The cameras more closely resemble cellphone cameras than traditional security camera systems. Processing capabilities are built directly onto the camera backplane, which helps maintain a low cost.

The low power requirements of each camera allow the creation of a single imaging system comprising over 100 cameras. Each camera has built-in processing capabilities to detect events and cooperatively share this information with neighboring cameras. The location of the event is reported to the host computer in Cartesian coordinates computed from data correlation across multiple cameras. In this way, events in the field of view can present low-bandwidth information to the host rather than high-bandwidth bitmap data constantly being generated by the cameras. This approach offers greater flexibility than conventional systems, without compromising performance through using many small, low-cost cameras with overlapping fields of view. This means significant increased viewing without ignoring surveillance areas, which can occur when pan, tilt, and zoom cameras look away. Additionally, due to the sharing of a single cable for power and data, the installation costs are lower.

The technology is targeted toward 3D scene extraction and automatic target tracking for military and commercial applications. Security systems and environmental/vehicular monitoring systems are also potential applications.

This work was done by Lawrence C. Freudinger of Dryden Flight Research Center and David Ward and John Lesage of SemQuest, Inc. For more information, contact SemQuest, Inc. at (719) 447-8757. DRC-007-022

Data Acquisition System for Multi-Frequency Radar Flight Operations Preparation

John H. Glenn Research Center, Cleveland, Ohio

A three-channel data acquisition system was developed for the NASA Multi-Frequency Radar (MFR) system. The system is based on a commercial-off-the-shelf (COTS) industrial PC (personal computer) and two dual-channel 14-bit digital receiver cards. The decimated complex envelope representations of the three radar signals are passed to the host PC via the PCI bus, and then processed in parallel by multiple cores of the PC CPU (central processing unit). The innovation is this parallelization of the radar data processing using multiple cores of a standard COTS multi-core CPU.

The data processing portion of the data acquisition software was built using autonomous program modules or threads, which can run simultaneously on different cores. A master program module calculates the optimal number of processing threads, launches them, and continually supplies each with data.

The benefit of this new parallel software architecture is that COTS PCs can be used to implement increasingly complex processing algorithms on an increasing number of radar range gates and data rates. As new PCs become available with higher numbers of CPU cores, the software will automatically utilize the additional computational capacity.

This work was done by Jonathan Leachman of ProSensing, Inc. for Glenn Research Center.

Inquiries concerning rights for the commercial use of this invention should be addressed to NASA Glenn Research Center, Innovative Partnerships Office, Attn: Steve Fedor, Mail Stop 4–8, 21000 Brookpark Road, Cleveland, Ohio 44135. Refer to LEW-18465-1.

Mercury Toolset for Spatiotemporal Metadata

Goddard Space Flight Center, Greenbelt, Maryland

Mercury (http://mercury.ornl.gov) is a set of tools for federated harvesting, searching, and retrieving metadata, particularly spatiotemporal metadata. Version 3.0 of the Mercury toolset provides orders of magnitude improvements in search speed, support for additional metadata formats, integration with Google Maps for spatial queries, facetted type search, support for RSS (Really Simple Syndication) delivery of search results, and enhanced customization to meet the needs of the multiple projects that use Mercury. It provides a single portal to very quickly search for data and information contained in disparate data management systems, each of which may use different metadata formats. Mercury harvests metadata and key data from contributing project servers distributed around the world and builds a centralized index. The search interfaces then allow the users to perform a variety of fielded, spatial, and temporal searches across these metadata sources. This centralized repository of metadata with distributed data sources provides extremely fast search results to the user, while allowing data providers to advertise the availability of their data and maintain complete control and ownership of that data.

Mercury periodically (typically daily) harvests metadata sources through a collection of interfaces and re-indexes these metadata to provide extremely rapid search capabilities, even over collections with tens of millions of metadata records. A number of both graphical and application interfaces have been constructed within Mercury, to enable both human users and other computer programs to perform queries. Mercury was also designed to support multiple different projects, so that the particular fields that can be queried and used with search filters are easy to configure for each different project.

This work was done by Bruce E. Wilson, Giri Palanisamy, Ranjeet Devarakonda, B. Timothy Rhyne, and Chris Lindsley of UT-Battelle; and James Green of Information International Associates for Goddard Space Flight Center. Further information is contained in a TSP (see page 1). GSC-15723-1