

CANAerospace/AGATE databus goes flying again

Hampton, VA - The NASA Langley Research Center is in the process of installing the CANAerospace/AGATE databus in two research aircraft used for the SATS program flight tests. The Small Aircraft Transportation System, SATS, is a partnership among various organizations including NASA, the Federal Aviation Administration (FAA), US aviation industry, state and local aviation officials, and universities. The project's initial focus is to prove that new operating capabilities will enable safe and affordable access to virtually any runway in the United States in most weather conditions. These new operating capabilities rely on on-board computing, advanced flight controls, Highway in the Sky displays, and automated air traffic separation and sequencing technologies.



The CANAerospace 1MBit/s, two-wire multitransmitter bus is used as a backbone network for flight state sensors, navigation systems and several research PCs driving high resolution flat panel displays installed in the cockpit. The research PCs, equipped with CANAerospace interfaces also serve as gateways between an airborne internet connection and the databus. They will be running the SuSE 8.0 Linux operating system and use nVIDIA high end graphics accelerators.

For research purposes, the two Langley aircraft will be equipped with CAIS (Common Airborne Instrumentation System), a flight data acquisition system which records all relevant flight state data including the CANAerospace information. Together with a voice/video recording installation, the high amount of data generated by the test flights will allow a thorough analysis of the crew assistance provided by the advanced cockpit interfaces. The CANAerospace interface for the CAIS system will be a joint development between Teletronics Technology Corp. of Bristol, Pennsylvania and Stock Flight Systems of Farchach, Germany.

CAIS is used in various programs by several NASA research centers and the US Air Force.

At the same time, the 3DED research program funded by the State of Bavaria in Germany will also use the CANaerospace/AGATE databus. The target of 3DED is the development and flight testing of a three dimensional situational awareness display for general aviation aircraft. Both SATS and 3DED are using identical CANaerospace/AGATE data objects sets which make them interface compatible.



The AGATE databus is based on Controller Area Network (CAN), a bus which has been used in the automotive industry since a number of years and generated the production of some 100 million interface chips by today.

The overlaying CANaerospace protocol, originally developed by Stock Flight Systems in Germany has been standardized by NASA as a next generation general aviation databus within the Advanced General Aviation Experiments (AGATE) program in 2001. Its major advantages are outstanding reliability, simplicity and a self-identifying message format which supports the interoperability of systems produced by different vendors.

CANaerospace is used as a distributed avionics system network in the Ae270 turboprop single engine aircraft and has already been certified by the aviation authorities of the Czech Republic. Also, it is present in other NASA programs like SOFIA, where it serves as data link between several realtime control systems for the infrared astronomy telescope which are spread throughout the fuselage of the Boeing 747SP research aircraft. SOFIA is a collaboration between NASA and the German Aeronautics Research Organization DLR. The SOFIA airplane will be operated from the NASA Ames Research Center in Moffet Field, California.

The highly reputed NASA Langley Research Center in Hampton, Virginia is the site where many of the astronauts of the Mercury and Apollo space programs were trained. The aeronautics division operates a variety of research aircraft including a Boeing 757, a Northrop T38, a Beech 200 King Air, an OV-10 Bronco and a UH1-D helicopter. The airplanes used for the SATS flight tests are a Cirrus SR-22 and a Lancair LC-40. Due to the good experience during system integration, the NASA Langley Research Center is evaluating the use of CANaerospace in other research aircraft as well.

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