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Innovate. Explore. Discover

Techshot, Inc.

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Success in Space










Over the past 30 years, Techshot equipment has flown aboard parabolic-flight aircraft, sub-orbital rockets, space shuttles, Northrop Grumman Cygnus cargo vehicles, SpaceX Dragon capsules and the International Space Station.

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Research and Manufacturing

- Materials Research
- Bone Densitometry
- Rodent Research
- Squid Research
- Cell Research (including stem cells)
- Protein Crystal Development
- *C. elegans* Research
- *Drosophila* Research
- Colloids Research
- 3D tissue/regenerative medicine
- Plant Research
- In-space 3D metal and electronics manufacturing
- In-space cell differentiation and expansion

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Recent Flight-qualified Techshot Payloads

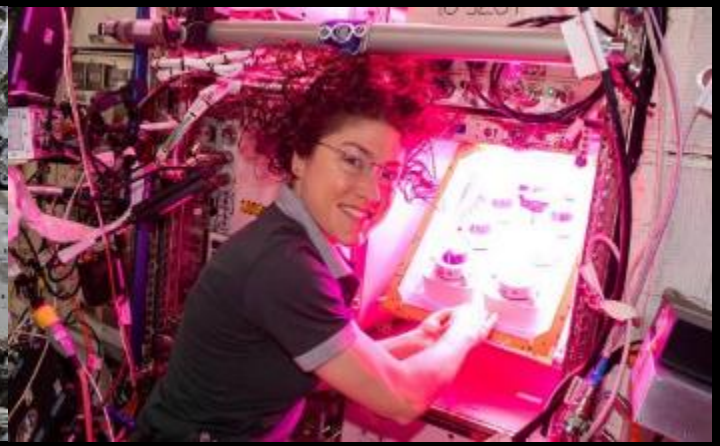
Bone Densitometer

ADSEP

MVP #2

MVP #1

3D BioFabrication Facility



PONDS

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Bone Densitometer

- **DXA scanner for mice: 35 kV/80 kV**
- **Osteoporosis, muscle wasting diseases**
- **Eli Lilly, Novartis, UCLA, & many others**
- **156 scans to date**

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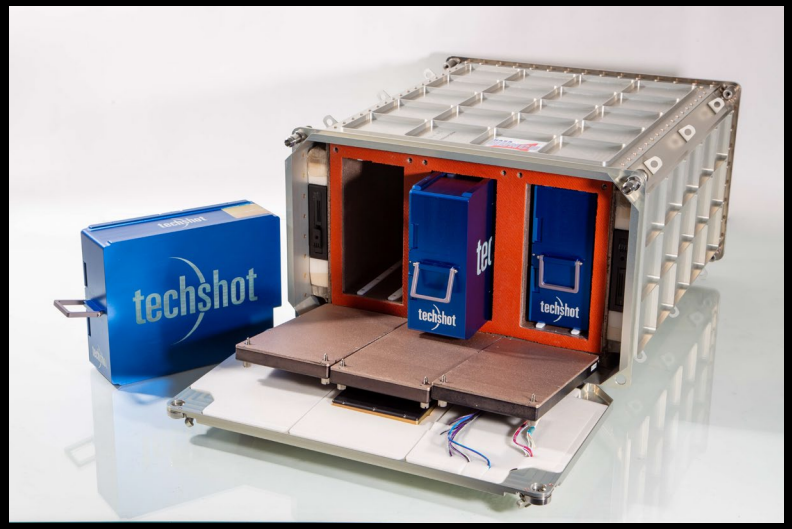
ADvanced Space Experiment Processor

ADSEP

- Multi-purpose payload
- Temperature and gas monitoring and control
- Remote operation
- Cameras
- Many types of experiment cassettes



Cell culturing, rotating bioreactor

C. elegans, Fluid Processing, Bacteria, squid, etc.

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3D BioFabrication Facility

BFF

The Techshot 3D BioFabrication Facility (BFF) is the first-ever American 3D printer capable of manufacturing thick complex human & animal tissue in the microgravity condition of space.

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Multi-use Variable-g Platform

MVP

- Dual 390 mm rotors, simultaneous 0-2g
- Thermal and gas control
- 12 sample modules, each with video capability
- Cell culturing (adherent and suspended)
- *Drosophila, C. elegans, fish, protein crystals, plants, etc.*
- Rotors and sample modules removable on orbit.

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Multi-use Variable-g Platform

A Few MVP experiment module examples

Tissue Chips

Plant seedlings

Bacteria

Drosophila

Cement

Human cells

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Passive Orbital Nutrient Delivery System

Passive Orbital Nutrient Delivery System

Next generation on-orbit plant growth device

Developed with Tupperware

Plants grow in arcelite, large reservoir provides water/nutrients

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Techshot-managed payloads

Advanced Plant Habitat

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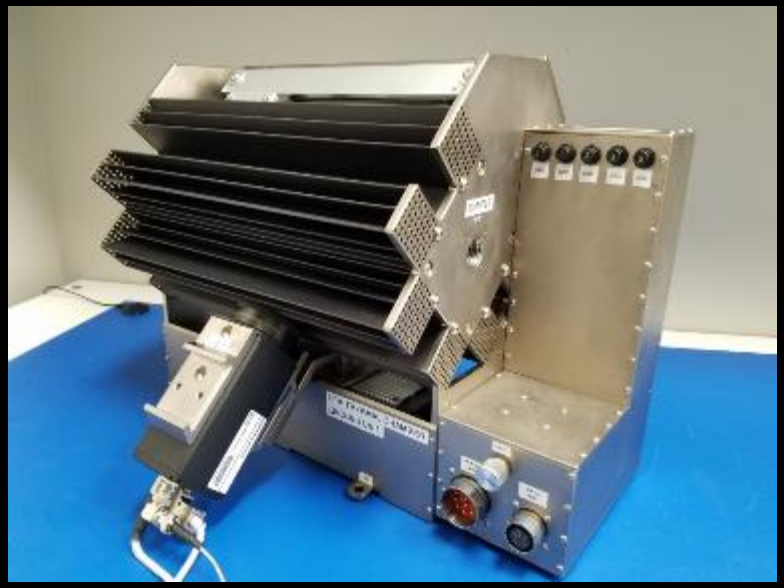
Techshot-managed Payloads

PFMI Furnace

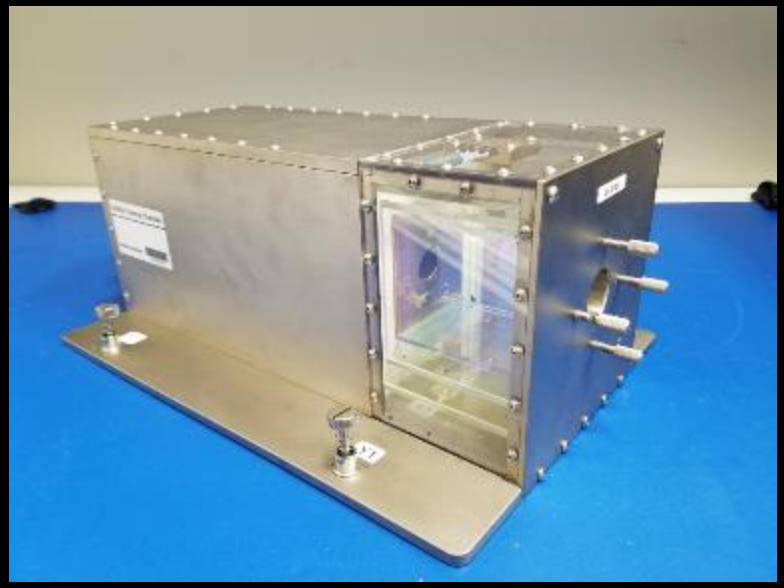
- Pore Formation and Mobility Investigation

SUBSA Furnace

- Solidification Using a Baffle in Sealed Ampoules



PFMI Thermal Chamber



SUBSA Thermal Chamber

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Recent SUBSA Experiment

BRazing of Aluminum alloys IN Space (SUBSA-BRAINS)

- Understanding and control of:
  - the capillary flow features of the brazing alloy, and,
  - the extent of the weakening of the joint by remaining voids are examples of the key phenomena which may impact brazing/repair in microgravity, and these phenomena are studied in this project.

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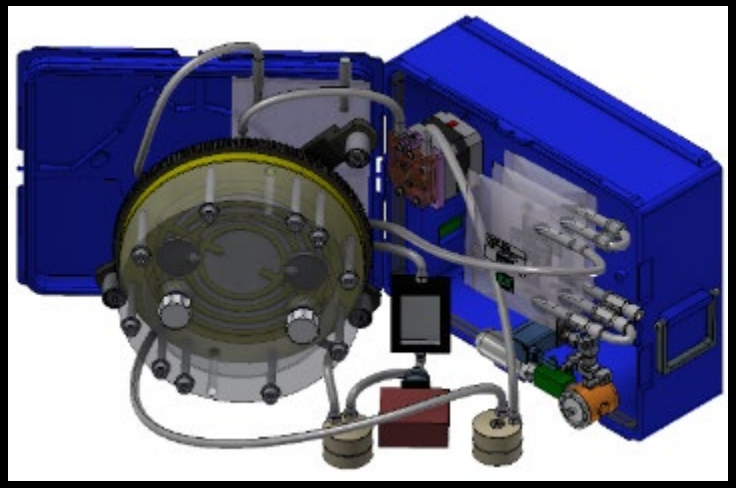
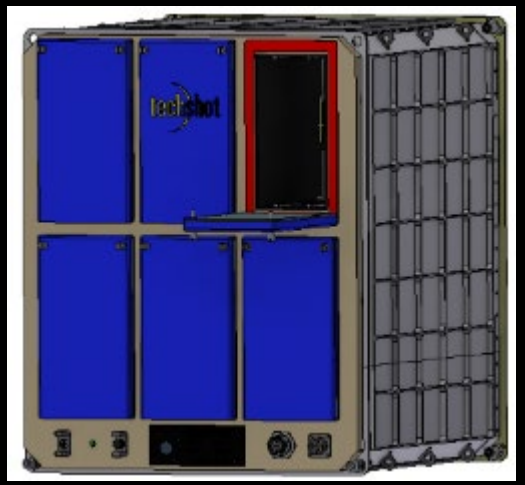
Cell Factory

In-work now



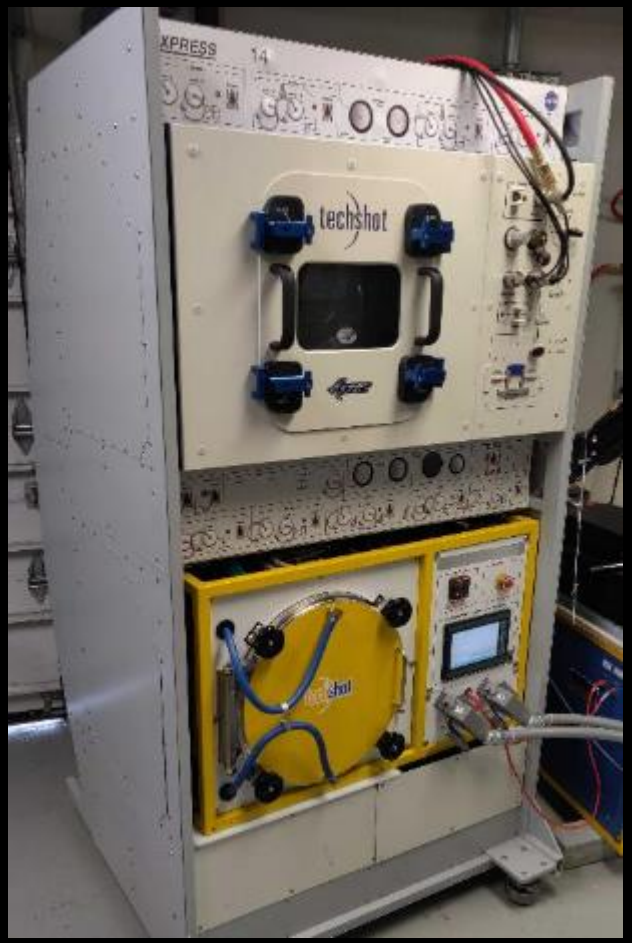


- Continuously manufacture large quantities of a variety of extremely high-value cells needed in space and on Earth for:
  - Research
  - Cell therapies
  - Regenerative medicine
  - Biomanufacturing with the Techshot BFF and other platforms

Techshot FabLab

In-work now

- All-in-one solution
- Additive manufacturing
- Subtractive manufacturing
- 3D printing
  - Metal
  - Electronics



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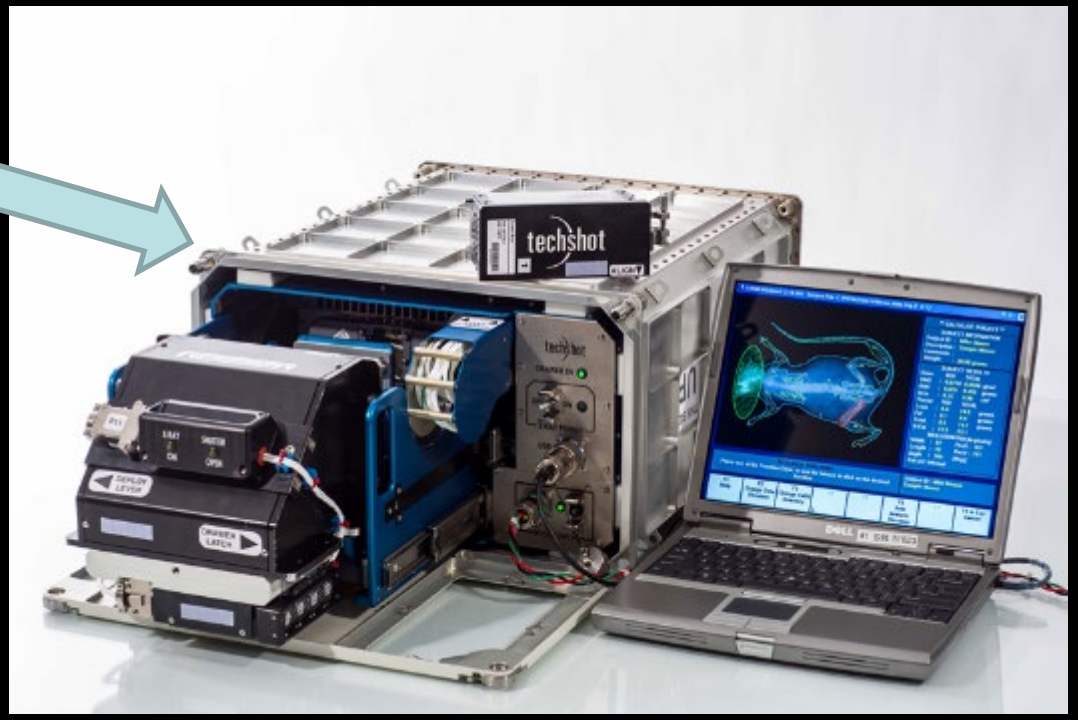
Bone Densitometer

“Flybilization”

We make <u>your</u> device work in space



Bone Densitometer

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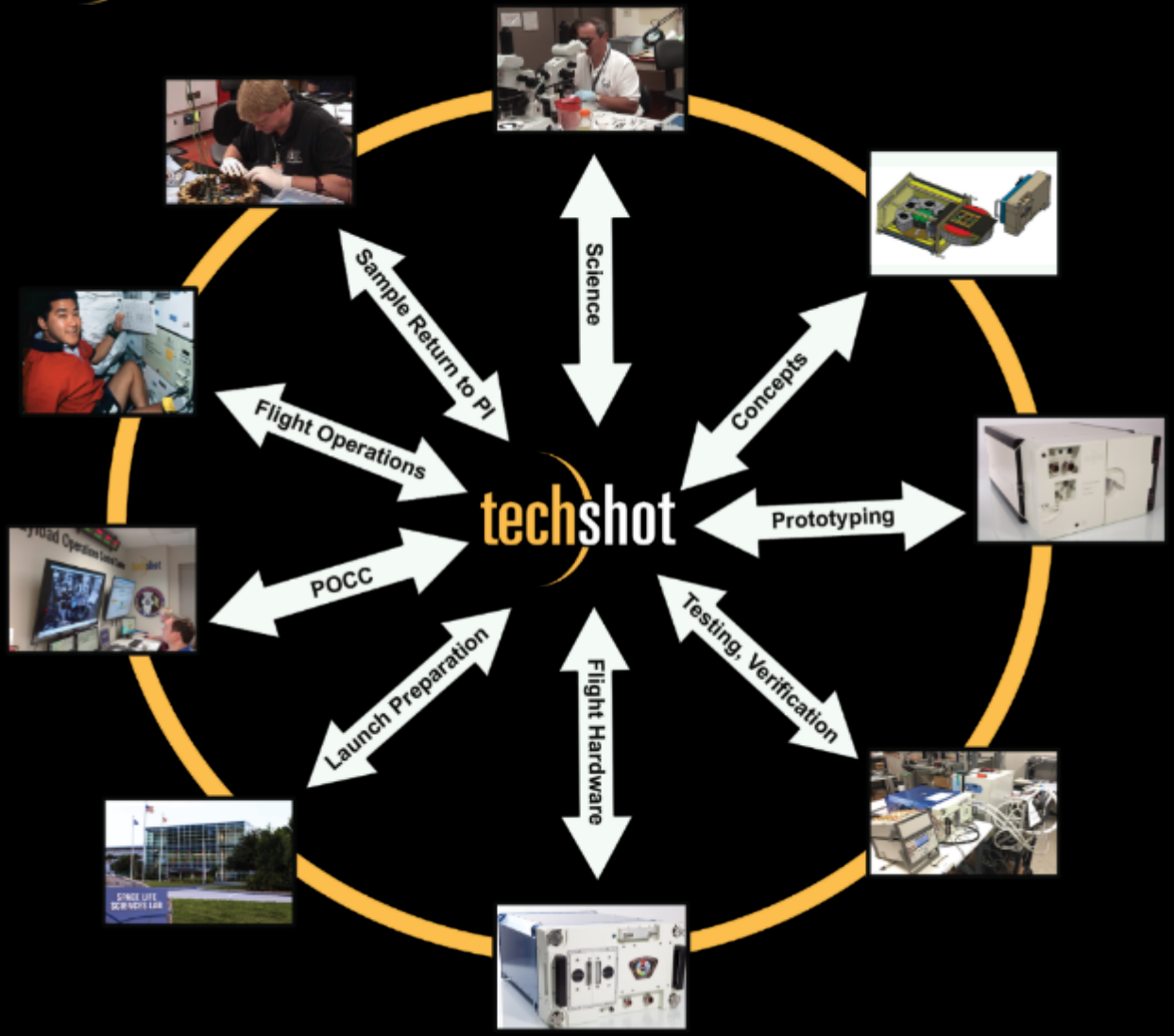
Our Continuum of Service



Techshot takes care of all aspects of a space research campaign for its customers.

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Office Locations

Indiana Florida

Greenville (metro Louisville, KY)

Kennedy Space Center

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Payload Operations Control Center

Each Techshot location includes its own “Mission Control”, where company scientists and engineers monitor and control their space-based equipment, speak directly with astronauts in space, and watch the experiments as they take place in real time.

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Key NASA agreements

Space Act Agreement

- Allows Techshot to operate commercially aboard the ISS, includes transportation, crew time

IDIQ Contract

- Pre-negotiated pricing menu for NASA use of Techshot hardware and services

REMIS Contract

- Besides its own equipment, Techshot also manages NASA's Advanced Plant Habitat and two space-based materials-science research furnaces through REMIS.

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Founders/Owners

Techshot was founded in 1988 by John Vellinger (left) and Mark Deuser (right).

The company develops, owns and operates its own extensive catalog of research and manufacturing equipment in space.

Techshot is very vertically integrated. From design, to fabrication, assembly, test, validation, verification and integration, all tasks are performed by the company's own internal mechanical, electrical, and software engineers.

Customers include U.S. federal agencies, universities and international commercial companies.

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www.Techshot.space

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