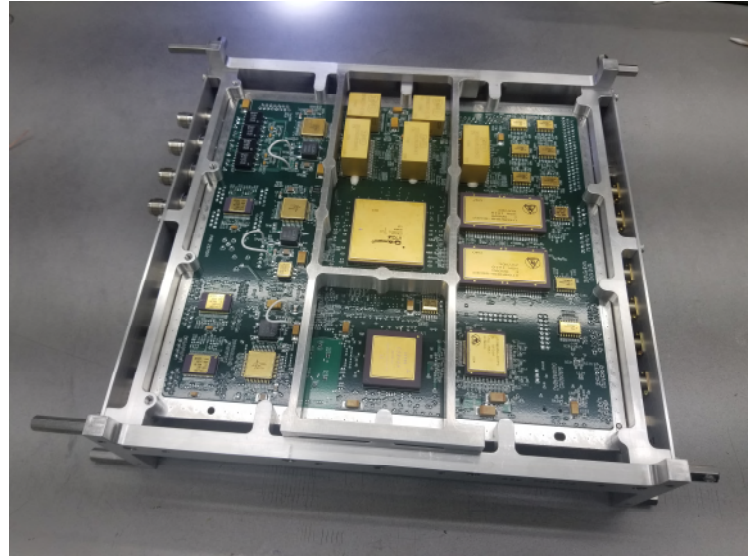




Wide Field Infrared Survey Telescope (WFIRST)

J&T recently completed the prototype printed wiring board design, fabrication, and assembly of Goddard Space Flight Center's (GSFC) new WFIRST space flight processor card design. This design utilizes multi-column-grid-array packages, including an RTG4 (radiation-hardened FPGA) and GR740 (radiation-hardened, fault-tolerant quad-core LEON4 SPARC V8 processor). This telescope will have a field of view 100 times greater than the Hubble Space Telescope and will aid in the exploration of dark matter and energy, and the understanding of the evolution of the cosmos. It is hoped that new worlds outside our own solar system will be located that could be suitable for life as we know it.



WFIRST Board

Manufacturing Facility Upgrade

J&T recently installed a new Speed Print 210 solder paste application machine. This machine allows for the precise application of solder paste to bare printed wire boards and verifies the paste application once complete. J&T has also installed the Mitutoyo Crysta-Apex S7106 high-accuracy Computer Numerical Control Coordinate Measuring Machine (CMM). This CMM provides the capability to inspect larger mechanical piece parts, also providing a higher level of inspection. It has an articulating head, which permits inspection of machined parts in three axes. The machine can be programmed to run multiple parts, greatly decreasing the inspection time required.



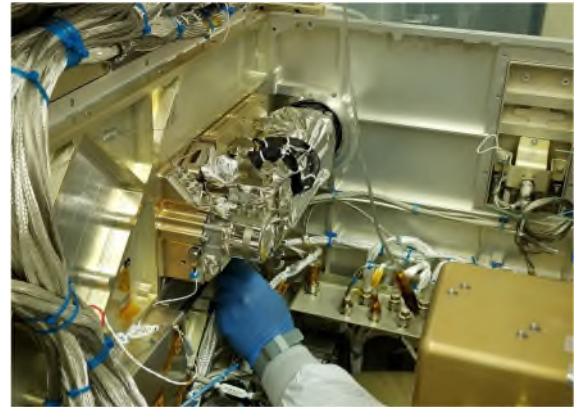
Speed Print 210



Coordinate Measuring Machine

Compact Thermal Infrared Sensor (TIRS) Instrument

J&T designed the new Compact TIRS Instrument board, which contains the TIRS Teledyne ASIC and TIRS Focal Plane Electronics control, and included the Power Conditioning and communications for the instrument, all in one card. The Compact TIRS Instrument detector electronics fits on a card less than six inches in length. Its design, layout, and fabrication was completed by J&T in less than six months. The Compact TIRS Instrument is ultra-low-cost infrared imaging detector demonstrating Strained Layer Super-Lattice detector technology. The Compact TIRS Instrument avionics was based on the \$200 million TIRS and TIRS II, but is a fraction of the size and cost. This infrared detector has dual military and NASA applications because it can locate forest fires as well as missile launches.



Compact Thermal Imager (CTI) Alignment

Visual Inspection Poseable Invertebrate Robot 2

Visual Inspection Poseable Invertebrate Robot 2 (VIPIR 2) is a multi-capability inspection tool designed to deliver near- and mid-range inspection capabilities in space. Designed for the International Space Station Dextre robot, VIPIR and VIPIR 2 contain a Motorized Zoom Lens to capture images of satellite parts at various distances on the Robotic Refueling Mission module, a borescope camera, and a workspace camera. Mission controllers can command the tip of the tube to rotate up to 90 degrees in four opposing directions. It can be used for external and invasive inspections.



VIPIR 2 Inspection Tool

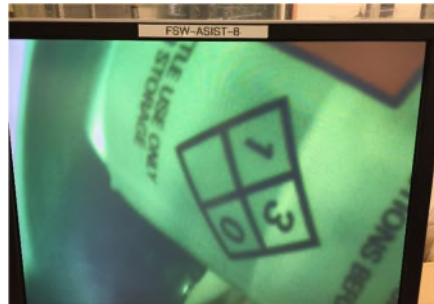


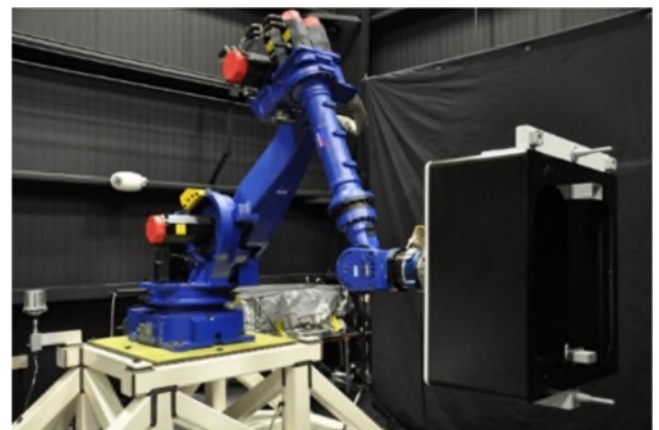
Image from Inspection Tool



VIPIR 2 Inspection Tool

J&T Robotics Support Team

Pictured is a demonstration of the robot arm and Advanced Tool Drive System replacing Orbital Replacement Units (ORUs) on the J&T-designed Mechanical and Electrical Interface module. The demonstration proved the concept of replacing ORUs to a client spacecraft with mechanical and electrical interfaces and providing thermal power and telemetry gathering of the ORUs during translation from the client spacecraft to the servicing spacecraft during removal of the original ORU and the reverse for the installation of the new/upgraded ORU.



Reconfigurable Operational spacecraft for Science and Exploration (ROSE) Robotic Arm

Staff Receives Exceptional Achievement Award

Supporting the GSFC Heliophysics Division (HSD), Greg Woytko was nominated for the Robert H. Goddard Exceptional Achievement for Technicians Award by the Government customer, who stated that Greg made extraordinary contributions to the research capabilities of the Division through his leadership and technical expertise in upgrading HSD's laboratories. Greg was appointed lab manager and was given responsibility for improving the safety, reliability, performance, and capabilities of 16 laboratories (including 5 certified clean rooms) that are spread over three floors. Performing a comprehensive evaluation and analysis of the Division's current laboratory capabilities, strengths, and weaknesses, Greg then worked with the entire organization to determine future needs and requirements. He developed a detailed plan that addressed safety and security; worked to stabilize and enhance existing core capabilities; and outlined a strategy to establish new lab capabilities to position GSFC to win new business opportunities for mission, instrument, and technology development.



Mr. Woytko (right) receiving award

Seeing the importance of tracking training requirements and compliance per lab, Greg performed an extensive trade study to identify solutions that could be adapted to fit the need. Working with other NASA centers, an internal application was identified and modified to meet Greg's needs and will soon be implemented center-wide. HSD has since created four additional labs for Cube/SmallSat missions, miniaturized coronagraph development, formation flying technology development, and a first-in-the-U.S. neutral atom beam facility—unique facilities for which Greg was given broad responsibility to develop rapidly and at low cost and succeeded in both respects. HSD is now ready to support parallel developments associated with recent wins in several mission/instrument proposals.

As stated in the nomination, Greg is a talented engineer and technician who internalizes the GSFC motto, "Everything begins with Science," and leads unerringly toward scientific goals that he always seeks to absorb and understand.

Robotic Arm Motor Controller Board

J&T created a robotic motor controller design that can control multiple joint motors more efficiently than the standard design. The Landsat-7 repair mission scheduled for 2020 requires use of a robotic arm to perform the repair tasks. A robot arm is made up of several motors that control each joint in the arm. These motors allow for both positive and negative motion that allows the robotic arm to maneuver like a human arm. J&T's motor controller design utilizes a revolutionary 120V trapezoid waveform power control versus a curved control wave used in most motor controller designs. The trapezoid waveform approach is more efficient and uses less power than the standard curved wave design approach. The J&T motor controller design is planned to be used in the Landsat-7 repair mission.

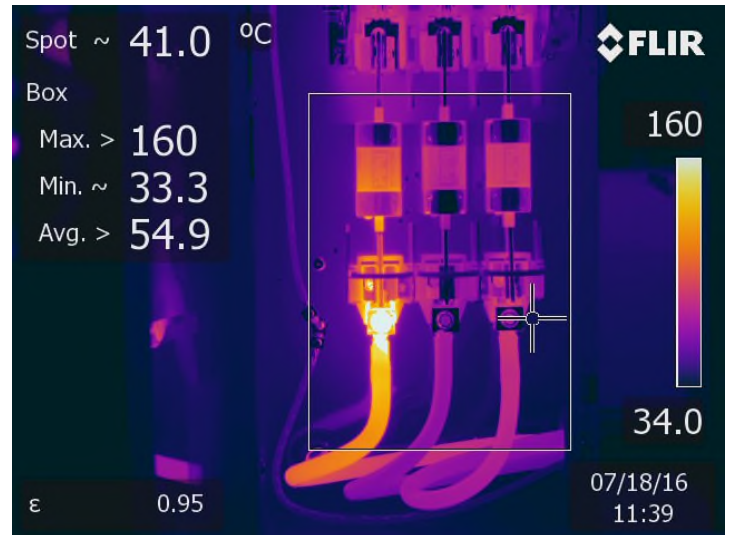


Motor Controller Board

Infrared Thermal Imaging Investigation

J&T has teamed with Emitted Energy Corporation, a supplier of FLIR infrared technology, to provide infrared thermal imaging investigation that allows J&T to evaluate a variety of equipment for unseen and uncharacteristic anomalies. Equipment includes electrical switch gears, electrical motors, overhead catenary for light rail systems, and various types of manufacturing equipment.

J&T uses this technology to identify problems before they happen. Through this new approach, J&T has shifted the industry focus from preventative maintenance to predictive maintenance.



Infrared Thermal Imaging

Graphical Information System Technology Support

The Washington Suburban Sanitary Commission (WSSC), the nation's 8th largest water and wastewater utility, has water and wastewater plants throughout the Washington D.C. suburban region. Easy access to information about the assets throughout these plants is critical to the safe and efficient operation of the facilities. Jackson and Tull is helping WSSC meet this goal through the use of Graphical Information Systems (GIS) technology. WSSC has a GIS map of each of its facilities, and J&T is linking that map to historical and current information about every asset at WSSC's Patuxent Water Treatment Plant in Laurel, MD. Using the links developed by J&T, WSSC staff can click on any piece of equipment at the plant and view all of the archival information associated with it.



GIS Map of the WSSC Patuxent Plant

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