

Techshot Media Release

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SpaceX Cargo Dragon Spacecraft to Deliver Techshot Research Equipment to the International Space Station

-- Device will conduct regenerative medicine experiments in space --

GREENVILLE, Ind. (August 8, 2017) – Onboard the next SpaceX cargo spacecraft launching to the International Space Station (ISS) from Pad 39A at the Kennedy Space Center will be a commercial research system owned and operated by Techshot Inc. The equipment will conduct regenerative medicine experiments onboard the station before returning to Earth in the same capsule for a splashdown off the coast of Southern California approximately 30 days later.

Techshot's ADvanced Space Experiment Processor (ADSEP) is a device approximately the size of a microwave oven that contains three separate modules, each of which simultaneously can process experiments in three separate on-orbit replaceable automated mini-laboratory cassettes. Two of the three cassettes on the mission will conduct research for a team led by Robert Schwartz, Ph.D., from the University of Houston.

Funded by the Center for the Advancement of Science in Space (CASIS), the study will evaluate a new approach to growing human tissue for transplant. The microgravity environment onboard the ISS could improve cell growth and development and 3D tissue formation, enabling discoveries that will advance translational disease treatments. Previous studies on Earth by Schwartz and his collaborators at the Texas Heart Institute and the Baylor College of Medicine have found that low gravity environments help specially programmed stem cells move towards becoming new heart muscle cells, which may be used to repair damaged hearts on Earth.

The third cassette contains an experiment conducted by and for Techshot itself. The company is developing a 3D bioprinter for the ISS known as the Techshot BioFabrication Facility (BFF), which it expects to launch to the station near the end of 2018. Critical to the

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success of the printer will be the ability to provide nutrients and mechanical stress for organs and tissues it manufactures in space – strengthening them and keeping them viable for transplantation back on Earth.

Approximately 36 hours prior to launch, Techshot scientists in a laboratory at the Kennedy Space Center will 3D print a one centimeter thick construct consisting of stem cells and heart muscle cells. They'll then place it inside the prototype BFF cell culturing subsystem, which for this mission is temporarily housed inside an ADSEP cassette. The printer used in the lab will be the same modified nScript unit that was the first to 3D print cardiac constructs with adult human stem cells in microgravity aboard an aircraft in parabolic flight. Video captured inside the cassette during the month-long experiment, and the tissue itself – which is expected to have developed its own micro blood vessels – will be evaluated for effectiveness after return from space.

“Techshot’s space bioprinting program leverages its terrestrially based technologies for cell isolation and vascular graft development, and its decades long experience culturing cells in space,” said Techshot Chief Scientist Eugene Boland, Ph.D. “Being able to test our novel approach for culturing 3D printed cells more than a year before we fly the whole BFF is invaluable. The data from this mission will get us one step closer toward our goal of helping eliminate organ shortages.”

Founded in 1988, Techshot Inc., develops technologies used in the aerospace, defense and medical industries. Through its Space Act Agreement with NASA, and its role as an official CASIS Implementation Partner, the company provides equipment and services that help federal, institutional and industrial customers live and work in space. www.Techshot.space

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ADSEP B-Roll: <https://youtu.be/wcx31KYYE2M>

ADSEP Images: <https://flic.kr/s/aHskY54sXo>

CASIS Interview with Robert Schwartz, Ph.D: <https://youtu.be/QhxxwzauQEmU>