CASE STUDY

Turkish Aerospace Industries (TAI) instruments Turkey's first indigenous trainer, the Hürkuş, with an Acra KAM-500 data acquisition system (DAS)

CURTISS-WRIGHT

Challenge

- In order to gain EASA CS-23 certification, TAI instruments Turkey's first indigenous trainer, the Hürkuş, with an Acra KAM-500 DAS.
- Over 500 test flights are planned prior to the first delivery in 2015

Solution

- The Hürkuş is instrumented with a hybrid PCM/Ethernet Acra KAM-500 DAS that also includes a Curtiss-Wright Flight Recorder and an IEEE-1588 PTP switch. Over 1000 parameters are acquired and delivered on-board and to the ground station; tightly integrated software provides real time system and data analysis

Results

- Over two month of projected savings for flight test program time to certification
- Reduction in Flight Test Program costs
- The development of a world class flight test capability to be used on future programs

Challenge

The development of Turkey's first indigenous trainer aircraft, Hürkuş, began in March 2006 as part of a contract signed between Secretariat for Defence Industries (SSM) and Turkish Aerospace Industries (TAI). The Hürkuş is a tandem two-seat, low wing, single engine, turboprop aircraft being developed as a new basic trainer. The program is supported by 27 Turkish companies and covers the manufacture of four prototypes. The first prototype, the Hürkuş-A, was rolled out in June 2012 and completed engine tests in February of 2013. The second is being tested for static durability, the third is in assembly, and the fourth will be tested for metal fatigue. Two variants are currently being developed:

- Hürkuş-A is a basic version which will be certified with EASA according to CS-23 requirements. It is intended for the civilian market.
- Hürkuş-B is an advanced version with integrated avionics (including HUD, MFDs, and mission computer). The cockpit avionics layout is similar to F-16 and F-35 fighters.

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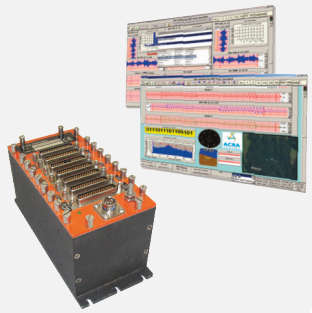

Solution

The Hürkuş flight test instrumentation (FTI) system is comprised of three 13U and one 6U Acra KAM-500 data acquisition units (DAUs) located in the baggage compartment, near the engine, and in the cockpit.

The four chassis system manages over 1,000 FTI parameters.

The DAUs each contain a power supply, a backplane controller with IRIG 106 encoder and a combination of the following modules:

- IRIG-106 PCM encoder /decoder
- Full-duplex, fast Ethernet
- Ethernet bus monitor parser
- Full and ¼ bridge analog to digital converter
- Accelerometer
- Thermocouple
- GPS and IRIG input
- MPEG-4 video encoder
- ARINC-429 transmitter

The four DAUs are connected via an IEEE-1588 FTI network switch, resulting in a hybrid PCM/Ethernet system that telemeters data to a ground station running Symvionics IADS® software for real time and post test analysis. The system also includes a seamlessly integrated Curtiss-Wright Multi-Purpose Flight Recorder (MPFR), a 3rd party data recorder, and a UDP box with a cockpit control panel that was developed in-house. Finally, real-time data analysis is enabled via a connection to a laptop running GS Works.

TAI has developed a UDP box and FTI controller for the data recorder system, including a power management system and independent power supply. The power distribution system provides the pilots with feedback and allows them to monitor the system for data loss via event markers.

Results

The Acra KAM-500 was chosen by TAI due to its reliability, user friendliness and interoperability. With ever changing requirements the systems re-configurability, modular design and the support of the Curtiss-Wright team has proved to save time and money. Because the system has been globally proven to produce accurate data, it provides a faster path to certification through the absence of lost data or flights.

TAI uses the Acra KAM-500 system on multiple projects thus saving time and costs incurred during the design and installation phases associated with learning a new system. Due to the inherent modularity of the Acra KAM-500 (any module works in any chassis), TAI is also able to save money on their flight test programs by re-using or shifting the modules between the programs.

Curtiss-Wright provides the most widely installed FTI system in the world with more flight hours than any other. TAI have successfully developed a hybrid Ethernet networked FTI system that can be easily adapted to suit changing program requirements and advancements in technology. The hardware is not program specific so long after the Hürkuş flight test program is complete; the hardware will continue to help TAI gain aircraft certification with reliable date. Combined with the Acra KAM-500 system and support provided by Curtiss-Wright, TAI is confident this and future flight test programs will be a success.

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