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THE UPM MARKET INFORMER



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Rolls Royce Starts Hydrogen Tests on Turbine Engine

In September, Rolls-Royce presented its AE 2100 test engine at an easyJet conference on the airline's roadmap to net zero aviation.

Today the BBC has reported that Rolls-Royce, in partnership with easyJet, has commenced tests running the AE 2100 on hydrogen. Rolls-Royce has entered into a multi-million-pound hydrogen engine and carbon removal project with easyJet. With hydrogen showing the most promise for zero-emission aviation, easyJet is also backing the Airbus ZEROe program. This program aims to have the first zero-emission commercial aircraft in service by 2023 using hydrogen technology.

Rolls-Royce and easyJet are working together and will run tests on two Rolls-Royce engines, the AE 2100 turboprop and the Pearl 15 jet engine, used on the Bombardier Global Express 5500 and 6500 business aircraft.

The immediate aim is to demonstrate that a jet engine can run and be controlled using hydrogen fuel. Today's BBC report said that the tests have shown that a jet engine using hydrogen can be started up and run at low speed. Based on that, the initial ground test has succeeded, which is not surprising given the know-how and resources that Rolls-Royce brings to the task.

Its partner, easyJet, also believes that hydrogen is the best way to get to net-zero aviation. The leading low-cost carrier found its own way to that conclusion, starting with exploring battery technology. EasyJet's chief operating officer, David Morgan, said: "We looked at battery technology, and it was quite clear that the battery technology was probably not going to do it for the large commercial aircraft that we fly. We've come to the conclusion that hydrogen is a very exciting proposition for us."

While sustainable aviation fuel (SAF) is already powering flights, its widespread adoption suffers from a lack of fuel and the necessary infrastructure to make it available. In the main, the aircraft and engines can operate using SAF, so the shift to its use lies outside the airline industry. However, for hydrogen-powered commercial aviation to work, not much of today's aviation ecosystem won't need to be reinvented or adapted. To turn hydrogen into a liquid, it needs to be cooled to -253C and turned back into a gas to power the engine. Also, liquid hydrogen takes up around four times the space as the same volume of kerosene, so new fuel tanks and systems will be needed.

By now, most of us have learned that hydrogen is not always a green alternative, with even the so-called blue hydrogen now under attack for its harmful properties. The hydrogen used in the Rolls-Royce AE 2100 is of the green variety produced at the European Marine Energy Centre in the Orkney Islands of Scotland. The report says it is made using an electric current to split water into its components, hydrogen and oxygen. The electricity needed is produced at the center using wave and wind power, making it a credible green fuel. Starting the engine and running it using hydrogen may seem like a small step, but it marks a significant milestone on the path to net zero aviation by 2050. *Source: Michael Doran, Simple Flying Magazine.*

Surcharge Totals September 2022 - February 2023



	Sep	Oct	Nov	Dec	Jan	Feb
15-5	1.1041	1.1043	0.9821	1.0176	*	*
15-7	1.5035	1.534	1.4687	1.5353	*	*
17-4	1.1187	1.1194	0.9957	1.0321	*	*
17-7	1.2318	1.2299	1.099	1.1528	*	*
201	1.0091	0.9963	0.8327	0.8539	*	*
301 7.0%	1.1991	1.1978	1.0707	1.1225	*	*
302/304/304L	1.3143	1.314	1.1836	1.2452	*	*
304-8.5%	1.3639	1.3639	1.2336	1.3002	*	*
305	1.7188	1.7214	1.5908	1.6914	*	*
309	1.7753	1.7784	1.6354	1.7365	*	*
310	2.5012	2.51	2.3623	2.5319	*	*
316/316L	1.7628	1.7951	1.7299	1.8226	*	*
316LS/316LM	2.83	2.88	2.83	3.06	*	*
317L	2.0354	2.0847	2.0414	2.15	*	*
321	1.4109	1.4079	1.2773	1.3484	*	*
347	1.7064	1.7068	1.5805	1.6518	*	*
409/409 Mod	0.4161	0.4058	0.2948	0.2774	*	*
410/410S	0.4166	0.4093	0.2991	0.2819	*	*
430	0.4893	0.4826	0.3565	0.3399	*	*
434	0.5953	0.6004	0.4958	0.4836	*	*
439	0.5239	0.5128	0.3775	0.3609	*	*
440A	0.4893	0.4826	0.3565	0.3399	*	*
2205	1.5896	1.6341	1.5655	1.6199	*	*
263	16.37	15.0165	11.9584	10.7724	10.9832	10.8442
276	12.4194	11.0588	9.506	9.5601	10.1487	10.0837
A286	4.2697	3.7093	3.0669	3.1578	3.194	3.0092
330	5.2845	4.5889	3.6909	3.8501	3.9296	3.6937
400	9.5045	8.2954	6.6443	6.9718	7.1931	6.8268
Custom 455	1.61	2.50	1.84	1.98	*	*
Custom 465	2.05	2.96	2.64	2.85	*	*
600	10.3161	8.9053	7.3446	7.6239	7.8565	7.4646
601	8.8208	7.6205	6.1229	6.3546	6.4998	6.1684
617	14.4168	13.0248	10.5673	10.019	10.3713	10.2334
625	12.1373	10.8391	9.6866	9.8369	10.2096	10.0402
Custom 630	1.37	1.31	1.26	1.29	*	*
718	10.7918	9.7184	8.6636	8.8356	9.0313	8.7834
X-750	11.0237	9.5815	7.7941	8.0417	8.2187	7.8343
825	6.6992	5.8342	4.9306	5.0611	5.1995	5.0087
HX	8.8909	7.8235	6.7705	6.8404	7.1842	7.0661
188	23.0095	22.247	17.6141	14.6262	14.555	14.287
CCM	20.26	21.15	20.97	19.61	*	*
L-605	25.3164	24.6902	19.4244	15.6932	15.5614	15.3483

*Surcharge currently not available

Medtronic Reports Positive Study Results for Next-Gen Evolut FX TAVR System



Medtronic today presented positive results for its next-generation transcatheter aortic valve replacement (TAVR) system.

The study compared the next-generation Evolut FX TAVR systems to earlier-generation Evolut systems. Data demonstrated significantly improved commissure alignment during TAVR procedures with Evolut FX.

A late-breaking presentation at PCR London Valves 2022 summarized the early limited market release of Evolut FX. The FDA approved the Evolut FX in August 2021. The study included data from 168 patients across six U.S. centers. It compared that data to outcomes for 378 Evolut PRO+ patients from a single center.

Medtronic said in a news release that commissure alignment represents a key aspect of TAVR procedures. It could provide easier future coronary access and improved coronary blood flow. It may also improve valve hemodynamic performance and facilitate redo-TAVR in the future.

Evolut FX features enhancements such as gold markers built into the frame. These facilitate the visualization of implant depth and valve commissure location during TAVR procedures. The system also employs a redesigned delivery system that enhances traceability and flexibility during valve deployment.

“In this early experience the Evolut FX system provided several enhancements over the PRO+ system not only because of its easier trackability, but more importantly achieving a more symmetric deployment on release and improved commissural alignment with reduced coronary overlap,” said Dr. Gilbert Tang, surgical director of the structural heart program at Mount Sinai Health System, professor in the department of cardiovascular surgery at the Icahn School of Medicine at Mount Sinai and the study’s principal investigator. “These features resulting in better procedural predictability and consistency in TAVR may be critical in low risk patients and broaden the adoption of TAVR to a wider population. By looking closely at data across multiple centers, we’re able to demonstrate the procedural improvements of the FX system over its predecessors.” [Read More Here](#)—Source: Sean Whooley, Mass Device Magazine.

Skyrora Working Towards 2023 Orbital Launch After Suborbital Failure

Scotland-based launch startup Skyrora is focused on making a first orbital launch attempt late next year, building on experience from a suborbital attempt in Iceland. Skyrora’s team took their 11-meter-long Skylark L single-stage suborbital launch vehicle to Iceland’s Langanes peninsula in October to attempt to reach above the Karman line. The rocket however reached an altitude of only around 300 meters, due an anomaly now discovered to be a software issue, and crashed into the Norwegian Sea.

Skyrora plans to have divers locate and retrieve the rocket for further research, including how the engines scale up for reusability.

The launch however did provide the team with around 60% of what they hoped to accomplish for the launch, Derek Harris, business operations manager at Skyrora, told SpaceNews at the Space Tech Expo Europe in Bremen, Germany, particularly in terms of proving mobility and agility. Skyrora is planning on another Skylark L launch from Iceland around April next year while preparing for

a first orbital launch attempt with the Skyrora XL from the SaxaVord Spaceport being developed on Shetland off the coast of Scotland. Skyrora XL is a three-stage rocket using 3D-printed engines designed to place payloads weighing up to 315 kilograms into sun-synchronous orbit.

Skyrora is in competition with Orbex, another UK launch startup, to make the first vertical orbital launch from British soil. The firm is developing a launch vehicle named Prime, capable of placing up to 180 kilograms into orbit, which it plans to launch from the Sutherland spaceport in Scotland. Beyond this, German startups Isar Aerospace and Rocket Factory Augsburg are providing competition on the continent with their respective Spectrum and RFA One launchers, aiming to make their first attempts to reach orbit in late 2023.

The competition for a limited pool of contracts may be fierce among these and other emerging European launch startups, but the indication is that, as demonstrated to an extent by initiatives such as ESA’s Boost! Program, and the force of wider European political trends, that there is a place for commercial launch providers to boost European autonomy and independence in space.

Source: Andrew Jones, Space News.

Boeing Set to Build \$200 Million R&D Campus in Bangalore



Boeing has announced plans to build a new ₹1,600 crore (\$200 million) research and development facility in Bangalore. The new facility will focus on engineering capacity across a 43-acre campus, with the workforce set to grow 25% in the coming years. Let's find out more.

Last week, Boeing revealed plans to build a new R&D facility in Bangalore, India's technology hub. The \$200 million investment will house thousands of engineers and other staff as the American planemaker ramps up research in several key fields. The new facility will be heavily involved in research on eVTOLs (electric, vertical, takeoff, and landing) vehicles and achieving Boeing's sustainability goal of hitting net zero emissions by 2050.

Notably, the new R&D campus is Boeing's biggest outside the US, which has historically focused its facilities within the country. The decision highlights India's presence as a major commercial and defense market for the planemaker, which is hoping to gain more market share in the coming years. Boeing India Engineering & Technology Centre (BIETC) currently employs 4,000, of which 3,000 alone as engineers. This number is set to go up by 25% in the coming months as the business continues to recover. There is currently no timeline for when the new campus will open.

As Airbus and Boeing tussle in the Indian market, both are pushing to be seen as the more prominent ones in the eyes of the public and government. Currently, the freshly privatized Air India (AI) is in talks with both plane makers for a 'historic' aircraft order, one that could see the addition of new types to the fleet for the first time in nearly two decades. While AI operates both aircraft, Boeing will be hoping that the 737 MAX is seen as a viable competitor to the A320's growing dominance in the market. Boeing has made strides in recent months, securing a major order for the 737 from startup Akasa Air. As SpiceJet and Akasa grow their fleets in the coming years, Boeing finally has a steady order pipeline from India. Air India's upcoming order is another big opportunity, especially if the carrier picks the 777X for future widebody operations. *Source: Pranjal Pande, Simple Flying Magazine, 2022.*

UPM Focus: UPM Additive Goes International—Formnext 2022



United Performance Metals is proud to be an international company. With branches in Northern Ireland, Hungary, Singapore, and China, we hope to make an impact on as much of the global community as possible! The metals industry encompasses a global market stretching into as many countries as you can name. Other industries including the medical, aerospace, defense, and space industries are all impacted by the metals industry, and as a high-performance metals solutions center, United Performance Metals must reach these industries globally as well.

United Performance Metals is no stranger to international travel either. Recently, members of our additive manufacturing solutions team exhibited at the Formnext 2022 show in Frankfurt, Germany, showcasing our additive solutions to additive companies from around the globe. Speaking of his

experience at the show, Joash Sutherland, Program Coordinator Lead for UPM Additive, said, "The idea was to showcase what we do and see if there is interest in the European market if we were to expand. The reception was positive and leads to a sign of growth for us in 2023.

Tiffany Walker, Marketing Lead for UPM also attended the Formnext show. "It was a great first time exhibiting at Formnext with our UPM Additive division. It brought in great leads and opportunities for our additive team, and helped us further extend our reach into the European market".

Clearly, international opportunities are a big part of UPM and we are always looking for new international endeavors to explore. With our products and solutions offerings, we are confident that we can best serve international companies looking for metals we provide. For more information on our additive manufacturing solutions center or our international branches visit www.upmet.com.