



Technology Focus: Data Acquisition

Measurement and Controls Data Acquisition System

Marshall Space Flight Center, Alabama

Measurement and Controls Data Acquisition System (MCDAS) is an application program that integrates the functions of two stand-alone programs: one for acquisition of data, the other for controls. MCDAS facilitates and improves testing of complex engineering systems by helping to perform calibration and setup of test systems and acquisition, dissemination, and processing of data. Features of MCDAS include an intuitive, user-friendly graphical user interface, a capability for acquiring data at rates greater than previously possible,

cooperation between the data-acquisition software subsystem and alarm-checking and analytical components of the control software subsystem, and a capability for dissemination of data through fiber optics and virtual and wide-area networks, including networks that contain hand-held display units. The integration of the data acquisition and control software offers a safety advantage by making alarm information available to the control software in a more timely manner. By enabling the use of hand-held devices, MCDAS re-

duces the time spent by technicians asking for screen updates to determine effects of setup actions. Previously recorded data can be processed without interruption to current acquisition of data. Analysts can continue to view test parameters while test-data files are being generated.

This program was written by Rick Hall of Marshall Space Flight Center, Alice Daniel formerly of UNITes (NTSI), and Frank E. Batts, Sr. of Langley Research Center. Further information is contained in a TSP (see page 1). MFS-32014-1

IMU/GPS System Provides Position and Attitude Data

Stennis Space Center, Mississippi

A special navigation system is being developed to provide high-quality information on the position and attitude of a moving platform (an aircraft or spacecraft), for use in pointing and stabilization of a hyperspectral remote-sensing system carried aboard the platform. The system also serves to enable synchronization and interpretation of readouts of all onboard sensors. The heart of the system is a commercially available unit, small enough to be held in one hand, that contains an integral combination of an inertial measurement unit (IMU) of the microelectromechanical systems (MEMS) type, Global Positioning System (GPS)

receivers, a differential GPS subsystem, and ancillary data-processing subsystems. The system utilizes GPS carrier-phase measurements to generate time data plus highly accurate and continuous data on the position, attitude, rotation, and acceleration of the platform. Relative to prior navigation systems based on IMU and GPS subsystems, this system is smaller, is less expensive, and performs better. Optionally, the system can easily be connected to a laptop computer for demonstration and evaluation. In addition to airborne and spaceborne remote-sensing applications, there are numerous potential terrestrial sensing,

measurement, and navigation applications in diverse endeavors that include forestry, environmental monitoring, agriculture, mining, and robotics.

This work was done by Ching Fang Lin of American GNC Corp. for Stennis Space Center.

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Refer to SSC-00225, volume and number of this NASA Tech Briefs issue, and the page number.*

Using Artificial Intelligence to Inform Pilots of Weather

Weather awareness is increased; workload is reduced.

Ames Research Center, Moffett Field, California

An automated system to assist a General Aviation (GA) pilot in improving situational awareness of weather in flight is now undergoing development. This development is prompted by the observation that most fatal GA accidents are attributable to loss of weather awareness. Loss of weather awareness, in turn, has been attributed to the diffi-

culty of interpreting traditional pre-flight weather briefings and the difficulty of both obtaining and interpreting traditional in-flight weather briefings. The developmental automated system not only improves weather awareness but also substantially reduces the time a pilot must spend in acquiring and maintaining weather awareness.

The automated system includes computer hardware and software, a speech-based hardware/software user interface, and hardware interfaces between the computer and aircraft radio-communication equipment. The heart of the system consists of artificial-intelligence software, called Aviation Weather Environment (AWE), that implements a