

Rocket carrying Alfred University research materials successfully docks at International Space Station

4/14/20

ALFRED, NY – A rocket carrying three-dimensional objects created at an Alfred University lab has successfully docked at the International Space Station. The objects will remain on an external platform at the space station and will later be analyzed for how they react to the extreme environments of outer space.

The Northrup Gruman Antares rocket NG-12 was launched Saturday, Nov. 2, under the National Aeronautics and Space Administration (NASA) Commercial Resupply Services mission. The rocket, which carried a Craig Technologies Aerospace Solutions on-orbit experimental facility arrived today (Monday, Nov. 4) just before 10 a.m. EST.

The rocket's payload contained ceramic objects created on the ExOne 3-D printer housed in Alfred University's Ceramic Research Education and Technology Enterprise (CREATE) Center. The objects will be secured in the Craig X Flight Test Platform, which mounts on the International Space Station's External Platform.

Craig Technologies is a Cape Canaveral, FL, firm that which engineers, designs, prototypes, manufactures and tests a wide variety of mission-critical systems for a diverse range of customers and operates a nationally-recognized Aerospace & Defense Manufacturing Center.

Xingwu Wang, professor of electrical engineering and renewable energy engineering at Alfred University, said the objects will be tested for how hold up against the vibrations of the rocket launch and flight as well as the harsh radiation environment found in outer space. After six months, Wang said, the materials will be returned the Earth. Researchers at Alfred University will use scanning electron microscopy (SEM) analysis to determine the extent of damage to the materials due to exposure to outer space radiation.

The experiments are part of a larger research effort to determine how ceramic objects can be created on the moon and on Mars using lunar and Martian soil. The research was the subject of a cover story in the [August 2018 American Ceramic Society \(ACerS\) Bulletin](#), titled "To Infinity and Beyond: Outer Space Applications of 3-D Ceramics Printed Via Ink Jet Methods."

Wang was one the co-authors of the article, which outlined the need for small, functional ceramic components – radiation detectors, humidity sensors, chemical sniffers – to aid in establishing exploratory bases on the moon and/or Mars. Shipping the components to outer space destinations is extremely expensive and limits their on-site inventory, the article notes. Manufacturing the ceramic components with three-dimensional printing, using binding agents (adhesive materials) and lunar and Martian soils would significantly decrease the cost of shipping the components from Earth to outer space.

The International Space Station "remains the springboard to NASA's next great leap in exploration," including missions to the moon and Mars, according to a press release from NASA announcing Saturday's mission. "Space station research also provides opportunities for other U.S. government agencies, private industry, and academic and research institutions to conduct microgravity research that leads to new technologies, medical treatments, and products that improve life on Earth."