Embraer, SkyTech in talks for up to six KC-390 transports
by David Donald

Embraer Defense & Security has announced that it has received a Letter of Intent for up to six KC-390 multi-mission transports from aviation services company SkyTech, which intends to supply them to military customers under lease agreements similar to those employed in the commercial aviation sector. Negotiations are under way with a view to having the aircraft delivered starting late in 2020, and SkyTech envisions a potential market that could lead to further purchases.

SkyTech is a new company formed by Australian charter and aviation services company Adagold Aviation and Hi Fly Transportes Aeros from Portugal. The latter operates a fleet of Airbus aircraft under its own air operator’s certificate on a range of wet and dry lease arrangements.

Between them they have significant experience in operating and supporting aircraft on behalf of military forces, and have worked together on an Australia Defence Force contract under which Adagold manages the Middle East Air Sustainment Services. This program involves an Airbus A340 leased from Hi Fly flying support missions to the Gulf region. Around a year ago the two companies joined forces as SkyTech to examine further joint opportunities in the military sector, including aircraft leasing and the arrangement of services such as maintenance and training.

As a result, the SkyTech venture saw a big demand for airlift, but at the same time recognized that many air arms could not afford the acquisition costs of new aircraft. Following talks with around 30 air arms around the world, the concept of the long-term lease of transport aircraft was welcomed favorably, and garnered sufficient interest to open negotiations with Embraer (Stand V01, Chalet CD31) for the KC-390.

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Indonesia goes shopping › page 37

How do you better train a pilot? With better tools.
Bombardier ‘gratified’ over C Series dumping decision
by Gregory Polek

Bombardier, still basking in the glow of its recent victory in the case Boeing filed with U.S. antitrust regulators over the sale of 50 CS100s to Delta Air Lines at prices the U.S. company said amounted to product dumping, has come to Singapore fully-focused on selling aeroplanes. Speaking with AIN at the company’s chalet Tuesday, Bombardier Commercial Aircraft senior vice president Colin Bole admitted to feeling “pleasantly surprised” by the U.S. International Trade Commission ruling in favor of Bombardier, as well as gratified that justice prevailed.

“You certainly sensed the overall industry feeling that the decision could have gone Boeing’s way. But we were very pleasantly surprised and even more happily surprised by the unanimous nature of the vote,” Bole told AIN in reference to the 4-to-0 decision by the USITC panel. “But for sure it has created positive sentiment in the industry. There was inevitably a veil of uncertainty because of this complaint, and we’ve had no reason to be enthusiastic, I would say, from airlines, industry onlookers and other stakeholders.”

With the distraction “gone away,” as Bole put it, Bombardier can return to focusing on the planned joint venture with Airbus that calls for the airplanes destined for the U.S. market to be built on the site of the A320 assembly facility in Mobile, Alabama.

Bole would not comment on persisting uncertainty over the timing of Delta Air Lines’ first delivery, however. The U.S. airline had planned to take delivery of its first CS300 this spring, but when Airbus agreed in mid-October to take a majority stake in the C Series program, it looked as though Delta would have to accept a delay in deliveries while it built the new U.S. assembly facility. Now, the unexpected USITC ruling in favor of Bombardier means that Delta can take airplanes built in Mirabel, Quebec, the site of the primary C Series line. However, neither Airbus nor Bombardier have indicated whether or not a victory in the antidumping dispute would mean a change in plans for the source of Delta’s airplanes.

For now, Bombardier (Chalet CD55) can turn its full attention at the show to the Asia-Pacific region, where Korean Air began flying its first CS300 some two weeks ago. Having now taken delivery of two out of 10 airplanes on order, KAL has reported not a glitch in its early EIS experience, said Bole. In a written statement, KAL affirmed Bole’s account.

“With over 250 flight cycles completed since its entry-in-service, we are very impressed by the performance and reliability of our new CS300 aircraft,” said KAL chief technology officer Soo-Keun Lee. “Thanks to the Bombardier team onsite who have worked in close collaboration with our team, the new fleet integration has been smooth so far.”

Although its sees a gradual path toward acceptance in the Asia-Pacific region, where larger narrowbodies have saturated the market, Bombardier fully expects to gain another Asian customer by the end of the year. “I would be disappointed if we did not get an order in this region this year,” concluded Bole.
Rockwell Collins achieves key regional successes

by David Donald

Avionics and information management specialist Rockwell Collins has continued to achieve success in the Asia-Pacific region and has announced a number of new deals during the Singapore Airshow. Included is an order to upgrade four Boeing 737-300s of Singapore-based Airmark Aviation with the TPR-901 Mode S transponder and GPS-4000S global positioning system sensor as part of an ADS-B Out solution. Airmark holds an option on a fifth upgrade.

The next Bahrain International Air Show (BIAS) is less than 10 months away, and the event—which is managed by Farnborough International Limited on behalf of the Kingdom—is shaping up to deliver on its goal to showcase more than just Bahrain’s aerospace business opportunities.

“IAI is optimistic about the next air show,” His Excellency Kamal bin Ahmed Mohammed, Bahrain’s minister for transportation and telecommunications, told AIN yesterday.

He has good reason to be optimistic. It recently added Embraer and Kuwait Airways to a growing list of prominent global aerospace companies that have committed to participating in the event. On the chalet row, only two of the venue’s 40 chalets remain, and the exhibit area is more than 70 percent sold out. The last event, in 2014, drew 40,000 industry professionals and a static display of more than 100 aircraft. The minister expects this year’s event to meet, if not exceed, these figures.

This year’s show takes place November 14-16 at Sakhir Air Base. Companies that are participating include Airbus, Boeing, Leonardo, Lockheed Martin, Textron and Thales. Also this year, the organizers are planning several new features, including a presentation of product demonstrations and a dedicated U.S. pavilion.

The steady growth of BIAS is helping show-case Bahrain’s potential as a global economic opportunity. Food-services giant Mondelez is building a $90 million factory there.

Airbus benefits from Asia-Pacific growth

by Gregory Polek

While trends show that airline traffic around the globe roughly doubles every 15 years, the Asia-Pacific region will see a three-fold increase, according to Airbus, thereby supporting its sanguine outlook for its widebody product line in particular. Speaking publicly yesterday for the first time as the company’s new head of sales, former Rolls-Royce Civil Aerospace president Eric Schulz noted that even though Airbus (Stand J23, Chalet CD17) accounts for just 40 percent of the widebodies in operation in the region, its backlog accounts for 60 percent.

In a region expected to generate 46 percent of all widebody demand over the next 20 years, the trends look encouraging for the European manufacturer. Airbus’s Asia-Pacific market forecast calls for an annual traffic increase of 5.6 percent, generating a demand for 14,450 new aircraft over the next two decades. Expected to account for some 40 percent of the world’s demand for single-aisle equipment, Asia will absorb almost 10,000 airplanes in that category. The sheer numbers will place pressure on manufacturers to keep pace with narrowbody demand especially.

Addressing Airbus’s industrial capacity, Schulz reported that studies aimed at increasing A320 production beyond the planned 60 per month have intensified. He also expressed confidence in the company’s supply chain to accommodate another rate boost.

“We were having the same question when we hit rate 40 and, at the time, we thought the supply chain would never be able to cope. It coped with rate 40, and it coped with rate 45 and then 50,” said Schulz. “I believe the industry has changed dramatically, and I believe that each and every one of our suppliers has plans in place today, which means that they are prepared.”

Of course, Airbus’s concern with production rates of its biggest airplane, the A380, differs dramatically. Planning to lower rates from 12 this year to nine in 2019 to six in 2020, Airbus needs to think about sustaining enough activity to keep the program viable for suppliers.

“That’s why it was so important to finalize our order with Emirates,” said Schulz, referring to an MOU covering a firm order for 20 airplanes and options on another 16 signed with the Middle East carrier last month. “We know that at a rate of six [per year] we are industrially viable. This means that we have the opportunity to keep a final assembly line open, but we also keep our suppliers in situations and volumes [that will allow them] to sustain the activity.”

Schulz added that he had held discussions with “a couple of customers still interested in the A380.”

“The door will continue to be open on some very specific markets where growth will be a big issue because of restricted airspace, restricted airports. And I think we’ll continue to have some opportunities.”

The steady growth of BIAS is helping show-case Bahrain’s potential as a global economic opportunity. Food-services giant Mondelez is building a $90 million factory there.

A strong, welcoming aviation sector is key to attracting global businesses like these, Mohammed said. The air show plays a role, but there is more—led by an expansion of the country’s airport. The center-piece, a new terminal, is “almost 50 percent complete” and is on track to open on time and on budget in the second half of 2019, Mohammed said.

Bahrain show will highlight aerospace

by David Donald

Another Singapore-headquartered company, BOC Aviation, has selected Rockwell Collins (Stand D23) to provide the avionics for 74 Boeing 737 MAX aircraft it has on order. Included in the suite are TTR-2100 TCAS-II system, GLU-2100 multi-mode receiver, MultiScan ThreatTrack weather radar and an ICS-300 Iridium satellite communications unit. Last year BOC Aviation also received 35 Next-Generation Boeing 737s with Rockwell Collins avionics.

Further afield, Taiwan has become a dedicated U.S. pavilion.

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Singapore maps aerospace growth plan through 2020

by Chen Chuanren

The Singapore Ministry of Trade and Industry has outlined details of its Aerospace Industry Transformation Map (ITM), launched on January 17 and designed to keep Singapore competitive and relevant in the worldwide aerospace sector, building on significant advances made up to now. In 2016, the country’s aerospace industry achieved a level of economic value-added of S$3.35 billion (US$2.54 billion), and it employs 21,000 people. The ITM aims to achieve a manufacturing value-added figure of S$4 billion (US$3.03 billion) and introduce 1,000 new jobs by 2020.

The idea is not only further strengthen Singapore’s aerospace expertise in areas such as maintenance, repair, and overhaul (MRO), but also to venture into new and emerging technologies to keep Singapore ahead of the curve.

There are three core ITM Strategies—pursuing operational excellence, driving innovation in emerging technologies, and equipping Singaporeans with relevant skills. The Economic Development Board (EDB) will spearhead the ITM.

Today, Singapore’s MRO contributes to 10 percent of global output. Civil Aviation Authority of Singapore (CAAS) has concluded an aviation maintenance agreement with the U.S. Federal Aviation Administration (FAA) and an airworthiness certification agreement with the European Aviation Safety Agency (EASA). Both provide mutual recognition of airworthiness papers and documentation.

“Leveraging our manufacturing and MRO base, and connectivity to the rest of APAC, Singapore is well positioned to be the APAC hub for in-market premium aftermarket services for OEMs. With Asia-Pacific demand driving the rapid growth of the global commercial aircraft fleet, there is a growing need for in-market aftermarket support services to better serve the growing fleet,” said Tan Kong Hwee executive director, transport engineering, Singapore Economic Development Board.

In the last two years, the EDB was responsible from establishing numerous new aviation firms, such as Eagle Services Asia, Thales, and Sabena Technologies, although they do not facilitate business-to-business deals.

“Aside from financial incentives, companies also seek connections. Many could be in Singapore for the first time and are not sure how to find the right partners.” Tan explained the role of the EDB: “We also help investors understand the value propositions of Singapore and assist in finding the suitable real estate for them.”

Tan also revealed that the Jurong Town Cooperation (JTC) will be opening up Phase 3 development of the Seletar Aerospace Park, and has 60 hectares (140 acres) of land open for potential investors.

Looking ahead, EDB aims to increase the aerospace sector’s productivity, not only by encouraging companies to invest in technology, but also by upgrading the skills of the aviation work force. Singapore Aerospace Manufacturing (SAM), an Accurat Technologies subsidiary, is investing in advanced automation equipment, as well as software and engineering capabilities to upgrade existing lines to manufacture next-generation aircraft components. It expects productivity gains of up to 30 percent.

The government forecasts that the global trend for unmanned systems, digital, and advanced manufacturing technologies will create demands for robotics engineers, data scientists and additive manufacturing (3D printing) design engineers. EDB is also involved in a joint program to explore new skills and opportunities for 86 job roles in the sector under the Skills Framework.

Asian Sky Media (ASM; Stand T107), Asian Sky Group’s (ASG’s) media division, is at 2018’s Singapore Airshow offering preview copies of its forthcoming Asia Pacific Helicopter Fleet Report YE 2017, which provides comprehensive data and background on the region’s rotorcraft fleet. ASM is also distributing copies of its recently published China GA Report, Asia Pacific Infrastructure Report, and Asian Sky Quarterly.

“As first time exhibitors at the Singapore Airshow, we’re excited to show the global aerospace industry what Asian Sky Group and Asian Sky Media have to offer,” said Jeffrey Lowe, managing director of Hong Kong-based ASG. “This year’s show kicks off our trade show and publication calendar for the year,” which starts with the publication of the copter report, slated for official release at HAI Heli-Expo in the U.S. later this month.

In addition to a catalog of the region’s helicopters, the report includes sections on helicopter leasing, the offshore market, and profiles of leading helicopter operators and corporate players in the region. ASM is also highlighting here its range of marketing services.

J.W.

Black Eagles jet flaps as tire bursts

by Chen Chuanren

A Korean Aerospace Industries (KAI) T-50B of the Republic of Korea Air Force Black Eagles aerobatic team was heavily damaged in an incident during takeoff from Changi International Airport’s Runway 02L/20R yesterday. The team was to have been part of the Singapore Airshow’s opening aerial display, for which it had been practicing for the past few days.

According to a Civil Aviation Authority of Singapore (CAAS) statement, the incident took place at around 1:24 pm, when the aircraft “skidded and crashed into the grass verge at the side of Changi Airport’s Runway [02L/20R] and caught fire.”

Based on videos and photos circulating online, Black Eagles 6 suffered a burst tire, resulting in a trail of smoke. The airplane came to rest inverted on a grassy area beside the runway, sustaining wing damage. The pilot was extricated by the airport emergency services, suffering minor injuries.

The incident runway was still closed at press time, with the Changi Airport Group issuing an announcement on potential flight delays due to the single runway operation and resulting backlog.

The Black Eagles terminated its routine, and was the last team scheduled to perform. According to show organizer Experia, the team will not perform today.
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Lead the way.
Slow but steady expansion drives Changi
by Peter Shaw-Smith

Changi Airport’s claim to be one of Asia-Pacific’s biggest hubs is supported by inexorable expansion, which has led to passing the 60 million passenger mark last year. Further evidence comes from ongoing site preparation for Changi East, to house the planned Terminal 5, and an upgraded Runway 3-21, which to date has been limited to military operations.

Changi Airport’s new Terminal 4 opened on Oct. 31, 2017, and the airport achieved the 60-million-passenger milestone less than two months later. According to the Airports Council International, Changi was the world’s sixth busiest international airport in 2016, behind only Hong Kong in the region.

“Changi Airport has set a new record in passenger movements in 2017, welcoming 60 million passengers [for the calendar year] on December 18. The steady growth in aviation is expected to continue, with Asia as the center of aviation traffic in the next 20 years. So passenger numbers at Changi look set to increase further in 2018,” a spokesman for Changi Airport Group (CAG) told AIN.

Terminal 4 will serve both full-service and low-cost carriers, with an annual passenger capacity of 16 million. This brings Changi Airport’s total passenger capacity to 82 million per annum. Cathay Pacific was the first airline to operate from Terminal 4.

“Financial year 2016-17 was marked by a more positive market environment for the aviation industry, with many airlines restructuring and reengineering their businesses. Low fuel prices further helped the industry grow faster than the global economy,” CAG chairman, Liew Mun Leong, and CEO, Lee Seow Hiang, wrote in remarks in the company’s 2016-17 annual report.

“Against this backdrop, Changi Airport performed well with passenger movements hitting a record of 59.4 million, representing a growth of 4.6 percent. The airport also enjoyed a 5 percent growth in concession sales, achieving an all-time high of S$3.4 billion [US$2.6 billion]. At the same time, we made good progress on our development projects.”

Since Singapore is an island only 50 km (31 miles) long, almost all flights to and from the destination are, by definition, international. A new passenger terminal building at Seletar Airport in Singapore, the hub of business-aviation operations, will also entail a large increase in passenger capacity.

“With the new Terminal 4, and our upcoming development projects such as the expansion of Terminal 1, the Changi East project, as well as a new passenger terminal at Seletar Airport, we are ensuring that our country’s airports continue to have sufficient capacity to meet the region’s demand for air travel in the decades ahead,” Hiang said.

With Terminal 4 having started operations, the airport’s focus is shifting to the Jewel Changi Airport project, set to come online in 2019, as well as developing Terminal 5 (also known as Changi East).

Jewel Changi Airport is a mixed-use airport terminal complex now under construction in the Terminals 1 and 3 area on land that was originally allocated for Terminal 1 car-parking, and will cost an estimated S$8.7 billion (US$6.8 billion). It is designed for leisure, retail, hotel, and airport operations.

Infrastructure Work To Be Done
As a greenfield development site, Changi East’s basic infrastructure, including utilities, water management systems, ground transportation (road and MRT) will take several years to build before airport facilities are commissioned.

An inter-agency Changi 2026 Steering Committee, established in 2012 to develop a plan for Changi’s expansion, included a recommendation to construct Terminal 5.

“Land preparation works for Changi East started in 2014, and as the area is situated on reclaimed land made of soft marine clay, almost toothpaste-like texture, ground improvement works to about one third of the site are necessary to increase the strength of the soil before new airport facilities can be constructed,” said the spokesman. “Works [are] expected to continue till about 2020.”

The 1,080-hectare site also involves the development of a three-runway system, as well as aviation facilities, tunnel, and canal systems to drain excess water from the site, and other related infrastructure and transport links.

“Besides T5, the scope of works for this mega-project also includes the operationalization of a three-runway system, the construction of tunnels and other underground systems, and the development of cargo complexes and other supporting infrastructure,” the CAG said in a press release.

“Changi Airport currently operates two runways, serving its four terminals. To ensure adequate runway capacity for the airport’s continued growth beyond this decade as well as to cater to the future Terminal 5, an existing third runway (Runway 3-21) used by the military will be converted for joint military-civilian use,” said the spokesman.

“Runway 3 will be lengthened to 4 km [13,123 feet] to handle larger passenger aircraft, and more than 40 km [25 miles] of supporting taxiways will be developed to connect it to the rest of Changi Airport. This involves pavement, drainage, and associated works.”

Terminal 5 will have an initial capacity of 50 million passengers per annum (mppa), bringing Changi Airport’s total handling capacity to 135 mppa by the end of the next decade. The terminal will also be connected to the MRT network.

“When fully completed with a capacity similar to that of Terminals 1 to 3 combined, Terminal 5 will be connected to the airport’s existing terminals to allow the expanded facility to be operated as a single, integrated airport for ease of transfer between different terminals,” CAG said.

The group continued, “2018 looks to be an equally exciting year for the Changi East team: the Master Building Consultant and Master Civil Consultant for Terminal 5 will be appointed, allowing work on the terminal design to [move into] a new gear,” it said.

“And upon the successful testing of the upgraded Runway 3, it will be commissioned and handed back to RSAF for military use, until the taxiways and other supporting infrastructure for the entire three-runway system is completed.”

Construction for the new Seletar Passenger Terminal Building also commenced in October 2016. A Civil Aviation Authority of Singapore report said, “Slated for completion by the end of 2018, the two-story terminal will be large enough to handle up to 700,000 passengers annually. This is 26 times the number of passengers that Seletar Airport currently caters for.”
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Business aviation is central to Bombardier’s prosperity

by Sean Broderick

Bombardier’s multi-year growth plan places significant emphasis on its Business Aircraft (BBA) division, with introduction of the Global 7000 and continued ramp-up of its aftermarket business the primary BBA contributors. The company is in the midst of a five-year turnaround plan that has set a target of $20 billion in revenue in 2020, up from $16.3 billion in 2016. Current projections expect BBA—which generates about $5 billion annually, second only to Bombardier’s rail-focused Transportation business—to grow to $8.5 billion. This year’s expected addition of the Global 7000 to its in-service portfolio will give Bombardier a deep lineup, just as the business-aircraft market is turning around, company executives say.

“At BBA, if you want to buy a legend, you buy a Lear. If you want the best value and utility in business jets, buy a Challenger,” said Bombardier CFO John Di Bert. “If you want performance, comfort, and range, there is nothing better than a [Global 5000/6000]. And soon, if you want performance, comfort, and range, the Global 7000 is going to be here.”

As the newest addition to the family approaches entry into service, the existing lineup continues to shine.

The Challenger family recorded two notable delivery milestones in the second half of 2017. The super-midsize Challenger 350 surpassed 200 deliveries, and the more recently introduced large-cabin Challenger 650 passed the 50-delivery mark.

Bombardier also unveiled a new Premier cabin interior for its Global 5000/6000. These major interior modifications in avionics and connectivity options. Among the notable introductions: its new Smart Services cost-per-flight-hour offering.

Unveiled this past October, Smart Services builds on Bombardier’s pioneering Smart Parts program, which was introduced in 1986. The new Smart Services integrates operator feedback and expands offerings to a broader set of potential customers. It is available to both entry-in-to-service customers and all existing Bombardier business jet operators’ aircraft with up to 20 years of service.

“We intentionally designed this offering to be fully flexible and bespoke, based on feedback from our customers,” said Jean-Christophe Gallagher, BBA vice president and general manager, Customer Experience.

The new service centers and expanded parts program are part of a concentrated effort to increase aftermarket revenues, said Coleal.

“We’ve also invested in our service network, giving capabilities such as interior modifications in avionics and paint, along with adding products and services that only we as an OEM can do from an IP perspective and also from an OEM design capability,” he explained.

“All of that has led to double-digit revenue growth within the fiscal year of 2017, which we’re very pleased with.”

Study ranks fuel efficiency of transpacific airlines

Hainan Airlines and All Nippon Airways (ANA) ranked first in overall fuel efficiency, both with an average rating of 36 passenger-kilometers per liter of fuel (pax-km/L), according to a recently released study by the International Council on Clean Transportation (ICCT). In the 2016 fuel efficiency statistics for transpacific airlines, Qantas Airways ranked lowest among the 20 airlines operating nonstop flights between the mainland U.S. and East Asia/Oceania, burning an average of 64 percent more fuel per passenger-kilometer than Hainan and ANA. According to the report, freight share was the most important driver of fuel efficiency overall, explaining almost half of the variation in airline fuel efficiency across carriers, followed by seating density.

The findings, based on Bureau of Transportation Statistics data compiled by Texas-based airline consultancy Airline Data Inc. (formerly Data Base Products) showed that Air New Zealand, EVA Air, and China Airlines (the latter two tied for fourth place) rounded out the top five fuel-efficient transpacific airlines. In its white paper, ICCT stated that there is an inverse relationship between aircraft size and fuel efficiency on transpacific operations. As aircraft weight, or maximum takeoff mass (MTOM), increases, fuel efficiency declines. It determined that this is predominantly because aircraft with four engines are generally less fuel-efficient than those with two.

ICCT is an independent nonprofit organization founded to provide technical and scientific analysis to environmental regulators. It has applied Airline Data’s analysis in the past, such as in its evaluation of the fuel efficiency of domestic U.S. carriers.

“Accurate, quality data empowers people and organizations throughout the industry to make informed business decisions,” said Jeff Pelletier, the company’s managing director. “Our data has been a trusted source of information for more than 30 years and we’re proud to be an ongoing part of ICCT’s fuel efficiency research program.”

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StandardAero’s Vector acquisition creates MRO

by Kerry Lynch

StandardAero’s business is reshaping with the company’s recent acquisition of Vector Aerospace, a move that created a combined organization that produces $3 billion annual revenues and fields a work force of 6,000 employees across 42 locations worldwide, including Singapore. At the same time though, StandardAero (Stand T130) is shedding other operations; it recently closed Associated Air Center, which had been a pioneer in VIP airliner completions, and plans to close its Los Angeles International Airport (LAX) business aircraft and engine MRO facility in California.

StandardAero acquired MRO specialist Vector Aerospace from Airbus in early November. Terms of that deal were not disclosed, but Airbus, formerly EADS, had acquired Vector in 2011 for $635 million.

The acquisition brought to StandardAero an entity that generated $700 million in revenues in 2016 and employed 2,200 workers in 22 locations across Canada, the U.S., the UK, France, Kenya, South Africa, Australia, and Singapore.

“Our combined organizations are better positioned to provide the industry with more global services, expanded MRO capabilities, and operational benefits to deliver faster, higher quality solutions to our combined customers worldwide,” said StandardAero CEO Russell Ford.

This acquisition expands StandardAero’s capabilities on Pratt & Whitney Canada PT6 and PW100 turboprop engines and significantly extends its reach in the civilian and military helicopter-engine MRO market, including on the M250, PT6T, Arririel 1 and 2, T56/CT56, and T700/CT7 engines, Ford said. “Vector also brings along new helicopter airframe and components services/support aligned with major OEMs like Boeing, Sikorsky, Airbus Helicopters, and Bell Helicopter.”

This was the second major StandardAero purchase since March, when it announced plans to acquire PAS Technologies, a support services company for the oil-and-gas sector, industrial-gas-turbine, power generation, and aerospace markets. While StandardAero is substantially boosting its MRO and support capabilities, the company also is shrinking in the completions arena with the decision to shutter its VIP completions specialist Associated Air Center at the end of 2017, just shy of its 70th anniversary. StandardAero said current and future volumes of work aren’t sufficient to support the costs necessary to run the facility. StandardAero made “multiple attempts to sell the business” before coming to the decision to shutter it altogether, the company said.

“After a thorough analysis, StandardAero has concluded that the business case for continuing to operate AAC is no longer an economically viable option for the company and its investors,” the company said. “The limited pipeline for new business opportunities, excess industry capacity, and slowing demands in the VVIP aircraft marketplace have all contributed to this decision.” The move, StandardAero added, is in line with its near-term growth plans to expand the group’s core engine MRO capabilities.

StandardAero further is closing its business aviation repair station at LAX by the end of March. The company will maintain mobile aircraft service capabilities in southern California.

The decision to close the LAX facility came after a consultation with the company’s owners, investors, and board of directors, the company said, attributing the move to the “unexpected reduction in the number of worldwide [Honeywell] TFE731 engine events and the associated revenue and volume declines that have accompanied this trend, along with multiple unsuccessful attempts to secure a long-term lease for the LAX facility.”

Singapore’s debutant ball for aircraft

The Singapore Airshow is turning into a coming-out party for a wide spectrum of aircraft making their debuts this year—a few of them appearing in the region for the first time. Military aircraft in premiere showings are the E-7A Wedgetail airborne early warning aircraft from the Royal Australian Air Force, sporting its distinctive large fin just forward of the empennage; the Global Hawk RQ-4B UAS surveillance platform from the U.S. Air Force; and the F-35B Lightning II operated by the U.S. Marine Corps.

From the civil aviation world, Airbus is displaying its newly certified A350-1000 long-range airliner, and Embraer is showcasing a prototype of its E-190 E2 second-generation jet. In the business aircraft category the HondaJet, with its patented over-the-wing engine mounts (OTWEM) is on display in Singapore for the first time, plus a trio of aircraft are making regional debuts at the airshow: Gulfstream’s G500 and G600, both on track for entry into service this year; and Cessna’s soon-to-be-flagship Citation Longitude, on the cusp of certification.

Embraer expects E2s will be fully compliant by year-end

by Gregory Polek

As Embraer (Stand V01, Chalet CD31) awaits certification of the E190-E2 on static display here, Pratt & Whitney remains hard at work addressing the last of the teething troubles associated with the PW1500G geared turbofan family at the heart of the performance gains the Brazilian airframer expects to realize.

Briefing reporters on Sunday on show grounds, Embraer Commercial Aircraft vice president of marketing Rodrigo Silva e Souza reported that “a few” of the E2s slated for delivery this year will carry GTFs fitted with early-wear combustor liners known as configuration B, but that by the end of the year all E2s will carry engines with longer-wear configuration C combustors. He added that Pratt & Whitney will retrofit the new combustors onto all the airplanes originally fitted with configuration B by year-end as well.

Out of between 85 and 95 E-Jets Embraer expects to deliver this year, some 10 percent will be E2s, said Silva. Plans call for first delivery to Norway’s Wideroe in April.

Final specifications for the airplane released late last month include 1.3 percent better fuel burn than original estimates, a more than 1,000-nautical-mile improvement in range from London City Airport and an additional 600 nautical miles out of Mexico City.

Aerodynamic improvements result in fuel-burn-rate decrease of 17.3 percent compared with that of the E190-E1, as opposed to the original estimate of 16 percent. The company attributes the improvement to better-than-expected performance of the new wing, an aerodynamically “clean” fuselage, and the “smart” use of the airplane’s fly-by-wire controls. More improvements come from flap slap and slat optimization during the flight test campaign and drag reduction on key elements such as landing gear.
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IAI launches new decoy and RPA capabilities

by David Donald

Israel Aircraft Industries (IAI) has launched a new aircraft self-protection system in the form of a towed decoy. Unlike other towed systems, the ELL-8270 is completely self-contained, requiring no aircraft interface other than the cable that enables it to be hauled behind the aircraft. Developed by IAI’s Elta Group, ELL-8270 is part of a family of aircraft self-protection systems offered by the company.

Towed decoys are trailed behind the carrier aircraft and emit signals that entice radar-guided missiles away from the aircraft. They normally are used to augment other self-protection systems, providing a final layer of defense. Other towed systems receive power and threat data via the towing cable, but the ELL-8270 operates autonomously. The lightweight system can handle multiple threats, and can be reeled back into the carrier platform. IAI also claims that it is cheaper than other decoys. IAI (Stand N41) is also promoting its range of RPAs (remotely piloted aircraft) at Singapore—including the Heron family operated by the RSAF—and has introduced remote takeoff/landing capability. Using satellite communications for command and control, the Heron can operate from runways anywhere in the world. In an operational scenario, it allows the air vehicle to operate remotely from austere strips where it can be serviced and fueled by a very small ground team, rather than have to fly back to its main base for replenishment. Israel’s air force makes extensive use of RPAs, comprising around 70 percent of operational activity. The turboprop Heron TP is the largest of the RPAs in Israeli service, and IAI has announced that the air force is to acquire more to increase flight hours by 70 percent. The new Heron TPs will also “feature capabilities which the Israel Defense Forces have never used before,” according to IAI.

Jet Aviation opens new hangar at Seletar

by James Wynbrandt

In conjunction with the Singapore Airshow 2018, Jet Aviation (Stand CD45) tonight will host the grand opening of its Hangar 3 at Singapore’s Seletar Airport. The 3,850-square-meter (41,440-square-foot) facility brings Jet Aviation’s total hangar space in Singapore to 11,650 square meters (125,400 square ft). Like Hangar 2, which opened in 2014, the facility was built in cooperation with the Singapore Economic Development Board and Jurong Town Council Corporation in response to the growing fleet of large, long-range business jets in the region and demand for their support services.

Hangar 3 can accommodate two Boeing Business Jets (BBJs) or Airbus Corporate Jets (ACJs), or five Gulfstream G550-size aircraft, and includes a large interior shop, drying rooms, a soft goods area and wood-shop. Hangar 2 can accommodate up to five of Gulfstream’s G650s or five Bombardier Global 7000s (the latter expected to enter service in the second half of this year).

“Jet Aviation is fully committed to meeting the needs of our customers as close to demand as possible,” said John Riggir, general manager of Jet Aviation’s MRO facility in Singapore and vice president of the Switzerland-based company’s Asia operations. “Whether that means investing in infrastructure or the latest technologies, we remain focused on meeting their requirements to the highest quality and safety standards, which this new hangar clearly demonstrates.”

Riggir noted Jet Aviation was named Best MRO (Singapore/Hong Kong) at the Asian Business Aviation Association’s Icons of Aviation Awards last November, and was designated a BBJ factory authorized service center and authorized warranty repair facility the following month. The facility is also authorized as an upholstery of Rockwell Collins (formerly B/E Aerospace) 16G seating.

Here at the show, Jet Aviation is also serving as the exclusive handler of all customer demonstration flights by appointment of event organizer Experia Events. Said Experia’s managing director, Leck Chet Lam, “We selected Jet Aviation to handle all the customer demonstration flights due to their high industry standards and professionalism.”

UK seeks stronger regional defense ties

Keen to foster greater defense industry cooperation with allies in Southeast Asia, the UK Government is supporting a range of UK-based defense and security companies exhibiting here at the Singapore Airshow under the delegation’s theme of “capability and innovation.”

“For many years, the UK and Singapore have shared an important strategic relationship, a relationship that has grown stronger as we have collaborated to identify global threats and proposed solutions,” said Alexis Hammer, regional director for the Americas and Asia Pacific of the UK’s Department for International Trade’s (DIT) Defence and Security Organisation, who also heads the UK delegation here (Stand M65). “The Singapore Airshow 2018 provides real opportunities for the international community to work together and learn from each other,” added Hammer.

The DIT noted that UK defense exports last year totaled £5.9 billion (S$14.7 billion; US$8.3 billion), while security exports were £4.3 billion (S$8 billion; US$6 billion), and the UK is second only to the U.S. as a destination for inward investment. J.W.
China trying to accelerate growth of GA infrastructure

by Mainbayar Badarch

China’s general aviation (GA) industry has huge potential for future development, although it is constrained by limited economic scale, operational restrictions, and some competition factors.

While it has grown relatively rapidly, China’s GA sector has a tiny fleet of aircraft, about 2,800, consisting of 66 percent fixed-wing, 32 percent rotorcraft, and 2 percent airships and hot-air balloons. The city of Beijing and Sichuan, Heilongjiang, and Guangdong provinces are the primary locations of China’s GA aircraft.

In the first half of 2017, there were 345 licensed GA enterprises in China, according to the Civil Aviation Administration of China (CAAC). As of October 2017, the total flight time of GA aircraft reached 661,000 hours, up 2 percent year-over-year. Operators logged 764,700 hours in 2016. Industrial aviation operations logged 82,900 of those hours, accounting for 11 percent of total operations; agricultural and forestry aviation operations flew 51,000 hours or 7 percent of the total; and other GA operations accounted for the majority, at 630,800 hours.

Over the past few years, the GA industry has faced many problems, including an onerous and expensive regulatory climate and extremely limited access to Chinese airspace, which is subject to many external constraints. There are also many constraints on the supply side of China’s GA businesses and operations, according to Yang Shuanchang, deputy director of the ministry of industry and information technology. Chinese society lacks a basic understanding on how to develop a GA industry. At the same time, the specter of some GA accidents has affected development of the industry.

To resolve those issues and encourage new economic development, the Chinese government put a special emphasis on GA in its 13th Five-Year Plan (2016-2020). The plan focused on six major points: safety, economic contribution, service level, an efficient airport network, the promotion of GA, and green development.

**Infrastructure Investment**

China has ambitions to build world-class aviation hubs and increase the number and distribution of regional airports. According to the plan, the number of GA airports will exceed 300 by 2020, with 578 new GA airports to be built under the provincial and enterprise planning process during 2017-2020, with an investment of more than ¥40 billion ($5.2 billion). These airports are expected to serve all prefecture-level cities, major agricultural production and forest areas, and at least half of the top-level tourist destinations. A well-established GA network could enable more people to travel by air, thus possibly helping to mitigate China’s “big city disease” problem by allowing people to live outside of major metropolitan areas.

According to the China GA Report 2017 issued by Asian Sky Group, by 2020 the coastal province Jiangsu will feature the most GA airports (71), followed by Yunnan (51), Xinjiang (47), Zhejiang (37), and Inner Mongolia (35). Transport times in many large provinces can be cut to less than an hour in GA aircraft, which will help improve communications and human resource deployment. Also, GA provides an ideal infrastructure for transporting rescue teams and resources to remote areas in the event of a natural disaster.

China currently has 75 CAAC-approved GA airports, the Asian Sky Group report noted, including 20 heliports, with eight airports located in Guangdong province, six in Shandong, five in Beijing, and five in Jiangsu province. Most of the airports are for fixed-wing GA traffic, and a few are heliports. Geographically, the majority of GA airports are located in the eastern provinces while western provinces have only eight airports.

Aside from the above approved airports, China has 202 non-certified fixed-wing GA airports, 33 heliports without certification, and more than 602 helipads or designated landing spots serving various mission segments. The majority of these landing spots are for emergency medical flights. Henan tops the other provinces with its 104 hospital-conducted landing spots. China intends to have 850 international-standardized bases for emergency air rescue by 2020.

GA airports are divided into A and B types, where A is open to the public and B is nonpublic. Under China’s GA airport classification management measures, released in April 2017, type A airports are categorized into three subtypes: A1, which are GA airports with commercial flights with an aircraft suitable for 10+ passengers; A2, GA airports with commercial flights with an aircraft suitable for five to nine passengers; and A3, all other airports not included in categories A1 and A2.

Among under-construction A1 and A2 airports, their locations include major agricultural production districts, forest regions, certified tourist attractions, territories with traffic issues, GA industrial zones, training schools, etc. A3 GA airports under construction sites include highway service stops (for helipads), first-class hospitals (also helipads), qualified tourism areas, and more.

In parallel, China is working to develop GA industrial parks, which consolidate many GA activities such as manufacturing, training, and flight operations in one zone. Currently, many types of GA industrial parks are being planned or under construction, with more than 140 underway. For example, the Dinghu town local government in Wuxi, Jiangsu province, announced plans to build a GA industrial park with an investment of ¥1.2 billion ($184 million), part of Wuxi’s ¥5 billion fund for equity investment in GA. Dornier Seawings invested $298 million to build facilities to manufacture its all-composite amphibious turboprop at the Dingshu airport. Wuxi vice mayor Wang Jinjian said that aviation is a good fit for the city’s economy.

The development of GA airports in China should coincide with some changes in management requirements implemented by the CAAC. For instance, the state council also passed regulations to provide greater autonomy to GA airports.

A number of policy documents on GA were developed during the last two years. The “Opinions on Promoting the Development of General Aviation Industry” guideline enacted by the state council in May 2016 was a key document for GA investors, aiming to help build a business-friendly environment. One estimate puts the value of China’s GA industry at ¥1 trillion ($150 billion) in the coming years. The number of GA aircraft is expected to reach 5,000, with annual flight hours surpassing 2 million, still far lower than the more than 210,000 GA aircraft in the U.S., which log an estimated 24 million flight hours annually.

The guideline targeted issues that hindered the industry’s development such as a shortage of GA airports and slow progress in opening up low-altitude airspace to GA operations. The state council also recommends simplifying the approval procedures that GA aircraft operators need to go through before being able to take off and fly in China.

Many provincial governments have successfully introduced plans to build GA airports in their provinces and speed up the implementation of these plans. The trend of social capital investment in general-purpose airports is on the rise.
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A high-level research report has concluded that Chinese investment in U.S. aviation and aerospace is limited to general aviation (GA) and thus provides little threat to the large commercial aircraft (LCA) market.

The report, titled "Chinese Investment in U.S. Aviation," was compiled by researchers at Santa Monica, California-based Rand Corporation and was released to raise awareness of the issues and possible threats. It builds on previous Rand studies, such as Ready for Takeoff: China's Advancing Aerospace Industry and The Effectiveness of China's Industrial Policies in Commercial Aviation, which similarly were undertaken for the U.S.-China Economic and National Security Review Commission (USCC), as part of ongoing investigations aimed at guiding policy decisions.

The report acknowledges that the U.S. aerospace and defense manufacturing sector is a "major contributor" to the U.S. economy, accounting for an estimated 13 percent of total U.S. manufacturing and, in 2015, generating a $67 billion trade surplus for the U.S. As well as acknowledging Boeing's significance in the LCA market, it also recognizes that "U.S. companies are also integral elements of global supply chains supporting regional jet (RJ) manufacturers Bombardier and Embraer."

In March 2016, China issued its 13th Five-Year Plan, in which it reiterated support for the development of the aviation industry. "The plan specifically mentioned LCA, RJ, and GA," notes the Rand publication, which also highlights to possible threat from the new C919 airliner, currently in flight testing, to Boeing's position with its 737 family.

While Rand says the U.S. should be concerned about threats to its future competitiveness from the C919 and from "future Chinese LCA designs, such as wide-body aircraft development with the Russians," it qualifies this by stating that "U.S. competitiveness is unlikely to be threatened in the near term because production of China's LCA—the C919—may be further delayed and operate less efficiently than current Western narrowbody aircraft on the international market."

Rand notes that by "aviation" it means the industry of manufacturing aircraft rather than operating airlines, a sector which is "not currently threatened by Chinese competition."

Part of the aim for this research was to assess the implications of technology transfer on U.S. national security and aviation industry competitiveness, it adds.

China Committed to Growth

The report concludes that China is likely to account for up to one-fifth of global demand for LCA "and is trying to grow its domestic GA industry, which is currently underdeveloped." It further concludes that it has "an unambiguous policy driving a globally competitive aviation industry by producing LCA and expanding China's domestic GA market;" and that Chinese investment in U.S. aviation has grown in scope and quantity over the past decade but is "limited to smaller GA companies with technologies not particularly relevant to commercial or military aircraft, likely because of effective U.S. export and foreign-investment regulations."

Over the past decade Chinese investors have acquired several U.S. aviation companies, "although CFIUS [Committee for Foreign Investment in the United States] or export controls appeared to have been followed in all cases." However, it does note that these investments "raise concerns of inadvertent technology transfer that might undermine U.S. national security and competitiveness."

One major driver for China's push to find GA investments has been its underdeveloped domestic GA market, caused partly by "[restrictive] flight regulations and limited small airport infrastructure." Rand points out that the Chinese State Council "hopes to double its size by 2020."

Tracking this growth in GA investment, Rand reports: "Since 2005, Chinese companies have steadily increased investment in U.S. aviation by acquiring, merging, or establishing joint ventures with more than a dozen U.S. aviation companies without directly running afoul of U.S. regulation."

"Over the past decade, we identified from open sources on average one to two investments in U.S. aviation per year, including 12 mergers and acquisitions, three joint ventures, and nine other agreements or failed deals. The combination of Chinese government policy to become globally competitive in aviation and the availability of capital drives these investments, but they are constrained by U.S. government foreign investment and export laws as well as classic business concerns about return on investment."

Rand suggests that the investment in GA manufacturers, with their "less advanced technologies...do not pose competitiveness challenges or national security concerns."

The report concludes also that "given the GA nature of most of the investments by Chinese firms to date, there are few technology-transfer concerns. The main benefits to China's industry would be on the business-process side, such as international marketing, achieving FAA safety certifications, and product support."
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For more information, please contact

Gary Boekenkamp, Executive Vice President of Strategy & Corporate Development
Phone: 407-443-6240 | Email: gboekenkamp@extantaerospace.com
Bombardier’s steadily increasing Asia-Pacific market presence received a major jolt in mid-January when Korean Air began revenue flights with the CS300, becoming the region’s first CS Series operator and ushering in what the OEM believes is a new era of small single-aisle activity.

“This is a very important milestone for the C Series program, because it is our breakthrough into the fast-growing Asian market,” said Fred Cromer, president, Bombardier Commercial Aircraft. Bombardier (Static Display CD55) sees Asian operators putting 3,870 small (60- to 150-seat) single-aisle aircraft in service in the next two decades, and Korean is an ideal carrier “to showcase the CS300 aircraft’s outstanding performance and capabilities,” he added.

Korean, which has ordered 10 CS300s, will use its newest fleet type to right-size capacity on regional routes now flown by larger narrowbodies. “These regional routes are the aircraft’s first priority,” the carrier said in a statement. “Korean Air may later take advantage of the CS320 and CS350 aircraft’s range and expand internationally.”

The carrier’s 127-seat CS300s also introduce a new wrinkle: a 25-seat premium economy section. The cabin features a 2-by-3 layout, including 19-inch (48-centimeter)-wide middle seats.

Bombardier is hopeful that the CS300s will further strengthen its Asia-Pacific presence, and believes that the aircraft’s early track record bodes well for new operators. Korean is the third airline to take delivery of a C Series-family model, following Lufthansa Group carrier Swiss Global and Air Baltic.

“There is a lot of excitement around the C Series,” Cromer said. “The other thing that I’ll tell you about entering [into] service is that we’re really being tested. We have Swiss on the one hand, that’s flying a very high cycle environment—shorter flights, airplane up and down—in congested hubs everyday. And on the other end of the spectrum, we’ve got Air Baltic, which is flying the aircraft on longer flights but for 15, 16, 17 hours a day of utilization, which is phenomenal for a brand-new airplane.”

At the end of 2017, Bombardier had delivered 24 C Series aircraft, including 17 last year. Its target for 2018 is 40, with plans to ramp up to 90-120 annually starting in 2020, depending on demand.

“We are very mindful of not taking undue risk in our business in terms of white tails,” Cromer emphasized. “What that means is we’re going to make sure that we balance what we see, year by year, as the demand, with the supply, in terms of what we’re producing.”

**Plans for CRJ and Q400**

While Bombardier Commercial’s focus is clearly on the C Series, it is not abandoning its more established products. Quite the contrary, it sees rising demand in emerging markets like China as ideal for its CRJ and Q400 product lines. “On the CRJ, we’re continuing to deliver that airplane into Asia, with the likes of China Express, expanding the markets, developing the regional market in key areas in China,” Cromer said. The aircraft “is very critical to our overall strategic plan,” he added.

Even in mature markets—notably North America—the aging of regional fleets that began to expand two decades ago bodes well for near-term sales.

“I think the replacement cycle is real and I think it’s coming, and we’re well positioned,” Cromer said.

Key drivers include fuel prices, aircraft age, and an up-gauging trend that has resulted in, for example, 70-seat aircraft replacing 50-seat regional jets (RJs). Fuel has stayed relatively cheap since mid-2014, which has helped make 50-seat RJs marginally economical to operate. Eventually, though, their operators will park them, and Cromer sees room for the CRJ900 and 1000 series to gain traction.

“If you look at the fleet plans of the major airlines, they’ve continued to see, over time, phasing those out, and up-gauging to larger aircraft, which we think benefits primarily the CRJ900,” he said.

Another boost will come from the CRJ’s new Atmosphere cabin, the company says. Unveiled in mid-September and slated to appear on customer aircraft starting in mid-2018, the new cabin reflects a response to customer calls for a more appealing interior.

**Universal Aviation Singapore earns IBAC’s IS-BAH registration**

Universal Aviation Singapore’s ground support facility at Singapore’s Seletar Airport has achieved Stage 1 registration under the International Business Aviation Council’s (IBAC) International Standard for Business Aviation Handling. The voluntary program is a safety management system-based set of global industry best practices for ground handlers that follows the structure of sister program the International Standard for Business Aviation Operators (IS-BAO), and incorporates the National Air Transportation Association’s Safety 1st Ground Audit program. The process takes several months, and candidates must pass a comprehensive independent audit.

“Earning our IS-BAH accreditation is validation of our ongoing commitment to safety and ensuring our clients’ mission success by reducing their operating risk and stress,” noted Yvonne Chan, the location’s managing director. “We are proud to earn this level of distinction, as it demonstrates to our customers and stakeholders our unwavering dedication to implementing industry-recognized best practices for safety, systems, training, and security.”

 Introduced in 2014, IS-BAH recently reached a milestone with the registration of its 100th member, and some facilities have progressed to Stage II in the program. “Universal Aviation Singapore is the second of our locations to earn IS-BAH, and our second in the last six months, joining Universal Aviation St. Louis,” said Charlie Mularski, the company’s senior vice president, international. “Throughout 2018 and early 2019, we anticipate five more Universal Aviation locations to be audited for IS-BAH.” C.E.
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GO BEYOND

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A330neo powers through Airbus flight-test program
by Ian Goold

Sixteen weeks into flight testing, the Rolls-Royce Trent 7000-powered A330neo (“New Engine Option”) has been performing as expected, according to Airbus (Stand J23, Chalet CD17). Initial tests have been completed with “aircraft behavior currently in line with predictions,” the manufacturer told AIN.

Two prototypes of the twin-aisle, two-engine jet are flying, while the assembled first-production unit is undergoing cabin installation, painting, and engine attachment ahead of first flight in the second quarter of the year; and a third flight-test machine now in final assembly is scheduled to fly in mid-2018. Also, after being used “to define main tuning for [the] A330neo initial development phase,” the manufacturer’s A330-200 flying testbed has handed that work over to the A330neo prototypes.

By February 1, the first A330-941—manufacturer’s serial number (MSN) 1795/registration F-WTTN—had flown 58 during 29 flights since being handed over the A330neo prototypes. The two prototypes have dual head-up display; high- and low-speed calibration of anemometry (altitude and airspeed indication); and checks of engines, aircraft-handling quality, flutter, and loads calibration. In addition, the first stalls were performed and climb and brake-on-landing performance tested.

Overall, flight-test activity has included flight-envelope expansion; high- and low-speed calibration of anemometry (altitude and airspeed indication); and checks of engines, aircraft-handling quality, flutter, and loads calibration. In addition, the first stalls were performed and climb and brake-on-landing performance tested.

Under what Airbus terms a “fast-paced development program from launch to first delivery,” the 1,100-flight-test hour campaign planned for the first A330-900 aimed at achieving EASA and FAA type certification in mid-2018. Airworthiness approval for the new A330-900 variant (for which Hawaiian Airlines is the only customer), is expected to require another 300 flight hours.

Asked how the campaign for the new derivative compares in scheduled length with those for entirely new models, Airbus said the campaign aims to achieve EASA and FAA type certification for the initial A330-900 variant around mid-2018. Airworthiness approval for the new A330-900 variant (for which Hawaiian Airlines is the only customer), is expected to require another 300 flight hours.

The overall time is whatever is needed to meet the regulations today. The 1,100 [flight hours] is needed for the combination of new wing and new engine, et cetera. Previously—the A330 first flew about 25 years ago—2,000 flight hours was enough. The A350-1000 derivative campaign was about 1,600 [flight hours].”

The overall A330neo flight-test program, involving MSN 1795 (600 flight hours) and MSN 1813 (500 flight hours), comprises five phases, the second machine having flown midway through the first such period. These include: initial development; development tests; certification tests; EIS preparation; and EIS support.

Flight-Test Fleet
Each flight-test A330neo is equipped with a medium flight-test instrument (FTI) fit. The first-production machine will sport a lighter FTI setup.

The two prototypes have dual head-up display and activated avionics functions, including airborne-traffic situation awareness, and ground-based landing, runway-overrun prevention, and tweeter-equipped traffic and terrain collision-avoidance systems. Airbus is using the two prototypes to check performance of system options, the two aircraft being fitted with equipment provided by alternative FMS, satcom, and brake suppliers.

Meanwhile, FTI equipment on third flight-test aircraft A330-841 MSN 1888, which is being used for certification of the smaller, longer-range variant, matches the prototype’s systems specification. TAP Air Portugal’s first production aircraft, A330-941 MSN 1819, will have a light equipment fit for production and cabin checks.

Airbus has a 1,100-flight-hour test campaign planned for the A330-900, aimed at achieving EASA and FAA type certification in mid-2018. The first A330neo prototype was Honeywell FMS and satcom and Messier-Bugatti brakes and is equipped with tail-bump protection for the Vmu minimum takeoff speed demonstration. Formal airworthiness approval is planned at the end of the EIS-preparation phase.

From the start of development testing, MSN 1795 will be fitted with ice shapes as Airbus explores aircraft handling with compromised aerodynamics. The starboard powerplant has been “very well instrumented” for the cold-weather campaign.

This first A330neo prototype has Honeywell FMS and satcom and Messier-Bugatti brakes and is equipped with tail-bump protection for the Vmu minimum takeoff speed demonstration. Formal airworthiness approval is planned at the end of the EIS-preparation phase.

• MSN 1813—The second prototype A330neo MSN 1813 is fitted with the alternative Thales FMS, Iridium satcom, and Honeywell braking system, with Airspace Refresh toilets in the passenger cabin. For performance testing, its Trent 7000 engines are equipped with rakes (primary and secondary gas flow pressure taps), which permit Airbus and Rolls-Royce to compare installed thrust with that measured in ground testing.

The second aircraft also is earmarked to conduct Cat III autoland certification activity, which will continue to the end of the fifth flight-test phase (after planned EIS). It will be used for aerodynamic performance and airline operations validation.

• MSN 1819—During the second quarter of 2018, Airbus plans to fly first-production A330neo MSN 1819, which is not part of the certification effort, to validate the A330neo passenger cabin, including air-conditioning performance. According, it has been configured with the manufacturer’s Airspace interior, designed to accommodate up to 10 more passengers than earlier A330-200 and -300 models. In January, cabin installation remained to be completed, along with painting and engine installation.

• MSN 1888—The 300-flight-hour A330-800 flight-test campaign with MSN 1888 will be mainly dedicated to “flight physics tests,” according to du Ché. This airframe entered the Toulouse A330 final assembly line last November and the first flight is expected in mid-2018, according to Airbus.

• MSN 871—Before the first A330neo’s inaugural flight almost four months ago, Airbus had already completed 130 flight hours with A330-200 MSN 871 between late 2015 and the second quarter of last year. The flying testbed’s work involved validation of the A330neo’s upgraded flight-control laws, systems de-risking, and initial checks of Airspace cabin components (such as overhead luggage bins).
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www.stengg.com/en/aerospace
SIA’s revamped A380 cabin now in service

by Chen Chuanren

After four years of development, Singapore Airlines (SIA) on December 14 last year received the first new Airbus A380 featuring its latest cabin product. The aircraft, 9V-SKU, is one of the five additional A380s SIA placed an order for in 2012. The new jetliner seats 471 in four classes—343 in economy and 44 in premium economy on the main deck; and 78 in business class and six in the SIA suites on the upper deck.

Older A380s have 245 to 333 seats in economy, 36 to 38 in premium, 60 to 86 in business class and 12 in suites. The new configuration aims to drive higher capacity and better efficiency of space, and to meet the rising demands for business class seats.

The six suites at the front of the upper deck have separate full-flat beds and an in-flight swivel seat, upholstered by Poltrona Frau. Beds in the first two suites can be combined to form a double bed for traveling couples and families. The suites are designed by Pierrejean Design Studio and manufactured by Zodiac Aerospace.

Other features include a full-size wardrobe and a 32-inch HD monitor for in-flight entertainment. Two large lavatories (one with a vanity table) situated at the front of the upper deck are also reserved for the suites.

The airline will expand its business class offerings to 78 across the fleet, taking the bulk of space on the upper deck. The new JPA Design business-class seats feature a cocoon back shell for privacy, and center-aisle seats can be combined into a double bed by lowering the center divider. The structure is made from carbon fiber instead of metal, thus allowing ample space under seats for full-size cabin luggage.

9V-SKU is also the world’s first GX-enabled A380, outfitted with the Inmarsat GX Aviation broadband connectivity system, giving passengers the new high-speed in-flight Wi-Fi service. This service is offered through SitaOnair.

SIA was the launch customer of the A380 a decade ago, and invested $850 million in the refreshed design as the A380 enters its second decade. The number of A380s in the SIA fleet will remain at 19 as it is also phasing out five of the older superjumbos.

Fleet Retrofit

The very first SIA A380, 9V-SKA, has already been withdrawn from service and returned to its lessor. Although not featuring the luxury in-flight products its Middle East competitors have incorporated, SIA’s new design suits its markets and maximizes the profitability on its A380 routes, believes the carrier.

The airline has appointed Airbus to retrofit the remaining 14 A380s to the new configuration, in close cooperation with SIA Engineering Company (SIAEC), although SIA is still considering how SIAEC will be involved. All SIA’s A380 will be retrofitted by 2020.

At the time of writing, the second new A380 was due to arrive in “early 2018.” Before the arrival of the third A380, SIA will consider the next route the new product will be deployed on.

“The A380 still has a role in our network, especially to slot-constrained destinations,” SIA CEO Goh Choon Phong said. Airbus chief operating officer Fabrice Brégier said Airbus is also in talks with launch customers on retrofit programs similar to that developed by SIA. “The A380 was launched a decade ago, and if they wish to maintain the attractiveness of the aircraft, retrofit is a must.” Although he did not mention names of potential clients, Emirates, Qantas, Air France, and Lufthansa also operate the aircraft.

Singapore currently has the largest Airbus training facility outside France, and is the region’s supply chain hub between Airbus and its Satair subsidiary. “Perhaps we can cover more on digital services, in big data as well as innovation. Currently we have some R&I with local research firm A*Star. We believe in Singapore and the region,” Brégier told AIN.

SIA will continue to set milestones in 2018, as it will be the launch customer for the Boeing 787-10 and Airbus A350-900 Ultra Long Range (ULR), which will join the fleet in the first and second half of 2018, respectively. In all, SIA is looking to receive 21 new airframes in the next fiscal year, including seven examples of the A350-900 ULR.
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LEAP

Extraordinary together
India’s Udan program could boost regional air services

by Neelam Mathews

India has rolled out a plan designed to encourage rapid growth in transportation services to, from, within, and between its regions. The Indian Ministry of Civil Aviation (MoCA) Regional Connectivity Scheme (RCS), titled “Udan” (“Ude Desh ka Aam Naagrik, or “let the common man fly”), has been designed to act as a catalyst for growth as the Indian economy matures.

The RCS was launched last year, after two phases of bidding for laid out routes, and now seems well on its way to maturity.

Demand is clearly there. Already growth in populated metropolitan areas has been spilling over to the hinterlands, opening numerous opportunities for regional aircraft, helicopters, and seaplanes to interconnect remote, underserved, or unserved airports, towns and cities.

Domestic ticketing is forecast to hit 300 million by 2022 and, given the current lack of infrastructure at airports, the government has started an ambitious scheme to upgrade airfields and airstrips along with offering incentives to encourage operators to start services to unused airports.

Airports Authority of India (AAI), implementation agency for the RCS in aviation, plans to invest $2.6 billion upgrading airport infrastructure by 2020. Otherwise, regional airports’ limited daylight opening hours, lack of runway lights, or radars could inhibit growth, the government believes.

Meanwhile, the key metro airports of Chennai, Bangalore, and Hyderabad are almost at full capacity, while landing slots at Delhi and Mumbai airports have limited availability. “MoCA is not in a position to ensure slots for RCS flight in Mumbai,” confirmed Minister of State for Civil Aviation Jayant Sinha, prompting one analyst to comment that this is “a big setback for Indian regional aviation.”

“India suffers from the classic chicken-and-egg syndrome. Unlike China, we add passenger capacity first and then build infrastructure to cope with the volume,” said Vishok Mansingh, CEO of Mumbai-based consultancy CAI Aero Services. “India follows the wait-and-watch policy; wait for business, cramp, congest, and then plan expansion later,” he said.

Despite this, the government seems ready to adapt. RCS rules are being altered as lessons are learned along the way. For example, the Directorate General of Civil Aviation will soon introduce industry-friendly regulations for seamless induction for new entrants/existing operators introducing a new type of aircraft. This includes complete initial crew training and release before aircraft import, instant approval of entry-in-to-service (EIS) trainers, freedom to hire expat trainers and a combined cockpit experience of 500 hours. The regulation is under preparation will be released soon, officials told AIN.

RCS Has Critics

However, many feel changes are to the detriment of operators. “RCS is confusing. Too many changes midway are putting initial operators at a disadvantage,” said Harsh Vardhan, chairman of Starair Consulting. AN Sharma, airport director of Ludhiana Airport, in the northern state of Punjab, told AIN load factors were touching a high of more than 90 percent as fares are subsidized, compared to the hefty cost of tickets four years ago when the airline withdrew from the destination. He added: “Airlines will need to ensure their credibility by not pulling out of [routes].”

While the initial plan of RCS was to encourage charter operators to join the fray, regulatory requirements, along with a lack of finance and a lack of confidence, have resulted in scheduled airlines entering the arena. One exception is Supreme Airlines, a charter airline flying short regular interstate routes in the state of Rajasthan.

Having started operations before the RCS came into being, Supreme is supported by the state using capital Jaipur as its base, while connecting to second- and third-tier cities using its two Cessna 208 nine-seat single-engine Caravan turboprops, according to vice president and founder, Akash Agarwal. He said plans are in the offto to expand the network. Rajasthan is thus the first to introduce a state-subsidized service. “These flights will be useful not just for tourists but also for students,” said Vasundra Raje, the state’s chief minister.

Meanwhile, in an unprecedented change from its stringent single business model of procuring only Airbus A320 family aircraft, IndiGo, India’s largest budget carrier, has ordered 78-seat ATR72-600 turboprops, operations of which have started already. “We expect to get 20 ATRs by January 2019,” said Aditya Ghosh, president of IndiGo.

Another large budget carrier, SpiceJet, has also announced orders for 25 Bombardier Q400 turboprops. “SpiceJet operates India’s largest regional fleet and has always been a firm believer in the growth story of India’s smaller towns and cities,” said SpiceJet chairman Ajay Singh. “We have worked hard over the years to put these on the country’s aviation map,” he noted.

Helicopters’ Turn

For the first time, helicopters are being included under RCS for “priority” areas that will include eight northeast states, three mountainous northern states, and the remote islands of Andaman and Nicobar, and Lakshadweep. “If we do not encourage helicopters, connectivity to priority areas will never be done,” said Sinha.

Helicopters will bring benefits in the difficult terrain and harsh weather conditions of the northeast. Already, Advanced Indian Air Force landing sites are being opened for joint military-commercial use. “These will be part of the RCS and bring respite to the population,” said DK Kamra, regional executive director of AAI.

A major challenge for helicopters operating under the RCS is the current rules require multi-engine aircraft. “If a single-engine aircraft is good to operate as a charter, why not under the RCS?” asked Rohit Kapur, president of India’s Business Aircraft Operators Association (BAOA).

Kapur said he hopes the third stage of RCS bidding will include the need to fill the gap between the 70-/80-seaters (ATRs and Q400s) and the 10-/15-seaters. “This is where the excess capacity of our charter operators can be used,” Kapur concluded.

Kapil Kaul, CEO of the Centre for Asia Pacific Aviation India, is not optimistic. “Unless airport infrastructure is developed, RCS can never take off.” Others, such as Boeing, are “still gauging how regions will pan out,” said Dinesh Keskar, the airframer’s senior vice president, sales, Asia Pacific and India. He added that the RCS would open new regional routes for aircraft, including Boeing’s 737 narrowbody. “We are very bullish that if it [RCS] works out, we will be one of the beneficiaries,” he told AIN.

RK Bali, managing director of BAOA, had the final word: “Udan is a national mission. Let’s give it some time, as there has been total transparency on part of MoCA on this.”

Budget carrier SpiceJet has ordered 25 Bombardier Q400 turboprops to serve smaller airports.
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IDEAS BORN TO FLY™
With JAL financial backing, Boom eyes XB-1’s first flight
by Sean Broderick

Boom Supersonic (Stand G55) enters the Singapore Air Show coming off an eventful 2017, highlighted by the unveiling of 76 pre-orders, an airline partner, and some $40 million in funding to back its efforts to build a supersonic passenger airliner.

As much news as the company generated last year, however, the months ahead could be even more compelling. If all goes as planned, Boom expects to fly its one-third-scale XB-1 demonstrator, which it calls “Baby Boom,” before the end of the year. It also could announce the location for its production facility where it will build its Boom Supersonic airliners.

Boom in November said it has begun the site-selection process. Among the criteria: a site with “previous aerospace influence” and room to grow, the company said.

In December, Denver-based Boom announced its first airline partner, revealing Japan Airlines (JAL)—which once held options for three Aerospatiale Concorde—as a strategic investor with aircraft-purchase options.

“There is a $10 million investment and pre-order of 20 aircraft, this is not just a milestone for Boom, but one for civil aviation,” Boom founder and CEO Blake Scholl wrote on the company’s blog. “JAL is the first airline in history to make a material financial commitment to a faster future. Concorde had dozens of pre-orders—but none carried any financial commitment, and ultimately British Airways and Air France got their Concorde for just $1 apiece.”

International Market

The JAL agreement formalized what has been more than a year of collaboration, Scholl said, noting that the airline’s team is providing input on everything from technical operations to the passenger experience. Boom’s primary target is the intercontinental business-class passenger. It has unveiled two cabin concepts, one with 45 seats including 10 in first class, and a 55-passenger layout. Scholl says the dual-class cabin fits longer-range flights such as transpacific routes, where a lie-flat seat may be desirable. The standard, single-class Boom configuration would have a seat pitch of about 75 inches. Boom’s goal is to “develop an airliner that will be a great addition to any international airline’s fleet,” Scholl said when JAL was unveiled as a partner. He says his company is engaged with about 20 airlines—five of which have placed either deposits or pre-order commitments. The only other announced pre-order customer is Virgin Atlantic, with deposits for an undisclosed number of airplanes.

“The airlines that are placing reservations are putting real money against them,” Scholl said at the 2017 Paris Air Show. “These aren’t letters of intent.”

While the company regularly expresses high regard for the legendary Concorde, it is adamant that technological advancements in the five-plus decades will enable Boom to develop a more efficient, practical supersonic passenger aircraft that will succeed even if current supersonic over-land restrictions don’t change. He believes that new technology will make supersonic flight less of a nuisance over land than it was in Concorde’s day, leading to removal of current regulatory restrictions. If not, he is confident that—unlike Concorde—the Boom aircraft could succeed even if its supersonic fight profile were restricted to overwater routes.

If all goes as planned, the Boom Supersonic airliner will enter service sometime in the mid-2020s. The company’s next major development milestone is getting the Baby Boom airborne. The aircraft, which will be powered by three General Electric J85-21 engines with variable-geometry intake and exhaust, completed preliminary design review last year and is slated to begin test flights in late 2018. Its target cruise speed is Mach 2.2—the same as the full-scale aircraft. The demonstrator is expected to fly with Honeywell avionics, Tencate carbon fiber prepreg, and 3D-printed components and tooling from Stratasys.

Scholl says the company has funding to get it through Baby Boom’s development and first flight. The JAL investment pushed announced funding past $50 million, including a $33 million Series A round unveiled in March 2017.

Bell Helicopter unveils urban air taxi at U.S. show
by Mark Huber

Bell Helicopter unveiled its design for an urban air-taxi design last month at the Consumer Electronics Show (CES) in Las Vegas. The four-passenger design will offer full connectivity, including video conferencing capability.

“The future of urban air taxi is closer than many people realize. We believe in the positive impact our design will have on addressing transportation concerns in cities worldwide,” said Bell CEO Mitch Snyder. “While we are laser-focused on the passenger experience and eager to share with the public, Bell continues to develop our air-taxi design to provide safe, reliable transportation services to the world.”

During CES 2018, attendees experienced an augmented reality simulator inside the air-taxi cabin designed to portray a variety of flight scenarios, including cross-city day and night trips. Last year, global ride-sharing service Uber and Bell announced plans to partner and accelerate the eventual large-scale deployment of electric vertical takeoff and landing (eVTOL) vehicles.

Scott Drennan, Bell’s director of engineering innovation, said his company’s design would be robust enough to fly 2,000 hours per year; be “modular, adaptable, and scalable”; be able to use a variety of powerplants; have both civil passenger and military logistics applications; and likely be certified under the FAA’s new powered-lift category developed for tiltrotors. Uber believes urban air taxis can be operated for near $1.32 per mile, about one-third the price of operating a turbine helicopter.
Aon warns against cutting coverage
by Gregory Polek

Calling 2017 another benign year for aviation claims in the Asia-Pacific region, insurance underwriter Aon nevertheless advised clients to resist resorting to so-called “cheap cover” in an effort to trim costs in a competitive environment so highly populated by low-fare carriers.

The company noted that low-margin industries such as aviation carry a greater potential than most to feel the drastic effects of uninsured losses. On a positive note, last year the company said it saw growing maturity in the industry toward insurance purchasing, as an increasing number of clients procured coverage for previously uninsured risks such as cyber security.

“The capacity for cyber coverage is growing,” said Gary Moran, head of aviation, Asia, for Aon Singapore and vice-chairman of the Asian Business Aviation Association (AsBAA). Many aircraft operators don’t seem too worried about insuring against cyber security issues, mainly because they haven’t seen their competitors get burned by such problems, he explained. “But there could be a cyber attack in your supply chain, with serious complications for your operations as a knock-on effect. We have put together a cyber team here in Singapore to get that message out.”

Meanwhile, improvements in aircraft technology and industry risk management resulted in the safest year on record for the world’s airlines, according to Aon. The continuing benign claims environment resulted in further downward pressure on rates, and clients enjoying reductions in the range of 5 to 10 percent on average. However, even in the absence of catastrophic or large losses, the value of attritional losses increased.

As the value of aircraft continues to rise, the value of everyday losses from bird strikes, hard landings, and other sources of minor incidents have increased in tandem, it added. Meanwhile, as the premium pool continues to shrink, the cost of attritional losses will become more of a concern for insurers as they begin to affect underwriting profitability.

For the business aviation community, Moran said, “the outlook is very good. [High] safety levels and high levels of pilot experience have helped keep losses to a minimum in Asia, and thus insurance costs have been fairly steady. “Operators are not getting the reductions they once had,” he said, adding that he doesn’t expect insurance premiums to “harden” or climb unless a catastrophic event somewhere in the world demands a heavy amount of insurance funding to cover losses.

Sukhoi shows Superjet 100 ‘saberlets’ in Singapore

Sukhoi Civil Aircraft (UAC, Stand J39, Chalet CS48) has brought to Singapore its Superjet SS100, equipped with so-called saberlets—wingtip devices meant to improve takeoff and landing performance and decrease fuel consumption by at least 3 percent.

The manufacturer flew the test airplane on display here for the first time on December 21. During the two hour, 42 minute flight, SCAC crew appraised stability and control under different flap configurations.

Taking the airplane to an altitude of 11,000 meters (36,000 feet), they also tested various “modes” to determine the level of fuel consumption at different flight stages.

Manufactured by Russia’s Voronezh plant (VASO), the form of the saberlet kits resulted from research and engineering performed with computational fluid dynamics by SCAC and the Central Aero-hydrodynamic Institute (TsAGI).

Part of SCAC’s Superjet 100 improvement program, the retrofitable saberlets will cut the cost of operating each airplane by as much as $70,000 per year, according to SCAC president Alexander Rubtsov.

News note

Under a new partnership agreement, U.S.-based logistics support integrator AAR (Stand S01) will provide in-flight connectivity logistics, repair and aftermarket management services for Viasat, which offers in-flight connectivity to airlines worldwide. AAR’s OEM Aftermarket Solutions group will manage Viasat’s inventory pool of components, including modems, antennas, radomes, wireless access points and power supply units.

“AAR’s scalable solution allows Viasat to leverage our aviation aftermarket expertise through our comprehensive logistics and repair process,” said Carl Glover, AAR’s v-p sales and marketing, parts supply, Americas.

“This global program supports Viasat’s current and future airline customers to ensure maximum systems component availability,” he added.
Singapore Technologies Engineering has upgraded and converted Northrop F-5E/F fighters for the city-state's RSAF as well as for Venezuela, Turkey, Brazil, and for other countries.

Singapore’s STEngg group marks 50th anniversary

by Chris Pocock

Over the past year, Singapore’s premier aerospace and defense company has been celebrating its 50th anniversary. Singapore Technologies Engineering (or STEngg) is now a multinational conglomerate with 22,000 employees and annual revenues of about $5 billion. But when founded in 1967, it made only ammunition for the rifles of the army of the young island republic.

Today, STEngg is a publicly traded company, although the Singapore government still retains a controlling half-stake through Temasek Holdings. The group has four sectors specializing in aerospace engineering and MRO (ST Aerospace); IT, simulation and training, satellites, satcom, and public transport systems (ST Electronics); shipbuilding and repair (ST Marine); and land warfare, including armored vehicles (ST Kinetics). It has expanded overseas with major operations in the U.S., China, and Germany, and more than 100 subsidiaries and associated companies in 46 cities across 24 countries. The group earns more than two-thirds of its revenue from commercial, rather than defense, sales.

The development of Singapore’s state-owned defense companies was driven by the philosophy outlined by the country’s first defense minister, Goh Keng Swee. He insisted that they be managed at arm’s length from the Singapore Armed Forces (SAF), and that they be profitable in their own right. Nevertheless, over the years, some overseas defense companies seeking business in Singapore have grumbled quietly that the Singapore government has favored or subsidized ST. But these concerns have generally been outweighed by the country’s reputation as an “intelligent customer” that does not require opaque “commissions” when buying from abroad.

ST Aerospace (Stand G01, L01) is responsible for more than one-third of the group’s turnover and is the most profitable sector. It started as the maintenance depot for the Republic of Singapore Air Force (RSAF), before developing upgrades for the RSAF’s fighters and transports and seeking similar work from overseas air arms. Then it diversified into airframe MRO, engine overhaul company with Singapore Airlines (SAEOL), formed the basis of Singapore Aircraft Industries (SAI).

STEngg Corporate Timeline

- **1967** Chartered Industries of Singapore (CIS) formed as a weapons-making company to support Singapore’s national defense.
- **1968** Singapore Shipbuilding and Engineering (SSE) formed (predecessor of ST Marine).
- **1969** Singapore Electronic and Engineering (SEEL) formed (predecessor of ST Electronics).
- **1971** Singapore Automotive Engineering (SAE) formed (predecessor of ST Kinetics).
- **1974** SAE, SEEL, and SSE were brought together under a state-owned holding group, Sheng Li.
- **1975** Singapore Aerospace Maintenance Company (SAMCO) formed (predecessor of ST Aerospace).
- **1981-82** SAMCO and SEEL and a government joint venture engine overhaul company with Singapore Airlines (SAEOL) formed the basis of Singapore Aircraft Industries (SAI).
- **1990** Diversification into commercial airframe MRO when Singapore Aviation Services Company (SASCO) was established at Changi, and Mobile Aircraft Engineering (MAE) was acquired in Mobile, Alabama.
- **1994** The Singapore government investment company Temasek Holdings took over the state’s majority stake in ST.
- **1997** ST Aerospace, ST Automotive, ST Electronics, and ST Marine merged to form ST Engineering.
- **2000** ST Automotive acquired CIS and was renamed ST Kinetics.
- **2002** Vision Technologies (VT) Systems established as the group’s U.S.-registered company; VT subsequently acquired a number of U.S. companies.
- **2004** An airframe MRO facility was established in Shanghai as a joint venture with China Eastern Airlines.
- **2007** ST Aerospace Academy created to train commercial pilots.
- **2008** An engine MRO facility created in Xiamen, China.
- **2011** Four ST/VT subsidiaries in the U.S. were granted Special Security Agreements (SSAs) to participate in defense contracting.
- **2012** Launched VIP aircraft completions business named Aeria within the San Antonio MRO facility.
- **2014** Another airframe MRO facility established in China, at Guangzhou, as a joint venture with the local airport authority.
- **2016** Became majority shareholder in German MRO and freighter conversion company Elbe Flugzeugwerke. Airbus is the minority shareholder.
- **2017** Launched Singapore Autonomous Vehicles consortium to develop standards and technologies for adoption in Singapore.

As the extended maintenance arm for the RSAF, STEngg developed a major upgrade for Singapore’s C-130 fleet, subsequently refurbishing “Herks” for the Royal Air Force of Oman.
EXPERIENCE THE QUIETEST AND MOST COMFORTABLE CABIN.
CAE’s regional growth driven by maritime flight operations
by David Donald

Simulation specialist and training systems integrator CAE has a significant presence throughout the Asia-Pacific region, which includes nations that the Montreal-headquartered company considers “home markets,” such as Australia and New Zealand. Singapore is becoming increasingly important, as is India.

In characterizing the region, Ian Bell, CAE’s v-p and general manager for Asia-Pacific and Middle East, remarked, “It’s a huge marketplace and very diverse. There’s a lot of ocean and a lot of independent territories. We’re seeing a big increase in naval activity, and there’s a great willingness for ASEAN nations to work together.”

With its common database technology and ability to integrate complex training systems, CAE can provide synthetic training environments that not only support sovereign training, but also provide an environment for interoperability. “We need to meet the requirements of individual forces,” said Bell, “but they also want to train alongside their neighbors.”

One area that is of great significance is maritime patrol, and the company has considerable experience in providing training systems for a range of maritime patrol and anti-submarine platforms, training both pilots and rear crew. Having provided systems for training P-3 Orion crewmembers, CAE is also involved in the Boeing P-8 program, which is the Orion’s successor with both the U.S. and Australian navies, as well as serving with India.

In the rotary-wing world, the company provides training systems for the Royal Australian Navy’s Sikorsky MH-60R Seahawk helicopters and New Zealand’s Kaman SH-2 Seaspirtres, and here in Singapore it supports the Super Puma and S-70B Seahawk communities. Other helicopter types for which CAE provides training aids in the region include the Australian army’s CH-47s and MRH90s, Leonardo AW139s and AW189s, and the Sikorsky S-70i Black Hawks of the Royal Brunei Air Force.

Training for the latter is conducted in the Multi-Purpose Training Center (MPTC) established as a joint venture with the Brunei government. Regarded as something of a “flagship” for the company, the MPTC has advanced classrooms and simulation capability that provide training for a variety of users. In addition to flight training activities that support Brunei’s S-70i and S-92 helicopters, and PC-7 turboprop trainers, the MPTC is being developed to provide training in diverse fields such as emergency management and healthcare.

For the S-70i syllabus CAE (Stand U87) has installed a Series 2000 full mission simulator with CAE 6000 Medallion image-generation system. This permits a wide range of missions to be undertaken in the simulator, including offshore rig landings, firefighting, and flying with night-vision goggles. Initial training for Brunei’s S-70i crews was undertaken by Sikorsky at its West Palm Beach facility in Florida, but training in the CAE simulator at the MPTC began in December, and is growing fast as the RBAF explores the system’s capabilities. “The take-up of simulator hours is increasing as training moves from live to synthetic,” reported Bell. However, spare capacity in the simulator can also be leased out to third-party operators of the S-70i (UH-60M).

Another area of interest for CAE is remotely piloted aircraft (RPA) systems. The company is the training partner for General Atomics, and is a member of Team Reaper that is pitching the Predator B to Australia. Bell sees the use of RPAs in the region as growing, especially for maritime patrol and search and rescue work.

CAE’s Brunei Multi-Purpose Training Center is a joint venture between the company and the sultanate, and features one of the region’s largest helicopter simulation training facilities.

STEngg group marks 50th anniversary

commercial work, and today is the world’s largest airframe MRO. It has converted more than 400 airliners to freighters. ST Aero’s first major engineering challenge was to continue the refurbishment of retired U.S. Navy Douglas A-4 Skyhawk attack jets that had been acquired in large numbers from the U.S. They served the RSAF as A-48 models until the late 1980s, by which time ST Aero had designed the A-4SU Super Skyhawk upgrade. This included re-engining with the GE F404 and a major modernization of the avionics. The company then designed a major upgrade for the RSAF’s F-5E/F fighters and the conversion of some into RF-5 reconnaissance versions, with help from Elbit Systems of Israel. It has since upgraded F-5s for Venezuela, Turkey, Brazil, and other countries.

Later came the tasks of maintaining and modifying the RSAF’s F-16 fleet. At the same time, ST Aero’s own engineers began writing operational flight programs for commercial applications. At the ST Engineering group’s kick-off 50th anniversary event last year, chief executive Vincent Chong looked forward as well as back. “We see great opportunities in smart city initiatives…in public communications, satellite communications, as well as autonomous and robotics,” he said.

More recently, Chong summarized STEngg’s business philosophy. “Just as a company can only be as strong as its people, a country can only be as effective as the talent that it has. Innovative countries are magnets for talent, which in turn drives economic growth for these countries, while enabling firms operating there to enhance shareholder returns,” he told Singapore newspaper The Business Times.

The A-4SU Super Skyhawk upgrade was STEngg’s first refurbishment milestone. It involved a GE F404 engine upgrade. STEngg designed and implemented for the RSAF’s “Herks” (C-130s) from 2007, and also for the Royal Air Force of Oman.

But the diversification into commercial MRO, to leverage the company’s engineering talent and to spread over-heads, has dominated the history of ST Aerospace since the early 1990s. A joint venture established in the UK, Airline Rotables, became one of the first companies to offer power-by-the-hour programs for aircraft components. As the airline industry expanded rapidly, so did the company’s MRO business, especially in the U.S. Since then, ST Aero has expanded its service offerings in this field, and in maintenance-by-the-hour. More than 600 aircraft operated by 17 airlines are now supported in this way by subsidiaries of ST Aerospace.

The company’s first passenger-to-freighter (P2F) conversions were Boeing 727s for Federal Express. In 2008, ST Aero gained its first supplemental type certifi cate (STC), for the Boeing 757 P2F, and a huge conversion contract from FedEx.

Meanwhile, ST Aero has been part of the unmanned systems revolution, designing the Skyblade fixed-wing for the SAF, and other systems such as the USTAR VTOL UAV for commercial applications. Expanded service offerings in this field, and in maintenance-by-the-hour.

AFI KLM E&M (Stand G10) will continue to provide component support to Malaysia’s AirAsia X Airbus A330-300s until they are retired, thanks to an extension of an existing agreement between the two companies. The deal, originally signed in 2007 when AirAsia X began operations, now covers the 30 A330s for the duration of their service with the carrier. AirAsia X has the option to add more aircraft.

Services covered under the deal include repair, pool access, and related logistic services, AFI KLM E&M said.

AFI KLM E&M also provides component support for AirAsia X’s A320neos.

continued from page 30
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Airbus’s BLADE NLF testing to resume this spring

Early in April, Airbus plans to start the second phase of a 150-flight-hour test campaign aimed at confirming technology that is expected to cut aerodynamic drag and fuel consumption significantly. The A340BLADE (for Breakthrough Laminar Aircraft Demonstrator in Europe) project, which uses the original A340-600 prototype modified with new natural laminar-flow (NLF) outer-wings, is part of the region’s Clean Sky joint-undertaking research program that aims to reduce aircraft CO2, greenhouse gas, and noise emissions.

Initial results from the first phase, flown during September to December last year, have been encouraging, says the manufacturer. “So far, with limited analysis, we are very satisfied with the observed behavior, with results meeting—and sometimes even exceeding—expectations,” said flight-test engineer Philippe Seve. “The aircraft has shown satisfactory handling qualities and flaw-free system behavior. Also, the flight-test instrumentation [FTI], thanks to extensive preparation work and redundancy precautions, was very mature from first flight.”

Now, the campaign’s second phase, which involves “aerodynamic imperfections flights,” is intended to “extensively test and characterize ‘laminarity’ robustness in representative operational conditions.” The A340BLADE is expected to fly about every three weeks, governed by changes to aircraft configuration, from the beginning of April to an undetermined date.

Choice of the A340-600 prototype (manufacturer’s serial number [MSN] 001) was driven by availability and its natural wing “split” at the outboard engine, permitting replacement NLF outer-wings.

Airbus hopes wing-friction drag will fall by 50 percent, which would translate into a reduction of “up to 5 percent” in block-fuel and CO2 emissions if applied to a short-range airliner over a range of up to 800 nm.

Testing NLF for ‘Robustness’

Airbus (Château CD17, Stand 123) says that this is the first test aircraft “to combine a transonic laminar-wing profile with a true internal primary structure.” Laminar—or “streamline”—flow relates to boundary-layer air adhering to the airfoil until interrupted by surface contaminants and other factors that generate turbulence (and consequent higher drag and reduced lift).

The A340BLADE campaign is intended to “validate the area of ‘laminarity’ that can be achieved for a large variety of cruise-flight conditions with respect to altitude, Mach number, and wing loading,” say Clean Sky researchers. It is testing the robustness and sustainability of NLF in operational service to enable commercial-aircraft manufacturers to properly specify production-tolerance requirements and design laminar components, including wings.

The program’s primary aim is to accelerate future industrialization (or mass production) of laminar wings, according to Airbus. Earlier technology had not been mature enough for airliners, nor been fully validated in flight. “The last 50 years have seen a more-than-70 percent improvement in relative fuel-burn/seat and 90 percent [reduction] in noise emissions, but a practical application of laminar flow has not been achieved,” said Airbus research and technology senior vice president Axel Flaig.

“Rapid and recent development of numerical-flow simulation tools enables us to design, build, demonstrate, and validate an optimized NLF wing,” said Airbus. “Aerodynamic flight-control laws related to the specific shape of the NLF wing [have been defined and validated through ground-test wind-tunnel [and] simulator sessions.”

Noting that laminar flow is “much better at lower speed, but requires transonic airflow,” BLADE project leader Daniel Kierbel points to many so-called “imperfection” factors that can inhibit NLF generation of an “industrial” wing. External considerations include wing leading-edge and surface erosion or contamination (de-icing fluids and grease, dents, dust, insects, and scratches); atmospheric disturbance; and acoustic disturbance and vibration.

Internal factors include deformation of fastener heads and joints, gap-filler material, local and “global” wing deformation, and system integration.

Flight-test Progress

The first round of flight tests has allowed Airbus to assess aircraft handling, extend the flight envelope, and obtain initial indications of achieved NLF, said Seve. The A340BLADE completed 23 test flights in the 13-week first phase, clocking 65-80 flight hours with up to three flights a week.

“We were able to demonstrate our capacity to fly and measure in night conditions,” said the engineer. “All this enabled us to move on quite far. In total, we have performed 165 cruise measure points for several Mach, angle-of-attack, Reynolds, sideslip, and aileron settings. Each point provided ‘laminarity’ extent, pressure distribution, and tolerance to ensure laminarity in all regimes of flight. Saab’s left outer wing is comprised of a single-piece carbonfiber-reinforced plastic (CFRP) wing ‘cover’ (or skin) and leading edge (including integrated spar cap and wing-rib feet), while GKN’s outer right wing has a mechanically fastened CFRP cover and metal leading edge with a joint at the forward spar.

A new wingbox interface connects the “old” and new sections of each wing, the latter very obviously identified by reduced 20-degree sweepback; specialist FTI is mounted in the cabin.

NLF wings attachment and modification of MSN001’s tailfin to contain an infrared-camera pod (to relay wing behavior) represent “a combination of experience and [a] technology bridge,” according to Kierbel. The pod also holds a pair of cone-flow cameras and anchors an anemometric airspeed/altitude-calibration “trailing cone.”

Developing the A340BLADE demonstrator involved “21 European partners, 500 contributors, and 6,500 parts,” according to Airbus. It also required production of wing-joint “aero-fairings” that separate the “turbulent” inboard wing from the NLF section, NLF-section wingtip pods that provide a defined flow pattern and accommodate FT equipment; and digital mock-up of the new wing section outboard of the No 1 (left outer) engine.

The A340BLADE exercise has “no link to any possible future aircraft program,” Airbus said.
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Leading The Situational Awareness Revolution
GE focuses on Asia-Pacific for widebody engine sales

by Chris Kjelgaard

The Asia-Pacific region, especially China, will remain GE Aviation’s (Stand F67) most important focus for widebody engine sales for the foreseeable future. That’s because air transport growth rates there are higher than those in any other part of the world, according to the manufacturer’s top commercial-engines marketing executive.

“The Asia-Pacific is definitely the growth market” for sales of widebody aircraft, whereas “the rest of the world is more a replacement market...[and is more] predictable,” Bill Brown, GE Aviation’s commercial engines marketing manager told AIN.

Unlike the rest of the world, where “after 25 years, [widebody] aircraft are driven out of service” and replaced, almost on a one-for-one basis, in China and the rest of the Asia-Pacific region “there are not just replacements, but it is clearly the growth market,” he said. China in particular is a vitally important market for sales of widebody aircraft and engines, he added.

As a result, said Brown, “We want to be in there with widebody aircraft, because there will be a revenue stream for the next 40 years” from aftermarket sales of spare engine parts and MRO services, running throughout the lives of the latest GE-powered widebody production programs.

The Asia-Pacific region represented only about 10 percent of GE Aviation’s widebody-engine market 20 years ago, and today it is “20 percent and growing,” said Brown. The proportion of widebody aircraft and engine sales for which the region will account in the future is going to be 20 to 50 percent greater than in the rest of the world, he said. “Replacement drives [widebody orders] in North America and Europe, but the growth quantity is in the Asia-Pacific and China.” The region has “a huge population and economic growth is much more in its infancy” than in most other regions. “The number of [countries] with 6 to 7 percent [overall economic] growth rates is phenomenal. Absolute numbers [of aircraft and passengers carried] are still dominated by North America and Europe, but eventually China and the Asia-Pacific will overwhelm them,” he said.

Brown provided AIN with a detailed breakdown, by geographic region, of all sales to date of widebody aircraft powered by the GE90, GEnx, and GE9X. While these detailed numbers don’t include GE Aviation’s sales of spare engines in each region, they show that of total sales of 1,196 GE90-powered widebodies to date (1,096 of which are already in service and 100 of which remain to be delivered), 459 aircraft (377 of which are already in service and 32 of which are yet to be delivered) were ordered by or for operators based in the Asia-Pacific region.

The means that fully 34 percent of all sales of on-wing GE90s to date have been for aircraft operated by Asia-Pacific carriers. The Asia-Pacific is the second-most important geographic region for GE9X sales, after the Middle East, with orders for 255 777X family widebodies. The 61 777Xs ordered by carriers based in the Asia-Pacific region represent more than twice the 30 777Xs ordered in total by European and North American airlines.

GE90

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GE9X

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GEnx

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</table>

Grand Total     | 69     | 719          | 321    | 36           | 707         | 307           | 50         | 2,209 | 33            |

That 61-aircraft Asia-Pacific Boeing 777X order total also represents 19 percent of total 777X orders to date, a percentage closely in line with Brown’s estimate that the Asia-Pacific region now accounts for approximately 20 percent of all new GE Aviation widebody engine sales.

The proportion of GEnx-powered aircraft—Boeing 787s and Boeing 747-8s, whether freighters or passenger-carrying aircraft—now operated by carriers based in the Asia-Pacific region and China further emphasizes the Asia-Pacific region’s growing importance as a geographic market for sales of GE Aviation widebody engines. All together, 249 of 687 GEnx-powered widebodies ordered to date are for operation by Asia-Pacific carriers, a number representing 36 percent of all GEnx-powered aircraft sales. The Asia-Pacific region also represents by far the most important geographic region for sales of GEnx-powered widebodies.

That 61-aircraft Asia-Pacific Boeing 777X order total also represents 19 percent of total 777X orders to date, a percentage closely in line with Brown’s estimate that the Asia-Pacific region now accounts for approximately 20 percent of all new GE Aviation widebody engine sales.

He noted that the Asia-Pacific region overall is a particularly important market for GEnx sales because “60 to 80 percent of all 787s in those countries are GEnx-powered.” The Rolls-Royce Trent 1000 competes in the same market. Additionally, “About a third of all 747s-8s are [based] in the Asia-Pacific,” he said.

Single Aisle

While China and the rest of the Asia-Pacific region represent GE Aviation’s most important market for widebody-engine sales, the region is also growing in importance as a market for sales of regional jets and single-aisle aircraft. Many of these aircraft will be powered by GE Aviation CF34-family engines and engines produced by CFM International, of which GE Aviation is a 50 percent joint-venture partner.

“Everybody is buying single-aisle aircraft, even to fly transatlantic routes. There is an explosion of single-aisle sales everywhere,” said Brown. “And in the Asia-Pacific, it has happened there. There are thousands of single-aisle aircraft on order in the Asia-Pacific.” This leads him to wonder, “Is the widebody [market] being encroached on?” To some extent the answer might be “yes.” Many—even the majority of—regional international routes in the Asia-Pacific region are no greater in range than about 4,000 nm, a distance that modern single-aisle jets such as the A320neo and 737 Max 8 can easily fly nonstop. In the future, other than flying on routes with high traffic volumes and between slot-constrained airports, the major role of widebodies operated by Asia-Pacific carriers might be to operate long intercontinental sectors.

One new intra-Asia-Pacific market that Brown sees as particularly important for sales of single-aisle aircraft is that for air travel between developed eastern China and relatively undeveloped western China. As the Chinese government works to promote the economic growth of western China’s regions, it is building large new cities in those regions, leading to “a huge boom in building airports, serviced with single-aisles,” said Brown. “A lot of China’s domestic growth is with single-aisles and regional jets.”
**Indonesian Air Force ponders new fighters**

by Reuben F. Johnson

For years, Indonesia’s Air Force (TNI-AU) has been trying to achieve a fighter force that fulfills its operational requirements. The force has an overall motto of “no area without air cover,” but to cover such a widespread archipelago, the country will need at least three new squadrons of combat aircraft, according to the TNI-AU’s own calculations. Part of the requirement has been filled by 24 used Lockheed Martin F-16s provided by the U.S. to Jakarta as Excess Defense Articles (EDA). These aircraft now supplement a fleet of six Northrop F-5EAs that are still in service, plus five Sukhoi Su-27SKs and 11 Su-30MKs, plus 21 BAE Hawk 200 attack aircraft.

The leadership of the TNI-AU has previously aimed for a fighter fleet divided equally between F-16s, which would all be upgraded to a near-common configuration, and additional Su-27/30s. However, in recent times:
- Russia’s Rosoboronexport has proposed an arms package deal that includes 11 Su-35S aircraft configured similarly to those that have already been delivered to the Russian Aerospace Forces (VKS) and the People’s Liberation Army Air Force (PLAAF). But it has been reported that the “Su-35S” for Indonesia would be fitted with previous-generation engines and other avionics as found on the earlier Su-27/30-era models. Also, there is concern that the Russian financing of the aircraft would saddle Indonesia with a crippling debt burden.
- Saab Aerospace is offering a variant of the JAS-39C/D Gripen. These might be new-builds, or former Swedish air force aircraft. But they would include modernization options and a package of technology transfer projects, as well.
- Indonesia has also been involved in the South Korean KF-X stealth fighter. In 2016 the two countries signed an agreement whereby Indonesia would share 20 percent of the development cost, and in return have some influence over the design, and participation by engineers from state-owned aerospace company PTDI in the South Korean program. The goal was to develop a 4.5 generation fighter that would enter service around 2025 with both the Korean and Indonesian air forces. But budgetary complications subsequently forced Indonesia to reconsider its participation. In October 2017, South Korean officials were trying to restructure the program to keep Indonesia involved.
- The Shenyang FC-31 fighter is a dark horse candidate. The Chinese media describes it as a premier fighter with a stealthy radar cross section, which can be sold for a “reasonable price.” Chinese industry officials have said that the latest 2.0 prototype configuration addresses many of the shortcomings in the original design.

There are some indications that Indonesia is finding it more attractive to secure technology transfer projects with China than with other nations. Chinese industry is building the Jakarta-Bandung High-Speed Railway, a 142-km project designed to shorten the travel time between the two cities from three hours to just 40 minutes.

But a key problem with the FC-31 at present is that the Russian-made Klimov/Isotov RD-93 engine that powered the original prototype developed insufficient thrust. Now with the latest prototype some three tonnes heavier, the question about what engine would allow this aircraft to achieve its true performance potential looms even larger.

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**Ameco to boost MRO, cabin completion capabilities**

by Sean Broderick

Ameco Beijing (Stand H65), eying more business jet completion work, is investing in new design resources to help meet growing demand.

The company will open a new workshop with 3D rendering and physical mock-up capabilities that will help present concepts to customers, Ameco said. The facility is slated to open in 2020.

Adding the new workshop will augment Ameco’s already extensive business jet capabilities. The airframe maintenance specialist has one dedicated hangar for business jet completion and maintenance, as well as two cabin-interior manufacturing workshops dedicated to business aircraft completions.

Ameco last year signed a five-year deal to offer warranty work on Boeing Business Jets (BBJs), and completed heavy maintenance checks and interior refurbishments on two BBJs. It also conducted its first ACJ319 heavy maintenance checks.

The company is increasing its commercial MRO capabilities as well. It plans to add Boeing 787 and Airbus A350 C-check capabilities in 2019 and 2020, respectively. Ameco also is preparing to add 737 Max and A320neo heavy maintenance services to its offerings.

Ameco will add to its auxiliary power unit (APU) maintenance capabilities as well. It will boost capacity for Honeywell APU GTCP331-9A9B work, and plans to develop GTCP331-350/350C overhaul capability in the next year.

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Asia-Pacific airline growth is boon for training companies

by Rick Adams

Singapore is rapidly becoming the epicenter for civil flight training in Asia. The Competition Commission of Singapore last week approved the proposed joint venture between Singapore Airlines (SIA) and Canadian simulator manufacturer CAE (Stand U87) to offer pilot training for Boeing aircraft types. Two years ago, SIA opened a similar JV with Airbus (Stand J23), the aircraft manufacturer’s largest training center. The recently formed Boeing Global Services (Stand S23) has its own seven-bay simulator facility bordering Changi Airport. And China-based Haite Aviation Training (Stand H75) in 2015 launched a $70-million, 21,000-square-meter (226,000-square-foot) facility at Changi Airport Business Park. CAE also now owns 100 percent of the Asian Aviation Centre of Excellence in Singapore, formerly a JV with AirAsia.

CAE’s “Airline Pilot Demand Outlook,” released last summer, estimates the Asia-Pacific region will need at least 90,000 new pilots in the next decade, more than the 85,000 pilots currently flying in the region. That represents about 35 percent of the 255,000 new pilots required worldwide. CAE’s forecast is based on estimated fleet growth, pilots per aircraft, retirements and attrition. The 25,500 new pilots per year estimate is lower than Boeing’s 31,850, based on 637,000 new pilots across the next 20 years, driven by aircraft fleet expansion of 41,030, and more in line with Airbus’s expected 34,900 new commercial airplanes by 2036.

Perhaps more significant for the region is CAE’s estimated need of 62,000 new captains. “There’s a lead time here. You can’t just have a pilot when you want one,” Nick Leontidis told AIN. Leontidis is CAE Group President, Civil Aviation Training Solutions. “In Southeast Asia, with a lot of the newer airlines, you tend to have young captains. You cannot be a captain right after you complete your program. You have to accumulate certain hours, you need certain training.”

Leontidis said, “We think the training programs need to be adapted to train captains out of the box. This will allow the airlines to quickly move pilots from the right seat to the left seat when they meet the requirements for that country’s regulator.” The first nine cadets who graduated from CAE’s Multi-crew Pilot Licence (MPL) program in 2011 with Air Asia took six years to become captains with the airline.

Focus on Core Business

Elsewhere in Asia, CAE sold two 7000XR Boeing 737 full-flight simulators (FFSs) to JEUair for the CAE Korea training center in Seoul. They deployed an Airbus A320 FFS to Jakarta Aviation Training Centre (JATC), Indonesia. In addition to the Singapore center, CAE also bought out AirAsia’s interests in joint training centers in Malaysia, Vietnam and the Philippines, but will remain AirAsia Group’s exclusive training partner. Conversely, China Southern Airlines acquired CAE’s equity stake in the Zhuhai Flight Training Centre, but will outsource excess training capacity to CAE for third-party training.

CAE has announced “the first commercial offering of its Next Generation Training System strategic initiatives,” a simulator data-driven capability branded as “CAE Rise.” An evolution of sorts of the company’s Simulator Operations Quality Assurance (SOQA) technology, Rise will compare data from flight crew training sessions against ideal criteria for various maneuvers, enabling instructors to focus on human factors analysis. CAE has also purchased 45 percent of the shares of training courseware specialist Pelesys (Stand F67), Fabrice Hamel, Airbus Vice President of Training Services, told AIN the OEM will open a new A320 flight and maintenance training center this year for VietJetAir in Ho Chi Minh City, Vietnam. “We bring the simulator, we bring instructors, and we bring the same Airbus flight training reference, the same philosophy; the same standard that we deploy in every training center we operate.” Airbus will add an eighth simulator to its Singapore center this year, a third A350, joining two A320 FFSs, two A330s, and an A380.

“We see a change in the airlines,” Hamel said. “Airlines want to focus on what they do best, which is to carry passengers. It started with the low-cost carriers; they didn’t really want to be involved in pilot training. But now we see a change in legacy airlines as well. They want to refocus on their core business, and they want to benefit from the experience of the OEM for pilot training.” L3 (Stand U75) is under contract to provide HNA Group with 11 RealitySeven FFSs for the recently opened Hainan Sky Plumage Training Center in Haikou, China. They have also launched a cadet pilot program in partnership with Hong Kong Airlines through the L3 Airline Academy Training Center in New Zealand. “International pilot training providers like L3 are well positioned to introduce professional aviation infrastructure and training technologies,” said Robin Glover-Faure, who was announced last week as the new President of L3 Commercial Aviation Solutions. “To offer volume solutions for the airlines in the region, L3 is utilizing our own large academies in the UK, New Zealand, Europe, and the U.S.”

Textron Aviation’s (Chalet CD11) TRU Simulation + Training has become embedded with both major aircraft manufacturers. As part of a 10-year agreement with Boeing, TRU has deployed 777 MAX FFSs to Boeing’s Singapore and Shanghai, China campuses. They also have purchase orders for two simulators for the 777-9, to be delivered to Singapore and the UK in advance of the aircraft’s entry into service in early 2020.

For Airbus, TRU is providing A320 FFSs for the Singapore center and Hua Ou Aviation Training Company in Beijing, China. Qantas Airways also recently ordered a
Airbus projects major presence at Singapore Airshow

Airbus has laid claim as the largest international exhibitor at the Singapore Airshow, where the A350-1000 commercial airliner headlines a list of new products from each of its divisions, including the defense, space and helicopter markets.

The A350-1000 has just arrived at Changi, as it continues a three-week demonstration tour of the Asia-Pacific region. Set to enter service with launch customer Qatar Airways, the largest of the A350 XWB family has enjoyed particular commercial success with airlines in Asia, drawing firm orders for 43 examples from Asiana Airlines, Cathay Pacific, and Japan Airlines.

On display here by Airbus Defense and Space, the A400M airlifter has proven its capabilities by playing a critical role in humanitarian operations around the world. The Royal Malaysian Air Force operates the aircraft on display at the show.

Finally, two of the company’s most popular helicopters—the H130 and H135—highlight Airbus’s presence in the light-medium category for a wide range of operations, including public utility, tourism, and private or corporate transportation.

At the Airbus stand in the main exhibition hall (J23), the company is displaying scale models of the A250-1000, A400M, Airbus-100 satellite, and H45 helicopter. The exhibit will also feature a full size mock-up of a section of the new A330neo Airspace cabin, as well as an area dedicated to the company’s growing services business, including information about the Skywise data platform and the Hangar of the Future project to digitize the MRO business.

Airbus has dedicated another section of the stand to innovations, embodied by a prototype of the Skyways autonomous parcel delivery drone, now at an advanced stage of development in collaboration with partners in Singapore. Visitors also can take a virtual reality tour experiencing the world of Airbus today and a glimpse of what the future may hold.

Subic Bay wants to become a hub for business aviation

As general and business aviation are slowly being squeezed out from Manila International Airport, the Subic Bay Metropolitan Authority (SBMA) is hoping to capture this opportunity and has committed its airport to being a hub for business aviation, similar to Sefeter Airport in Singapore.

“My vision is to make Subic Bay International Airport a business aviation airport, as well for general aviation, MRO, and charter flights,” said Wilma Eisma, the chairperson and administrator of SBMA.

“We can get spillover from neighboring airports like Clark, but I would rather court GA/BA heavily and have a niche for them to attract tourists with curated experiences.”

She told AIN during an Asian Business Aviation Association (AsBAA) visit to Subic Bay that they are in the process of privatizing the airport. The process is under guidance from the U.S. Trade Development Agency on the best methods. The aim is to complete the study this year and start privatizing by 2019, before the end of the Duterte administration in five years.

After years of neglect, especially since the exodus of FedEx, the airport was almost mothballed and turned into an entertainment district by the previous president, Benigno Aquino III. The SBMA now has around 900 million pesos (US$17.6 million) reserved for the improvement works at Subic Airport, similar as installation of an instrument landing system and automated weather observation systems. More than 200 hectares (494 acres) of land are earmarked for development at the airport, including plans to extend the 9,000-foot runway.

Also on the table for business aviators is Clark International Airport, which has unveiled a master plan drawn up by Groupe ADP. The former U.S. air base aims to be the second major international hub in the Philippines, with a second terminal currently under construction to handle eight million passengers per annum by 2020.
Taiwan’s Air Asia MRO is seeing civil, military growth

by Chris Pocock

You may know Air Asia as Southeast Asia’s largest low-cost carrier. But there is another Air Asia in the region. It is a major MRO company on Taiwan that traces its history all the way back to 1946. Today, it offers a wide range of services to airlines as well as air arms, who were the original customers.

To reduce the confusion, Taiwan’s Air Asia is also known as Air Asia Company Ltd, or AACL. It is based at Tainan Airport, where there are three big hangars for narrowbody airliners and 12 small ones for the overhaul of helicopters, plus a big engine and component shop. But some of AACL’s 800-plus employees also work at six other locations on Taiwan, thanks to a major outsourcing contract from the country’s armed forces. The company overhauls and supports Taiwan military aircraft ranging in size from the C-130 Hercules down to the MD 500 helicopter.

The latest addition is the P-3 Orion, 12 of which are now in service with the Taiwanese Air Force. Lockheed Martin was obliged to find a local support and overhaul company as an offset. “But after a survey, Lockheed Martin chose us,” an AACL official told AIN. The company names EVA Air as a competitor that derives a significant amount of its turnover from third-party MRO.

The recent renewal for five years of the local military outsourcing contract, otherwise known as the Government Owned Contractor Operated (GOCO) contract, helped AACL’s application for a public listing on Taiwan’s stock exchange last September. Before this, about 80 percent of the company was owned by the Taiwan Aerospace Corporation (TAC), 30 percent of which is already privately owned, with the remainder held by banks and quasi-government entities.

AACL’s turnover reached S$121.8 million (US$92.4 million) in 2016, and about one-third of that is already commercial work. The company is seeking new customers in Asia, especially airlines flying the A320 and 737 families. It holds commercial MRO approvals from the U.S. FAA, China, Japan, and Russia plus seven other jurisdictions, five of them in Asia. These also cover the MD-80/90 series, most Bell helicopters, and a variety of other types.

The company has also been licensed as an authorized service center by major non-airframe OEMs, including Honeywell, Rolls-Royce, and the Triumph Group.

As part of its expansion strategy, AACL is seeking approvals from EASA and “strategic alliances” with other repair shops. It has held talks in Indonesia, Thailand, and Vietnam. The company told potential investors last year that the global aviation maintenance market will rise in value from S$89.1 billion (US$67.6 billion) in 2016 to S$132.6 billion (US$100.6 billion) in 2026. By that time, China and the Asia-Pacific region should account for 40 percent of that.

The West Risks Losing Its Edge on EW

After more than 15 years being bogged down in the Middle East battling unconventional electronic warfare (EW) threats, there is an increasing risk that Western EW operators might lose the skills and technology needed to tackle the rising threats against high spectrum EW capabilities from the East. In the past decade, Russia and China have increased investments and complexities in their EW capabilities in enormous proportions.

This message was brought across by Air Marshal Philip Sturley, RAF (Retired) and Air Adviser and Mentor, at the Asian Defence Exhibition and Conference Series (ADECs), organized by Clarion Events in Singapore last week.

“Few people now know about EW outside the context of Afghanistan,” he said. “We need to make the practice of EW at the level of command staff, and increase its awareness and education. We have underestimated its value in peacetime, only to play catch-up in conflict.”

Sturley also called for greater EW collaboration by various air arms in the region, slowly but surely, to promote interoperability and trust. Indeed, exercises like Cope Tiger and Pitch Black have begun integrating EW tactics into the exercise scenarios.

His points were echoed by Dr. Robert Andrews, managing director of EW Test and Evaluation (EWTE) Consultants Ltd. He observed that the West is catching up on developing counter-IED and infrared multi-spectral flares during the conflict in the Middle East, where the adversaries were using commercial of the shelf (COTS) systems and MANPADs, which at that time were relatively new to NATO commanders.

However, at the same time, Russian anti-aircraft systems were digitally upgraded, incorporating new technologies such as active electronically scanned array (AESA) radars, which are harder to detect and jam.

The S300/S400 surface-to-air missile system is one example of such a capable system where true radar data is still sketchy. Now, with both Moscow and Beijing building and deploying more new missiles and EW assets, there is a chance that the West might not be fully ready in terms of hardware and soft skills.

Andrews suggests using COTS, military off the shelf and open architecture to keep EW development ahead of the curve and adaptive to changes. He also highlighted new trends in EW such as the use of drones, new radar materials like gallium nitride as well as cognitive EW, which learns and adapts to the ever-changing EW environment.
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ScanEagle UAS offers new capabilities

by Mark Huber

The Boeing/Insitu ScanEagle fixed-wing UAS system continues to gain new features and capabilities as its popularity increases with both military and civilian users. The Singapore Navy has deployed it from its Victory class corvettes at sea, and it has also been used by the UK Royal Navy. The U.S. Navy has flown it since 2005, and worldwide it is in use by more than two dozen countries.

ScanEagle has a wingspan of 3.1 meters (10.2 feet), a length of 1.6 meters (5.3 feet), a maximum takeoff weight of 23 kilograms (50.7 pounds) and a typical cruise speed of 50 to 60 knots. Endurance can exceed 24 hours. Power comes from a two-stroke, aft-mounted engine that runs on either JP-5, JP 8 or high-octane unleaded C-10 gasoline. Range from its positive controller varies from 80 to 150 km (43.2 to 90 nautical miles) and service ceiling is 19,500 feet. The turret can accommodate electro-optical and infrared sensors and cameras including EO, EO/IR and MWIR (mid-wavelength infrared) dual imager. The video datalink can be analog or digital encrypted and the C2 datalink can be either encrypted or unencrypted.

The ScanEagle system can include a trailer-mounted, runway-independent Mark 4 launcher for ground-launched operations, a compact Mark 4 launcher for maritime and multi-mission operations, a single-operator ground control workstation, and the SkyHook runway-independent recovery system. Approximate system cost is S$46.1 million to S$69.5 million (US$34.5 to $55 million) depending on supporting hardware and sensor packages ordered. A typical system includes three to four air vehicles. "All night or high-end sensors; you're at the top of that range. A more baseline system, you're closer to the bottom. In many ways it's akin to buying a new car. The base model is at one end of the scale, but if you add all the high-end options, the price increases," said Andrew Duggan, managing director of Insitu Pacific.

Maritime Surveillance

"ScanEagle fits the needs of Asian navies particularly well in places like the South China Sea, which is a complex operational environment right now. Most countries in the region have an increased need for maritime awareness," Duggan said. "While many countries employ manned aerial maritime surveillance, we think ScanEagle fits very well below that level of surveillance to provide organic surveillance for vessels employed in that area. More nations around South China Sea will start deploying ScanEagle in the next 12 to 24 months." Duggan said ScanEagle ideally is deployed at sea from ships in the 50- to 60-meter class, although it has been launched and recovered from smaller ones. He said, "Because of ScanEagle's long endurance and the fact that we don't take up space on the helicopter deck, we can operate in concert with a maritime helicopter."

At any given time, Duggan estimated that there were between five and 15 ScanEagle systems deployed in the region. Singapore has been operating the system since 2011 and its navy has been trained to support the system independently. Insitu can also support ScanEagle in the region from its base in Australia.

ScanEagles equipped with Sentient's ViDAR (visual detection and ranging) system have proved a powerful maritime surveillance tool. Lighter and more compact than radar, ViDAR is domain, by sending objects detected to the operator for further analysis by the aircraft's primary sensor. On ScanEagle, it provides continuous scans in a 180-degree arc ahead of the vehicle to a range of 37 km (20 nm), and can cover more than 45,824 sq km (13,305 sq nm) of ocean in 12 hours at 60 knots. ViDAR autonomously detects any object on the surface of the ocean, providing the ground control station with an image and location coordinate of each object detected in real time. Selection of one of these images automatically cross-cues the primary sensor to objects of interest for closer inspection.

Civil Applications

ScanEagle is also increasing in popularity for civil and parapublic operations, according to Duggan. Last year Insitu announced a contract with Shell QGC in Queensland (Australia) to use the system to monitor and inspect infrastructure in a patrol area encompassing 1.73 million acres in the massive Surat Basin gas fields, potentially reducing travel by ground crews of up to 800,000 km/year (432,000 nm/year). The sensor pack used on ScanEagle for this application enable collected data to be automatically processed and analyzed in near real-time with actionable information (including equipment checklists and operational status) before being delivered directly to field operators and supervisors, and management staff in the headquarters facility in Brisbane. While the average ground crew can inspect four to five wellheads per day, Duggan said ScanEagle can do an order of magnitude of that easily.

Last year, ScanEagle was also flown over the massive wildfires in Oregon and California and Hurricane Harvey in Texas in the United States. ScanEagle collected and processed data on hot spot and fire line locations and disseminated up-to-date information to firefighters for their morning planning meetings. Duggan noted that ScanEagle can supplement manned firefighting fleets by "flying the gaps," or operating during dense smoke conditions or at night, when manned aircraft typically are grounded due to hazardous flying conditions. He also said that ScanEagle can fly lower than manned spotter aircraft, beneath the altitude used by water bombers, to gather more precise information.

Duggan said that very few private or parapublic users either have the budget or appetite to own their own ScanEagle systems; rather, the company provides turn-key solutions to these users, selling them the data from ScanEagle via hourly or daily rates. Going forward, he said, the company is focusing on software that will enable the vehicle to do more data processing onboard to "minimize the amount of data that needs to be passed around," increasing reliability in "a certifiable way," and bringing autonomy to the system that "can be trusted by the regulators," even though ScanEagle is a robust and proven system with nearly 1 million flight hours. Duggan said, "These assets really start to show huge synergistic benefits to military and commercial organizations when one pilot can fly multiple aircraft. That is where the future is in this space." Currently military and civilian authorities require that each vehicle be flown by a dedicated operator.
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Anti-UAS programs ramp up as OEMs rush to fill a niche

by Mark Huber

As governments worldwide continue to refine their regulatory approach to counter-UAV technologies, more companies are jumping into the market and advancing their programs. In December, Germany’s Hensoldt demonstrated its Xpeller counter-UAV system at the Airbus airfield in Hamburg.

Xpeller uses a suite of radar, RF, optical sensors, and a targeted jammer. The system can be integrated into existing airport systems. During the demonstration, Xpeller detected UAVs approaching from a number of locations and was able to identify a variety of UAVs, including small recreational models, from a distance of several miles away. Xpeller can assess a UAV’s threat potential, analyze its control technology, including lasers and high-powered microwaves, devoted to UAS (unmanned aircraft systems) abatement. Among the companies and organizations working on such systems are Boeing, Raytheon, BAE Systems, Lockheed Martin, GACI, the Dubai Civil Aviation Authority, Sanad Academy, Sensofusion, SystemsGroK, Batelle, Blighter Surveillance, Systems DroneShield, Bede, CTS Technology, Theiss UAV Solutions, MGTech, Malou Tech, Guard from Above, Saab, UMS Aero Group, OpenWorks Engineering, Advanced Ballistics Concepts, Snake River Shooting Projects, Department 13, DeFect, Drone Defence, and Liteye Systems. Methods include jamming and ballistic interception with munitions and nets.

Some of these systems are very mobile and compact and can be fitted to delivery devices the size of hunting long guns. Some systems, such as Amtec’s Sky Net “less lethal” Mi-5 ballistic shells, can be fired from a 12-gauge shotgun. Amtec is the largest volume producer of 40 mm grenade ammunition and fusing in the world, and is the current sole prime contractor to the U.S. Department of Defense for the 40 mm family of grenade ammunition. The Mi-5
cost $20 for a three pack. The rounds contain five-foot wide capture nets and can down drones up to 55 pounds. The nets travel toward the target, attach to it, and cause it to crash.

Of course there is no shortage of high-tech and dramatically more expensive anti-UAS solutions. The most dramatic of these are targeted laser weapons that are virtually impossible to detect or defend against, exemplified by Boeing’s Compact Laser Weapons System that successfully downed a drone during testing in 2015 by burning a hole in it. The laptop-controlled Boeing system is about the size of four suitcases, can be field assembled quickly and operated by two technicians, and operates off 320-volt field power.

Lockheed Martin also has an anti-drone laser system, as does Raytheon. The latter also continues to refine its “Phaser” high-powered microwave system that can also be operated off field power such as a diesel engine. The company claims it is faster and therefore more effective than a laser and could be operational within two years.

The U.S. Department of Defense is moving quickly to fund and evaluate counter-drone systems. The Department has budgeted $750 million toward rapid development of effective technology and last February hosted a “hard kill challenge” in White Sands, New Mexico, to evaluate prototype systems.

The challenge’s focus was on technologies that could hard kill a UAS beyond a range of 250 meters. During the challenge, teams had the opportunity to hard kill a combined 30 rotor- and fixed-wing Group 1 UASs (mass less than 22 pounds, altitude under 1,200 feet agl, speed below 62 mph) in scored events and four additional UASs in non-scored events.

For the most part, the technologies evaluated at White Sands were less mature and effective than the Pentagon had hoped and left lingering questions with regard to how well they would work against UASs, especially warming drones. While the need for anti-UAS in a combat environment is indisputable as groups such as ISIS begin to weaponize drones, widespread deployment of such systems by civil law enforcement creates the possibilities for misidentification and erroneous destruction/damage of UAVs.

Bell V-280 Valor Tiltrotor Flight Testing is Now Underway

Bell Helicopter’s V-280 Valor next-generation tiltrotor prototype made its first flight on December 18 from the company’s facility in Amarillo, Texas. The V-280 program is part of the Joint Multi-Role Technology Demonstrator (JMR-TD) initiative, a science and technology precursor to the Department of Defense’s Future Vertical Lift (FVL) program. It combines the resources of Bell, Lockheed Martin, GE, Moog, IAI, TRU Simulation & Training, Astronics, Eaton, GKN Aerospace, Lord, Meggitt, and Spirit AeroSystems.

"The Valor is designed to revolutionize vertical lift for the U.S. Army and represents a transformational aircraft for all the challenging missions our armed forces are asked to undertake," said Bell CEO Mitch Snyder. "I could not be more proud of the progress we have made with first flight.”

According to the DoD, the FVL program is designed to find a replacement for the Army’s Sikorsky UH-60 Black Hawks and the Bell UH-1 operated by the U.S. Marine Corps. The program ultimately could result in deliveries of as many as 4,000 aircraft by 2030 under a contract potentially worth $100 billion and include significant foreign military sales.

Bell (Stand G01) said the V-280 can carry 14 passengers and four crew and eliminates the V-22’s rear loading ramp in favor of six-foot-wide fuselage doors under the wings. The tiltrotor provides twice the speed and range of conventional helicopters. Specifications include a maximum speed of 280 knots; combat range of 500 to 800 nautical miles; maximum self-deployable range of more than 2,100 nm; and more than 13,000 pounds of usable load. It features fly-by-wire flight controls and a pair of GE Aviation T64-GE-419 turboshaft engines.

Bottom left: Germany’s Hensoldt demonstrated its Xpeller counter-UAV system at the Airbus airfield in Hamburg.
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Boeing unveils new unmanned VTOL cargo vehicle

Though it’s not on display here at the Singapore Airshow 2018, Boeing (Stand U09, U23) is touting a new unmanned electric vertical-takeoff-and-landing (eVTOL) cargo vehicle (CAV) prototype, designed to carry payloads up to 500 pounds (227 kg). It will be used to develop autonomy technology for future aerospace vehicles. Led by Boeing HorizonX, the prototype CAV was unveiled last month. It was designed and built in less than three months and completed initial flight tests at the Boeing Research & Technology’s Collaborative Autonomous Systems Laboratory.

“Our new CAV prototype builds on Boeing’s existing unmanned aerial vehicles capabilities and presents new possibilities for autonomous cargo delivery, logistics and other transportation applications,” said Steve Nordlund, Boeing HorizonX vice president. “The safe integration of unmanned aerial vehicles is vital to unlocking their full potential.”

The CAV complements the eVTOL passenger air vehicle prototype aircraft in development by Aurora Flight Sciences, which Boeing acquired late last year.

Rockwell Collins

with Rockwell Collins ARINC Airport Solutions as part of its 2032 “smart airport” program. With the focus on Port Moresby-Jacksons International Airport, Rockwell Collins ARINC is providing a range of products, such as VMUSE, AirVue, AirDB, AirPlan and Veripax, that enhance capabilities in areas such as passenger-processing, flight information display, operational databases, and optimization of passenger flow through security checkpoints. One area where Rockwell Collins has achieved considerable success is the commercial head-up display (HUD) market. In late December, a Shandong Airlines Boeing 737 equipped with a Rockwell Collins Head-up Guidance System (HGS) made the first takeoff by a Chinese commercial aircraft in conditions below the normal 150-meter runway visual range limits.

Numerous other flights were delayed when fog beset Jinan-Yaoqiang International Airport, but HGS-equipped aircraft were cleared to operate. With China’s air traffic continuing to rise, and fog and haze a regular hindrance, head-up display systems are seen as an important factor in minimizing schedule disruptions.

KC-390 talks

SkyTech considers that the Brazilian aircraft offers a thoroughly modern airlift capability, and a considerable performance improvement over the popular but aging C-130 Hercules, as well as great versatility for a number of tasks. SkyTech aims to acquire the aircraft in full NATO military specification, including optional inflight refueling capability, and lease them to air arms.

They will remain the property of the company, but will be military-registered and operated. Lease terms could vary, but would typically be 10, 12 or 15 years.

A service provision arrangement would be entertained if a government required it, but the long-term lease offers the most attractive proposition for most potential customers. For those customers, the arrangement not only greatly reduces start-up costs by removing the acquisition element, but would also permit upgrading at the end of the lease term.

The original lessee could acquire a new fleet, allowing the force to maintain currency with technology and refresh costs by removing the acquisition element at reduced interest costs on the operational fleet at reduced interest rates compared with a traditional outright acquisition program.

Changi’s Jewel

Right: Singapore Minister of Transport Khaw Boon Wan (center) took a moment five-story above-ground mix of landside public shopping, dining, hotel, aviation and general attractions. The Sky Nets attraction is above and behind the forest inside the Jewel model. See page 6 for the full story.
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