The cameras more closely resemble cell-
phone cameras than traditional security
camera systems. Processing capabilities
are built directly onto the camera back-
plane, which helps maintain a low cost.
The low power requirements of each
camera allow the creation of a single im-
ageing system comprising over 100 cam-
eras. Each camera has built-in process-
ing capabilities to detect events and
cooperatively share this information
with neighboring cameras. The location
of the event is reported to the host com-
puter in Cartesian coordinates com-
puted from data correlation across mul-
tiple 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 compro-
mising performance through using
many small, low-cost cameras with over-
lapping fields of view. This means signif-
icant increased viewing without ignor-
ing 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 in-
stallation costs are lower.
The technology is targeted toward 3D
scene extraction and automatic target
tracking for military and commercial ap-
plications. Security systems and environ-
mental/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 sys-
tem 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 paralleliza-
tion 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 soft-
ware architecture is that COTS PCs can
be used to implement increasingly com-
plex processing algorithms on an in-
creasing number of radar range gates
and data rates. As new PCs become avail-
able with higher numbers of CPU cores,
the software will automatically utilize
the additional computational capacity.
This work was done by Jonathan Leach-
man of ProSensing, Inc. for Glenn Re-
search Center.
Inquiries concerning rights for the commer-
cial use of this invention should be addre-
sed to NASA Glenn Research Center, Innovative
Partnerships Office, Attn: Steve Fedor, Mail
Stop 4–8, 21000 Brookpark Road, Cleve-
land, Ohio 44135. Refer to LEW-18465-1.

### Mercury Toolset for Spatiotemporal Metadata

**Goddard Space Flight Center, Greenbelt, Maryland**

Mercury (http://mercuryornl.gov) is a set of tools for federated harvesting,
searching, and retrieving metadata,
particularly spatiotemporal metadata.
Version 3.0 of the Mercury toolset pro-
vides orders of magnitude improve-
ments in search speed, support for ad-
ditional metadata formats, integration
with Google Maps for spatial queries,
facetted type search, support for RSS
(Really Simple Syndication) delivery of
search results, and enhanced cus-

tomization to meet the needs of the
multiple projects that use Mercury.
It provides a single portal to very quickly
search for data and information con-
tained in disparate data management
systems, each of which may use differ-
ent metadata formats. Mercury harvests
metadata and key data from contribut-
ing 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 ex-
tremely fast search results to the user,
while allowing data providers to adver-
tise the availability of their data and
maintain complete control and owner-
ship of that data.

Mercury periodically (typically daily)
harvests metadata sources through a col-
lection of interfaces and re-indexes
these metadata to provide extremely
rapid search capabilities, even over col-
lections with tens of millions of meta-
data records. A number of both graphi-
cal 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 Dewarakonda,
B. Timothy Rhyne, and Chris Lindsley of
UT-Battelle; and James Green of Informa-
tion International Associates for Goddard
Space Flight Center. Further information
is contained in a TSP (see page 1). GSC-
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