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Cheers!

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The use of aircraft in Search and Rescue (SAR) operations began to proliferate in the 1950’s, coinciding with the formation of the United Nations and the Geneva Convention on the High Seas. A trend toward international aviation cooperation combined with advancement of aircraft technology buoyed the use of specialized aircraft for SAR operations.

In 1958, the International Convention of Maritime Search and Rescue was created to provide cooperation between nations in support of SAR operations in international waters, “establishing an international maritime search and rescue plan responsible to the needs of maritime traffic for the rescue of persons in distress at sea.” Thereby, no matter where an accident may occur, the rescue will be coordinated by a SAR organization or when necessary, between neighboring SAR organizations. Today, the world’s oceans are divided into 13 SAR areas and in each, countries have bordered SAR regions for which they are responsible.

Age Is Just a Number: retrofitting older aircraft for SAR

Today, several aircraft OEMs manufacture SAR-based platforms, and many have proven to be strong, workhorse aircraft. Specialized onboard equipment make these aircraft high-utility but also higher in cost than most transport aircraft. Fortunately, today’s advanced avionics technologies make it possible for even the oldest aircraft to extend their lifespan, adding capability and safety features for a fraction of the cost of replacing the aircraft.

Universal Avionics specializes in custom solutions for special-use aircraft like SAR helicopters, providing technology that enables life-saving operations for our communities. In order to provide operation-specific functionality, our engineers employ an “Open Architecture Approach” to cockpit modernization. This provides a lot of flexibility in avionics integrations; making it easy to add, upgrade, and integrate various cockpit components without a total equipment replacement. Keep what works well, and replace those that don’t.

Common Rotary and Fixed Wing SAR Aircraft

- Aerospatiale: SA 360 Dauphin
- AgustaWestland: AW101, AW109, AW119, AW139, CH-149 Cormorant
- Bell: 412, CH-146 Griffon, UH-1 Iroquois, UH-1H Twin Huey
- Boeing: Vertol CH-113 Labrador, CH-114, CH-46 Sea Knight, and CH-47 Chinook
- MD: 902 Explorer
- Mil: Mi-8, Mi-17
- Sikorsky: CH-47B, HH-4, HH-60 Pave Hawk, HH-60 Pave Hawk, S-61, S-70, S-76, S-92, SH-60 Seahawk
- Westland: Lynx, Sea King, Wessex

The use of aircraft in Search and Rescue (SAR) operations has become vital to aiding those in distress. Whether in the sea, mountain, urban or combat environment, helicopters in particular demonstrate undeniable importance.

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The latest technology to be incorporated into Universal Avionics’ PMS is the Transition to Hover feature. This has quickly become a must-have for crews engaged in overwater SAR operations, where the helicopter must be brought to a position to allow for winch operations. The new feature allows pilots to mark a target and have the PMS provide an automatic downwind leg with a course reversal. This positions the helicopter to a point where it can perform the transition down and deceleration to a stable hover downwind of the target. Mark-On-Target can be activated during any operation, including during automatic search patterns. With Transition to Hover, just a single pilot action after Mark-On-Target allows the automatic procedures to be executed. Advanced technologies like this enables more hands-free operations for the crew – so they can focus on the life-saving mission at hand.
It’s 1997 and the VLF/Omega navigation network is scheduled to shut down after 26 years of beaming radio signals around the world. With the aviation industry focused on GPS navigation, greater interest in modernizing cockpits emerges and buoys a flurry of development among avionics suppliers for other advancements like cockpit communications. The industry began moving past traditional ACARS VHF and radar systems to develop what we now consider modern-day data link systems.

We at Universal were at the forefront of data link development in the 1990’s. It was clear this technology would enable quick advancements in air-to-ground communications, inflight weather information, and position tracking. We also knew it would be a key capability that would improve the safety of aviation for corporate, airline and military aircraft. Our engineers and pilots recognized the potential for substantial safety improvements in the cockpit by leveraging technologies like digital data transmissions integrated with navigation systems and other cockpit components. And we’ve continued to advance data link technology ever since.

With the evolution of data link technology, came the evolution of UniLink.

UniLink UL-600 released. “Uni” for Universal and “Link” for the air-ground data link service. The first UniLink model was developed jointly with Teledyne Controls where most of the hardware would be developed by Universal Avionics. The UL-600 utilized an external CSDB-tuned VHF radio.

UniLink UL-601 released. UL-601 units included an embedded radio. Soon, SatCom became available with the release of UniLink Software Version SCN 11.0, which also included support for an external AT716 VHF radio.

UniLink UL-700/701 released. It was wholly-developed by UASC, allowing for a customized user interface for customer databases, and the addition of an updatable geographic database used to support efficient data link frequency management. Over the ensuing years, many interfaces were added including CMC, Multi-function Control Display Unit (MCDU), ARINC 702A FMS, as well as a database to support airlines that wanted ACARS but required a custom interface solution.

UniLink UL-800/801 released. Today’s UniLink, the UL-80X, is the most advanced CMU on the market. It provides capability for VDL Mode 2, Future Air Navigation System (FANS) 1/A+ which includes support for Controller-Pilot Data Link Communications (CPDLC) services. It includes an additional Air Traffic Control (ATC) database (also customizable) as well.

SCN 31.1 software with ATN B1 CPDLC and CM for DLS-IR (formerly Link 2000+) receives FAA and EASA approval.

The sky’s the limit. I can’t see an end in sight for this technology. New types of information will be made available and we’ll see higher speed data transfers. It’ll eventually mean a significant reduction of paper and voice communication in the flight deck.

– Frank Hummel, Universal Avionics Senior Project Engineer, 1997 quote in ProPilot Magazine

Now TSO’d!
UniLink UL-800/801 Software Version SCN 31.1

- Support for Aeronautical Telecommunications Network Baseline I (ATN BI) Controller-Pilot Data Link Communications (CPDLC) and Context Management functions
- Meets European implementation of ATN BI CPDLC in upper airspace, outlined in the Single European Sky ATM Research (SESAR) Data Link Services Implementing Rule (DLS IR)
- Meets TSO-C160A
This Cessna Citation VII is the launch aircraft for the InSight Display System. The new flight deck has been installed, flight tested, and FAA certified.

4 - EFI-1040P Displays  
2 - EFIS Control Display Units (ECDU)  
2 - Alphanumeric Keyboards (ANK)  
2 - Cursor Control Panels (CCP)  
2 - UNS-1Fw Flight Management Systems (FMS)  
2 - Data Concentrator Units (DCU) II  
2 - Engine Interface Units (EIU)  
1 - UniLink® UL-801 Communications Management Unit (CMU)  
1 - Terrain Awareness and Warning System (TAWS) Class A  
1 - Reference Select Panel (RSP)  
1 - Solid-State Data Transfer Unit (SSDTU)

This Cessna Citation VII is the launch aircraft for the InSight Display System. The new flight deck has been installed, flight tested, and FAA certified.

This was an excellent demonstration not only of how well RNP approaches work and how easy they are to fly, but also of a rather oldish business jet’s transformation into a capable, modern machine, strictly via an avionics upgrade.

– Matt Thurber, AIN Editor-in-Chief (following his first flight of the InSight-equipped Citation VII)

+ Components Removed: 30  
+ Weight Savings: 193.55 lbs.  
+ First Test Flight: August 23, 2012  
+ Total Flight Hours with InSight: 261.9
Universal Avionics Database Engineering Department is based at the company’s headquarters in Tucson, Arizona, USA. The experienced team of nine provides support and development of tools and processes for databases such as PMS Navigation, InSight, UniLink, and Advanced Performance (TOLD). It also develops and supports PC-based tools related to databases (Universal Flight Planning and InSight Data Download Tool), and serves as a liaison with data suppliers to resolve any data issues in supplied data. Several team members also actively support the AEEC ARINC Industry Activities Navigation Database Subcommittee and the RTCA Special Committee (SC)-217 Aeronautical Databases.

**The Issue**

“Every 28 days, we update our PMS Navigation Databases so we have the latest and greatest for each airport base,” said David Coffin, Fleet Planning Manager for PAL Airlines. “When CYCLE 1707 was released and the LPV approach was taken away from CVBZ, we were restricted to day VFR only, which we have a 50% chance of each day. This raised a big flag for our operations and I called Norm Mathies, our Universal Avionics Sales Representative, to give him a heads up that the missing parameters would need to be ready within a certain deadline or we would have to wait another 6 weeks for the approach to be reinstated, which would nearly be impossible for us.”

**The Outcome**

The Universal team kept close tabs on the issue, coordinating with the data supplier to populate the missing information. The LPV approach was successfully reinstated in the next database cycle—just hours before release.

“During a long (holiday) weekend in the U.S., Universal Avionics had their database team lined up and ready to go. The service that Universal provided was phenomenal! They understood our operations were in jeopardy and they were able to resolve the issue quickly for us. Universal was all on board, pulling all of the strings,” says Coffin.

**The Key Players**

**Kim Jordan**
Manager of Database Engineering
Utilized technical experience to mentor team on the most appropriate solution for the specific situation.

**Tanya Romero**
Software Engineer
Volunteered to work the holiday weekend to process PMS Navigation Databases. This enabled UA to recognize the issue early and coordinate with the data supplier.

**Louie La Compte**
Database Systems Engineer
Key coordinator between UA and data supplier to populate missing data that allowed for the approach to be reinstated for PAL.

**Jose Ugarte**
Nav Data Production Specialist
Mitigated the delay of database delivery to customers by prioritizing database duplication efforts appropriately.