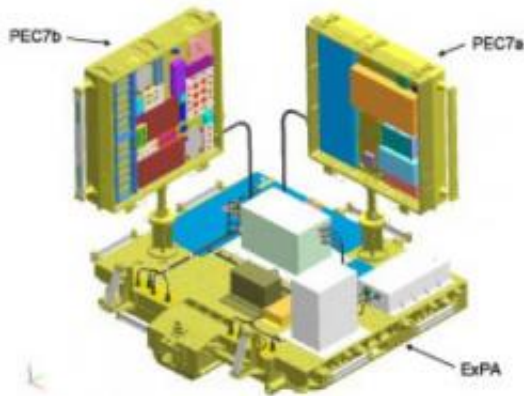


NRL's MISSE7 launched aboard STS-129

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This is an illustration of the MISSE7 experiment showing the two Passive Experiment containers (labeled PECa and PECb) and the Express Payload Adapter. Credit: Naval Research Laboratory

The Materials on the International Space Station Experiment (MISSE) 7, designed and built by the Naval Research Laboratory (NRL), launched aboard STS-129 on November, 16, for transport to the International Space Station.

MISSE7 consists of two Passive Experiment Carriers (PEC7a and PEC7b) and three experiments mounted to the Express Pallet Assembly (ExPA). The individual experiments on MISSE7 include in situ monitoring of materials exposure, environmental monitoring including temperature, atomic oxygen exposure, and [ionizing radiation](#). "The results will provide a better understanding of the durability of advanced materials and electronics when they are exposed to vacuum, solar

radiation, atomic oxygen, and extremes of heat and cold," explains Mr. Phillip Jenkins, principal investigator. These materials and electronics, including [solar cells](#), coatings, thermal protection, optics, sensors, and computing elements, have the potential to increase the performance and useful life of the next generation of satellites and launch systems.

NRL is responsible for the overall hardware integration and operation of MISSE7, including the power and data interfaces between the ISS and over 20 experiments included on MISSE7. NRL designed and built the power supply and thermal control system. The Communications Interface Board (CIB), which serves as the communication link between the ISS and the MISSE7 experiments, was designed, built, programmed and delivered to NRL by the Mobile And Remote Sensing (MARS) Lab at NASA GRC. Individual experiments that make up MISSE7 include investigators from NASA, DoD, DOE and university derived experiments. MISSE7 was integrated and flown under the direction of DoD's Space Test Program. NRL researchers from the Spacecraft Engineering Department and Electronics Science & Technology Division worked in conjunction on the MISSE7 project.



The MISSE 7 experiment on the Express Logistics Carrier 2 of the International Space Station was photographed by a space-walking STS-129 astronaut during the mission's third and final session of extravehicular activity (EVA). This is the latest in a series of experiments that expose materials and composite samples to

space for several months before they are returned for experts to analyze. This MISSE experiment actually is plugged into the space station's power supply. Credit: National Aeronautics and Space Administration, ISS021-E-031746, 23 Nov. 2009

After the PECs and ExPA were transported to the ISS on STS-129 the ExPA, fully integrated on the Express Logistics Carrier-2 (ELC2), was installed onto the ISS. On flight day eight, astronauts performed an "Extra Vehicular Activity" (EVA) and installed the PECs onto the ExPA and opened the PECs to expose the experiments to the space environment. The PECs will remain on the [International Space Station](#) for approximately eight months when they will be returned to Earth during the STS-134 mission. The ExPA will be left behind to support the next mission, MISSE 8.

Below is a summary list of the experiments flying on MISSE7.

- Xilinx Vertex 4 and Vertex 5 single event upset (SEU) testing - Sandia National Laboratory (SNL)
- Solar cell testing - NRL; Air Force Research Laboratory (Space Vehicles Directorate), Lockheed Martin
- Atomic oxygen erosion and fluence monitoring - NASA GRC
- Mirror component testing - Aerospace Corp. and NRL
- Space Cube, advanced processor design SEU testing - NASA GSFC

- Multi-core processor single event upset testing - NRL
- SiC electronics testing - NASA GRC
- Raytheon's "Victory Chip" CMOS imager array - Assurance Technology
- HyperX, a high-performance, ultra-low power processor, SEU testing - NASA GSFC
- Materials exposure and environmental sensor suite - Air Force Research Laboratory, NASA GRC, MSFC, ARC, JSC, SNL and Boeing Phantom Works
- Tribology measurements - Air Force Research Laboratory and U of Florida
- Miniaturized electrostatic analyzer - US Air Force Academy

Source: Naval Research Laboratory ([news](#) : [web](#))

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