

# Goddard Tech Trends

Volume 3 | Issue 1 | Fall 2006



# tech trends

2

Next-Generation  
X-ray Detectors

3

The Methane Mystery

4

Applying Cryogenics to  
Human Spaceflight

5

SPHEREs in Space

6

Keeping the  
Homeland Secure

7

Advanced Manufacturing Adds  
Capability

## On The Cover:

Naoko Iyomoto, a scientist working in the X-ray Astrophysics Laboratory, holds an X-ray microcalorimeter, a sensitive thermometer that precisely measures temperature variations of incoming X-ray photons.

See page 2 for story.

## Build It and They Will Come

### Advanced Manufacturing Branch Adds New Capability

Goddard's ability to machine and assure the accuracy of specialty parts for spacecraft and scientific instruments has advanced to the next level of sophistication now that the Center has acquired a high-precision optical-measuring machine, which it has housed in a Class-100 clean room, according to Garcia Blount, head of Goddard's Advanced Manufacturing Branch.

The machine, the Smartscope Quest 600, adds a new dimension to what his organization can offer in the way of machining components, checking their accuracy, and retooling them if necessary, Blount said. "Our main goal is to not only make specialty parts, but to make sure that they're accurate. With this machine and the high-speed machining center we acquired more than a year ago, we can do all these things within a day."

### James Webb Space Telescope First Customer

The James Webb Space Telescope project will be the first to use the Smartscope when verification testing begins on the project's microshutter arrays, an enabling technology for the telescope's Near-Infrared Spectrograph, said Greg Woytko, manager of the Instrument Development Lab.

Each microshutter array is made up of 62,415 tiny shutters — each the width of a human hair. Precisely aligned on a silicon grid, they open or close to allow or prevent

starlight from entering the spectrograph. However, astronomers will need to know the precise position of each shutter so that they know which shutters to open or close to get a particular field of view. Ultimately, the spectrograph will require eight arrays — four for the actual instrument and four for backup.

"The Smartscope is just the right tool to verify the location of each shutter," said Scott Schwinger, the lead mechanical engineer on the microshutter project. And because it is capable of detecting alignment problems that are thousands of times smaller than the width of a human hair, the Smartscope also will help technicians precisely align the arrays onto the silicon grid. "Verification will be included in the assembly process," he said.

Without Smartscope, Schwinger and his colleagues would have had to verify the arrays optically. "We'd have to choose three or four data points, but with this machine, we can see each shutter panel," he said.

### Other Specialty Equipment

George Bertholdt, a quality assurance expert who will operate the Smartscope, expects the machine to get heavy use in the months ahead — especially when used in conjunction with the MIKRON high-speed machining center housed nearby. With the MIKRON, technicians

*Continued, Page 8*



The Smartscope is the latest addition to Goddard's Advanced Manufacturing Branch. A highly precise measurement tool, it is now housed in a Class-100 clean room in Building 5. George Bertholdt (in the forefront) operates the machine.