Design for the Future
Upgrade for NextGen CPDLC, Data Comm / DCL, and FANS 1/A+ with the industry-leading UniLink® UL-800/801. STC’ed for FANS on over 25 aircraft types.

Equip with the best today to be ready for the future.

Here we are, already halfway through 2017! Wow, where has the time gone? It feels like it was just yesterday that we were working on our revamped first quarter issue of the Universal Flyer. Now, we’re just one more issue away from closing out the year.

For this issue, we are starting off with a customer spotlight on Keselowski Transportation. This is an exciting article as it highlights NASCAR driver, Brad Keselowski, and how his Learjet 45 helps him to manage a work-life balance at all drive for. Thank you to Joey Meier, Keselowski Transportation’s Chief Pilot, for taking a moment to chat with us about their operations.

We also take a look at global air harmonization as it continues, with aviation agencies invoking various types of agreements to define rules of airspace, aircraft registration, and safety. It’s important to understand today’s Bilateral Aviation Safety Agreement (BASA) between the United States and the European Union as it will streamline the process of aviation certification across countries.

Then, we take a look at what’s happening with today’s military aircraft and how Commercial Off-The-Shelf (COTS) solutions found in corporate jets are being applied to military derivative aircraft. This article explains how commercial products can benefit the Military market.

Last but not least, we’ll take a look at the certification status of the new InSight Display System, and hear a little from our engineering team that’s helping to move this product forward. Happy reading!

Cheers!

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

The Team
Michelle James
Editor-in-Chief
Stacy Honda
Managing Editor
Derek Hoyle
Art Director
Matthew Grizzard
Web/Production
Derek Hoyle
Cover Art
John Hamby
Photography

Contact
Sales & Marketing
5260 E. Universal Way
Tucson, AZ 85756 USA
Tel: (800) 321-5253 • (520) 295-2300
Fax: (520) 295-2395
Email: universalflyer@uasc.com
www.uasc.com

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

The Team
Michelle James
Editor-in-Chief
Stacy Honda
Managing Editor
Derek Hoyle
Art Director
Matthew Grizzard
Web/Production
Derek Hoyle
Cover Art
John Hamby
Photography

Contact
Sales & Marketing
5260 E. Universal Way
Tucson, AZ 85756 USA
Tel: (800) 321-5253 • (520) 295-2300
Fax: (520) 295-2395
Email: universalflyer@uasc.com
www.uasc.com

Racing Home
NASCAR driver, Brad Keselowski, relies on his Learjet 45 to spend more time with family.

Open Skies
A look at global harmonization in aviation and the most recent FAA/EASA bilateral agreement.

Finding New Purpose
The use of COTS systems in military aircraft is on the rise.

InSight®: On the Eve of TSO
A monumental project for Universal Avionics.

3rd Quarter 2017 | 2
Have you thought about what U.S. sport has the largest fan base? The National Football League, maybe Major League Baseball, or National Basketball Association? You might find the answer surprising… with 75 million fans, NASCAR is the country’s 2nd most popular sport.

With 36 races packed into 10 months per year, racers have a full schedule. Now, add in obligations such as practices and testing, media sessions, sponsor events, and meetings, while still making time for family… Sounds a little challenging, right? Not for Brad Keselowski, professional stock car racing driver and team owner, who is currently competing full-time in the Monster Energy NASCAR Cup Series. That’s because he has a key to making it all work – Keselowski Transportation, a company Brad established to manage logistical coordination for transporting his racing equipment via tractor trailers, and personal travel via a Bombardier Learjet 45.

While the trucks haul Brad’s car and gear across the country, Brad uses the Learjet 45 to transport his most valuable asset – his family. The aircraft is a great tool for Brad to meet scheduled business obligations, but the most rewarding aspect about flying privately is having the opportunity to provide a quick, private, and comfortable way to bring his wife and young daughter ‘on the road’ with him. Likewise, when his family needs to stay home, Brad appreciates the reduced travel time to get back to them. With a schedule as demanding as Brad’s, saving just a couple hours by avoiding the arduous check-in and security process of commercial airlines, plus being able to access airports closest to home, means more time with his family.

An essential piece to making this all work is Brad’s Chief Pilot, Joey Meier. We had the opportunity to sit down with Joey to discuss Keselowski Transportation’s aircraft operations (see facing page).

Q&A with Joey Meier, Chief Pilot

Universal Avionics: Can you tell us about your Learjet 45 flight deck?

Joey: The aircraft is equipped with the standard OEM Honeywell Primus 1000 system, which includes a full autopilot, and dual Universal Avionics UNS-1Ew FMSs. We were previously operating legacy UNS-1C+ FMSs, but recently upgraded for WAAS with the dual UNS-1Ews.

Universal Avionics: Nice upgrade! What were some of the motivators behind it?

Joey: With the 2020 ADS-B Out mandate right around the corner, we saw an opportunity to get the installation done before shops became too full. In addition to that, we wanted to take advantage of your SBAS-FMS Upgrade Incentive Program before it expired. We were able to trade in our UNS-1C+s for a good credit toward the UNS-1Ews. Besides that, we really just wanted access to better approaches.

Universal Avionics: What are you noticing now that you’re flying the new avionics?

Joey: We can now arrive to KSVH from the west compared to before when we would normally have had to use the ILS 28 when weather was IFR. Now, we can go straight into RWY 10 with RNAV WAAS approach.

Universal Avionics: Thank you for your time, Joey. Is there anything else about Keselowski Transportation that we may not know?

Joey: We travel the entire NASCAR schedule, flying around 220 hours a year, and also being gone about 220 days per year.

business aviation in the U.S.

• Only about 3% of business aircraft registered in the U.S. are flown by Fortune 500 companies
• 85% of companies that utilize business aircraft are small-medium size businesses
• More than 70% of passengers aboard business aircraft are non-executive employees

Making Business Happen

• Reaches 10 times the number of U.S. airports than the airlines do

Economic Impact

• Contributes $150 billion to U.S. economic output and employs more than 1.2 million people

Source NBAA Business Aviation Fact Book
Today’s Open Skies Agreements

Modern-day bilateral and multinational partnerships seek to bridge a broad range of divergent airworthiness issues across airspace systems. In what proved significant for business aviation operators, the FAA, TCCA, and EASA signed a groundbreaking amendment to an existing agreement in March of last year eliminating the need for equipment manufacturers to obtain both an (FAA) TSOA and an (EASA) ETSOA. The “Technical Implementation Procedures (TIP) for Airworthiness and Environmental Certification Between the Federal Aviation Administration of the United States of America and the European Aviation Safety Agency of the European Union” cleared the way for equipment manufactured in the U.S. or E.U. to be mutually accepted by the other organizations, including Transport Canada.

For companies like UASC, avionics equipment certified under FAA TSOA will no longer need to seek EASA ETSOA or Transport Canada approval now that the bilateral agreement is in place. This saves operators, manufacturers, and install centers considerable time and money associated with certification activities. Plus, the agreement retroactively applies to previously TSO’d products.

Challenges Still (and Will Always) Exist

While the FAA/EASA/TCCA TIP amendment signed last year represents a milestone for global regulatory harmonization, a lot of confusion among aircraft OEMs and installation centers remains in regard to the application and implementation of the policy. Even with an avionics system TSOI approved, install centers still face significant challenges in securing interagency STC approvals for aircraft operating internationally, signaling that more work is in store for harmonizing our airspace systems.
Ten years ago, the worldwide ‘market correction’ shook the tenants of normal business practices to its core. Like many industries, aerospace and defense were impacted significantly. There were anticipated effects, like budget cuts, but there were other, unexpected, outcomes as well.

Knewingly, the correction resulted in reduction (or stagnation) of government budgets, forcing a shift in strategy to maintaining the utilization of our airborne defense systems versus replacing them. New aircraft production stalled. Investment dollars were moved from procurement of new aircraft to extending the life of older fleets, producing higher demand for retrofit and upgrade of militarily aircraft. For the flight deck, that means adding high performance navigation and data link communications.

The shift was further spurred by a renewed availability of Commercial Off-The-Shelf (COTS) avionics that integrate well into these aircraft and suppliers leveraging existing TSO'd components against military avionics upgrade requirements. The result? More COTS components being integrated into military platforms.

Traditionally, equipping government and military aircraft flight decks have been served by Federal Acquisition Regulation (FAR) Part 15 companies – those which produce items specifically for military applications. Part 15 outlines a host of military specifications that are generally well-suited to outfit new aircraft and its associated systems. But, it becomes tricky because FAR Part 15 items have a development timeline and procurement cost that in some cases are not the best value proposition to address a capability upgrade. Due to smaller aircraft fleets upgraded with the residual per unit costs, FAR Part 15 items are often extremely expensive.

This is where FAR Part 12, known as Commercial Off-The-Shelf or ‘COTS’ components enter the picture. COTS products, with high flexibility, prove to be a successful solution to the military’s conundrum of wanting to upgrade aging aircraft with the latest technology without the cost (in terms of time and money) of a large scale development project often required when partnering with FAR Part 15 suppliers. Using the component model, individual COTS units integrate with existing third party avionics architectures – and all without a wholesale ‘rip and tear’ of an entire cockpit.

There are situations where only an FAR Part 15 component or full retrofit flight deck will be appropriate, but we now know there is a place for the integration of COTS products in military aircraft. In truth, fitting ‘square peg’ commercial products in the ‘round hole’ military market takes a bit of finesse but is ultimately feasible… and rewarding for all involved.

UASC Perspective: Where COTS Components Thrive

Being an FAR Part 12 avionics supplier for the U.S. Department of Defense (DOD) presents some challenges, but it’s not without its successes. For UASC, we have positioned the InSight Display System and FMS Tactical mission computers for successful integration with existing avionics in many commercial derivative platforms, like these for example:

- CASA CN-235
- Boeing RC-135
- Sikorsky UH-60
- Lockheed Martin C-130
- Dash-8 ARL-E
- Learjet C-21

Aircraft Production:

- Production of military trainers/light attack, and transport aircraft has stagnated since 2007, with production expected to grow beginning in 2020.
- Fighter aircraft will account for 54% of units, followed by trainer aircraft at 24%, military transport at 13%, and special purpose at 9%.

Commercial Avionics Find a New Life in Military Aircraft

The Mission:

Meet upcoming FAA mandates and increase the utilization of the existing aircraft fleet through technological upgrades that address component obsolescence and add mission capability.

UASC Perspective: Where COTS Components Thrive

Being an FAR Part 12 avionics supplier for the U.S. Department of Defense (DOD) presents some challenges, but it’s not without its successes. For UASC, we have positioned the InSight Display System and FMS Tactical mission computers for successful integration with existing avionics in many commercial derivative platforms, like these for example:

- CASA CN-235
- Boeing RC-135
- Sikorsky UH-60
- Lockheed Martin C-130
- Dash-8 ARL-E
- Learjet C-21

Aircraft Production:

- Production of military trainers/light attack, and transport aircraft has stagnated since 2007, with production expected to grow beginning in 2020.
- Fighter aircraft will account for 54% of units, followed by trainer aircraft at 24%, military transport at 13%, and special purpose at 9%.
“Originally, InSight’s Synthetic Vision System (SVS) was planned to be a follow-on to our Vision-1® SVS product. However, after taking a deep look at what was really required by the system, we decided to combine it with recent graphical techniques, the capabilities inherent in modern graphics hardware, and a little bit of artistry to come up with a fresh approach. We wanted to improve situational awareness without distracting the pilot, so we needed subtle features that were evocative, rather than in your face.

Interestingly enough, the ice caps in InSight’s SVS were discovered inadvertently early in the system development, when we were evaluating a new water coverage data source. We were a bit surprised to see lakes on the tops of mountains! (Frozen water, right?). Once we figured out what that was all about, we saw how to distinguish frozen water from the liquid variety, and created a way to render them separately. Later, this was refined to become what you now see: white ice with shadows caused by the terrain curvature and reflective water.”

A Monumental Project

From an engineering standpoint, InSight is the largest and most complex project ever undertaken by Universal Avionics. More than 6 types of Air Data Computers, 5 types of Flight Guidance Systems, and 7 types of Weather Radar Systems are supported in the initial release of this system (with additional systems to be added in the future).

- 4 New Line Replaceable Units (LRU)
- 17 Processors
- 36 New circuit cards
- 450 New hardware drawings
- More than 750 new lifecycle documents
- More than 41,000 pages of documentation
- More than 2,500 design reviews
- Over 1,400,000 lines of code

We are happy to announce that TSOA and STC data packages for our new InSight Display System have officially been submitted to the FAA for final review. The submittal encompassed thousands of pages of compliance data to prove substantiation that all regulatory requirements have been met and that the system meets its intended function. Now, the FAA has a 30-day window to review all finalized documentation before issuing the InSight TSOAs, as well as the STC for the first installation on our Cessna Citation VII. We continue to support questions and clarifications when requested by the FAA, and their teams are working hard to complete a timely review and issuance of the approvals.

In his own words: Making the Next Synthetic Vision

Dr. David Grable, Senior Principal Software Engineer

"In his own words: Making the Next Synthetic Vision

"Originally, InSight’s Synthetic Vision System (SVS) was planned to be a follow-on to our Vision-1® SVS product. However, after taking a deep look at what was really required by the system, we decided to combine it with recent graphical techniques, the capabilities inherent in modern graphics hardware, and a little bit of artistry to come up with a fresh approach. We wanted to improve situational awareness without distracting the pilot, so we needed subtle features that were evocative, rather than in your face.

Interestingly enough, the ice caps in InSight’s SVS were discovered inadvertently early in the system development, when we were evaluating a new water coverage data source. We were a bit surprised to see lakes on the tops of mountains! (Frozen water, right?). Once we figured out what that was all about, we saw how to distinguish frozen water from the liquid variety, and created a way to render them separately. Later, this was refined to become what you now see: white ice with shadows caused by the terrain curvature and reflective water.”