The Bulletin
A week in Defense & Aerospace

"*The Bulletin*" is a newsletter published by ADIT focusing on international aerospace and defense markets. You will find here a digest and some short analysis of a selection of news picked around the world over the last 7 days.

480

THE POWER [engine] OF LOVE

The Power of Love was a song released by the Californian rock band ***Huey Lewis and the News*** in 1985 as part of Robert Zemeckis' blockbuster ***Back to the Future*** motion soundtrack. And it was starting like this:

♫ The power of love is a curious thing
Make a one man weep, make another man sing
Change a hawk to a little white dove
More than a feeling, that's the power of love? ♫

Speaking of power and feelings, last weekend, the **Chinese C919 airliner program** – currently in a busy flight testing program was just about to lose its own powerplant, which must cause some strange feelings! No there was **not the slightest technical problem with the LEAP-1C** engine, the variant specially designed for the airplane, and supplied to COMAC since 2014 by CFM International, the hugely successful JV created in the mid-70's between **US GE Aviation and French Safran**. Don't worry: the flight test campaign of the C919 continues unabated. But **on Feb 18. several reliable sources** - starting with the Wall Street Journal, later confirmed by Reuters and cross-checked Aviation Daily – said that **the Trump administration was about to deny LEAP-1C export license to China…** Meetings were scheduled in Washington with representatives of the Dept. of Commerce, and official language elements were about to be released. **Such a decision was totally unexpected**, but it was **certainly possible from a regulatory point of view**, and with someone as impulsive as Donald Trump at the White House, it could never be ruled out neither**…** Considering the lack of alternate suitable powerplant, in spite of the government-owned Aero Engine Corp. of China efforts, **denying any engine containing US component to the C919 would have basically meant the death of the program**, and a major setback for Chinese ambitions in commercial aviation. The Chinese are clearly lagging in terms of jet engines technologies. And at this stage, in a foreseeable future, offering the C919 powered by a domestic engine would kill outright any export prospects. So the feelings in China must have been quite hurt, or as Huey Lewis used to sing:

♫ First time you feel it, it might make you sad
Next time you feel it, it might make you mad ♫

But soon after, **and just as unexpectedly**, **Donald Trump opposed** the unattributed move in a series of tweets pledging open and fair trade, and **backing away from the "*National Security excuse*"** sometimes put forward to cover otherwise purely protectionist policies. Just like Huey Lewis, he may have suddenly felt the *power of love*, *"Can you feel it? Hmmm…."* Or he may have simply been **reminded the possible and counterproductive backslash on US** OEMs. Which brings us back to ***Huey Lewis*** clever opening words:

♫ The power of love is a curious thing
Make a one man weep, make another man sing
Change a hawk to a little white dove
More than a feeling, that's the power of love? ♫

The motivations behind this veiled threat are up to anyone's guess: remind China about one weakness during trade discussions? Put pressure regarding the 5G/Huawei issue? Send a subtle message on IP theft, just a few days before the Defense Counter Intelligence Agency released its report on Foreign Targeting of cleared industry? And this all episode may finally be down to a power struggle inside Washington, far from a grand bargaining plan… Or as Huey Lewis used to sing:

♫ It don't take money, don't take fame
Don't need no credit card to ride this train
It's strong and it's sudden, it can be cruel sometimes
But it might just save your life ♫

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SNAPSHOTS

The Garmousha drone, made by ADASI, a subsidiary of the government-owned conglomerate Edge, was on display on the first day at UMEX 2020, a conference dedicated to unmanned technology that took place Feb. 23-25.).

On Feb. 23, a Chinese special carrier loaded the Odyssey, Sea Launch's ocean-going launch platform. The ship and platform are expected to arrive in Russia, 50km from Vladivostok, in the second half of March. In 2018, the aviation S7 Group purchased the Sea Launch company. (*Credit: Howard Freshman. ©The Grunion)*

POINTS OF VIEW

UE: Boeing Embraer and *"the Brussels effect"*

Numerous questions arise concerning **Boeing-Embraer's alliance especially after the EU slowed the merger process** for the second time by requesting more than 1.5mn pages of documentation, **postponing their final decision deadline to April 30th**, more than two years after both companies first notified their wish to link their commercial activities.

As recently seen with Alstom and Siemens, the EU has the power to veto European mergers. But procedure and jurisdiction allowing the European Commission to examine, authorize or even cancel a merger between two non-European companies having activities located outside the Union as it is actually the case between the US and Brazilian manufacturers are somewhat byzantine. So what is the mechanics behind the decision process happening within the organization that we often tend to shortcut EU-related matters to the European Commission.

If the Commission is indeed the "guardian" of EU treaties and act as a decision-making body, not all of the 27 commissioners (one per member country) are responsible for economic matters. In our case, **only Margrethe Vestager** assumes responsibilities for such matter. Amongst the 54 services acting as subsections of the Commission, one in particular, the **Directorate General for Competition (DGC) is specialized on topics linked** to economic matters and act as an advisory body to its commissioner. The latter DGc employs economists, industry experts and special advisors who **analyze about 300 merger proposals annually**, sometimes with the help of national bodies such as "l'autorité de la concurrence" in France. But how does it concretely works?

In principle, the commission only examine large merger cases within an "EU dimension" for companies reaching a certain turnover. Among the turnover thresholds for EU dimensions are the following:"*(i) a* ***combined worldwide turnover*** *of all the merging firms* ***over €5bn****, and (ii) an* ***EU-wide turnover*** *for each of at least two of the firms* ***over €250mn***" *or "****a worldwide turnover*** *of all the merging firms* ***over €2.500mn****, and a* ***combined turnover*** *of all the merging firms over* ***€100mn*** *in each of at least three Member States*", the Commission explains. If companies meet these requirements, **they must notify the Commission** with their merger project for the DGC to review their case. **In general, 90% of cases are resolved in the first phase of investigation (in 25 days)** even though it sometimes happen that the European Commissioner has concerns about the potential impacts such merger can have on competition (the famous **antitrust policy**). The **Commissioner generally decides to notify the companies of its doubts under the EC Merger Regulation Art. 2a** which stipulates: "*The commission shall take into account the* ***need to maintain and develop effective competition within the common market*** *in view of, among other things, the structure of all the markets concerned and the actual or potential competition from* ***undertakings located either within or outwith the Community***". Following this, **merging companies can offer remedies to defend their case**, **as UT and Raytheon did** when they offered BAE to acquire Collin's Aerospace Military GPS and Airborne tactical radios business, bought out for $2.1bn earlier this year.

Previous examples of A&D merger cases vetted by the European Commission included the **£8bn acquisition of GKN by Melrose in 2018** quickly judged as "*compatible with the internal market and with Agreement on the European Economic Area"*. In 2018 also, the EC has notified **Northrop Grumman that it has approved the acquisition of Orbital ATK for $9.2bn without conditions**. In April 2019, the Commission also approved the $5bn acquisition of StandardAero by the Carlyle Group, in absence of "any *issue for the internal market*".

But sometimes, merging entities offer "remedies" to the EC in order to defend their case, as **UTC did with Rockwell Collins in 2017**. The EC finally approved the $50bn merger under certain conditions such as divestment of businesses in actuators, pilot control, ice protection and oxygen systems. The same case happened between **L3 and Harris last June** which had to divest their global night vision business in order to complete their $18bn deal (a corresponding deal had even been announced earlier with Elbit Systems…). The group later sold its airport security business to Leidos for $1bn.

Nevertheless, if concessions aren't sufficient, **a second, longer phase of investigation is opened** and even more data are reviewed such as internal documents, extensive economic details or revenues for an **extra 90 days period** (or more if companies refuse to give the necessary documents!). For example, Raytheon and United Technologies - who are expected to combine in the second quarter in a $120bn operation - have agreed to offer BAE to acquire Collin's Aerospace Military GPS and Airborne tactical radios businesses, bought out for $2.1bn. However, **the Commission announced no later than today it is expected to decide on the merger by March 13th 2020**, two weeks later than planned.

Boeing and Embraer have not been asked for any concessions but are currently experiencing a longer investigation anyway. This is a consequence of the concept known as ***the "Brussels effect"*** which enables the EU to (de facto) enforce its laws outside its borders. Unlike global political bodies (like the UN) where stakeholders agree to adopt measures by coercion (such as sanctions for example) the Brussel effect or "***unilateral regulatory globalization***" occurs through market mechanisms. The academic expert who named the concept, Pr. Bradford states:"*Because the EU has the World's largest internal market, companies that want to trade with the union must decide whether to adopt one set of standards for Europe and another or multiple other sets of standards for the rest of the world. In most cases, they choose to adopt one standard—that of the EU. Therefore, despite its financial and political shortcomings, the EU is a major force in the global economy*". For example, **in 2012, the EU included aviation into its**

existing Emission Trading Scheme which obliged any airline, regardless of their country to purchase emissions-permits for any flight within the European Economic Area. **In October 2000, even after validation by the US DoJ, the $42bn merger proposed by Honeywell and GE was blocked by the Commission** on grounds that it would create a monopoly in the jet engines segment, hence it was simply not legally possible to let the acquisition proceed in the US market and not in the EU one.

For the sake of weighting even more on the commercial balance, many countries decided to create their own "market effect", which is why **Boeing-Embraer's Alliance was already approved by 8 nations (including Nigeria, Kenya, China, Japan and South Africa -** see *The Bulletin #479*). But since Oct. 2019, and after a first deadline on Feb 20. was passed, it remains suspended to EU's decision, last but not least jurisdiction to have a say.

The Commission must now argue if the merger would severely **reduce the number of major participants in the global jet market from three to two**; hence penalizing airlines which would only have 2 suppliers to deal with, since new entrants such as China or Japan will take years before becoming a meaningful alternative. Several observers, including customers representatives such as Aengus Kelly from Aercap, think that leaving Embraer alone would rather penalize the market**. Other analysts such as Scott Hamilton - believe the merger process is being held hostage on purpose by the European Union,** in response to President Trump's implementation of taxes on Airbus jet imported into the US. The ongoing "*trade war"* set up by the US administration levied a 10% tax in Oct. 2019 and it seems the World Trade Organization even gave the US the authority to levy 100% taxes, which could enable the US to potentially benefit up to $7.5bn. The merger between Boeing and Embraer could be a leverage to make Trump drop tariffs on the European manufacturer – stay tuned.

ITALY: "Counting ships from the stars"

A few weeks ago, *The Bulletin* covered the 5th edition **of SMi's Maritime Reconnaissance & Surveillance Technology (MRST)** conference that took place in Rome on Feb. 5-6, taking the opportunity to speak with several of the naval experts active in this fast changing field. Here are our key take-aways. A century ago, navigation officers aboard warships would use complex optical instruments, known as sextants, to determine their course in the open seas by looking at the star-spotted night sky. Nowadays, things are pretty much the other way around: **we are increasingly using complex optical instruments aboard observation satellites**, to spot myriads of vessels and determine their courses… With the help of ever more advanced space-based assets, bountiful harvests of **data are now being collected daily, and then fused, correlated, analyzed, etc**. to transform them into actionable information. In turn, this new "*gold rush*" allowed for a "***revolution in maritime ISR"***, giving birth to systems so powerful they can **automatically detect and track suspect vessels from above.**

What we learned – Maritime Domain Awareness (MDA), that is to say situational awareness, **augmented with intelligence insights**, is currently being transformed by some far reaching technological innovations. Most industry players try to follow the trend, usually resulting in a widely shared, **3-phase approach to data: *collect, analyse and predict***. But some companies have been trying to adopt alternate ways to deal with the **increasing need for Maritime ISR capabilities "*from coastal to deep water*."** This necessary extension of the coverage area is obviously driven by challenges posed by **near peer powers** in contested zones, the shenanigans of several **rogue states** (Iran, North Korea), and **other asymmetric threats** such as piracy, and trafficking.

Revolutions in space. The space market has experienced rapid changes over the last decade (cheaper access to space, emergence of small sats, launch of new constellations, etc.) that prompted the **availability of new and better payloads** (optical, radar, laser, etc.) as well as optimized coverage and higher revisit rate. These trends allowed **satellite operators like Maxar or ImageSat to sell more imagery and associated services**, gaining a competitive advantage that underlines an important fact: **a lot of vessels do not emit any AIS signal in some areas of the globe (sometimes over 70%),** which prompt authorities to correlate this imperfect data with SAR and E/O to better search, detect, ID and track those "*dark ships*."

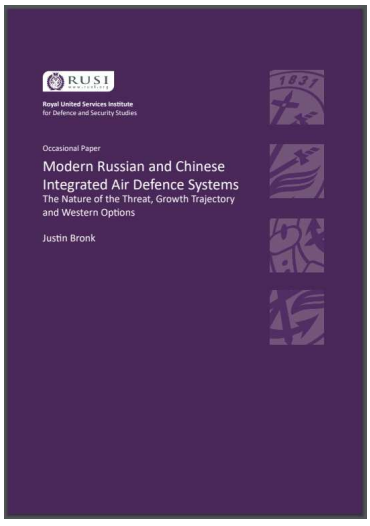
Dealing with legacies. With that in mind, and under persistent budget constraints, it was **far easier for nation-states to keep their current legacy systems running**, than advocating for a continental reset of all MDA infrastructure and software solutions. The European Commission (EC) therefore sought to involve a number of national champions and start-ups into **several programs to build & test alternative solutions**. The latest initiative is **OCEAN2020** (Open Cooperation for European mAritime awareNess), the first project funded by the European Union's Preparatory Action on Defense Research and implemented by the European Defense Agency (EDA), **gathering more than 40 partners led by Leonardo**. OCEAN2020 is an eff**ort to interconnect in one System of System (SoS) all the assets needed to perform MDA missions**: drones (UxV), ships and task forces, as well as Maritime Operation Centers (MoC). This concept collects the benefits of different assets teaming. For example UxV with ships bring **payload modularity** and thus tailored info (compared to the fixed equipment of a frigate), while UAV offer **endurance, versatility and resolution advantage** (compared to satellite coverage, even if it can quickly inspect wider areas). With OCEAN2020, which already passed its **first sea trial last year**, Leonardo also validated an **overall architecture** where the various management systems (combat, mission, etc.) are currently being integrated in order to share a common picture

Human in the machine. MSA solutions providers, like the **French CLS**, are **often agnostic regarding data sources and format**s, and can import

other providers or customers' existing assets in their systems. This is critical for end-users (navies, coast guards, etc.) since it **allows them to add their own intelligence to the picture**. But the multiplication of data feeds, combined with the quantitative boom of data (mostly driven by sensor quality and diversity) can quickly lead to complexities and bottle necks. **Tel Aviv-based *Windward*** for example, choose to go **cloud-based to conciliate computing power and flexibility in data access/storage**, explaining that ad hoc architectures are bound to be saturated by data, sooner or later. This also enables to **apply advanced automation**, via artificial intelligence (AI) and machine learning (ML) techniques, to improve systems efficiency and reduce the man-power needed to operate this vast array of drones, satellites, and data centers. After all, as one of the speaker said, *"there is nothing more manned than an unmanned system…"*

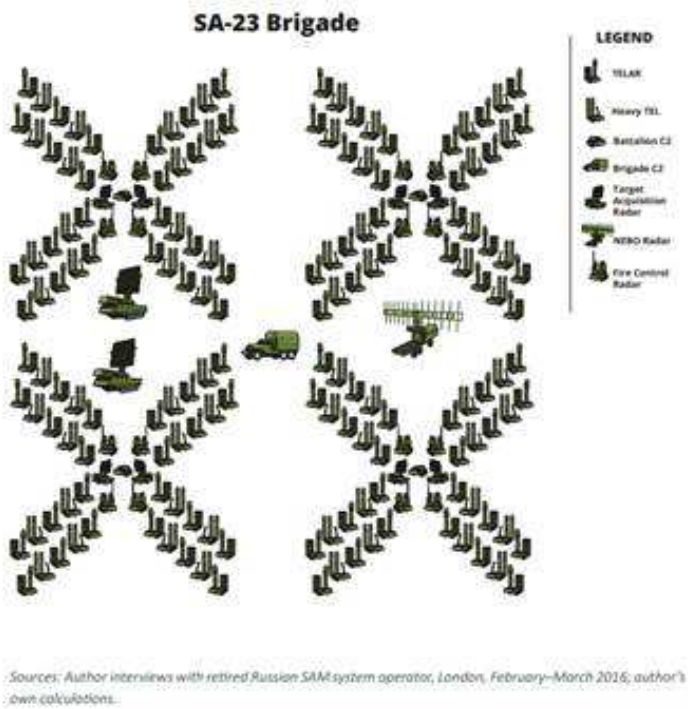
PUBLICATION

Modern Russian and Chinese Integrated Air Defence Systems: (RUSI - 2020/01/15)



This Occasional Paper provides an assessment of technological and strategic trends in Russian and Chinese integrated air defence systems. And to be fair, this excellent, 30 pages paper is a kind of "*Integrated Air Defense for Dummies*", popularizing a matter that is often taken for granted but **rarely detailed and properly explained**, in spite in all its complexities, and the obvious sensitivities it carries with it.

In this paper, RUSI Research Fellow Justin Bronk, a recognized expert in Air Power matters, draws on in-depth research including interviews he managed to have with current or retired operators of such systems, on both sides of the Iron Curtain. After having depicted **the Basics of Surface to Air Missile (SAM)** systems operations and their use in traditional or asymmetric warfare in a first part, he describes the tactical use of these systems with their characteristics, advantages and drawbacks along with the offensive or defensive measures that are nowadays adopted by different actors. With all the resources spent and experience gained during the cold war (including the shoot-down of Gary Power's U-2 in 1960) **Russia is a seasoned and sophisticated IADS operator**, he pledges. And today, the Russian Federation is **still at the cutting edge of technology, especially with its newly developed S-400 battery using the 400km range 40N6 Missil**e, and the **advanced NEBO-M radar complex**. That said Mr. Bronk highlights that such systems are often limited in terms of their effective range by "***radar horizon issues***" (earth rotundity or mountains) or increased aircraft stealth capabilities which are specifically designed to be difficult to detect and track. To overcome this issue, a solution have been developed by Moscow: "*the Russian approach has been to develop multiple classes of digital radar operating across a broad range of the radar spectrum, scanning for targets from multiple different angles and ranges to allow th*e returns to be cross-referenced. The idea is that this **multi-static, multi-frequency *approa***ch *will overcome many of the advantages of stealth aircraft by ensuring a sufficiently high effective resolution to allow detection and tracking at much greater ranges (…) the **Nebo-M is designed to feed directly into either SA-21 or SA-23 battalions**' command vehicles, and increase the long-range and anti-stealth capabilities of the whole IADS through them"*.



(Credit: RUSI – Justin Bronk)

So is the S-400/Nebo-M combination the perfect *"F-35 killer"*, as it is sometimes dubbed? The author remains reserved on the matter, arguing the latter aircraft was specifically designed to avoid detection and if not invisible to a vast array of networked sensors, it remains very complicated to track. (That why it was so important for the US and NATO to deny the Russians the opportunity to better scrutinize the stealth fighter using S-400 batteries in Turkey...) **Regarding doctrine, Russia have a precise** vision when it comes to using these IADS, especially in regards to the buffer zone it virtually seeks to maintain against the NATO allies. Mr. Bronk indicates that besides defending the Russian airspace, the long range missiles of systems like the S-400 and S-300V4 allow the Russian IADS to threaten aircraft flying **well inside their own natioanl airspace,** especially near Poland the Balkans and the Kaliningrad enclave. Besides the defensive options against fighters with long range stand-off missiles, this **also gives Moscow potential offensive options** in case of an open conflict. The author especially emphasizes the ability given by these IADS to enable the Russian Air Force to focus on NATO ground forces during crucial moments whilst obliging NATO air forces to focus on Suppression of Enemy Air Defenses (SEAD) and Destruction of Enemy Air Defenses (DEAD) missions rather than supporting friendly troops throughout the first weeks of an eventual conflict.

China has a rather different strategy in mind, Mr. Bronk notices, as one of Beijing's goal is to **be able to limit US influence in the Pacific**. Less empowered than the Russian when it comes to SAM capabilities, Beijing successfully gained high capacities for radar and sensor technologies **thanks to their advanced domestic electronic capacity**. According to the author: "*While not able to combine maritime-, air- or land-based sensor and shooter platforms in joint engagements yet, China is able to project a* ***more varied and geographically extensive IADS than Russia.*** *This is thanks to a mixture of mainland coastal SAM sites, sites on artificial reefs throughout contested maritime areas, and a rapidly growing and increasingly capable PLAN task group presence inside the First Island Chain"*. These detection capabilities, combined with the **HQ-9 SAM system** (or HHQ-9 for the Navy variant) could potentially enable China allies to safely project their aviation within 1000km of Chinese shores. The question for Western Air Forces is now: what is the best way to deal and overcome these threats, in order to maintain air superiority in the theater? After **giving a clear definition of both DEAD and SEAD missions**, Mr. Bronk suggests that those who can afford it, should opt for **both Very Low Observable aircraft, combined with specialized and powerful Electronic Warfare platforms**. That's the US way of going at well protected A2/AD (Anti-access/area denial) zones. For less affluent Air Forces though, Mr. Bronk suggests that **stealthy airframes, while more costly up front, retain value over the long-term**, whereas as constantly upgrading EW capabilities is a never-ending, and finally costly endeavor… Anyway, both EW professionals and the general public interested in those matters might read this occasional paper with profit.

VALUATION

Meggitt Plc.: Examining the moving parts on cash (Morgan Stanley - 2020/02/26)

Morgan Stanley recently published a thorough analysis about Meggitt, one of UK's biggest player in the global aerospace global market. As such, the British manufacturer is being indirectly hit by several factors such as the 737Max grounding and the worldwide expansion of the Covid-19 (or coronavirus). Both elements negatively impact the group which had to issue a profit warning, two months only after the start of the year. The group which weight about £4.4bn on the London Stock Exchange, provides items such as high-strength composite parts, landing gears, sensors and polymer seals for different aircraft, as well as related aftermarket services to most civil and military OEM and Tier-1 worldwide, including Boeing, Eurofighter, Lockheed Martin, Dassault, Rolls-Royce, Gulfstream, GE, Bombardier, P&W, Safran and others. Regarding the 737MAX, the company recently disclosed: "*sector-specific factors, including the production halt of the 737 Max and supply chain disruption, as well as the wider macroeconomic impact of Covid-19, are expected to hold back margin progression in the short term*".

▲AND▼ IN THE A&D SECTOR OVER ONE WEEK

	Δ over 1 week	Thursday closing value
Airbus Group	-12,73%	115,00
BAE Systems	-3,75%	631,80
Boeing	-14,43%	287,76
Bombardier	-20,00%	1,12
Dassault Aviation	-4,69%	1 015,00
Elbit Systems	-2,53%	154,38
Embraer	-12,70%	17,18
General Dynamics	-7,74%	171,55
General Electric	-17,08%	10,39
Honeywell	-11,70%	159,55
Huntington Ingalls	-7,87%	218,73
Irkut	-13,07%	34,04
L-3 Communications	-6,02%	210,32
Leonardo	-12,76%	9,64
Lockheed Martin	-5,89%	400,90
Northrop Grumman	-8,67%	331,75
Oshkosh Corp.	-9,42%	76,71
Rheinmetall AG	-14,02%	82,52
Rolls Royce	-9,63%	600,60
Raytheon	-9,14%	200,30
Saab AB	-10,69%	264,10
Safran	-10,92%	129,65
Thales	-2,78%	94,28
Textron	-12,14%	41,85
United Technologies	-7,69%	138,38

Analysts forecasted that both combined factors could potentially lead to a 5% or £20mn drop for this year operating profit.

Morgan Stanley highlights that **near-term damages on Free Cash Flow are likely to persist** even though they forecast **a potential upside to the 70% long-term floor level** discussed by management due to stable investments followed by a **normalization of the working capital related to site delocalization**. "*FCF estimates by -20%/-15%/-11% to reflect our view of cash headwinds. We now forecast FCF of £195mn in 2020 at 62% conversion (prior £245mn, 80%) and £255mn FCF at 77% conversion in 2021 (prior £301mn at 87%)",*the analysts wrote. They also forecasted (1) a **peak in working capital in 2020** especially due to the challenges related to the 737 grounding, site consolidation and supply chain but seems (2) **an increasing capex of £10mn/ year** due to the Ansty Park site delocalization; and (3) a **cash tax increasing in 2020** (included the flagged £18m tax due from the UK Controlled Foreign Company ruling), as well as a continued convergence to **higher rates of P&L tax beyond**. Even if analysts believe that the two first factors cited above tend to be transitory, they assess that the **optimization of working capital in 2021 and further**, could see upside to current targets and could be a chance once the group's delocalization is done and MAX issues clearer. They even **forecast a medium-term conversion of 80%-85% (10% lower than their previous estimates)**. Finally analysts continue to "***value Meggitt on 6.5% FCF yield***" which sees their **price target reduced on lower cash flow estimates**. *"We view the Meggitt story of increasing aircraft content gains, and operational improvement as intact, though we view the near-term set up as still presenting challenges given potential downside to air traffic assumptions*", they conclude.

UNLIKELY LINK

SPAIN / UAE: One, two, princes kneel before you

The United Arab Emirates (UAE) and Spain recently decided to reinforce their cooperation on Defense matters, along with other issues that were reviewed during a meeting held in Madrid, at the MoD's Headquarters. **Major General Pilot Isaac Mohammed Al Baloushi**, Assistant Undersecretary for Defense Industries and Development at the Emirati MoD had the opportunity to discuss with his counterpart **Mr. Angel Olivares, the Spanish Secretary of State for Defense**. The Emirati general also had the opportunity to "*meet* ***the Spanish Director General of Armament and Material, Admiral Santiago Ramon Gonzalez Gomez*** *with whom he talked about enhancing collaboration in the Defense industries in order to boost economic diversification efforts in both countries*", the Emirate news agency WAM adds. Even if relations between both countries were cordial since the UAE's creation in 1971, **ties were enhanced in 2009 after the official visit of King Felipe VI** and his wife in Abu Dhabi. Since then, **more than 15 bilateral agreements were signed**, especially on matters related to aerial transportation, extraditions, cooperation in defense equipment and joint military exercises, protection of classified data, cultural and diplomatic exchanges. Over the time, Madrid has implemented an embassy in UAE along with **two branch offices who deal with Defense and Military matters**. Economically speaking, the 4th session of UAE-Spain Joint Economic Committee was held in 2017, chaired by **Sultan Al Mansouri** and Mr. Luis de Guindos Judo, both minsters of Economy. The latter committee focused on enhancing trade in goods and services while encouraging the need for investments on either sides. On this occasion, Al Mansouri stated: "*We are proud to count Spain among one of our closest political and economic allies. Our non-oil bilateral foreign trade has flourished in recent years, growing by an impressive 26.3% from $1.9bn in 2011 to $2.4bn in 2016.* ***Spain's direct investments to the UAE continue to grow,*** *with 45 commercial companies, 112 commercial agencies and 2.456 trademarks from Spain registered locally as of 2015*". Madrid imports numerous products from the UAE especially electronic devices, mineral oil, aluminum and manufactured products. On the other hand Spain exports vehicles and tractors along with perfumes, seeds, and ceramic. In 2018 they exported for $1.5bn of goods and services compared to $1.7bn in 2017 (a decrease of approximatively 10% from one year to another). During the event, both officials underlined the need to push for SMEs to cooperate in preparation for the **2020 Expo which will be held in Dubai**. On this matter, the Spanish minister commented: "*We have strong bilateral relations with the UAE, mainly in terms of economic and trade cooperation which continues to grow.* ***The UAE is among our country's most important partners in the Middle East*** *and we consider it an important economic destination for the Spanish Government and our private sector*".

AT-A-GLANCE

CIVIL AVIATION

- USA: Boeing is planning more support for suppliers for its 737 MAX jetliner program. It is an effort to prepare them for restarting

production—and to dissuade some from seeking more business from Airbus. Regulators grounded the aircraft last March which has left a network of more than 600 big suppliers and hundreds of smaller firms in limbo about business that in some cases contributed half their annual sales. The company said it plans to stockpile more parts than in the past to guarantee order flow. Boeing had set aside $4bn for additional expenses this year, and has earmarked some of those funds for cash advances and other support for suppliers. According to the Wall Street Journal, Boeing has agreed to cover payments for jet engines made for its grounded 737 MAX by General Electric and France's Safran. Normally, final payment isn't made until the plane is delivered to an airline. Under the deal, full payment will be made upon delivery to Boeing, which will ease the burden of a production delay on suppliers resulting from the MAX grounding since last March, the Journal adds.

- USA: The Federal Aviation Administration (FAA) has prepared an airworthiness directive requiring all Boeing 737 MAXs to be inspected for a manufacturing defect the jet maker discovered in December. All MAXs found to have the defect will have to be fixed before they can fly again, although Boeing doesn't expect this requirement to add further delay to the aircraft's return to service. Meanwhile, Boeing is said to have found foreign object debris such as tools or rags in the fuel tanks of two-third of the aircraft it inspected which creates a safety hazard. Boeing's estimate for a mid-2020 return of its grounded 737 Max, but the hits keep on coming for the company.
- USA: Boeing says it has nominated two new outside directors it says will bring safety and engineering experience to the board: Steve Mollenkopf, Qualcomm CEO since 2014, and Akhil Johri, who spent 31 years at United Technologies to 2019 including his final four years as CFO. The two would replace longtime directors Edward Liddy and Mike Zafirovski after Boeing's annual meeting in April.
- USA: U.S. aviation regulators are mandating enhanced training for airline pilots, from newly hired first officers to veteran captains, culminating years of debate over how to improve cockpit decision-making and leadership skills. The final rule released Monday, which is slated to become effective by April 2023, calls for recurrent command and mentoring training for captains.
- USA: Arconic CEO John Plant is staying on to lead Howmet Aerospace when the specialty metals company splits this year, and will be co-CEO with Tolga Oal, according to a regulatory filing. Plant granted an initial three-year deal atop the big supplier to engines and airframe parts for Airbus and Boeing jets. Oal currently heads Arconic's engineered structures unit.
- USA: ExpressJet Airlines, a United Express carrier, has announced that it will add 36 Embraer ERJ145 aircraft to its United Express fleet, which will make ExpressJet the world's largest operator of the 50-seat Embraer ERJ145 aircraft.
- USA: United Airlines says it's adding 20 Bombardier CRJ550 regional jets to its fleet. The aircraft will be operated by partner GoJet Airlines and features 20 Economy seats, 20 Economy Plus seats and 10 First Class seats.
- AUSTRALIA: Qantas Airways continues to evaluate a number of aircraft types for possible future orders, including current narrow-bodies as well as Boeing's potential New Mid-market Airplane.
- JAPAN: Mitsubishi Aircraft Corporation, an MHI Group company, announced today that it has completed its maiden flight with the first Pratt & Whitney GTF PW1200G engine assembled in Japan. The flight was completed in the United States at the company's Flight Test Center in Moses Lake, WA, and was performed by the company's Flight Test Aircraft 1 (FTA1).
- JAPAN: ANA HOLDINGS Commits to Adding up to 20 Boeing 787 Dreamliner Jets. The agreement with Boeing includes 11 787-10s, one 787-9 and options for five 787-9s valued at more than $5bn at list prices. The airline said that those 15 Dreamliner will be powered by the General Electric GEnx-1B, and not the Rolls-Royce Trent 1000 that powers its existing fleet.
- JAPAN: A special purpose company of Japan's Sojitz Corporation, Atlantis Aviation Corporation, has been revealed as the party behind three Boeing 787-9 orders that were previously attributed to an undisclosed customer.
- CHINA: China Eastern has officially launched a new subsidiary on Feb 26th. OTT Airlines will operate ARJ21 and C919 aircraft ordered by the group from COMAC. China Eastern has indeed agreed to order 35 ARJ21 past summer. The airline could receive its first plane as early as this year with deliveries scheduled to extend to 2024. The SkyTeam carrier is the launch customer for Comac's C919 program, which is still undergoing testing. Cirium's fleets' data indicates the airline has 5 on order, with another 15 options.
- SINGAPORE: An Airbus A321 passenger-to-freighter (P2F) conversion—developed by joint-venture partners ST Engineering, Airbus and Dresden-based freighter conversion specialist Elbe Flugzeugwerke (EFW)—has secured EASA supplemental type certification (STC).The A321P2F program launched in 2015, with ST Engineering handling engineering development and Airbus providing certification support and original equipment manufacturer (OEM) data. As the STC-holder, EFW is heading up the program and will handle adaption engineering for serial production, sales, marketing and customer support.
- MALAYSIA: according to Reuters, Malaysian long-haul budget airline AirAsia X said it will defer delivery of 78 Airbus A330neo

planes and consider other changes to reduce its fleet, as the coronavirus outbreak adds pressure on the loss-making carrier.

- INDIA: Boeing has told India's SpiceJet that it will cover the cost of putting its pilots through sessions on simulators, which sell for up to $20mn, once the 737 MAX cleared to fly again. FlyDubai and Ryanair are also in talks on the matter.
- INDIA: Vistara has taken delivery of its first wide-body aircraft the Boeing 787-9 Dreamliner, becoming India's first airline to fly the 299-seater plane.
- UAE: MTU Maintenance, an aero engine solutions provider, has opened its new office in Dubai. The company said demand for narrow-body services is expected to grow in the Middle East. The company has also witnessed a rise in CFM56 and V2500 shop visits from the region.
- QATAR: American Airlines and Qatar Airways are burying the hatchet, at least enough to revive a dormant agreement to sell flights on one another's networks. US carriers have accused state-owned Mideast carriers including Qatar of receiving illegal subsidies that allow them to fly otherwise unprofitable routes, akin to dumping. Qatar tried to buy a stake in American in 2017 before being dropped as a partner.
- RUSSIA: flag carrier Aeroflot, a member of the SkyTeam alliance, has taken delivery of its first A350-900, becoming the launch operator of the latest generation widebody aircraft in Eastern Europe and CI, Airbus said I a statement today. Aeroflot has a total of 22 A350-900 aircraft on order and operates an Airbus fleet of 126 aircraft (107 A320 Family and 19 A330 Family aircraft), the company adds
- SWITZERLAND: The manufacturer Ruag International announced on Thursday the restructuring of its Aerostructures Division in Emmen , which will result in a reduction of up to 90 jobs "at most" over the next two years, ATS reports. A redundancy plan has been put in place. This reorganisation "*is in line with the creation of a profitable aerospace group by 2021 at the latest*" and its future privatisation, Ruag said. The group says it is 'exploiting every opportunity' to offer the employees concerned positions in the group's other activities or with its partners.
- UK: The British court ruled Thursday in favor of environmentalists opposed to the expansion of London's Heathrow airport, Europe's busiest, which could bury the project unless the government revises its plan.
- UK: Meggitt says it's still being paid by GE and Snecma and delivering parts used on Leap jet engines that equip the Boeing 737 MAX. However, the UK-based aerospace supplier told investors that it has paused direct deliveries to Boeing of other MAX parts for three months, given the shutdown of assembly.

SPEAKERS' CORNER

"We no longer want all our profitability to depend on a small number of very large contracts." said **Airbus CEO Guillaume Faury** during FY2019 results presentation *(L'AGEFI – 2020/01/20).*

"We're introducing the NH90 into our fleet, and I have to admit we have been doing that for 10 years," **one Dutch air force officer** noted sardonically at the International Military helicopter (IMH) Conference in London, later adding though that he feels *"it is the finest naval helicopter out there today" (Gareth Jennings @GarethJennings3 – 2020/02/25)*

"IAF is much better prepared. Give it another six months, Rafale will come. Give it another six months, S-400 will come. So, the story is going to be very lot different," said **Former Indian Air Chief BS Dhanoa** commenting on the Balakot Airstrike performed one year ago. *(Asian News International – 2020/02/26)*

"and whatever, it is a question of divest to invest" Chairman of the Joint Chiefs of Staff **Gen. Mark Milley** told the House Armed Services Committee, explaining that the current changes in the character of war and the geopolitical landscape must trigger some fundamental choices in US weapon procurement policy. *(InsideDefense.com – 2020/02/26)*

"Europeans don't have a choice" said Naval Group departing CEO **Hervé Guillou** regarding future continental shipyards consolidation *(Defense News– 2020/02/27)*

"We make the greatest weapons ever made. Airplanes. Missiles. Rockets. Ships. We make the best" President Donald Trump said at the start of a two-day state visit to India *(Bloomberg – 2020/02/24)*

"The fighter jets era has passed" said SpaceX CEO **Elon Musk** at the Air Warfare Symposium in Orlando today. *(Defense News– 2020/02/29)*

45000: such is the number of people that French group Safran plans to hire between now and 2024, which represent a 50% hike in total workforce *(Challenges.fr – 2020/02/27)*

€7.3bn: such is the level of annual sales recorded by Dassault Aviation in 2019 (+44% y-on-y), a record high in the company's history – mainly fueled by Rafale export contracts. *(Dow Jones- 2020/01/27).*

1.000.000: such is the number of flight hours passed last month by the Airbus Helicopters *fleet (Airbus Helicopters– 2020/02/21)*

$1000: Such is the amount of the deposit asked by Virgin Galactic or those who want the first chance at buying spaceflight tickets when the company re-opens sales later this year. *(CNBC – 2020/02/25)*

1,179,200: such is the total number of jobs directly or indirectly supported by general aviation in the US in 2018, contributing $128bn to US GDP. *(PWC- 2020/01/19).*

Shares down almost 5% after guiding to lower revenue growth this year.

- EUROPE: United Technologies Corp and Raytheon Co have offered concessions to address EU antitrust concerns about their plan to create a $120bn U.S. aerospace and defense giant, a filing on the European Commission website showed on Monday. The companies submitted their concessions on Friday. The European Commission, which did not provide details in line with its policy, extended its deadline for a decision to March 13 from Feb. 28.

BUSINESS AVIATION

- CANADA: Bombardier's Challenger 350 business jet has been the most delivered business jet in the super mid-size segment for the last six years. 56 Challenger 350 aircraft have been in 2019, out-delivering competitors in the super mid-size segment; the company announced. "The Challenger 350 aircraft offers customers the complete package – superior comfort, performance, reliability and value, all in a single business jet. This unbeatable combination is why, year after year, the Challenger 350 business jet continues to top the rankings as the world's most delivered super mid-size business aircraft and why it remains the preferred choice of flight departments, individuals and charter operators around the world," said Peter Likoray, Senior Vice President, Worldwide Sales and Marketing, Bombardier Business Aircraft.
- USA: Boom Supersonic announced that its XB-1 test program will be fully carbon neutral through the use of sustainable aviation fuels and carbon offsetting. The company is the first commercial airplane manufacturer to commit to a carbon-neutral test program.
- ITALY: Piaggio Aero Industries and its subsidiary Piaggio Aviation, currently under Extraordinary Administration, officially launch an international call for the sale of their business complexes. Expressions of interest have to be send to the Extraordinary Commissioner, Vincenzo Nicastro, no later than April 3, 2020, the company mentioned. "Just over a year since the extraordinary administration started, we have succeeded in creating a respectable order intake, which makes the company attractive for a buyer," said Nicastro. "We shall rigorously evaluate each of the offers that will reach us," he added, "*with the aim of selling the company in its entirety and finding a buyer who can offer a solid, long-lasting recovery and development plan. We aim at concluding the process within the current year.*"
- UK: Jet Maintenance International (JMI) announced a new line maintenance service for Dassault Falcon business jets at London Biggin Hill. "With more business aviation maintenance organizations based here than at any other airport in Europe, we're delighted that JMI also has chosen London Biggin Hill to place its line station here," said London Biggin Hill marketing manager Andy Patsalides. "The move will offer further support to our many Dassault operators and strengthen the airport's position as the capital's preeminent full-service business aviation and aerospace hub."
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- FRANCE: Daher unveils new features for the Model Year 2020 versions of its TBM 910 and TBM 940 which will be equipped with HomeSafe, an emergency autoland system based on Garmin's Autoland system that can guide the aircraft to a landing in the event of pilot incapacitation. The system is currently is under validation for application on the TBM 940 and will be available when certified by the airworthiness authorities. "As Daher continues its efforts to introduce technological features that enhance operational safety for our pilot owners and operators, we have also widened the focus in our model year 2020 TBM 940 to address safety from the passenger point of view with HomeSafe," said Daher aircraft division senior v-p Nicolas Chabbert.
- FRANCE: Speaking at the company's annual results presentation in Paris yesterday, Dassault chairman and CEO Eric Trappier promised to reveal more details about its "Future Falcon" business jet by June. *"I could announce this today, but I have decided that I wouldn't,"* said Trappier. "*It's the art of timing your announcements.*" He also refused to be drawn on what segment the type will serve. Possible options for the French OEM are most likely to be a brand-new aircraft larger than its Falcon 8X flagship, or a replacement for the ageing Falcon 2000 series, said Corporate Jet Investor. Regarding 6, Trappier said the new plane is on schedule for first flight early in 2021, with certification and entry-into-service to follow in 2022. The Falcon 2019 order intake represented €2,308mn versus €2,314mn in 2018.Order intake was steady and included the Archange contract for the acquisition of 2 intelligence aircraft (based on Falcon 8X) to implement the Universal Electronic Warfare Capacity (CUGE) and associated support, the company said. Dassault delivered 40 Falcons in 2019, deliveries for next year should remain stable, CEO Eric Trappier added.

MILITARY AVIATION

- USA: Northrop Grumman has announced that it received a $110mn production order from the U.S. Air Force late last year for FMU-167/B, also known as the Hard Target Void Sensing Fuze. The Hard Target Void Sensing Fuze is an all-electronic, cockpit programmable, intelligent fuze capable of destroying deeply buried and targets. The Hard Target Void Sensing Fuze is an all-electronic, cockpit programmable, intelligent fuze capable of destroying deeply buried and targets. It provides multiple delay

arming and detonation times, as well as a void-sensing capability, which allows for precision activation of the fuzed

- USA: on Feb. 26 Air Force Magazine published an article about the Service wish to end the MQ-9 Reaper production line early. According to the Magazine, the MQ-9s already in the inventory will serve for decades to come in very important ways General Atomics wants its smaller customers to switch over to the SkyGuardian for new orders as it would mean having only one type in production and those customers would benefit from its enhanced abilities and lower sustainment costs.
- CANADA: Canada's long-running effort to buy new fighter jets faces another delay. The federal government announced Tuesday it is giving jet makers another three months (until June) to submit their proposals for replacing Canada's aging CF-18s. The move is to ensure the government receives high-quality bids for the estimated $19bn contract. Canada plans to buy 88 new fighters to replace the CF-18s, which are now nearly 40 years old. The government is spending an estimated $3.8bn to extend the lives of the CF-18s and buy 18 secondhand jets from Australia that will fly for the Air Force until the last of the new fighters arrives in 2032.
- CANADA: The Royal Canadian Air Force has started test flying a Lockheed CP-140 maritime patrol aircraft fitted with a new missile warning system, a satellite antenna radome and other upgrades, defense officials in Ottawa announced on Feb. 21.
- USA: According to FlightGlobal, Lockheed Martin's hypersonic Air-Launched Rapid Response Weapon (ARRW) is wrapping its critical design review. ARRW will officially pass the milestone on 27 February and the US Air Force (USAF) is pleased with the missile's development progress which is to reach early operational capability by FY2022.
- USA: Restarting a military jet's engine in flight is a critical safety feature that can only be demonstrated by doing something a flight crew rarely wants to do: shutting off the engine in flight. Yet, a Boeing T-7A trainer crew recently did it, at 20,000ft above an Illinois test area, then flew the plane for 48 seconds before successfully restarting the GE F404 engine and landing back safely at Boeing's St. Louis site. "Engine air start testing requires a large amount of preparation, planning and teamwork," said T-7A Chief Pilot Steve Schmidt. "*It's a test of all the subsystems built for backup in the event a pilot would have to shut the engine down in an emergency and power it back up again.*"
- USA: Kratos Defense and Security Solutions has started building production examples of its XQ-58A Valkyrie unmanned air vehicle (UAV), despite an investigation into an Oct. 2019 mishap which delayed an expected contract from the US Air Force (USAF). The company had expected the USAF to grant it a production contract within 90 days of the start of FY2020, which for the US government begins 1 October 2019. That funding was delayed as the US Department of Defense (DoD) investigated an "anomaly" that caused the UAV to be damaged on landing after its third test flight in the fall, the company says in an earnings call on Feb. 25.
- USA: Lockheed Martin received a direct commercial sale contract from the United Arab Emirates Air Force and Air Defense (AFAD) for expedited delivery of Sniper Advanced Targeting Pods (ATP), spares and upgrades. This contract marks the first integration of Sniper ATP on the Mirage aircraft. Deliveries of Sniper ATPs and spares will support the UAE AFAD's requirement to provide precision targeting capability for their existing Mirage 2000 fleet. UAE AFAD currently employs Sniper ATP on its F-16 Block 60 aircraft.
- INDIA: Air Force Chief RKS Bhadauria on Wednesday said that IAF is ready to take on any enemy target if needed. The Air Chief further said the Rafale fighter jets and S-400 air defense systems will act as game-changers. He also categorically rejected the reports about delay in induction of much needed S-400 air missile defense system. The country has placed an order of 5 units of the S-400 missile defense system during the 19th India-Russia bilateral annual summit held in New Delhi in 2018.
- TUNISIA: DSCA approves a possible Foreign Military Sale of 4 beechcraft AT-6C Wolverine light attack aircraft, package valued at $325.8mn.
- RUSSIA: The newest Russian Zircon hypersonic missile was first tested from a ship - project 22350 frigate Admiral Gorshkov shot Zircon from the Barents Sea at a military training ground in January. This was reported to TASS by two sources in the power structures of the North-West Federal District.
- RUSSIA: TASS, citing anonymous defense industry source, reports that a prototype of a new hypersonic air-to-surface missile for the Su57 has been built. Missile to be carried internally. Not tested on Su-57 yet. No further details - no confirmation of the information.
- RUSSIA: New type of subunits might be formed in the Russian Airspace Forces, in which manned, unmanned and optionally-manned vehicles will operate in a single formation, the chairman of the Russian Machine Builders' Union Vladimir Gutenev told RIA Novosti. Meawnhile. , the Izvestia daily said Defense industry sources said a decision in principle had been made to arm Russian combat drones with precision gliding Grom 9-A-7759 bombs. Trials to release their mockups from Okhotnik S-70 drone have been held.
- ITALY: The Italian Air Force received its first F-35B Lightning II on Saturday Feb. 22, 2020. The aircraft, , is the third F-35B STOVL (Short Take-Off and Vertical Landing) built at the FACO (Final Assembly and Check-Out) facility in Cameri, Italy. The first two jets were delivered to the Italian Navy in 2018 and 2019, respectively,

and were transferred to MCAS Beaufort, home of the U.S. Marine Corps F-35B pilot training.

- ITALY: Leonardo chief executive Alessandro Profumo has disclosed that the company has sold six M-346FA light attack aircraft to a major "international customer.", presumably Azerbaidjan The deal was signed last month.
- FRANCE: The French Directorate General of Armaments (DGA) and Dassault Aviation have tested a nEURON demonstrator along with five Rafale fighter jets and an AWACS (Airborne Warning and Control System) aircraft, in multiple tactical configurations. One of the objectives of the campaign was to study the use of a stealth combat drone in an operational context, also involving reflection on defense tactics in the face of such a vector, French Ministry of Defense said in a statement Thursday.
- FRANCE: Dassault Aviation announced on Thursday that it was forecasting lower sales this year, with a decline in deliveries of its Rafale aircraft compared with a record high in 2019. The group is expected to deliver 13 Rafales in 2020, compared with 26 last year.

HELICOPTERS

- USA: The U.S. Air Force's new combat rescue helicopter will be known as the HH-60W Jolly Green II, the Air Force secretary announced on Thursday. The Air Force plans to buy 113 HH-60Ws over the program of record, and has already procured 10 helicopters in fiscal 2019 and 12 in FY20. In its FY21 budget, the service requested $1.1bn for 19 HH-60Ws, and production is planned to ramp up to 20 helicopters in FY22 and FY23.
- CHINA: Chinese state-owned media released images earlier this month showing the People's Liberation Army (PLA) Changhe Aircraft Industries Corporation (CAIC) Zhishengji-10 (Z-10) attack helicopter fitted with new engine exhaust outlets that face upward instead of outward to reportedly reduce the rotorcraft's frontal infrared signature.
- MALAYSIA : Kuala Lumpur has confirmed that it will take delivery later this year of the six MD 530G armed helicopters, Jane's reports
- INDIA: State-run Hindustan Aeronautics (HAL) on Thursday offered an indigenous multirole helicopter to the Indian armed forces for replacing its medium lift choppers such as MI-17s, Kamovs and Seakings. "We have apprised Defense Minister Rajnath Singh of the progress made on the design and development of the multirole helicopter for induction in the Indian Air Force (IAF), Navy and Army," HAL Chairman R. Madhavan said in a statement, he added "We hope to develop the new helicopter in the next 8-10 years

...MEANWHILE...

IN-FLIGHT LOUNGES VS SKYBARS

Bloomberg notices that, Airlines have been lately moving away from horseshoe-shaped bars, to in-flight lounges designed like a coworking area but with flight attendants who can bring you cocktails. Etihad was the industry's earliest adopter of this bar-to-lounge trend in 2014. Similarly, Emirates began transitioning the mostly-standing-room-only bars on its A380s to a more understated, yacht-inspired design in 2017. Last September Virgin Atlantic introduced a new business-class-only concept called "*The Loft*," which offers various seating configurations in a common area. The Loft includes two booths, a small table, and a standing counter for three, with power ports all around. A 32-inch HD screen on the back wall allows passengers to synchronize their Bluetooth headphones and watch a movie in tandem. From any of those areas, guests can order not just cocktails but light meals and snacks. That same logic drove Qantas to install new lounges on 3 of its A380, with 9 more to come end of 2020.

GOODBYE KATHERINE JOHNSON

On Monday, Katherine Johnson, who was responsible for calculating the trajectories of the Apollo 11 flight to the moon in 1969, passed away at the age of 101. The news was relayed with sadness by NASA administrator Jim Bridenstine himself, who tweeted "This *American hero and her pioneering legacy will never be forgotten*". Katherine Johnson was one of the few coloured women to hold a Ph.D in mathematics in the mid-20th century, and in 1953 she accepted a job at NASA, performing calculations critical to ensuring a safe and accurate trajectory for a number of different important missions during the Cold War space race. Indeed, even before the iconic 1969 Apollo 11 moon mission, she had calculated the trajectories of Alan Shepard, the first American into space, as well as John Glenn's orbit around the Earth in 1962 (he later personally asked her to check calculations for Friendship 7 mission). In 2016, the movie *Hidden Figures* made her story (and two other distinguished black female colleagues at NASA) famous to a worldwide audience.

"JAM-MASTER JAMMIN' ACRONYM

The US Defense Advanced Research Project Agency (DARPA) runs a lot of complex programs, and has a special talent for naming each one of them. Aviation Week recently disclosed one of them, aimed at providing "*tactical beyond-line-of-sight communications in an anti-access/area-denial environment by deploying low-cost expendable repeaters ground vehicles, unmanned aircraft, high-altitude platforms and low-orbiting satellites*" The acronym for this new $7.4mn Resilient Networked Distributed Multi-Transceiver Communications project is **RNDMC**. With an old-school rap flavour indeed…

when the present fleet of medium lift copters are scheduled to be phased out".

- PAKISTAN: Pakistan looks set to turn to China for its attack helicopter replacement needs after US embargoes halted sales of rival Bell and Turkish Aerospace products, Flight International writes from the International Military Helicopter conference. Islamabad ordered 12 Bell AH-1Zs under the USA's Foreign Military Sales process in 2015 and then followed that in 2018 with a deal for 30 Turkish Aerospace T129s worth $1.5bn.
- RUSSIA: Russian Helicopters Holding Company (part of Rostec State Corporation) announced it has delivered the first serial produced Mi-38 helicopter to its client, Gazprombank leasing company. The helicopter, built by Kazan Helicopters, will be operated by Russian Helicopter Systems (RHS). The MI-38 is a multipurpose helicopter, it can be used for transportation of cargo and passengers, search and rescue operations, and as a flying hospital or an offshore helicopter for delivering specialists to oil production platforms at sea. The first serial produced machine will be used for business class transportation. Director General of Russian Helicopters Andrei Boginsky disclosed: "The demand forecast of potential buyers for Mi-38 by 2030 is more than 100 aircraft".
- RUSSIA: Mi-171A2 helicopter by Russian Helicopters holding company (part of Rostec State Corporation) established a Russian record: it reached a maximum speed at a limited distance of 1.6 kilometers, the company said in a release. During the "Baikal Mile" festival the civilian helicopter operated by the crew of the Ulan-Ude Aviation Plant (U-UAZ) reached the speed of 268kph at a minimum altitude of 20 meters.
- ITALY: Leonardo will begin a series of flight trials in the UK in April in which an Unmanned Air Vehicle (UAV) will be controlled by the crew of Lynx Wildcat helicopter – so called Manned-Unmanned Teaming (MUM-T). With the UAV deployed around 4nm (8km) from the helicopter, the UAV will be used to search for a person in three different settings – in the open, under tree cover and in an urban area. The drone will be piloted by the observer/gunner in the Wildcat's left-hand seat and data from its electro-optical payload will be fed into the helicopter's standard displays, says Leonardo.
- GERMANY: Berlin is looking to buy more than 60 Airbus Helicopters H145Ms to replace its ageing EC135s and Bell 206D to address a broad spectrum of missions - including training and light attack -. The army alone requires nearly 50 helicopters on its own: 24 for training and a further 24 as battlefield utility helicopters to equip its three aviation regiments. The navy and air force are likely to need another 16 aircraft between them. Helicopters could be required from 2021.
- FRANCE: Safran Helicopter Engines has invested €50mn in its Tarnos site. The manufacturer modernizes its plant to upgrade its MRO capabilities for helicopter's engines. The objective is to reduce the repair cycle time by 30%. Safran repairs 1,500 engines per year, including 650 for the Tarnos plant alone. The €50mn modernization project involved the construction of three new 33,000-square-meter buildings, which were delivered in February 2019.
- FRANCE: The French Air Force has finally confirmed a long-rumored interest in acquiring Boeing CH-47F Chinooks for Special Forces missions and hopes to lease a pair of the tandem-rotor helicopters as a trial before making any purchase, Flight International reports. In addition, the service hopes to shortly outline an upgrade package for its fleet of Airbus Helicopters H225M Caracals.

UNMANNED AERIAL SYSTEMS

- USA: Airspace Experience Technologies (ASX), an eVTOL company, has signed a MoU and a cooperation agreement with Spirit AeroSystems, a supplier of structures, fuselages, and wing components for commercial aircraft. According to co-founder Anita Sengupta, ASX is currently moving toward an "affordable" commercialization of their MOBi-One drone.
- USA: Wing Aviation has issued a statement welcoming the new ASTM International standard for Remote ID, following the FAA's Notice of Proposed Rulemaking: "the ASTM standard reflects 2 years of collaboration between regulators and industry [and] supports a diverse drone ecosystem, protects privacy, and enables hobbyists to participate in the airspace."
- USA: The director of the Defense Digital Service (DDS), Brett Goldstein, has started forming a rapid-response team to innovate on countering small UAS. He pulled together both existing DDS personnel and a Defense Innovation Unit project called Rogue Squadron. "It's an interdisciplinary, multi-modal group ranging from electrical engineers to radio frequency experts to software engineers", declared Mr Goldstein.
- USA: The Department of Transportation has appointed 2 new members to the FAA's Drone Advisory Committee. They are Christian Ramsey, President of uAvionix Corp., and Lee Moak, founder and CEO of The Moak Group.
- JAPAN: Japan Airlines has successfully carried out trial flights to deliver fresh fish from Nagasaki Prefecture to Tokyo using drones. Twenty kilograms of fish were packed into a cool box at Kamigoto Airport and transported to Saikai, 35km away, by a Yamaha

FAZER-R G2, and then shipped to Tokyo to be served at a restaurant on the same day.

- SOUTH KOREA: Disease control officers are using drones to disinfect high-risks spots, amid the outbreak of coronavirus. This week, several drones flew over a hospital in Cheongdo, North Gyeongsang Province, where at least 7 deaths and 114 confirmed cases have been reported.
- CHINA: EHang announced that its EHang 216 autonomous aerial vehicle (AAV) successfully transported medical supplies on 4km and landed on the rooftop of the Hezhou hospital. The AAV then returned to its base after the delivery flight, which is part of recent exercises for the prevention and control of coronavirus epidemic organized by the local authorities.
- UAE: ADASI, a subsidiary of the government-owned conglomerate Edge, unveiled its 1st locally made VTOL drone at UMEX 2020. The UAV, dubbed Garmousha, is designed to carry a 100kg payload and would have a 6h endurance. It can be used to detect gas pipeline leaks, survey infrastructure, and perform SAR operations, according to ADASI CEO Ali Al Yafei.
- UAE: The Ministry of Climate Change and Environment (MOCCAE) announced that it had carried out a drone-enabled local planting project, in cooperation with Nikai Group, Falcon Eye Drones and 2 local businessmen. MOCCAE used drones to disperse seeds, prepped to maximize the chances of successful planting.
- NIGERIA: Yaniv Gelnik, Zipline's representative in Africa, has visited the Anambra region to present their drone-based medicine delivery solution to health sector members. Indeed, the state government had recently partnered with Zipline for drug delivery and is willing to deploy it quickly.
- GERMANY: Volocopter has raised additional $40mn, taking the round total of recent investments to $94mn. The new backers are DB Schenker, Mitsui Sumitomo Insurance Group, TransLink Capital, Lukasz Gadowski, and Btov. These investments will support the development of a new series of drones for the delivery of parcels and heavier items and the certification process of VoloCity, a flying taxi.
- IRELAND: Manna Aero has been planning to begin next month fast-food deliveries on behalf of Just Eat, Ben & Jerry's and Camile Thai at the University College Dublin. However, Irish Aviation Authority (IAA) sources of the newspaper Independent expressed caution about the regulatory viability of a full commercial launch under current conditions. Manna's CEO Bobby Healy quickly denied these allegations: "The IAA have been a tremendous help and guide over the past 3 years, working together we have ensured that our drones are extremely safe in all operating conditions."

LAND & GROUND-BASED SYSTEMS

- USA: The US Marine Corps (USMC) has awarded BAE Systems with a $113.5mn contract to produce an additional 26 amphibious combat vehicles (ACVs), which brings the USMC's total ACV buy up to 116.
- USA: Prime contractor Northrop Grumman has added two suppliers, Bechtel and Kratos, in the team that will develop US' next-generation intercontinental ballistic missile system -- the Ground Based Strategic Deterrent (GBSD). The team already counts Aerojet Rocketdyne, General Dynamics, Honeywell, and Lockheed Martin. "*Bechtel will provide launch system design, construction and integration, and Kratos will provide other vehicle transporters including the missile transporters and payload transporter*," Northrop said in a statement.
- USA: DRS Network & Imaging Systems has received a $21.4mn contract from the US Army, the DoD announced on 19 February. The contract will see the company supply mission system computers, chief of section displays (CSD) and CSD chargers for the M777A2 Digital Fire Control System.
- USA: Raytheon has completed the first radar antenna array for the U.S. Army's new missile defense radar in less than 120 days after being selected for the job, following a competition to replace the service's Patriot air and missile defense system sensor. The company won a contract to build the Lower-Tier Air and Missile Defense Sensor, or LTAMDS, in October.
- JORDAN: The US State Department has made a determination approving a possible FMS of up to 700 Advanced Field Artillery Tactical Data System (AFATDS) software license copies and related equipment for an estimated cost of $300mn.
- UKRAINE: Ukraine and Poland will collaborate to develop and manufacture in Poland the Ukrainian-made ATGM (Anti-Tank Guided Missile) called Pirat, according to the Ukrainian defense magazine. The Polish company concerned will be Mesko.
- POLAND: The modernization of Leopard 2A4 main battle tanks (MBTs) has been delayed, Polska Grupa Zbrojeniowa (PGZ) and the Polish Armament Inspectorate (AI) have told Jane's. The prototype of future Polish Leopard 2PL MBTs delivered by project leader PGZ and Rheinmetall Landsysteme was still being tested at the end of February.
- ROMANIA: The MoD awarded Iveco Defence Vehicles a seven-year frame-type contract to supply 2,902 tactical trucks, on 31 December 2019. According to a company statement, an initial

delivery order for 942 trucks is in place and these are to be delivered over four years beginning in 2020.

- ESTONIA: Milrem Robotics is highlighting its new fifth-generation Tracked Hybrid Modular Infantry System (THeMIS) unmanned ground vehicle (UGV) at UMEX 2020 being recently held in Abu Dhabi. The UGV has been specially designed for use in hot climates. The improvements to included larger radiators with improved airflow and heat dissipation.
- SERBIA: According to the MoD, Serbia has taken delivery of the first batch of Pantsir-S1 air defense missile system from Russia. According to news published on January 18, 2020, Russia and Serbia had signed a contract to purchase up to 6 Pantsir-S1 air defense systems.
- FRANCE: After a rise in turnover of 25% in 2018 and 38% in 2019, Arquus forecasts a growth of 10% in turnover in 2020, a low figure due to the structure of the order book but which will stabilize the industrial organization. The company can count on a robust order book estimated at €5.8bn at the end of 2019, including €1.5bn firm contracts

NAVAL SYSTEMS

- USA: According to Jane's, Huntington Ingalls Industries is planning to "invest heavily" in unmanned vessels development for the US Navy.
- USA: according to an exclusive report from Bloomberg, The US Navy and Congressmen do want to buy an additional sub for FY 21 but newest $161bn Virginia-class submarines are expected to be 10 to 15 months late
- CANADA: The Canadian federal government has confirmed to the Parliament it has spent around CA$1bn over the last 7 years on design and preparatory work for its Navy's new frigates and supply ships.
- AUSTRALIA: The Department of Defence provisionally accepted on Feb. 14 the 3rd and last Hobart-class Air Warfare Destroyer, named Sydney. Based on a design by Navantia, the vessel was built by ASC and Raytheon Australia.
- MYANMAR: Hindustan Shipyard delivered to the Indian Navy on Feb. 21 the INS Sindhuvir, a refitted Kilo-class submarine India has committed to transfer to the Myanmar Navy. This vessel would become the 1st submarine operated and owned by this country.
- INDIA: The Indian press reports that the Indian nuclear-powered attack submarine program is making good progresses, and should soon reach the detailed design phase. New Delhi plans to develop and build locally 6 SSNs. The 1st unit is hoped to be delivered to the Indian Navy in a decade.
- INDIA: Goa Shipyard delivered the 1st in class of 5 Coast Guard OPVs on Feb. 24. This 105m-long ship was designed by Goa Shipyard.
- PAKISTAN: Turkish company STM stated that, despite "French sanctions and restrictions", the Pakistan Navy's Agosta 90B modernization program was making progress. The company added that it hoped to relaunch the 1st submarine being refitted by the end of the month, and begin sea trials. STM won in 2016 a contract to modernize 2 Pakistani Agosta 90B of French origin. A contract for the 3rd one could follow.
- SAUDI ARABIA: According to local Spanish media La Voz de Cadiz, Saudi Arabia is interested in acquiring 2 LPDs based on Navantia's Galicia-class ships (in service within the Spanish Navy). Navantia is currently building 5 corvettes for the Saudi Navy.
- GREECE: The French Minister of the Armed Forces visited earlier this week her Greek counterpart to discuss, among other things, the sale of two FDI frigates. La Tribune reports that this contract is on a "good path".
- ITALY: Fincantieri inked a MoU with Makareb Technologies in order to explore opportunities to jointly develop automation solutions.
- GERMANY: In a press release, tkMS announced its intention to ramp up additive manufacturing of submarine parts. The ThyssenKrupp TechCenter Additive Manufacturing will be transferred from Mülheim to Kiel by June 2020. According to the German shipbuilder, 3D printing is mature enough to produce more complex, more resistant and lighter parts at less costs.
- GERMANY-NORWAY: Shephard reports that talks between Germany and Norway to implement the International Naval Safety Association's 'Naval Submarine Code' have been dragging on for the past 2 years. The 2 navies, which are to jointly operate U212CD submarines, have indeed different philosophies about the use of submarine: while Norway will operate mostly in a deep-water oceanic environment, Germany will, instead, heavily focus on the Baltic's shallow waters.
- NETHERLANDS: Damen, Thales Netherlands and the maritime innovation cluster Extended Reality have announced to have developed a virtual reality program aimed at helping the Dutch Navy's Technical Training students familiarize with naval vessels (Holland-class OPVs in the 1st place).
- UK: Babcock has begun construction of a new module hall at its Rosyth shipyard, in order to build the 5 Type 31e frigates ordered for the Royal Navy.
- UK: The British MoD has accepted into service the HMS Tamar, the 4th Batch 2 River-class OPV produced by BAE Systems.

- UK: Britain's defence minister Ben Wallace officially announced on Tuesday the start of a program to replace the country's nuclear deterrent. "To ensure the government maintains an effective deterrent throughout the commission of the Dreadnought Class ballistic missile submarine we are replacing our existing nuclear warhead to respond to future threats and the security environment," he said in a statement. Trident replacement which will be based on the proposed W93 sea-launched US technology, warhead. The decision was previously disclosed by Pentagon officials ,
- SPAIN: Navantia announced on Feb. 26 that the Spanish MoD selected the local company Abengoa, over its competitor Tecnicas Reunidas, to supply the S80 submarine program its AIP module.
- SPAIN: The US Department of Defense has expressed interest in increasing the number of destroyers based at the Spanish naval base of La Rota from 4 to 6. This decision, which is yet to be confirmed, would benefit Navantia, which is in charge of maintaining the US Navy's destroyers based in Spain.
- FRANCE: Naval Group CEO Hervé Guillou revealed at a press conference last week that his company delivered to the French and Brazilian navies the 1st batches of new-generation F-21 heavyweight torpedoes in late 2019 – early 2020.

SPACE SYSTEMS

- USA: The Space Development Agency is projecting its R&D budget will increase to nearly $7.5bn by FY2025 -- major near-term growth that offers a glimpse at how the Pentagon plans to inject new funding across its space portfolio, inside the Pentagon reports.
- USA: SpaceX is reportedly seeking to bring in $250mn in new investment during a funding round expected to close by mid-March. The new raise would value SpaceX at around $36bn, up from $33.3bn previously. Meanwhile, The U.S. government has sharply criticized SpaceX's objections to contracts awarded for the creation of new spacecraft, telling a California federal court the Air Force properly assigned $2.2bn in deals that excluded Elon Musk's company
- USA: On Feb. 25, after a weeks-long approach, Northrop Grumman's Mission Extension Vehicle-1 (MEV-1), the first satellite servicing spacecraft, successfully docked with the Intelsat-901 communications satellite in a 'graveyard orbit' 300km above the geostationary arc, in order to keep it in service an additional 5 years.
- CHINA: Four new CAST-made satellites, launched on Sept. 23 (No.47-48) and Dec. 16 (No.52-53), have recently passed tests in orbit and joined the BeiDou Navigation System (BDS), according to the Satellite Navigation System Management Office. More BDS satellites are planned to be launched in March and May to complete the network.
- USA: The maiden flight of the Long March-5B rocket, carrying an experimental version of a manned spaceship, is expected to take place in mid to late April. In the future, that rocket will be also used to launch the prototype core capsule of the country's space station.
- USA: Lockheed Martin will acquire Vector's GalacticSky software-defined satellite technology assets by default, after no qualified bids were received by Feb. 21. The $4.25mn deal will be finalized on Feb. 28.
- EGYPT: The Ministry of Scientific Research said Feb. 16, it will establish a Satellite City Industrialization & Assembly Center this year in cooperation with China. Egypt is also Egypt looking to sign cooperation agreements with other countries such as France, Italy, Kazakhstan, and the United States.
- EUROPE: Arianespace's Vega rocket is on track to conduct its Return to Flight (RTF) rideshare mission on March 23, after stacking operations began in Guiana on Feb. 24. Vega suffered a first failure during the July 2019 launch of Falcon Eye-1.
- SPAIN: PLD Space performed a full mission duration hot test fire (~2 min) of its TEPREL-B liquid, 'regenerative' rocket engine, validating nominal performance of what will power its proposed MIURA 1 launch vehicle. Back in May 2019, the company suffered a catastrophic engine failure that caused significant material damage.
- FRANCE: Airbus Defense & Space said Feb. 24, that the first 2 Pléiades Neo imaging satellites have started comprehensive environmental testing, to ensure they are ready for in-orbit operation. These 2 very high-resolution satellites are expected to be launched in mid-2020.
- FRANCE: On Feb. 21, the MoD said that Air Force officers have started to join the '*Harpoon*' team of its new Space Command (CdE) announced last Sept. Based at the Toulouse Space Center (CST), this core team will be hosted at the French Space Agency (CNES), and develop into a 200-strong command by 2021, until 5,000m² dedicated facilities for 400 to 500 airmen are built by 2025.

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