar of potential benefits for the Department of Defense," DARPA program manager Steve Komadina said.

As of last September, DARPA planned to fly the Shepard aircraft by the end of 2023, but the schedule was delayed for unknown reasons.

A hybrid-electric propulsion system could greatly extend the range of a flying-wing aircraft. General Atomics Aeronautical Systems Inc. in 2022 revealed a competing concept, the Gambit 4 UAS, leveraging a common structural and avionics baseline with the original Gambit UAS design.

The latter concept closely resembles the XQ-67 Off-board Sensing Station, which is in flight testing for the Air Force Research Laboratory.

BUSINESS

EHang Scores Up To 300 Orders From China County

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EHang has announced a firm order for 30 aircraft with plans to sell an additional 270 to Wencheng County in Wenzhou City, Zhejiang Province, marking the latest municipal government in China to partner with the startup as part of the country's efforts to build out a "low-altitude economy" for drones and advanced air mobility (AAM) aircraft.

The order for 30 pilotless EH216-S two-seat multicopters included predelivery payments worth 50% of the contract price, according to EHang, which has previously set the list price for its aircraft at RMB2.39 million ($338,000) per unit in China, and $410,000 in global markets.

In addition to the 30 firm orders, EHang said Wencheng County had agreed to purchase a further 270 units by 2026, and has already paid a nonrefundable deposit toward those aircraft, although it did not disclose the amount.

Located in a coastal and mountainous region in Southeastern China, Wencheng County—which EHang described as a top 10 destination in the country for ecological tourism—will collaborate with EHang to develop "aerial tourism and explore innovative commercial applications." They will aim to "provide thrilling aerial sightseeing experiences for visitors, utilizing the county's wealth of scenic natural attractions."

Similar to other agreements between EHang and local governments in China, the startup said its partnership with Wencheng County will include joint collaborations involving demonstrations, sales, maintenance and operations.

"EHang is continuously expanding low-altitude use cases globally, striving to advance the commercial deployment of passenger-carrying pilotless eVTOL aircraft," EHang chairman and CEO Huazhi Hu said in a statement. "In collaboration with Wencheng ... we share a goal to develop various pilotless low-altitude use cases, promote the establishment of a low-altitude operation benchmark in Zhejiang and create a competitive advantage for the low-altitude economy in the East China region."

The agreement with Wencheng County is the latest in a string of similar arrangements agreed between EHang and various municipal governments throughout China, part of Beijing's centralized push to encourage the development of its low-altitude economy concept, a goal that was enshrined in the Chinese government's most recent five-year plan issued in 2021.

Including the latest deal with Wencheng County, EHang has now partnered with six cities across four provinces, according to a company spokeswoman. These include Guangzhou and Shenzhen, Guangdong Province; Hefei, Anhui Province; Wuxi and Wenzhou, both in Zhejiang Province; and Taiyuan, Shanxi Province.

OPERATIONS

Spacesuit Water Leak Delays NASA Spacewalk

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HOUSTON—NASA was once again forced to postpone an International Space Station (ISS) spacewalk on June 24 when lead astronaut Tracy Dyson experienced a water leak in her spacesuit's internal cooling unit while she and crewmate Mike Barratt were preparing to depart the orbital lab's Quest airlock for a 6 1/2-hr. outing.

Neither of the astronauts was ever in danger, NASA said.

The delayed excursion was originally planned for June 13. But that spacewalk was postponed when Dyson's initial partner, NASA astronaut Matthew Dominick, experienced a spacesuit discomfort issue. That also took place while the pair was suited up in Quest and preparing to depart.

The leak appeared after Dyson and Barratt switched the power source for their spacesuits from the ISS to battery power at 8:46 a.m. EDT, the official starting point of the outing with the airlock depressurized and the exit hatch open.

"Oh my goodness," Dyson told NASA's Mission Control. "My helmet fogged up. It was ice crystals."

"There is water everywhere," Barratt told the flight control team

The spacewalk was halted 31 min. after it began, with Dyson and Barrett still in the airlock.

Once the external hatch was closed and Dyson and Barrett were out of the pressurized portion of the airlock, Dominick, who was assisting his colleagues, entered for a quick assessment. Dominick told flight controllers he could spot only five small drops of water on the wall of the pressurized segment of the airlock.

Assessment of the servicing and cooling umbilical unit of Dyson's spacesuit was underway. In the aftermath of the leak, NASA did not say if or when the twice-delayed spacewalk might be rescheduled or whether it intends to proceed with plans for a July 2 spacewalk to replace an external camera.

NASA also intends to test a strategy for ground control of the station's 57-ft.-long Canadian robot arm with a spacewalker on the end rather than command of the robot arm by an astronaut at a control post inside the ISS's U.S. segment.

Ground controllers have previously commanded the robot arm for external maintenance and upgrades, but not with astronauts in foot restraints at the tip. The effort is intended to inform operations aboard NASA's planned Gateway, a lunar-orbiting, human-tended multi-module space station that is part of the agency's strategy to establish a sustained human lunar presence.

NASA is working with Collins Aerospace to develop an upgrade to the space shuttle-era spacesuits. They consist of an internal, long underwear-like component called a liquid cooling and ventilation garment that includes narrow tubes through which water flows for thermal control. It is covered by an outer pressure garment, helmet and primary life support system backpack, boots and gloves.

Earlier incident

During a July 2013 spacewalk, European Space Agency astronaut Luca Parmitano experienced a water leak during an excursion with NASA astronaut Chris Cassidy in which Parmitano's spacesuit helmet began to fill with water. With Cassidy's help, Parmitano was able to rapidly make his way back to the ISS airlock and quickly remove his helmet, into which an estimated one to two quarts of water had flowed.

In December 2022, NASA issued Collins a $97.2 million task order for a new low-Earth-orbit spacesuit for use aboard the ISS and the multiple commercial successors to the orbital lab envisioned by NASA. Under the task order agreement, the spacesuit's new version, which is in the development process, is to undergo a spacewalk demonstration aboard the ISS by April 2026.

The planned June 24 spacewalk by Dyson and Barratt had two primary tasks. They were the retrieval of a failed electronics box called a radio frequency group (RFG) for its return to Earth for refurbishment, and the swabbing of the exterior vents on the Destiny laboratory and airlock modules for samples that are to be frozen in metal containers for preservation.

Once returned to Earth, the samples are to be analyzed for evidence of human microbial activity that might have survived in the harsh space environment, a factor in the architecting of future spacecraft supporting the human exploration of Mars.

The failed RFG, which was part of an exterior S-band antenna, was removed from the orbital outpost's starboard power truss in December 2021 and eventually stowed on an external platform attached to the airlock module. Previous plans to retrieve the RFG from the stowage platform with spacewalks in April and November 2023 were delayed by difficulties removing fasteners in the first instance and a lack of time during a November outing.

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combatant command, responsible for conducting space operations and monitoring space activities and threats, among other duties. Whiting noted it is also a geographic combatant command, responsible for all military operations starting at 100 km (62.1 mi.) above the Earth's surface. The command achieved full operational capability in 2023.

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PROGRAMS

NASA Manages Cost And Schedule Upgrades, But Challenges Remain

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NASA suffered significant cost growth on some major programs even as the agency managed to get control over problems with some of its flagship efforts, the Government Accountability Office found in a new audit.

Those programs singled out as major projects experiencing notable cost growth since last year's assessment are the Artemis Orion crew capsule, up by $321.2 million; Low Boom Flight Demonstrator, increased by $101.8 million; Spectro-Photometer for the History of the Universe, Epoch of Reionization and Ices Explorer (SPHEREx), growth of $28.6 million; Solar Electric Propulsion (SEP), up by $20 million; and Volatiles Investigating Polar Exploration Rover (VIPER), increased by $5 million.

The 130-p. report, "NASA Assessment of Major Projects," was released June 20 by the GAO as part of an audit for Congress. It assesses 36 major projects, those estimated to cost more than $250 million from formulation through launch to the end of operations.

The agency currently plans to invest more than $81 billion in those major projects, 11 of which are related to Artemis. Audit findings note that total cost and schedule overruns assessed at $7.6 billion and 20.9 years in 2023 have decreased to $4.4 billion and 14.5 years in 2024.

The audit attributed the declines primarily to the departures of the Space Launch System (SLS) and the Exploration Ground Systems (EGS)—the large rocket and launch complex facilities for Artemis missions—from the major projects list since the last audit. Each demonstrated their capabilities during the late 2022 uncrewed Artemis I test flight. The SLS and EGS were previously assessed at $3.6 billion in cost overruns and four years each in schedule delays.

In total, 11 out of 16 major projects under development have so far not experienced cost growth in 2024, and 13 of the major projects have not experienced schedule delays.

Prior recommendations

NASA has implemented a range of recommendations from past annual audits to make improvements in its oversight, but 39 of those recommendations had yet to be fully implemented as the audit was nearing completion, including eight identified by the GAO as high priority. "NASA remains committed to strengthening our acquisition rigor and oversight," agency Administrator Bill Nelson said in a response included in the audit. "NASA recognizes the challenges of complex, innovative space and aeronautics programs, and continues to improve policies and processes that control cost and schedule and promote mission success."

The audit credits NASA with establishing a Moon to Mars program office in 2023 in response to congressional legislation and appointing a chief program management officer to address cost and schedule challenges. The report also notes improvements associated with raising the Technology Readiness Level (TRL) requirement to TRL 6 at the point of preliminary design review for 11 projects with critical technologies.

"Achieving this level involves demonstrating a representative prototype of the technology in a relevant environment," the audit notes. "GAO's past work shows that maturing technologies prior to product development can help reduce technology-related cost increases and schedule delays."

PROGRAMS

China Completes 'Most Complex' Reusable Rocket Test To Date

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SINGAPORE—China's state launch provider CASC says it has completed the country's most complex reusable rocket test yet after landing an unnamed demonstration rocket following a controlled descent.

Powered by three indigenous deep-throttling, variable-thrust, liquid oxygen-methane engines, the rocket lifted off from the Jiuquan Satellite Launch Center on June 23 at 1 p.m. Beijing time. The rocket reached an altitude of 12 km above sea level, adjusted for altitude at the launch site.

On its return, the rocket deployed its landing legs 50 m above ground and touched down 6 min. after launch.

CASC says the test validated the rocket's "high-load landing cushioning technology, large-thrust, highly variable reusable engine technology, dual cryogenic pressurization and delivery technology, high-precision navigation guidance, return and landing control technology, and health monitoring technology."

The demonstration rocket had a diameter of 3.8 m (12.5 ft.). China intends to launch the full-size rocket—expected to be 4 m in diameter—in 2025.

In addition to this state-run project, a number of privately owned entities in China also are experimenting with and developing their own reusable launch platforms. In January, LandSpace completed its first test "hop" for the Zhuque-3 rocket. The minute-long test saw the rocket reaching a height of approximately 350 m, landing 100 m away from the liftoff point with a precision of about 2.4 m.

PROGRAMS

Lockheed Gains $977 Million More For Next-Gen Missile Warning Sats

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The U.S. Defense Department has awarded Lockheed Martin a $977.5 million contract modification to support the next four years of development of the Next-Generation Overhead Persistent Infrared (OPIR) program.

It will cover on-orbit developmental and operational testing, as well as calibration and tuning of the main mission payload, along with the entrance into the interim operations period, through July 31, 2029, per the June 21 contract announcement. The full Next-Gen OPIR contract value now stands at nearly $8.2 billion.

The Next-Gen OPIR program includes two satellites for use in geostationary orbit (GEO), meant to replace the current Space-Based Infrared System (SBIRS) constellation. Lockheed Martin is building the two GEO-based systems, as well as two polar coverage satellites to be stationed in a highly elliptical orbit. Raytheon—now part of RTX—is designing and building a modernized ground segment, called the Future Operationally Resilient Ground Evolution (FORGE).

The Next-Gen OPIR program was launched as a rapid prototyping initiative in 2018, and transitioned to a major capability acquisition in 2023. The Space Force anticipates the OPIR mission payload delivery and space vehicle environmental testing to take place in 2024 in preparation for launch in 2025, according to the Government Accountability Office's annual Weapons Assessment Report, released in June.

The program has faced numerous schedule challenges. Flight hardware production and integration challenges delayed an original payload delivery target date by roughly 11 months, GAO said. Meanwhile, the Next-Gen OPIR program office remains committed to delivering the first GEO-based system by 2025, according to the report.

PROGRAMS

India's Reusable Launch Vehicle Pushpak Completes Landing Test

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SINGAPORE—The Indian Space Research Organization (ISRO) has completed the third and final landing experiment for its scaled reusable demonstrator, nicknamed Pushpak.

The reusable launch vehicle (RLV), designed to reduce launch costs by as much as 80%, is India's answer to the U.S.'s X-37 orbital test vehicle and the Chinese reusable experimental spacecraft.

The first two landing tests took place in April 2023 and March 2024. ISRO conducted the third trial at the aeronautical test range in Chitradurga, Karnataka, on the morning of June 23. Pushpak was released from a Boeing CH-47F Chinook at an altitude of 4,500 m (14,764 ft.), 4.5 km (2.7 mi.) away from the runway. The agency says that Pushpak "autonomously executed cross-range correction maneuvers, approached the runway and performed a precise horizontal landing at the runway centerline."

The vehicle landed at a velocity of 320 kph (199 mph) before being slowed by a drag chute and landing gear brakes, while autonomously using two rudders and a nose wheel to maintain

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OPERATIONS

Boeing Starliner's Return To Earth Moves To July

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HOUSTON—NASA and Boeing are moving the CST-100 Starliner Crew Flight Test mission's return to Earth into July to accommodate further evaluation of the spacecraft's propulsion system as well as a pair of upcoming spacewalks, according to an agency update issued late June 21.

The Starliner crew, NASA astronauts Barry "Butch" Wilmore and Sunita "Suni" Williams, docked autonomously to the International Space Station (ISS) on June 6, a day after launching on what was initially envisioned as a stay of about a week at the seven-person orbital laboratory.

The spacecraft's return to Earth has been pushed back four times. The latest decision moves a planned undocking on June 25 from the ISS into July. Specific dates for the new undocking and landing plan have not been determined.

"We are taking our time and following our standard mission management team process," Steve Stich, manager of NASA's Commercial Crew Program, stated as part of the latest update. "We are letting the data drive our decision-making relative to managing the small helium system leaks and thruster performance we observed during rendezvous and docking. Additionally, given the duration of the mission, it is appropriate for us to complete an agency-level review, similar to what was done ahead of the NASA SpaceX Demo-2 return after two months on orbit, to document the agency's formal acceptance on proceeding as planned."

The 2020 test flight with two astronauts that led to NASA's certification of the SpaceX Crew Dragon for the regularly scheduled transportation of astronauts to and from the ISS was extended from a planned 14 days to 64 days.

Following its June 5 launch, the Starliner service module propulsion system experienced three helium leaks, two more than identified pre-launch, as well as failures of five of the 28 reaction control system (RCS) thrusters. Four of the RCS thrusters were recovered prior to docking. The helium and RCS hardware have been under evaluation by NASA and Boeing since the docking.

The latest rescheduling is also to accommodate a pair of NASA ISS spacewalks that were planned for June 24 and July 2. But the June 24 excursion was postponed when lead astronaut Tracy Dyson experienced a water leak in her space suit's internal cooling unit while she and crewmate Mike Barratt were preparing to depart the station airlock (see related story).

PROGRAMS

AeroMech Unveils Starlink STCs For Textron Models

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Engineering firm AeroMech is developing a supplemental type certificate (STC) for installation of the Starlink satellite communications terminal on Cessna Citation 560XL series business jets and will pursue STCs to fit the system on several other Textron Aviation models.

AeroMech, based in Everett, Washington, said June 24 that its STC for the Citation 560XL midsize jet, including the Citation Excel, XLS and XLS+ will be available in September. The Citation Ascend will be included in the certification soon after.

AMI Aviation Services, a wholly owned AeroMech subsidiary and FAA Part 145 repair station, will install Starlink at its facilities at Orlando Sanford International Airport (KSFB) in Florida and Smyrna Airport (KMQY) in Tennessee, or through "go teams" sent to an operator's location.

AeroMech said it will also provide Starlink STCs and PMA installation kits to qualified Starlink dealers.

Starlink is a high-speed, low-latency, Ku-band inflight connectivity system supported by a constellation of thousands of low-Earth-orbit satellites. A Starlink shipset consists of an Aero Terminal phased array, electronically steered antenna mounted to the top of the fuselage, a power supply and a wireless access point.

An FAA Organization Designation Authorization company, AeroMech has already completed STCs to install Starlink on Beechcraft King Air 200- and 300-series models in the Textron Aviation portfolio. In addition to the Cessna Citation 560XL, the company announced plans to pursue Starlink STCs on other Textron models, including the Citation Sovereign, Citation X, Citation Latitude, Citation Longitude, Cessna Caravan, Cessna SkyCourier, and Hawker 800/900 series aircraft. AeroMech said it is accepting pre-orders for the Citation 560XL Starlink STC Equipment Package. Pre-orders will allow operators to lock in a discounted price and obtain Starlink as soon as the STC is available.

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heading on the runway.

ISRO says the mission validated the spacecraft's inertial sensor, radar altimeter, flush air data system and pseudolite positioning system. "Through this mission, the advanced guidance algorithm catering to longitudinal and lateral plane error corrections, which is essential for the future orbital reentry mission, has been validated," the agency says.

India plans an orbital reentry mission using a full-scale RLV using its Geosynchronous Satellite Launch Vehicle Mk. II as a launcher on a yet-to-be determined date.

BUSINESS

As Certification Nears, eVTOLs Face Credibility Crisis

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As the advanced air mobility industry makes continued strides toward type certification of the first electric vertical-take-off-and-landing (eVTOL) aircraft, skepticism is growing about the near-term usefulness and commercial viability of the new vehicle class.

Many of the promises and projections made in the heady days of 2021—when money was plentiful, and startups were able to raise capital through SPAC mergers—have since proved to be wildly optimistic. Timelines have shifted right, vehicle and operating costs have been revised higher, and in some cases, performance specs have shifted lower. All this is reflected by an investment scene that has all but dried up, with even the leading eVTOL manufacturers struggling to raise the funds needed for certification and entry-into-service.

The decline in market sentiment is reflected in the share prices of those eVTOL makers who went public. Lilium and Vertical Aerospace, which face questions about their financial viability, have been stuck in sub-dollar territory for months, down more than 90% from their IPO prices. Archer, Joby and Eve have fared somewhat better, all trading in the $3-5 range, but in all cases, investors are sitting on large paper losses.

As a result, very few investors are willing to touch AAM these days. While startups who already went public have had some success raising money from existing shareholders, the bearish market environment poses a serious challenge for multitudes of other companies who missed the initial investment wave.

"The question in my mind is whether this market is going to overcorrect," says Kevin Noertker, founder and CEO of hybrid propulsion developer Ampaire. "It's disappointing. I've talked to many people who were excited about eVTOL, and now they won't touch aviation ... My fear is that this heyday of funding and innovation, which the industry has seen over the last half decade or so, could dry up if the industry plays its hand poorly."

Rising skepticism

With the rising skepticism surrounding eVTOLs, some industry players are hoping that attention could shift to technologies like hybrid propulsion and electric conventional-takeoff-and-landing (eCTOL) vehicles, which they argue offer a more realistic and viable near-term use case. Hybrid propulsion can achieve a much more useful range, capable of enabling regional air mobility services, while eCTOLs can offer the noise and emissions reductions of eVTOLs, but with a proven business case and much lower hurdles in terms of airspace, infrastructure and regulations.

A key theme of the skepticism involves concerns about the capabilities of existing battery technology, as well as their slow rate of improvement. "When you start to do something commercial, there's no way you can do it with electric [propulsion] only because the range will be too low," says Jean Botti, founder and chief technical officer of French hybrid eVTOL startup Volt Aero. "Are people really going to spend five or six million euros for an airplane that is going to carry them for 50 kilometers? I think this is a very bad business proposition."

Former Airbus engineer Jean-Christoph Lambert, who now heads Ascendance Flight Technologies, another French hybrid eVTOL startup, is similarly doubtful about the potential for battery-powered flight. Since crossing the English Channel in 2015 as part of the Airbus E-Fan project, Lambert observes that batteries have only improved 20%, a rate of growth he described as "not even close" to what is needed to enable commercial aviation.

"One kilogram of fuel is equivalent to 15 to 25 kilograms of batteries, so if you have 100 kilograms of fuel, you need five tons of batteries," Lambert says. "What is needed is a 2,500% increase in energy density, but we're improving just five percent or so every few years. So it's not just a matter of time–it will not happen any time soon. Batteries alone are not going to be a scalable way to decarbonize aviation."

In addition to a focus on hybrid propulsion, some startups are wondering whether many eVTOL aircraft concepts—such as tiltrotor, tiltwing and lift-plus-cruise designs—are too complex and costly to certify and maintain relative to more traditional aircraft. Companies developing electric and hybrid eCTOLs, such as Eviation, Heart Aerospace and Electra.aero, among others, take the view that tube-and-wing aircraft using airport runways will be easier to certify with less infrastructure burden.

Propulsion

Other startups, including Ampaire, Dovetail Electric Aviation and Universal Hydrogen, go a step further, focusing instead on developing propulsion systems to be retrofitted into existing small airplanes, a strategy they argue is more pragmatic than developing a clean-sheet eCTOL.

"The industry made big commitments and, to make a bit of a generalization, those ambitions have not been delivered on," Noertker says. "That's why we're focused on developing something non-speculative. We're not building a new airplane—we're building a propulsion system. And rather than go fully electric or hydrogen, which has phenomenal infrastructure challenges and questionable economics, we're going hybrid-electric."

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PROGRAMS

Four Firms Chosen To Bolster Pentagon's Space Data Effort

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The U.S. Space Force has awarded contracts to Blue Origin, CACI International, General Atomics and Viasat to develop space laser communication terminal prototypes, with the goal of enabling on-orbit crosslink compatibility among future satellites.

Under the contracts, the companies are expected to build long-range space optical communication terminals that can transmit a new common waveform, as part of Space Systems Command's (SSC) Enterprise Space Terminal (EST) program, the service announced in a June 17 statement. The award amounts were not disclosed.

The on-orbit crosslink capability will allow the Space Force to move toward a space mesh network in which satellites in orbital regimes ranging from low Earth orbit (LEO) to past geostationary orbit (GEO) can all talk to one another, John Kirkemo, senior materiel leader of SSC's Advanced Communications Acquisition Delta, says in the Space Force statement.

The EST program has earmarked $100 million to build the terminals, and is taking advantage of efforts by the Pentagon and commercial developers to make a new enterprise waveform operational that can communicate in the Beyond-Low-Earth-Orbit (bLEO) regimes.

The program also is working to leverage prior investment and technical developments made by the Space Development Agency (SDA), EST program manager Capt. Brooke Kunzelman said in a June 17 email. The SDA is developing a mesh space data transport layer as part of its broader Proliferated Warfighter Space Architecture.

The four Other Transaction Authority (OTA) contracts were awarded through SSC's Space Enterprise Consortium. The U.S. Air Force stood up the SpEC in 2018, prior to the creation of the Space Force, as a way to utilize OTAs to deliver prototype technologies for the space domain more rapidly.

PROGRAMS

Airbus Eyes Ambulance Services For eVTOL Push

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LONDON—Airbus is targeting ambulance and medical services (AMS) as an early market for its electric vertical-take-off-and-landing (eVTOL) system, in part to gain broader acceptance for the new technology, says Andra Steltemeier, head of commercial development for urban air mobility (UAM) at the European aerospace giant.

The company in March unveiled its CityAirbus NextGen, a four-person eVTOL, including one pilot. It expects to fly the system for the first time this year. Airbus aims to have an operational system ready in the second half of this decade, but is not rushing to be first to market, Steltemeier said June 19 at the Revolution.aero conference here. The company last year achieved power-on for the vehicle.

The sentiment to first focus on services such as AMS was echoed by other companies. Aircraft and helicopter lessor LCI Aviation, which has partnered with Airbus and others, believes mission-critical uses, such as AMS and cargo carrying, are more promising near-term commercial opportunities than carrying passengers, company Chief Commercial Officer Nigel Leishman says. "We are interested in passengers, but it is much longer down the pathway than everybody expects,'" he says. LCI has also signed agreements with Elroy Air for 40 Chaparral VTOL aircraft and for up to 1,125 eVTOLs from BETA Technologies.

Paul-Frank Bijou, vice president for business development at Germany-based eVTOL startup Lilium, said at the event that servicing socially related missions would help foster industry credentials.

For Airbus, Steltemeier says, getting to first flight is not the OEM's main eVTOL challenge. Those are more medium- and long-term and focused on issues such as battery supply.

The CityAirbus prototype is due to undergo flight testing at Airbus's Donauworth helicopter facility in Germany. It builds on lessons Airbus learned from its Vahana and CityAirbus demonstrators. Airbus expects the flight testing to yield lessons for the operational configuration, but currently expects that version to be conceptually similar to what will fly. The NextGen is designed for 80-km (50-mi.) operational range and 75 mph cruise speed.

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But even with a more pragmatic approach, Noertker says that general disillusionment among investors has made it so even startups that are setting achievable goals cannot raise the cash needed to fund their programs, a development that could threaten the future of decarbonization in aviation.

"Billions of dollars were raised on the backs of either explicit or implicit commitments around the size of the market, the timeline and the economics," Noertker says. "Now we're seeing the repercussions, and unfortunately it's affecting the entire industry."

Contracts

Selected U.S. Military Contracts For The Week Of June 17 - June 21, 2024

June 17

U.S. ARMY

Astronics Test Systems Inc., Orlando, Florida, has been awarded a $215,500,000 firm-fixed-price contract for the production and delivery of radio test set TS-4549/T. Army Contracting Command, Newark, New Jersey, is the contracting activity (W15QKN-24-D-0027).

U.S. NAVY

Thales USA Inc., Overland Park, Kansas, has been awarded a $10,455,330 firm-fixed-price contract for the production and delivery of 11 OE-4691 tactical air navigation (TACAN) antenna systems, 196 high power assemblies, 49 low power assemblies, and 49 remote monitor and maintenance controllers, as well as associated data, to upgrade existing shipboard TACAN systems and to support new ship construction to include all air capable ships, providing range and bearing information to equipped aircraft in support of the Navy. Naval Air Systems Command, Patuxent River, Maryland, is the contracting activity (N0001924C0021).

June 18

U.S. NAVY

The Boeing Co., St. Louis, has been awarded $211,986,000 for a ceiling-priced delivery order (N00383-24-F-YY1S) under a previously awarded basic ordering agreement for the repair of 11 various configurations of flight control surfaces used on the F/A-18 E/F and EA-18G aircrafts. Naval Supply Systems Command Weapon Systems Support, Philadelphia, is the contracting activity.

The Raytheon Co., McKinney, Texas, has been awarded a $35,000,000 firm-fixed-price undefinitized contract to procure materials necessary to support the production and delivery of 18 APY-10 Radar Systems, to include 14 for the government of Canada; three for the government of Germany; and one for the Navy in support of the P-8A Poseidon aircraft. Naval Air Systems Command, Patuxent River, Maryland, is the contracting activity (N0001924C0040).

June 20

U.S. NAVY

Data Link Solutions LLC, comprised of BAE, Wayne, New Jersey; and Collins Aerospace, Cedar Rapids, Iowa, have been awarded an indefinite-delivery/indefinite-quantity contract with a maximum potential value of $998,828,164 for the production, retrofits, development, and sustainment of the Multifunctional Information Distribution System (MIDS) Joint Tactical Radio Systems (JTRS) terminals. There are currently three variants of MIDS JTRS terminals: the Concurrent Multi-Netting 4, the Tactical Targeting Network Technology, and the F-22 variant. These terminals will continue to be procured, sustained, and updated for future growth. Naval Information Warfare System Command, San Diego, is the contracting authority.

U.S. MISSILE DEFENSE AGENCY

Lockheed Martin Rotary & Missions Systems, Colorado Springs, has been awarded an extension to the indefinite-delivery/indefinite-quantity contract HQ0147-19-D-0002. The contract's total value is $282,775,135. The Missile Defense Agency, Redstone Arsenal, Alabama, is the contracting activity (HQ0147-19-D-0002).

U.S. AIR FORCE

Northrop Grumman Mission Systems, McLean, Virginia, has been awarded a contract with a ceiling value of $189,000,000 for Combat Air Forces Distributed Mission Operations services. The contract provides for distributed training to capable Air Force trainers worldwide by establishing a virtual environment to conduct distributed training events, from daily team training to large-scale exercises that provides a safe training environment at a lower cost than live fly. The Air Force Life Cycle Management Center, Simulators, Wright Patterson AFB, Dayton, Ohio, is the contracting activity (FA8621-24-D-B001).

June 21

U.S. NAVY

The Applied Research Laboratory (ARL), Pennsylvania State University (PSU), State College, Pennsylvania, has been awarded a cost-plus-fixed-fee, indefinite-delivery/indefinite-quantity modification with a ceiling increase of $1,390,000,000 to a previously awarded contract (N00024-18-D-6401) for research, development, engineering, and test and evaluation for programs throughout the Department of Defense (DOD) within its approved core competency areas of: (1) guidance, navigation and control, (2) advanced thermal propulsions, (3) advanced propulsors, (4) materials technology and manufacturing technology, (5) atmosphere and defense communications, and (6) mission related and public service. Naval Sea Systems Command, Washington Navy Yard, Washington, D.C., is the contracting activity.

U.S. AIR FORCE

Lockheed Martin Space, Sunnyvale, California, has been awarded a $977,599,318 cost-plus-incentive-fee contract modification (P00127) to previously awarded contract FA8810-18-C-0005 for Phase 2.1B. The Phase 2.1B contract modification is for on-orbit developmental and operational testing, calibration, and tuning of the Overhead Persistent Infrared (OPIR) main mission payload, entrance into the interim operations period, and interim contractor support for the Next Generation OPIR Geosynchronous System for two space vehicles consistent with the space vehicle 3 descope. Space Force, Space Systems Command, Space Sensing, Los Angeles AFB, California, is the contracting activity.