



## GLOBAL SCIENCE & TECHNOLOGY, INC.

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### **High Tech Lab Helps Hubble, Future Space Telescopes to See Better, Further**

Greenbelt, MD – On any given day, at any given time, a handful of NASA Goddard Space Flight Center (GSFC) experts, run key Hubble and future space telescope components through the mill.

“We’re doing something here at Goddard that is unique,” explained Roger Foltz, a detector test specialist.

Roger works in a lab in the Goddard Space Flight Center (GSFC) called the Detector Characterization Laboratory or DCL. He, along with several other engineers, technicians and scientists, test tiny cameras called “detectors” or sensors. The idea is to simulate the environment the detectors will operate in space and evaluate their performance. Theoretically, the best of the best end up on the Hubble or Hubble’s replacement the James Webb Space Telescope (JWST).

“Here’s how it works,” explained a scientist in the DCL - Dr. Anne Marie Russell: “In one test, for example, we put the detector in a vacuum or space-like environment then hit it with photons. If the device is able to detect or see every single photon, then it’s perfect. And while perfection is impossible, we measure how close to perfect this cutting-edge technology can be.”

Of course getting a near-perfect detector isn’t easy. The DCL team tests dozens of detectors which may yield only one good enough for use in a NASA space science instrument.

“The detector tests we do in the lab characterize the behavior of the device in the presence and absence of light,” explained Dr. Russell. “We need to know how efficiently the detectors respond to light, what they do when there is no light and how faint a source of light they can detect. This information makes it possible to select the best detectors and ultimately to get the most precise, accurate science.”

Right now the team is testing detectors for a new science instrument called the third generation “Wide Field Camera” or WFC3. This camera will replace an earlier model



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currently in use on the Hubble Space Telescope. WFC3 is scheduled to fly sometime in 2007.

“We’re already gearing up for our next mission,” said Brent Mott, Electronics Engineer, who oversees the DCL at Goddard. “We’ll be testing detectors that will end up on Hubble’s replacement, the James Webb Space Telescope.”

Scheduled to go up sometime in next decade, the James Webb Space Telescope (JWST) will be larger than Hubble and will orbit farther from Earth. The detectors on JWST that the DCL will test are for use in a science instrument called NIRSpec which is designed to measure the formation and evolution of galaxies, the star formation rate and chemical abundances of young galaxies.

After launch and commissioning of NIRSpec in 2011 and 2012 respectively, the instrument must operate for nominal mission duration of 5 years until 2017.

The DCL is in demand and because of that demand Goddard is making a major investment in a new DCL clean room that will, according to Brent Mott, create a world class capability to simultaneously characterize multiple detector technologies.

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### **About Global Science & Technology, Inc.**

Global Science & Technology, Inc. was founded in 1991. With offices in Maryland, Washington, D.C., Virginia, West Virginia, Colorado, and North Carolina, GST has built a highly specialized workforce that includes experts in key domains of engineering, science, communications, and information technology. GST provides all levels of scientific and technical expertise and support within the federal R&D laboratory environment. GST’s major clients include NASA Goddard Space Flight Center (GSFC), NASA Headquarters (HQ), the National Oceanic and Atmospheric Administration (NOAA), the Department of Defense, the State of West Virginia, and the US Air Force. Much of GST’s work has been in direct support of NASA and NOAA science missions and related data systems. GST’s signature emphasis is on systems interoperability and solutions based on open standards.