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From the CEO:

In case you may have missed our recent news, I wanted to share a quick note about Universal Avionics’ announcement that it has signed a mutual agreement with Elbit Systems Ltd (NASDAQ: ELST) whereby Elbit will acquire Universal Avionics. We are confident that we will be able to expand and enhance our business by leveraging the additional resources of a well-capitalized and committed partner to serve you better. For more details, please read my open letter to customers on our website: uasc.com/openletter.

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“ADS-B Out is coming” – we’ve heard it a thousand times, and we’ll hear it a thousand more over the next 21 months. With less than 2 years left until the FAA’s 2020 mandate, shops are becoming full. According to the Aircraft Electronic Associations’ 2017 Avionics Market Report, “the retrofit (avionics) market showed an increase in its percentage of total sales, recording an all-time high, a 20% increase over 2016.” This growth is likely a result of aircraft equipping for ADS-B Out. In this issue’s first article, we walk you through the NextGen roadmap, starting with ADS-B Out, and see why now, more than ever, it’s important to thoroughly research your upgrade options.

Our next hot topic is safety. Over the years, the need for controlling and regulating aircraft avionics has become pivotal to public safety. Looking at our environmental testing on page 5-6, you can learn more about your avionics’ safety standards and how UA meets and exceeds them. Skipping to our last article in this issue, we talk about another complex process essential to safety – certification. This process cannot be taken lightly as it ensures products are airworthy so aircraft operators and their passengers stay safe.

Don’t miss our space tourism article on pages 7-8. What can $75,000 buy you? Soon, a several hour journey to space! Our neighbor in Tucson, World View, is creating a new market with commercial space flight and it’s pretty amazing.

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About

The Universal Flyer is a quarterly print publication featuring product and program announcements, company milestones, spotlights, and more. Email or call Sales & Marketing to update your subscription preferences.

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In case you may have missed our recent news, I wanted to share a quick note about Universal Avionics’ announcement that it has signed a mutual agreement with Elbit Systems Ltd (NASDAQ: ELST) whereby Elbit will acquire Universal Avionics. We are confident that we will be able to expand and enhance our business by leveraging the additional resources of a well-capitalized and committed partner to serve you better. For more details, please read my open letter to customers on our website: uasc.com/openletter.
Automatic Dependent Surveillance-Broadcast (ADS-B) Out is on the minds of many operators. But, it’s only one piece of the FAA’s NextGen roadmap. When planning your upgrade, UA advocates taking a step back to consider a comprehensive avionics upgrade solution. One that not only meets the needs of today, but the future as well. We believe in adding value to the aircraft you own and love to fly today.

Let’s follow the roadmap… we see 2-3 additional NextGen/SESAR upgrades that follow right after ADS-B which may affect your operations:

1. Future Air Navigation System (FANS) 1/A+: Important to consider if you fly in the North Atlantic Airspace or U.S. Airspace where Data Comm is prevalent. See list of Data Comm equipped airports at uasc.com/dcl.


3. Performance-Based Navigation (PBN): Impacts just about every operator throughout the world. An integrated FMS (like UA’s SBAS-FMS) unlocks the ability to upgrade to these technologies now – or down the road. Once the SBAS-FMS is in place, you can add the UniLink CMU to gain Controller-Pilot Data Link Communications (CPDLC) capabilities to meet Data Comm, FANS 1/A+ and European Data Link mandates.

Now, more than ever, it’s important to do thorough upgrade research. Learn more by downloading a full copy of the NextGen Roadmap at uasc.com/NextGenRoadmap.

Overall, the installation cost will be close to a remote-mounted or stand-alone solution, yet this King Air operator will benefit from:

- A new warranty
- Increased database memory
- ADS-B failure messaging
- Operational familiarity

All that plus avoiding the dreaded potential for increased downtime and:

- Removal and reinstallation of interior
- Addition of a fuselage doubler
- Damage tolerance assessment
- Interference with existing radios
- Additional certification efforts

By researching upgrade options and choosing an integrated SBAS-FMS solution, the King Air operator is not only equipping for ADS-B Out, but also taking the first step in preparing for NextGen and SESAR.

A King Air operator with a UNS-1K FMS is looking to upgrade for ADS-B Out. As in most cases, ADS-B transponders will need to be added. However, with a UA FMS upgrade, only the existing Navigation Computer Unit (NCU) and antenna will need to be replaced, in all likelihood. Even the existing FMS Control Display Unit (CDU) can be retained.

ADS-B Upgrade Analysis: is an FMS upgrade really more expensive than remote-mounted GPS sensors?

Not necessarily!

A stand-alone Satellite-Based Augmentation System (SBAS) GPS receiver may meet your ‘wants’ today, but will it fulfill your ‘needs’ in the future?
Mood rings, pet rocks, 8-tracks, Steelers 16 – Vikings 6, Jaws and Disco… What could they all possibly have in common with avionics? The answer: 1975.

Until this time, the term “avionics” was not well-known. However, the concept is easy to understand: Aviation + Electronics = Avionics. As airplane travel became more commonplace, the need for controlling and regulating the safety of aircraft avionics became crucial to public safety. The answer came in the form of RTCA Document No. DO-160, which would become an integral part of the aviation industry for decades to come.

Setting the standard

The Radio Technical Commission for Aeronautics’ (RTCA) DO-160 set a new standard for environmental testing of aircraft avionics – from small general aviation aircraft all the way to large airliners. Since then, the standard has undergone multiple revisions as new and improved test techniques emerge.

Similar to what operators encounter during airborne operation, standardized tests ensure the performance characteristics of avionics.

DO-160 Tests
- Temperature and altitude
- Humidity
- Vibration
- Power input
- Lightning
- Electro-Magnetic Interference (EMI)

Modifying to safety

With over 6,000 people in the air at any given hour in the U.S. alone, we recognize the importance of safety in your avionics. In addition to adhering to RTCA DO-160G, we perform an internal Highly Accelerated Life Test (HALT) prior to a product entering production. HALT is not required to meet any industry regulations. Rather, it reflects our commitment to quality and safety.

As a destructive test, HALT identifies the operational temperature and vibration limits of each product. Tests run from -100°C to +200°C and vibration to 50 Grms (Root Mean Square). As the last step in the testing, we combine the temperature, thermal shock and vibration tests, and repeat for 5 cycles. Several of our products operate to the HALT chamber limits.

Between DO-160G and HALT, we can sleep well at night knowing our avionics will perform as designed to the highest safety standard in any environment we operate in.
Disruptive innovation doesn’t come easy

If you fly often, you might have become immune to the beautiful in-flight view from a cabin cockpit. Soon, a jaw-dropping view from the edge of space will be available which is sure to impress even the most frequent flyer.

World View, an Arizona-based stratospheric technologies company, is spearheading a new market for commercial space flight with crewed and uncrewed applications for tourism, business and science. Most excitingly, World View is developing a space tourism experience to loft an innovative pressurized capsule to the edge of space beneath a high-altitude balloon the size of a football field.

The company’s ‘Voyager’ program will make traveling to the space frontier as accessible as flying on a commercial aircraft. World View says the price of a Voyager ticket to the edge of space begins around $75,000 (USD) - a small price to pay for a several hour journey to experience views only astronauts have seen.

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Jane Poynter, Co-founder and CEO, expressed in a recent interview that the stratosphere is an area of incredible opportunity. Largely, because it’s a sweet spot underserved above air traffic and below space travel at 100,000 feet from Earth.

Poynter further explains the intricacies of operating in the stratosphere. “It’s really hard to operate in the stratosphere,” she said. “The air is that perfect situation where it’s incredibly difficult to fly with a wing, but you’re not really out of the atmosphere enough to be able to fly a satellite that goes whizzing around, because you just get dragged down by all that atmosphere.”

In addition to human space flight, World View’s second primary business unit offers uncrewed flight systems using the same stratospheric balloon technology for applications such as communications, remote sensing, weather and research.

The company routinely uses this technology to fly commercial payloads to the stratosphere for a wide variety of government, commercial and education customers according to their website.

To follow the development of World View’s innovative stratospheric technology, sign up on their website worldview.space/multimedia/#stay-informed to receive the latest test flight videos and company news.

Discriminative experience

During an interview with DownTown Podcast, Poynter sheds light on the experience she hopes tourists will have. “When you speak to astronauts about this amazing experience of seeing the world, they really do talk about it like this amazing transformative experience,” she said. “That’s what I hope we can really deliver to people when they go up.”

Poynter was one of eight people to spend two years sealed inside a 3-acre prototype space base called Biosphere 2 in the early 1990s. She explored her time in Biosphere 2 transformed the way she looks at our world. It’s her hope World View can give people the same experience by looking at the world from the outside-in using stratospheric balloon technology.

She founded World View with fellow Biospherian, Taber MacCallum, who is the company’s Chief Technology Officer, Astronaut Mark Kelly as Director of Flight Crew Operations and Chief Scientist Dr. Alan Stern (who led NASA’s recent first ever mission to Pluto).

Disruptive innovation doesn’t come easy
Like many avionics manufacturers, UA’s certification process is an interconnected web of moving pieces and relationship management. Geanine Ballard, Director of Engineering Services Organization, breaks down the complexities of this important process designed to keep you flying safely.

UA: What exactly does the UA Certification Department do?

GB: UA’s Certification Department is the focal point between the FAA and our company for the certification of our products. This team coordinates each phase of the products’ life cycle with multiple cross-functional internal teams, while closely managing our relationships with three main branches of the FAA: The Los Angeles Aircraft Certification Office (LAACO), the Manufacturing Inspection District Office (MIDO), and Flight Standards District Office (FSDO).

At the start of each new project, Certification and Engineering review the FAA requirements to create a Project Specific Certification Plan (PSCP) for application to the FAA for a Technical Standard Order Authorization (TSOA) to obtain the product design and production approval and Supplemental Type Certification (STC) for the airworthiness approval for installation on an aircraft.

This plan outlines how UA proposes to show compliance to the regulations the FAA has established for a certain product. My team is responsible for the overall design review and compliance approvals, FAA part and installation conformity, and on-aircraft ground and flight testing. This is accomplished using our in-house Designated Engineering Representatives (DERs) and Designated Airworthiness Representatives (DARs). This allows us to maintain more control over the schedule as opposed to using outside consultants for this phase of the process. My team relies on our test aircraft when the software is made available from our engineering team to fly same day to collect data and review crew user interface. UA’s products really are developed for pilots by pilots and our in-house flight test DERs help ensure everything is designed the ‘Universal way’.

We hold our FAA relationship in high regard and consider them, as they do us, a partner in our success.
– Geanine Ballard, Director of Engineering Services Organization

UA: Explain the process of certifying a new product.

GB: During the software development and verification process, certification provides support with testing in the lab and on our King Air F90 and Cessna Citation 650. When the software is robust enough to take to full certification, the Certification team continues with the airworthiness approval process for the installation on the aircraft. The STC supplements the original Type Design of an aircraft. The FAA requires us to complete on-aircraft testing for the software to supplement issuance of the TSOA.

UA: What is UA’s experience with the FAA?

GB: In our experience, the FAA seems to appreciate our level of integrity, honesty and ability to work with them even when challenges come up. Over the years, we have demonstrated our expertise, knowledge and ability with the certification of our products, so much so that the FAA has delegated some steps to UA. For example, we often receive delegation for ‘Applicant Show of Compliance’ in lieu of TIA, which replaces the need for direct FAA participation in flight tests. This benefits UA, as it significantly shortens the time required to obtain TSOA and STC approvals.

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