

The Business Daily of the Global Scheduled Airline Industry Since 1939

August 7, 2024

Inside:

AIRLINES

- Airlines Cancel Flights Into Dhaka International After Civil Unrest.....PAGE 3
- Southwest Airlines Investor Elliott Details Board Intent, Voting Power.....PAGE 6
- Airlines Brace For Middle East Disruption As Tensions Rise.....PAGE 6
- Qatar Airways Boosts IndiGo Capacity With Leased Boeing MAXs.....PAGE 8

AIRFRAMERS

- Boeing Plans 737 Plug Door Design Changes.....PAGE 4

TECHNOLOGY

- ZeroAvia Eyes Potential For Hybrid-Powered Narrowbodies By 2030.....PAGE 5

AIRFRAMERS/SUPPLIERS

Boeing Questions CFM RISE Open Fan Viability For 737 Successor

GUY NORRIS, guy.norris@aviationweek.com

Boeing is questioning the use of CFM International’s RISE open fan engine to power its next-generation single aisle aircraft and appears to be leaning toward a choice of advanced ducted engines instead.

While any propulsion decision on a 737 successor remains relatively far off, either move would have significant implications for Boeing, CFM and the wider engine industry. Airbus and Boeing are both reviewing new engines for their next generation single-aisle programs in the mid-2030s, which implies that firm propulsion system selections will be needed in the 2026-2027 timeframe to support current development schedules.

Sources inside the airframe-maker say Boeing is concerned the additional structural weight and potential aerodynamic impacts associated with the installation of the open fan may offset much of the concept’s expected efficiency benefits. As a result, the open fan concept will have to work hard to earn its way onto a future Boeing aircraft.

The prospect of the 737 successor being offered with multiple ducted engine options with simpler installation requirements would also mark a paradigm shift in Boeing’s long

BOEING, P. 2



Investors Are Giving RTX The Benefit Of The Doubt

MATTHEW FULCO, matt.fulco@aviationweek.com

The share price of RTX hit a 52-week high of \$118.30 on Aug. 2, illustrating how investors remain bullish about the aerospace and defense (A&D) giant despite ongoing travails with Pratt & Whitney’s geared turbofan (GTF) engine.

The stock has risen about 35% over the past year, overcoming an initial dip in price after the GTF problem was first announced, and is the second-best performance among the top 10 A&D companies by market capitalization. Only General Electric’s (GE) shares have done better.

In the second quarter (Q2), RTX’s sales rose 8% annually to \$19.7 billion and earnings per share increased 9% to \$1.41, coming in ahead of Wall Street’s expectations. In a July 26 client note, Ken Herbert of RBC Capital Markets said “RTX posted very strong Q2 results,” highlighted by \$2.2 billion free cash flow generation, an increase in 2024 guidance and the resolution of some contractual overhangs. “We think there was a lot to like in the quarter, and the company demonstrated strong execution,”

Herbert said.

Pratt’s performance was “better than we anticipated,” investment bank Jefferies wrote in a July 28 client note, adding that “the engine output at Pratt up 33% [year-on-year] contrasts GE’s LEAP.”

Herbert did note that RTX’s management is reluctant to provide many details on the GTF recovery plan. In the company’s Q2 earnings call, CEO Chris Calio said merely that the plan is on track. As of the end of June, RTX had inspected more than 6,000 powder metal parts “in the field across all programs” while the associated fallout rate remains below the 1% the company had assumed.

Responding to an analyst question about the impact of Airbus receiving fewer engines than anticipated, Calio said, “We’re not necessarily where we need to be with Airbus.” However, he emphasized RTX is “aligned on what they need” and will be in a

DAILY MEMO, P. 2

BOEING, From P. 1

running single aisle propulsion strategy. The past three generations of 737 have been powered exclusively by CFM since the debut of the CFM56-3 powered 737-300 in 1984.

The open fan is part of CFM's RISE (Revolutionary Innovation for Sustainable Engines)—a fully committed GE Aerospace-Safran joint venture technology program targeting a 20% step-change improvement in fuel efficiency compared with its current Leap 1 turbofan. The effort is now entering advanced test and development following its launch in mid-2021 and, as of July, has notched up more than 250 component and system tests.

Boeing says it is too early to comment on the engine situation but adds “when positioning for our future, we are focused on the technology and capabilities that we need at Boeing and across the industry to ensure our next set of products delivers a generational leap in capability for our customers and reshapes our markets.”

CFM says only that it “is focused on providing the best innovation for next-generation commercial engines that helps improve fuel efficiency and reduce emissions in continuous collaboration with our airframer and government partners.”

The GE Aerospace-Safran joint venture believes the 21st century design approach to the open fan adequately deals with Boeing's weight and installation concerns. However, it also stresses that the RISE program is not yet a specific product and that the open fan—while the most visible part of the initiative—is one part of a broad suite of technologies under development.

Another element of the suite is a more powerful fan drive gear system which could also be adapted to drive a ducted propulsor rather than an open fan.

Although a turbofan can contain a released blade, an open rotor is almost certain to require shielding of the airframe and systems even if features such as certifiable fail-safe hubs and frangible blade tips are incorporated. The economic viability of the open fan therefore depends heavily on the size of the weight penalty likely to be incurred to protect the aircraft from damage caused by a rotor burst or blade release.

Boeing is also understood to be wary of other potential open fan aerodynamic and installation effects. These include loads from the blades which must be accommodated in the engine mounting structure, as well as the possibility that left- and right-hand engines may have to rotate in different directions to offset aerodynamic effects. Such installation considerations would have significant fleet maintenance and operational implications.

Should Boeing's swing toward ducted fans continue, it will bolster prospects for Pratt & Whitney and Rolls-Royce. Pratt sees the next narrowbody study as a potential opportunity to re-enter the Boeing single-aisle sector with a second generation of its PW1000G geared turbofan (GTF) family, while Rolls announced plans in late 2023 to develop a mid-thrust version of the UltraFan geared engine for the narrowbody market.

BOEING, P. 3**DAILY MEMO, From P. 1**

position to deliver in the second half of the year.

“We expect no news to continue to be good news for the [GTF recovery] program, but we also continue to hear cautionary comments from airlines” about the length of the shop visit turn-around times for the engines, Herbert said.

RTX also benefited in the June quarter from the ongoing aftermarket boom and a strong performance by its Collins Aerospace division. Jefferies said that “Collins profit is doing its part” with a margin of 16.4%, an annual increase of 210 basis points. For its part, investment bank TD Cowen expects RTX's aftermarket sales to continue increasing in the mid-teens—they rose 14% year-on-year at Pratt and Collins in the second quarter—“thanks to vigor at Collins' interiors business from certification of new seats and normal [fourth quarter] lift as airlines take planes out of service after the summer travel peak to install new seats.”

Looking ahead, perhaps the most significant potential headwind for RTX is an uncertain macroeconomic environment,

which could ultimately dampen travel demand and adversely impact the broader aviation sector. On Aug. 5, markets panicked in reaction to a worse-than-expected July jobs report in the U.S. that renewed fears of an impending recession in the world's largest economy. The Dow Jones Industrial Average lost more than 1,000 points, its worst performance in more than two years, while the S&P 500 and Nasdaq each fell 3%.

During the Aug. 5 market rout, RTX's share price fell about 1%, in line with similar decreases among the other largest A&D companies. On Aug. 6, it rose .56% in morning trading.

Some analysts are not convinced of an impending economic downturn, however. Goldman Sachs has raised the probability of a recession in the next year from 15% to 25%, but says the risk is “limited.” Scott Wren, senior global market strategist at Wells Fargo, described recession fears as “overblown,” adding, “It's not time to panic here.” The bank's economists expect growth to slow in the U.S. economy, but not turn negative.

AIRLINES

Airlines Cancel Flights Into Dhaka International After Civil Unrest

CHEN CHUANREN, chuanren.chen@informa.com

SINGAPORE—Airlines from India, Malaysia and Singapore are among those that have canceled flights into the Bangladeshi capital of Dhaka after weeks of civil unrest led to Prime Minister Sheikh Hasina’s resignation.

Dhaka Hazrat Shahjalal International Airport (DAC) closed for 6 hr. on Aug. 5 at 5:30 p.m. local time. While flying has since resumed for most domestic flights, a number of key international airlines have canceled flights into the capital.

Air India said Aug. 5 that it would halt flights between New Delhi and DAC with “immediate effect,” without providing specifics on the duration of the suspension.

Indian LCC IndiGo—which operates flights to DAC from Chennai, Kolkata, Mumbai and New Delhi—canceled all flights to Dhaka on Aug. 6.

IndiGo said it plans to resume operations on Aug. 7.

Flightradar24 data also shows cancellations from Air Arabia, flydubai, Malaysia Airlines and Singapore Airlines across Aug. 6 and Aug. 7.

Anti-government riots in Dhaka kicked off in July and have left more than 250 people killed. Bangladeshi Prime Minister Sheikh Hasina resigned on Aug. 5 and fled the country. India has stepped up border security following the events.

The Associated Press is reporting that the country’s President Mohammed Shahabuddin, after dissolving the Bangladeshi parliament on Aug. 6, on early Aug. 7 announced that Muhammad Yunus, a Nobel Prize winner and political opponent of the former prime minister, will head up an interim government.

CAPA – Centre for Aviation and OAG Schedules Analyser data shows Dubai, Kuala Lumpur and Jeddah, Saudi Arabia, are the top international points from Dhaka based on offered seats. Various points in India together account for 15.5% of the total seats into Dhaka.

BOEING, From P. 2

Pratt is already working with Boeing to provide the PW102XG, a derivative of the PW1500G GTF for the initial X-66 transonic truss-braced wing demonstrator. The X-66 is due to start flights in 2028 under NASA’s Sustainable Flight Demonstration program. Given the close links between the initial Pratt-powered X-66 and the likely timing of critical design choices for Boeing’s next single-aisle, the follow-on engine type decision could inform the preferred power options for the next production model.

“It is too soon to talk in any specifics about a future airplane,” Boeing says. “As an experimental plane, the X-66 provides us the opportunity to learn more about a geared turbofan propulsion architecture by direct interaction through operating the engines on the airplane. While important as the source of propulsion for all of our X-66 work, it is also important from a GTF learning perspective.”

—An extended version of this report will be published on Aug. 9.

Airline pricing benchmark trends at your fingertips.

Harrell Airfare Reports

For a focused look at airline pricing trends, rely on the H-300 and H-300+ curated/custom reports from Harrell Associates. Used by buy and sell-side airline analysts, the H-300 reports are organized in easy-to-use Excel tables that include current and comparable year-over-year data.

H-300 Reports

Weekly:

- Current & Historical Airfares – 100,000+ per month
- Top 3 major airlines - Top 80+ routes/airline - 300 origin/destinations
- 34 Major U.S. cities - 35% Sample of Domestic Revenue

Data Elements:

- Normal/Discount Business Fares and Yields
- Leisure Fares and Yields
- Combined/Mixed Weighted Business/Leisure Fares and Yields.



Custom Reports Also Available – Virtually any Airline/Route/Point of Sale/Fare Type.
For FREE Sample Reports, contact Bob Harrell at 212-358-1709,
bob@harrellassociates.com, or visit www.harrellassociates.com.

HarrellAssociates

Staff

EDITORIAL

2121 K Street, NW, Suite 210, Washington, DC 20037
+1-202-517-1100 awin.aviationweek.com

EDITORIAL STAFF

Managing Editor Mark Nensel
Executive Editor Jens Flottau
Contributing Editors Christine Boynton, Sean Broderick, Michael Bruno, Bill Carey, Chen Chuanren, Alan Dron, Thierry Dubois, Matthew Fulco, Ben Goldstein, Kurt Hofmann, Helen Massy-Beresford, Victoria Moores, Guy Norris, Tony Osborne, Maxim Pyadushkin, Lori Ranson, Garrett Reim, Adrian Schofield, Graham Warwick
AWIN Managing Editor Guy Ferneyhough
Air Transport Group Editor-In-Chief Karen Walker
Group Editorial Director Joseph C. Anselmo
Associate Producers Heidi Carcella, Donna Thomas-High
Copy Editors Cory Hitt, Natalia Pelayo

DATA & ANALYTICS

Senior Director, Forecasts & Aerospace Insights
Brian Kough
Senior Industry Analyst Craig Caffrey
Director, Data Operations & Solutions Terra Deskins
Manager, Civil Fleet, Flight & Forecast Data Dan Williams
Commercial Aviation Analyst Antoine Fafard
Senior Fleet/Forecast Engineers/Analysts
Brian Bostick, Nigel Harod, Nigel Howarth, Bo-Göran Lundkvist

SUBSCRIBER SERVICES

Customer Service, New/Renewal Sales
Aviation Daily, 22701 W 68th, Ste 100,
Shawnee, KS 66226-9806
Tel: +1-877-369-3706 (within the U.S.)
Tel: +1-913-850-6930 (outside the U.S.)
Fax: +1-800-455-3145
Email: tech_assistance@aviationweek.com

INTELLIGENCE AND DATA SERVICES

Senior VP, Intelligence, Data and Media Anne McMahon
Tel: +1-646-469-1564, anne.mcmahon@aviationweek.com
Senior Director, Intelligence and Data Matt Holdreith
Tel: +1-917-703-0920, matt.holdreith@aviationweek.com

Discounted rates for multiple users and enterprise access available. Custom packages and additional services available including Intelligence/Research, Fleet Data, Forecasts.

User Engagement Melissa Crum, Tel: +1-913-284-2951
melissa.crum@aviationweek.com

Online access to Aviation Daily is available at awin.aviationweek.com

ADVERTISING

Sales Director Tom Davis
Tel: +1-469-854-6717, tom.davis@aviationweek.com

REPRINTS

Wright's Media
Tel: 1-877-652-5295 (within U.S.)
Tel: 1-281-419-5725 (outside U.S.),
informa@wrightsmedia.com

Published daily except Saturdays, Sundays and holidays by Aviation Week, 2121 K Street, NW, Suite 210, Washington, DC 20037. (ISSN No. 0193-4597).
Gregory Hamilton, President, Aviation Week.

COPYRIGHT © 2024 by Informa Markets, a trading division of Informa, PLC. All rights reserved. None of the content of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means (electronic, mechanical, photocopying, recording or otherwise) without the prior written permission of the publisher. Available in online and email editions.

Vol. 437 • No. 27

AVIATION WEEK
NETWORK
an **informa** business

AIRFRAMERS

Boeing Plans 737 Plug Door Design Changes

SEAN BRODERICK, sean.broderick@aviationweek.com

Boeing is developing changes to ensure 737 mid exit door (MED) plugs cannot be mistakenly left unsecured and plans to roll out retrofit kits once the new design is certified and in place on the production line, a top executive said.

The work stems from lessons learned from the Jan. 5 loss of a MED plug from Alaska Airlines Flight 1282. Four bolts needed to secure the door were not reinstalled after it was opened as part of pre-delivery rework near the fuselage opening.

News of the changes was revealed Aug. 6 by Boeing Commercial Airplanes SVP, Quality Elizabeth Lund during an NTSB hearing on the accident.

"[Boeing is] working on some design changes that will allow the plug to not be closed if there's any issue until it's firmly secure, that would hold it securely in, as well as simple changes to make sure things like that the fasteners are lanyarded on," Lund said.

Boeing has "approved the design changes to begin" the work, Lund added, giving a "very rough estimate" of completion "within the year" for production-line aircraft.

"We will then make them available for retrofit in the fleet," she said.

MED plugs block unneeded emergency exits on aircraft that don't have enough seats to require the extra doors. Designed to be opened, pivoting up and away from the aircraft about 15 deg. only during routine maintenance or unusual circumstances, the 737-9 MED plugs are identical to ones available on the 737-900ER.

Other 737 doors are equipped with sensors that trigger a flight deck warning when they are not secured. But the sensors are not active on MED plugs. Boeing engineers considered activating sensors on MEDs as part of the design changes, but "they don't think that will work necessarily as we would want," Lund said.

The Alaska Flight 1282 aircraft, N704AL, operated 153 flights with the unsecured left-side MED plug before it blew off.

It is not clear what happened to the four bolts—two guide track bolts near the panel's top and two arrestor bolts near the bottom—that keep the structure in place when Boeing removed them and laid the panel flat, outside the fuselage, to prepare the nearby area for work. Boeing's processes for documenting non-routine work did not record who closed the door or what may have happened to the missing hardware.

A Boeing analysis of the MED plug design done for the NTSB probe found that installation of one lower arrestor bolt or both upper guide bolts would have kept Alaska 1282's left MED in place.

Meanwhile, a letter from Boeing to the NTSB confirms 737 MAX flight manuals did not explain a key flight deck door design change from the 737 Next Generation. The change equalizes pressure during a decompression event, causing the door to blow open. On earlier 737s, panels on the door can blow open, but not the entire door.

Alaska Flight 1282's door opened when the door plug blew off, surprising the pilots and making an already challenging situation even worse.

"That was a shock ... initially," the Alaska 1282 first officer told investigators, according to a transcript prepared by the NTSB. "Then you [start] dealing with the important things."

Boeing reviewed the 737-9 flight crew operations manual (FCOM) immediately after

PLUG DOOR, P. 5

TECHNOLOGY

ZeroAvia Eyes Potential For Hybrid-Powered Narrowbodies By 2030

VICTORIA MOORES, victoria.moores@informa.com

Airbus-funded powertrain developer ZeroAvia is evaluating an interim hydrogen-electric concept to power narrowbody airframes, which could potentially come to market as early as 2030.

ZeroAvia is looking to scale its hydrogen-electric propulsion to power a 100- to 200-seat aircraft within eight to 10 years, using the proposed ZA10000 family of powertrains. This is likely to require a new blended-wing narrowbody design, capable of carrying sufficient liquid hydrogen.

Airbus became one of ZeroAvia's lead investors late in 2023, and ZeroAvia CEO Val Miftakhov said he is hoping to power Airbus' ZEROe concept aircraft, which is expected to come to market around 2035.

However, ZeroAvia head of R&D Rudolf Coertze is also exploring an interim solution that could potentially power existing narrowbody architectures.

"We are targeting the 2035-2040 timeframe for full hydrogen-electric [for narrowbodies]. If we look at a more hybrid solution, there is an opportunity that we can potentially bring that [timeline] back by at least a few years, so we would be targeting around 2030-2032 for something like that," Coertze said.

This "stepping stone" hybrid engine would combine a gas turbine engine, for hydrogen combustion, with an electric drive and hydrogen fuel cells. This configuration would mean ZeroAvia could use the gas turbine to generate take-off power, before switching to the fuel cells during the cruise.

However, this interim solution would likely carry payload-range

penalties. Coertze said ZeroAvia will need to do a detailed network evaluation, looking at the actual distances being flown.

"For example, instead of having an aircraft that can fly all the way up to 3,000 nm, we would look at the actual routes that it [the narrowbody] is actually flying," Coertze said. "And look at the highest percentage of those, which are typically less than 1,000 nm anyway. And then you look at something that is more purpose-designed for that, which requires less fuel, which then could potentially get into a traditional tube airframe design."

He added that this may be a retrofit option for existing narrowbodies. "Those are details that we are going to work through and see what the real possibilities are," Coertze said.

For the time being, ZeroAvia is working to certify the ZA600, which will power smaller commercial turboprops up to 20-seats. A ZA600 prototype engine flew on a Dornier 228 in January 2023 and the design has already been submitted to the UK CAA and U.S. FAA, with certification of expected in 2025 and entry-into-service (EIS) in 2026.

Beyond this, ZeroAvia is eyeing 2027 engine certification and 2028 EIS for the ZA2000, which will power larger turboprops with 40- to 90-seats, such as ATRs and De Havilland Canada Dash 8 Q400s. The ZA2000 is currently being ground tested on an Alaska Airlines Dash 8 Q400. At the Farnborough Airshow, KLM and ZeroAvia announced plans to perform an initial ZA2000 demonstration flight between two unnamed airports in 2026.

Explorations are also underway for a regional jet variant, the ZA2000RJ. This is being developed in partnership with Mitsubishi's regional jet division, which owns design rights to the CRJ platform. The timeline for the ZA2000RJ is five to six years off.

ZeroAvia estimates that its technology can cut climate impact by up to 90% compared with traditional kerosene-powered flight.

PLUG DOOR, From P. 4

the Jan. 5 accident, the company told the NTSB.

"Since it shares the same decompression non-normal procedures and many design similarities to the 737NG, the systems description section of the 737 MAX FCOM was written based on the 737NG FCOM," Boeing wrote. "However, the flight deck door design for the 737 MAX ... is different than the 737NG and that difference was not captured in the FCOM description."

The omission upset some 737 MAX pilots, who view the unexpected opening of a flight deck door in response to a decompression as both an unwelcome distraction and a potential security risk.

Boeing said it updated the manuals to reflect the design change and alerted operators on Jan. 13, eight days after the accident.

20

YEARS

AVIATION WEEK

PROGRAM EXCELLENCE

FORUM & AWARDS

November 20, 2024

Washington, DC

Recognizing outstanding program performance, key A&D industry insights & much more!

REGISTER TODAY

AIRLINES

Southwest Airlines Investor Elliott Details Board Intent, Voting Power

CHRISTINE BOYNTON, christine.boynton@aviationweek.com

The large investor calling for change at Southwest Airlines says it intends to give shareholders the opportunity to elect new board members, having identified qualified and eager candidates.

Elliott Investment Management's latest statement is contained in an SEC filing dated Aug. 5. In it, the activist investor reiterates its belief that Southwest "requires fundamental changes ... to evolve its strategy and improve its performance," adding that it "intends to provide shareholders with an opportunity to elect new highly qualified board members, whether by requesting that [Southwest] call a special meeting of shareholders or at an annual meeting of shareholders."

Southwest's annual shareholders' meetings are typically held each May. In the meantime, the fund has had conversations with "a number of" qualified former airline executives and industry leaders with relevant experience "who are eager to serve on the board," it says, stating that it may propose or nominate director candidates at a future meeting.

Its filing also details the makeup of Elliott's previously announced 11% economic interest, an overall percentage that has not changed. Should Elliott or another entity acquire 12.5% or more of the company's stock, the transaction would trigger Southwest's so-called "poison pill" defense, allowing stockholders to then acquire shares at a 50% discount.

Of the fund's 11% stake, 7% represents beneficial ownership (including 23.3 million in common shares and another 18.6 million shares in the form of physically settled swaps), according to the filing, while 4% (23.9 million shares) are in the form of cash settled swaps which did not convey voting rights. Under Southwest's bylaws, special meetings of the shareholders may be

called by one or more shareholders that collectively own at least 10% of Southwest shares and possess full voting rights for said shares. Among the common stock Elliott owns are 17.3 million shares acquired in 14 transactions between July 11-Aug. 5.

Elliott has previously warned of its intent to "move expeditiously to give shareholders a direct say" absent alignment on what it sees as "necessary leadership changes," while remaining "open to collaborating" with airline management. That collaboration has been described as one-sided by the airline, which said in July that the investor group was "focused on personal attacks on our leadership team and board, conditioning any serious discussions on an immediate CEO change."

In reaction to Elliott's latest filing, Southwest said it "remain[s] focused on restoring our industry-leading financial performance and building a sustainable and profitable future for the airline and our shareholders." The airline has teased more details to come on its future plans during an investor day in late September.

Public statements and letters to Southwest's board have been released by Elliott on June 10, June 26, July 8, and July 25, most recently after Southwest announced a significant shift to its core model with plans to assign seats, segment the cabin, and begin red-eye flying. Elliott called those initiatives as coming "more than a decade late."

Elliott representatives have met with Southwest's CEO, Executive Chairman and members of its board at the airline's headquarters "to convey the views included in the board letters," the fund says, and it plans to "continue to seek to engage in a dialogue with the board and/or management about the matters set forth in the board letters and other strategic opportunities to maximize shareholder value."

The Aug. 5 filing, a 13D, is required by the SEC when an investor "with control intent" owns 5% or more of a company's common shares.

AIRLINES

Airlines Brace For Middle East Disruption As Tensions Rise

KURT HOFMANN, hofmann.aviation@netway.at

ALAN DRON, alandron@adepteditorial.com

HELEN MASSY-BERESFORD, helen.massy-beresford@aviationweek.co.uk

Airlines are preparing for further disruption to their Middle East schedules, and Jordanian authorities have asked carriers to fly with extra fuel, amid growing fears of an attack by Iran on Israel.

Regional tensions have been rising in recent days after high profile Hezbollah and Hamas leaders were killed, growing fears of a possible attack by Iran on Israel. Some airlines have already made

changes to their schedules as a result of the situation in the region.

On Aug. 4, Jordanian authorities issued a NOTAM advising all airlines that fly into Amman, the Jordanian capital, to ensure their aircraft carry 45 min. of reserve fuel to enable a possible diversion out of Jordanian airspace if the politico-military situation suddenly deteriorates. The NOTAM was scheduled to expire at 22:00 GMT, Aug. 6.

Royal Jordanian Airlines, and Jordan as a whole, are waiting to see the reaction from Iran following last month's assassinations of senior Hezbollah and Hamas leaders in Lebanon and Iran, Royal Jordanian CEO Samer Majali said Aug. 6.

DISRUPTION, P. 7

TECHNOLOGY

UK Backs Hydrogen-Electric Powertrain Developments

GRAHAM WARWICK, graham.warwick@aviationweek.com

A GKN Aerospace-led project to develop and test a 2-megawatt cryogenic hybrid-electric propulsion system is one of five to be supported by almost £103 million (\$133 million) in government funding via the UK's Aerospace Technology Institute.

With a total budget of £44 million, the GKN-led H2FlyGHT project will develop a propulsion system combining liquid-hydrogen (LH2) storage, fuel-cell power generation, cryogenically cooled power distribution and cryogenic electric drive systems.

H2FlyGHT is a follow-on to the £54 million H2Gear program, under which a GKN-led team plans to ground test a 1-megawatt demonstrator powertrain in 2026. This will use cryogenic LH2 as fuel and to cool gaseous helium that cools the distribution network, power electronics and superconducting motors to reduce resistance, increase efficiency and save weight.

Intended to streamline the path to flight testing and certification of a 2-megawatt powertrain for a 46-seat regional aircraft, H2FlyGHT also involves: Parker Meggitt on thermal manage-

ment and balance of plant for the fuel cell system; University of Manchester for the superconducting motor coil design; and University of Nottingham for the full motor design and cryogenic inverter development.

In addition to H2FlyGHT, the UK government is supporting the £17.5 million AFCAD (Advanced Fuel Cell for Aviation Decarbonization) project led by ZeroAvia. A follow-in to the startup's government-supported HyFlyer I and I projects to flight test hydrogen-electric powertrains, AFCAD aims to commercialize ZeroAvia's high-temperature proton exchange membrane fuel-cell technology.

Rolls-Royce is receiving support for the £20.3 million Hotline (Hot Section Lifting and Materials) project to develop turbine technologies that reduce unit and life cycle costs. Cranfield University and the University of Birmingham are partners in the Hotline project.

Also supported is the £10.9 million Scenic Composites project led by Queens University Belfast to build composite materials capability in the Belfast, Northern Ireland, aerospace cluster. A £10 million project to reduce material usage, led by Belfast-based Short Brothers (currently part of Spirit AeroSystems), also receives UK government backing.

DISRUPTION, From P. 6

"Last time [Iran] reacted there was a missile firing and they closed the airspace here for a while," Majali said. "The missiles went over and were intercepted and that was that. I don't know if there's going to be a replica of that or not. The issue is, whether we will be given notice, or no notice, of an impending missile crossover."

In April, the carrier kept aircraft on the ground and then released them when the situation was over, Majali said, adding, "Other aircraft that were actually flying were diverted."

Royal Jordanian faces another issue regarding the lessors that provide some of its aircraft, and the insurance companies that provide coverage for them, Majali said. "Everyone outside the region is ultra-conservative, and so we have to deal with that as well," Majali said.

The CEO stressed—not for the first time—that, while in close proximity to violent events, Jordan remains both safe and calm. However, any disturbances in the region tend to have an immediate effect on bookings, especially among tourists in Europe and North America, which affects Royal Jordanian.

Lufthansa said Aug. 6 that all flights from the group airlines to Beirut, Tehran and Tel Aviv are suspended until Aug. 12. All Lufthansa group flights to Amman and Erbil are also suspended through Aug. 7.

Air France said it was monitoring the situation in Lebanon

in real time. "Due to the security situation at destination, Air France has extended the suspension of its flights between Paris-Charles de Gaulle and Beirut [effective since July 29] until Aug. 8, 2024, inclusive," Air France said.

The airline added that the resumption of operations would be subject to a new assessment of the local situation. Passengers with reservations up to and including Aug. 18 can postpone or cancel their trip free of charge.

Qatar Airways is able to adjust operations within two hours if airspace via Iran and Iraq is closed, its CEO Badr Mohammed Al-Meer said in a recent interview. "This happened a few months ago when the conflict was [happening] and the airspace was closed. However, we always have our plans ready, Plan B and Plan C," Al-Meer said. "A few months ago we diverted our flights over the Saudi air space further on to Egypt and then we continued our flights to Europe and to the United States. This has proven we are ready when something happens like this. We are always ready."

Meanwhile, Wizz Air spokesperson Andras Rado said the LCC had restarted flights to Tel Aviv Aug. 6. "But we continuously assess the situation and act if necessary. Furthermore, we keep our operations to TLV during [the] daytime," Rado said.

Regarding the Wizz Air Abu Dhabi network, he said, all four Wizz Air AOCs are operating as normal to and from Abu Dhabi, with no temporary closures of routes.

AIRLINES

Qatar Airways Boosts IndiGo Capacity With Leased Boeing MAXs

KURT HOFMANN, hofmann.aviation@netway.at

VIENNA—Qatar Airways is supporting IndiGo with Boeing 737-8 capacity as the Indian ULCC grounded more than 70 Airbus A320neo family aircraft related to the Pratt & Whitney geared turbofan (GTF) engine problems.

Qatar Airways Group CEO Badr Mohammed Al-Meer told Aviation Week that all of the 737-8s will be leased to IndiGo, and they will operate between India and Qatar Airways' hub at Doha Hamad International Airport.

"We want IndiGo to fly to Doha from Indian destinations because we have a very strong relationship with them," Al-Meer said.

"Subject to regulatory approvals, we will induct six more aircraft from Qatar Airways for the Doha route on wet or damp lease in the coming quarters," an IndiGo spokesperson said.

Qatar Airways operates nine 737-8s. One 737-8 has already been leased to IndiGo since Aug. 1. A second aircraft began operations on Aug. 4.

The IndiGo spokesperson said the airline's current count of grounded A320neo family aircraft remains in the mid-70s, related to the Pratt GTF engine problems.

On its fiscal 2025 first quarter financial results call July 26, IndiGo said it is working with Pratt toward a constant supply of spare engines and based on current estimates, expects the

groundings to start reducing toward the start of 2025.

Business Class Launch

IndiGo has also announced that it has selected Recaro R5 seats for its upcoming A321neo business class cabin. Recaro R2 seats will be used in economy class.

"IndiGoStretch" is the first business class product for IndiGo's narrowbody fleet.

"IndiGo is embarking on an additional new path of its incredible growth story by introducing in 2024 a tailor-made business product on the nation's busiest business routes," IndiGo CEO Pieter Elbers said in an Aug. 5 statement.

Forty-five shipsets have been ordered for the A321neo upgrade which will feature 12 business class seats and 208 economy class seats.

Aircraft deliveries are scheduled to begin in the fourth quarter of 2024, and all business class installations are expected to be completed by the end of 2025.

"Tailored to enhance the traveler experience in IndiGo's new business class cabin, the R5 embodies excellence in ergonomic design while touting sustainability principles," Recaro CEO Mark Hiller said.

IndiGo said the R5 seats will offer "advanced comfort and robust functionality," featuring a 38-in. pitch and a customized, ergonomic, lightweight design.

IndiGo operates a fleet of 350 aircraft on over 2,000 daily flights, connecting 88 domestic and 33 international destinations.

SUSTAINABILITY

Indonesia Eyeing SAF Made From Coconuts

CHEN CHUANREN, chuanren.chen@informa.com

Indonesia President Joko Widodo is looking to use the country's massive coconut production as a potential feedstock to create sustainable aviation fuel (SAF).

The country is the world's second-largest producer of coconut; it produced 2.8 million metric tons in 2023.

According to the *Jakarta Globe* news site, the president, better known as Jokowi, said there remains room for growth in the coconut sector, suggesting the value of the crop should be increased through other sectors like bioenergy and SAF.

"This is a huge task that we have to address; we can promote the use of coconut-based aviation fuel in other countries," Jokowi said.

Indonesia is not new to utilizing its cash crop sector to power the aviation industry. The country introduced palm oil-based SAF produced by PT Pertamina in 2023, first used in a commercial demonstration flight on a Garuda Indonesia Boeing 737-800.

On April 12, the Japan Civil Aviation Bureau (JCAB) proposal to use "non-standard" coconut as a new feedstock was approved by the ICAO Council. Non-standard coconuts are those that are inedible due to cracking, mold, or are too small for consumption.

Japanese oil producers are sourcing for new feedstock to help the country achieve its 10% SAF target by 2030.

The usage of cash crops such as palm oil are frowned upon in markets like the EU, where it is claimed that the product competes for land with food crops. Numerous regulators have called on the industry and certificating agencies to study this option from a scientific viewpoint.

Industry Data
Leisure Fares

Week Of July 29 Vs. Previous Week And Year-Ago Week

LEISURE FARES (ONE WAY)

Airline	Route	Last Year		This Year		% WoW	% YoY
		24-Jul-23	31-Jul-23	22-Jul-24	29-Jul-24		
UA	ATL-EWR	\$49	\$54	\$53	\$53	0%	(2)%
DL	ATL-TPA	\$54	\$54	\$33	\$33	0%	(39)%
AA	BOS-WAS	\$49	\$49	\$54	\$48	(11)%	(2)%
DL	CHI-MSP	\$69	\$69	\$33	\$33	0%	(52)%
UA	CHI-NYC	\$69	\$69	\$45	\$43	(4)%	(38)%
UA	DEN-LAX	\$54	\$54	\$45	\$54	20%	0%
AA	DFW-LAX	\$114	\$84	\$64	\$54	(16)%	(36)%
UA	EWR-ATL	\$49	\$54	\$53	\$53	0%	(2)%
DL	EWR-ORL	\$75	\$75	\$53	\$53	0%	(29)%
UA	LAX-DEN	\$54	\$54	\$45	\$54	20%	0%
AA	LAX-DFW	\$114	\$84	\$64	\$54	(16)%	(36)%
AA	LAX-NYC	\$93	\$93	\$123	\$113	(8)%	22%
DL	MSP-CHI	\$69	\$69	\$33	\$33	0%	(52)%
UA	NYC-CHI	\$69	\$69	\$45	\$43	(4)%	(38)%
AA	NYC-LAX	\$93	\$93	\$123	\$113	(8)%	22%
DL	ORL-EWR	\$75	\$75	\$53	\$53	0%	(29)%
DL	TPA-ATL	\$54	\$54	\$33	\$33	0%	(39)%
AA	WAS-BOS	\$49	\$49	\$54	\$48	(11)%	(2)%

Source: Harrell Associates, LLC – Fares as filed by the airlines.

LEISURE COST PER MILE

Airline	Route	Last Year		This Year		% WoW	% YoY	Length Type	% Thru Range	Current Quintile
		24-Jul-23	31-Jul-23	22-Jul-24	29-Jul-24					
UA	ATL-EWR	\$0.06	\$0.07	\$0.07	\$0.07	0%	(2)%	M	39%	2
DL	ATL-TPA	\$0.13	\$0.13	\$0.08	\$0.08	0%	(39)%	S	3%	1
AA	BOS-WAS	\$0.12	\$0.12	\$0.13	\$0.12	(11)%	(2)%	S	15%	1
DL	CHI-MSP	\$0.20	\$0.20	\$0.10	\$0.10	0%	(52)%	S	8%	1
UA	CHI-NYC	\$0.09	\$0.09	\$0.06	\$0.06	(4)%	(38)%	M	23%	2
UA	DEN-LAX	\$0.06	\$0.06	\$0.05	\$0.06	20%	0%	M	28%	2
AA	DFW-LAX	\$0.09	\$0.07	\$0.05	\$0.04	(16)%	(36)%	L	21%	2
UA	EWR-ATL	\$0.06	\$0.07	\$0.07	\$0.07	0%	(2)%	M	39%	2
DL	EWR-ORL	\$0.08	\$0.08	\$0.06	\$0.06	0%	(29)%	M	19%	1
UA	LAX-DEN	\$0.06	\$0.06	\$0.05	\$0.06	20%	0%	M	28%	2
AA	LAX-DFW	\$0.09	\$0.07	\$0.05	\$0.04	(16)%	(36)%	L	21%	2
AA	LAX-NYC	\$0.04	\$0.04	\$0.05	\$0.05	(8)%	22%	T	33%	2
DL	MSP-CHI	\$0.20	\$0.20	\$0.10	\$0.10	0%	(52)%	S	8%	1
UA	NYC-CHI	\$0.09	\$0.09	\$0.06	\$0.06	(4)%	(38)%	M	23%	2
AA	NYC-LAX	\$0.04	\$0.04	\$0.05	\$0.05	(8)%	22%	T	33%	2
DL	ORL-EWR	\$0.08	\$0.08	\$0.06	\$0.06	0%	(29)%	M	19%	1
DL	TPA-ATL	\$0.13	\$0.13	\$0.08	\$0.08	0%	(39)%	S	3%	1
AA	WAS-BOS	\$0.12	\$0.12	\$0.13	\$0.12	(11)%	(2)%	S	15%	1

Fares above are the lowest levels for fare types generally used for leisure travel.

Sample data from the Harrell Associates H100 Airfare Report

WoW = week over week; YoY = year over year.
Airline Codes: AA: American; DL: Delta; UA: United; US: US Airways
Airports: Fares are for the airport with the most non-stop flights.
Most fares are filed city specific rather than airport specific.
CHI = O'Hare; NYC = LaGuardia/Kennedy; WAS = Reagan/Dulles

Leisure Fares: Lowest fare generally used by the leisure traveler.
These fares are highly restricted in terms of advance purchase, penalty, minimum stay, etc. All fares shown are one way.
Cost per mile (CPM) is based on DOT route mileage.
CPM % Through range shows the relative position of the

cost per mile as compared to the Min and Max levels for the trip length type, Short, Medium, Long, etc.
Trip Length Type Detail: S = Short: 650 miles or less
M = Medium: 651 - 1,000 miles; L = Long: 1,001 - 1,750 miles
T = Transcon: 1,751 miles or more.

The full Harrell H100 family of reports tracks:

- Nearly 300 major routes every week for most major airlines
- 40 top routes for each airline
- Over 30,000 business and leisure data elements per month

Harrell data capabilities:

- Year-over-year detailed pricing data that is hard to find
- Financial planning models – pricing, yield, investing
- Custom reporting available

HarrellAssociates
89 Washington Place • New York, NY 10011, USA
212-358-1709 • 877-871-2086 • info@harrellassociates.com

Industry Data

Week Of July 29 Vs. Previous Week And Year-Ago Week

Business Fares

NORMAL BUSINESS FARES (ONE WAY)

Airline	Route	Last Year		This Year			
		24-Jul-23	31-Jul-23	22-Jul-24	29-Jul-24	% WoW	% YoY
UA	ATL-EWR	\$244	\$244	\$318	\$313	(2)%	28%
DL	ATL-TPA	\$277	\$277	\$361	\$331	(8)%	19%
AA	BOS-WAS	\$269	\$269	\$219	\$269	23%	0%
DL	CHI-MSP	\$452	\$452	\$356	\$356	0%	(21)%
UA	CHI-NYC	\$234	\$234	\$308	\$308	0%	32%
UA	DEN-LAX	\$1,054	\$1,054	\$448	\$448	0%	(57)%
AA	DFW-LAX	\$549	\$549	\$378	\$378	0%	(31)%
UA	EWR-ATL	\$244	\$244	\$318	\$313	(2)%	28%
DL	EWR-ORL	\$179	\$179	\$573	\$573	0%	220%
UA	LAX-DEN	\$1,054	\$1,054	\$448	\$448	0%	(57)%
AA	LAX-DFW	\$549	\$549	\$378	\$378	0%	(31)%
AA	LAX-NYC	\$549	\$549	\$523	\$408	(22)%	(26)%
DL	MSP-CHI	\$452	\$452	\$356	\$356	0%	(21)%
UA	NYC-CHI	\$234	\$234	\$308	\$308	0%	32%
AA	NYC-LAX	\$549	\$549	\$523	\$408	(22)%	(26)%
DL	ORL-EWR	\$179	\$179	\$573	\$573	0%	220%
DL	TPA-ATL	\$277	\$277	\$361	\$331	(8)%	19%
AA	WAS-BOS	\$269	\$269	\$219	\$269	23%	0%

Source: Harrell Associates, LLC – Fares as filed by the airlines.

NORMAL BUSINESS COST PER MILE

Airline	Route	Last Year		This Year				Length Type	% Thru Range	Current Quintile
		24-Jul-23	31-Jul-23	22-Jul-24	29-Jul-24	% WoW	% YoY			
UA	ATL-EWR	\$0.32	\$0.32	\$0.42	\$0.41	(2)%	28%	M	14%	1
DL	ATL-TPA	\$0.68	\$0.68	\$0.89	\$0.82	(8)%	19%	S	35%	2
AA	BOS-WAS	\$0.66	\$0.66	\$0.54	\$0.66	23%	0%	S	25%	2
DL	CHI-MSP	\$1.31	\$1.31	\$1.03	\$1.03	0%	(21)%	S	49%	3
UA	CHI-NYC	\$0.32	\$0.32	\$0.42	\$0.42	0%	32%	M	15%	1
UA	DEN-LAX	\$1.22	\$1.22	\$0.52	\$0.52	0%	(57)%	M	25%	2
AA	DFW-LAX	\$0.44	\$0.44	\$0.31	\$0.31	0%	(31)%	L	25%	2
UA	EWR-ATL	\$0.32	\$0.32	\$0.42	\$0.41	(2)%	28%	M	14%	1
DL	EWR-ORL	\$0.19	\$0.19	\$0.61	\$0.61	0%	220%	M	33%	2
UA	LAX-DEN	\$1.22	\$1.22	\$0.52	\$0.52	0%	(57)%	M	25%	2
AA	LAX-DFW	\$0.44	\$0.44	\$0.31	\$0.31	0%	(31)%	L	25%	2
AA	LAX-NYC	\$0.22	\$0.22	\$0.21	\$0.17	(22)%	(26)%	T	12%	1
DL	MSP-CHI	\$1.31	\$1.31	\$1.03	\$1.03	0%	(21)%	S	49%	3
UA	NYC-CHI	\$0.32	\$0.32	\$0.42	\$0.42	0%	32%	M	15%	1
AA	NYC-LAX	\$0.22	\$0.22	\$0.21	\$0.17	(22)%	(26)%	T	12%	1
DL	ORL-EWR	\$0.19	\$0.19	\$0.61	\$0.61	0%	220%	M	33%	2
DL	TPA-ATL	\$0.68	\$0.68	\$0.89	\$0.82	(8)%	19%	S	35%	2
AA	WAS-BOS	\$0.66	\$0.66	\$0.54	\$0.66	23%	0%	S	25%	2

Fares above are the lowest levels for fare types generally used for normal business travel.

Sample data from the Harrell Associates H100 Airfare Report

WoW = week over week; YoY = year over year.
 Airline Codes: AA: American; DL: Delta; UA: United; US: US Airways
 Airports: Fares are for the airport with the most non-stop flights.
 Most fares are filed city specific rather than airport specific.
 CHI = O'Hare; NYC = LaGuardia/Kennedy; WAS = Reagan/Dulles

The full Harrell H100 family of reports tracks:
 • Nearly 300 major routes every week for most major airlines
 • 40 top routes for each airline
 • Over 30,000 business and leisure data elements per month

Normal Business Fares: Lowest fare generally used by the business traveler. These fares are highly restricted in terms of advance purchase, penalty, minimum stay, etc. All fares shown are one way. Cost per mile (CPM) is based on DOT route mileage. CPM % Through range shows the relative position of the

Harrell data capabilities:
 • Year-over-year detailed pricing data that is hard to find
 • Financial planning models – pricing, yield, investing
 • Custom reporting available

cost per mile as compared to the Min and Max levels for the trip length type, Short, Medium, Long, etc.
 Trip Length Type Detail: S = Short: 650 miles or less
 M = Medium: 651 - 1,000 miles; L = Long: 1,001 - 1,750 miles
 T = Transcon: 1,751 miles or more.

HarrellAssociates
 89 Washington Place • New York, NY 10011, USA
 212-358-1709 • 877-871-2086 • info@harrellassociates.com