



Science Development
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Hardware Engineering
Thomas Kyler, CTO
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STAARS

Space Technology and Advanced Research Systems, Inc.

FOR THE ADVANCEMENT OF LIFE SCIENCES,
DEVELOPMENT OF NEW MEDICINES,
IDENTIFICATION OF NEW THERAPIES,
AND DISCOVERY OF NEW BIOTECHNOLOGY,
WE GO INTO THE NEXT FRONTIER,
TO BENEFIT ALL MANKIND.



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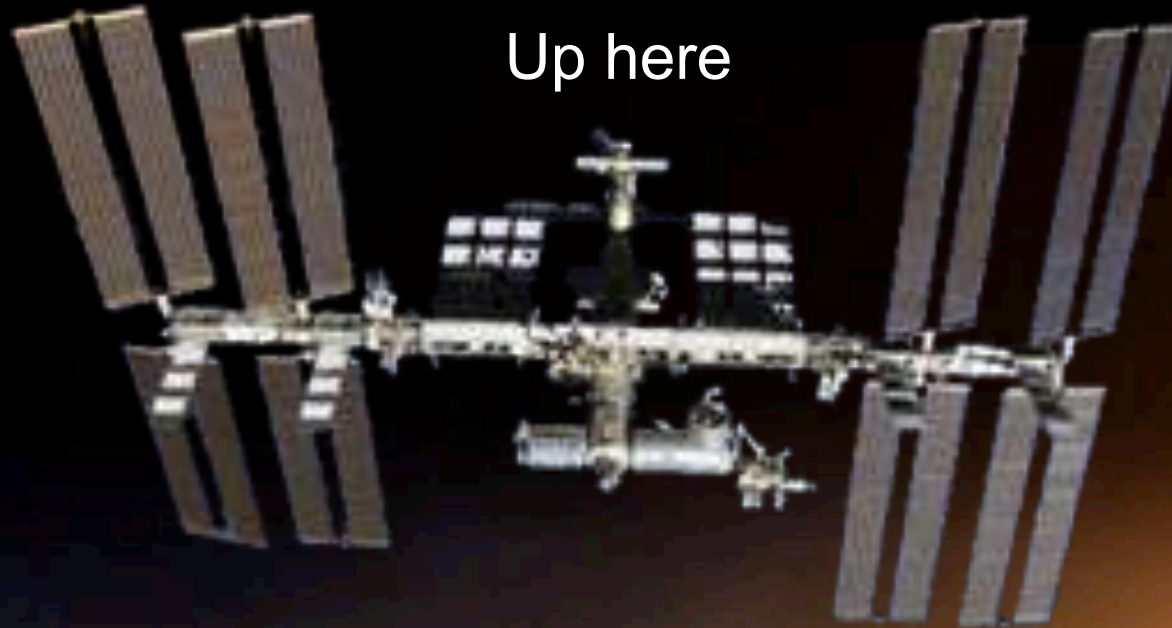
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Field Station Research

Up here



Do the advanced research here



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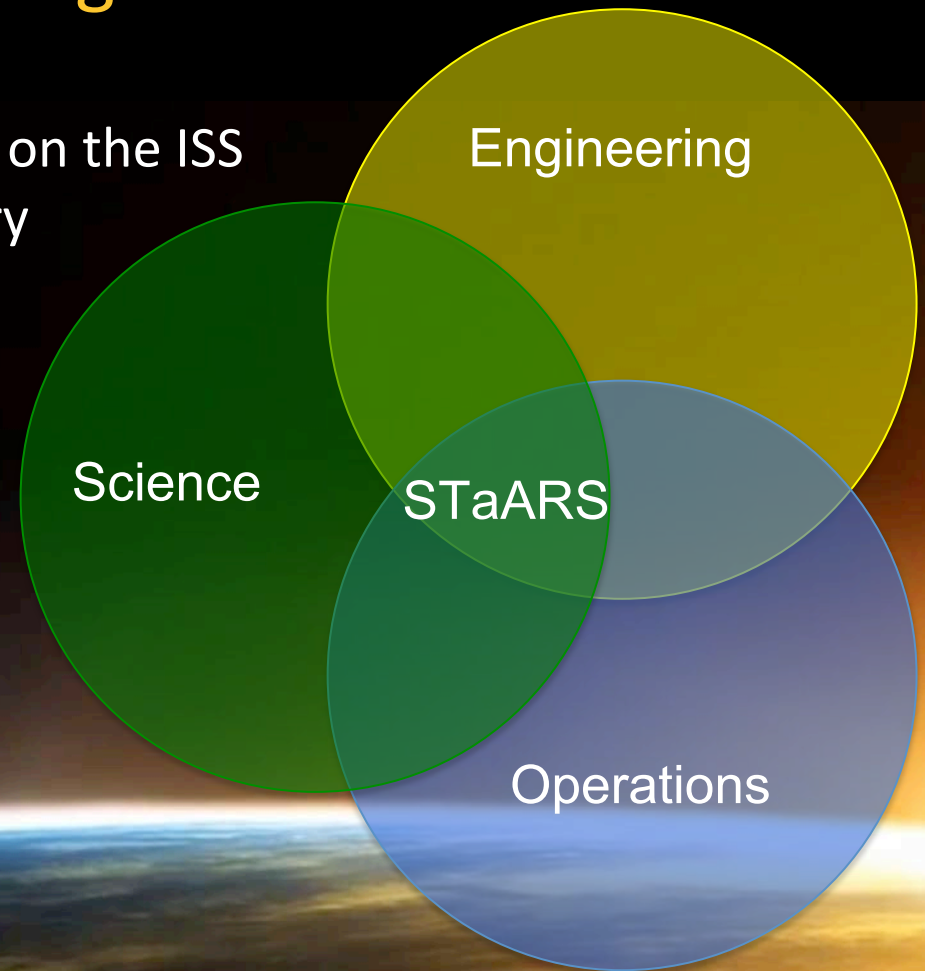
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Project Integration

To conduct terrestrial-quality research on the ISS at levels required by academia, industry and government labs, **we integrate** all aspects of the project **Engineering**, **Flight Operations**, and **Science**.

Goal is to build long term research programs that **produce major advances in biotechnology, Bioengineering and life sciences.**





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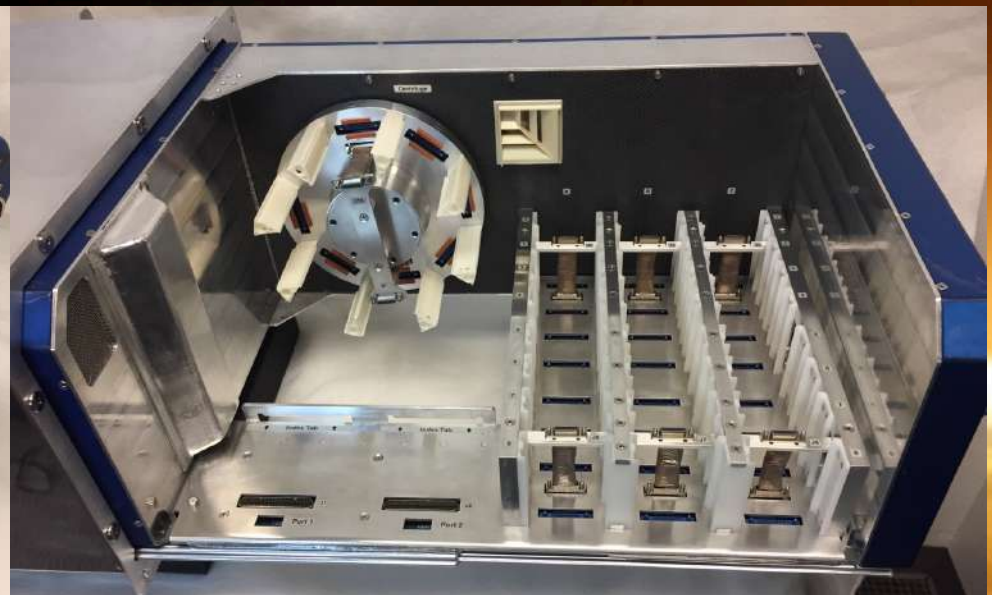
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STaARS-1 Experiment Facility

- Supports **24 Experiment Containers** and **2 CORE Labs** providing the flexibility of configuration, access, and control to a diverse range of research objectives
- Temperature control between **ambient** and **37°C**
- **STaARS Hyper-G Centrifuge** – Provides variable gravity controls (microgravity to 1.5xG) for experiments





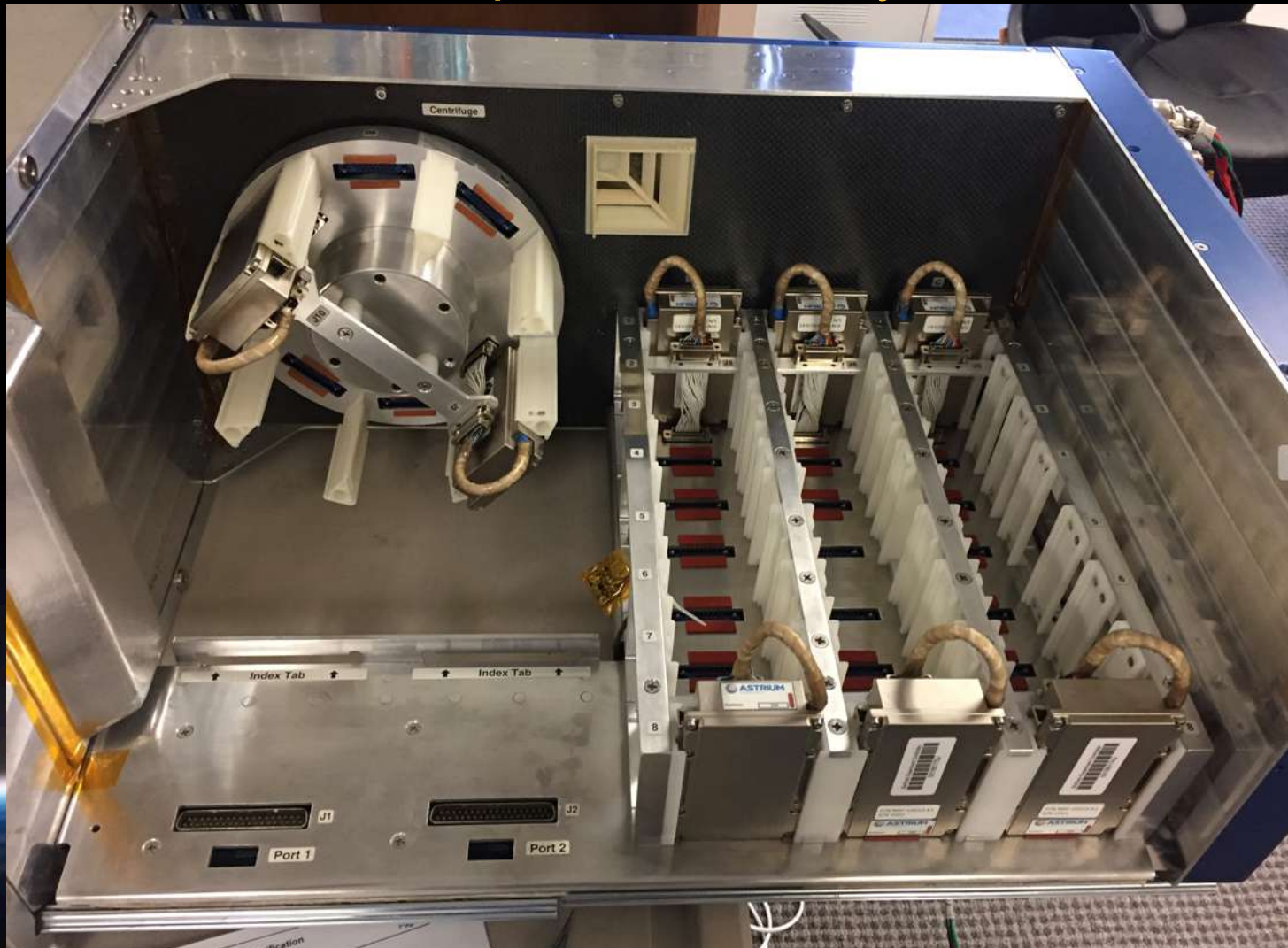
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STaARS-1 Experiment Facility Hardware





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STaARS-1 Experiment Facility Advanced Hardware Support

- Airbus DS my_bioracks and Kayser Italia Experiment Containers – controllable growth with video observation and fluid exchange capacity in flight proven configurations (32 years)





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STaARS-1 Experiment Facility Hardware

Petri Dish



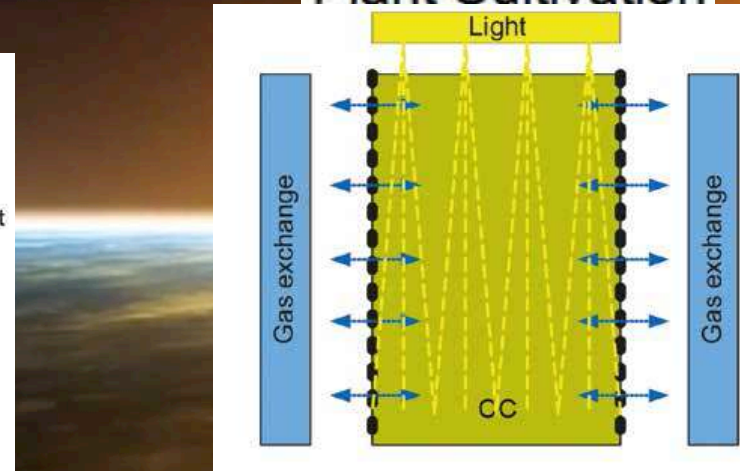
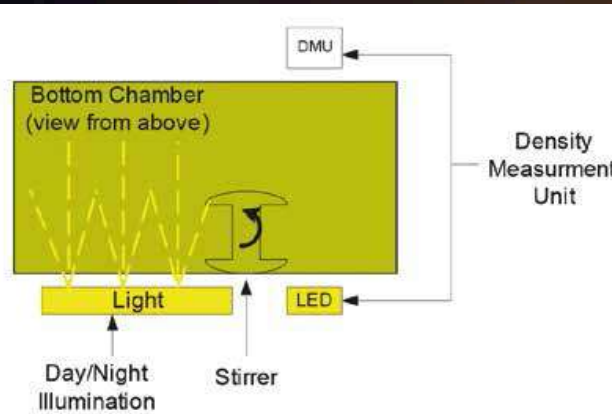
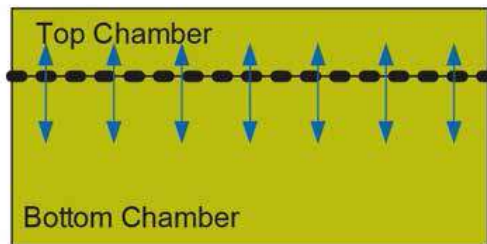
Mini Aquarium



Plant Cultivation



Closed Ecosystem





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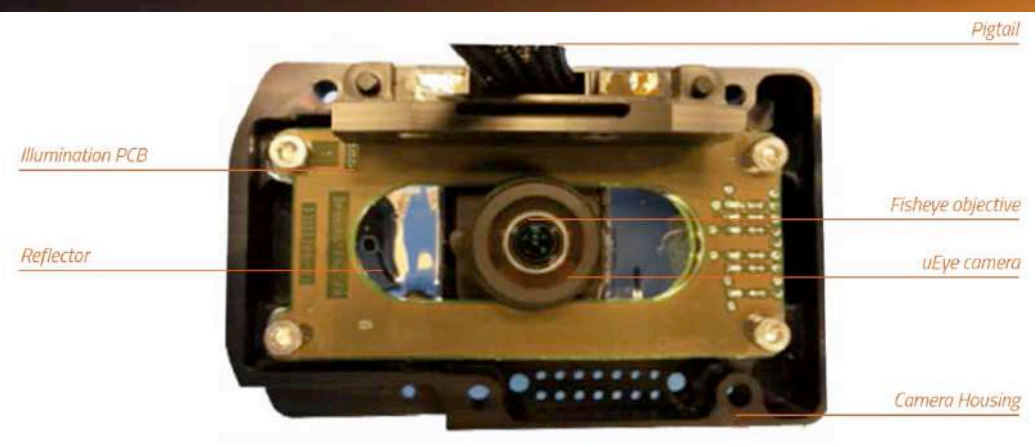
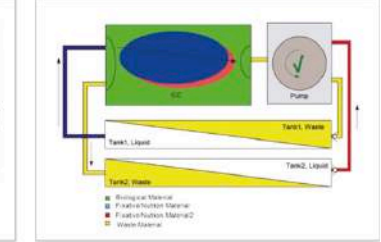
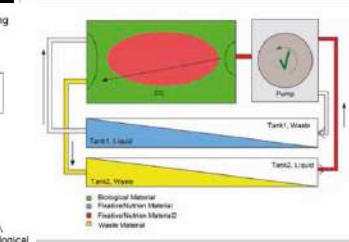
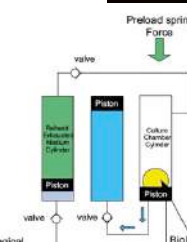
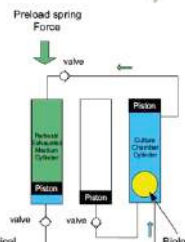
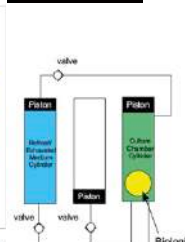
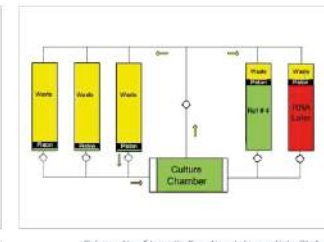
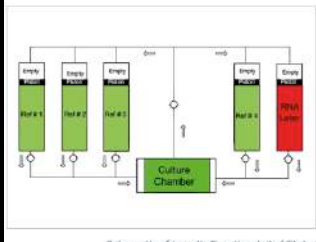
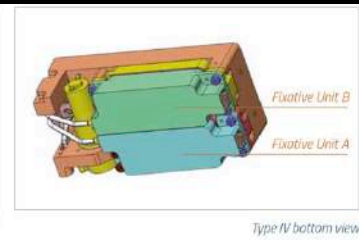
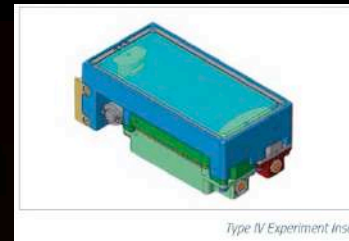
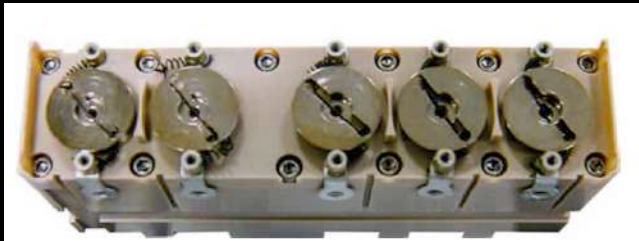
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STaARS-1 Experiment Facility Hardware

Cell Culture with Media Exchange, Spectrophotometry, and Video





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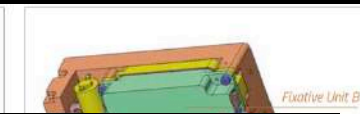
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STaARS-1 Experiment Facility Hardware

Cell Culture with Media Exchange, Spectrophotometry, and Video



Airbus Defense and Space My_Bioracks Hardware

- First mission – D1 Mission in 1985
- 32 yrs, +140 experiments, >350 publications



Kayser Italia Experiment Container Hardware

- First mission in 1992
- 25 yrs with over 75 successful missions



For hardware brochure: email Dr. Heath Mills - hjmills@staars.space



Reflector



uEye camera

Camera Housing



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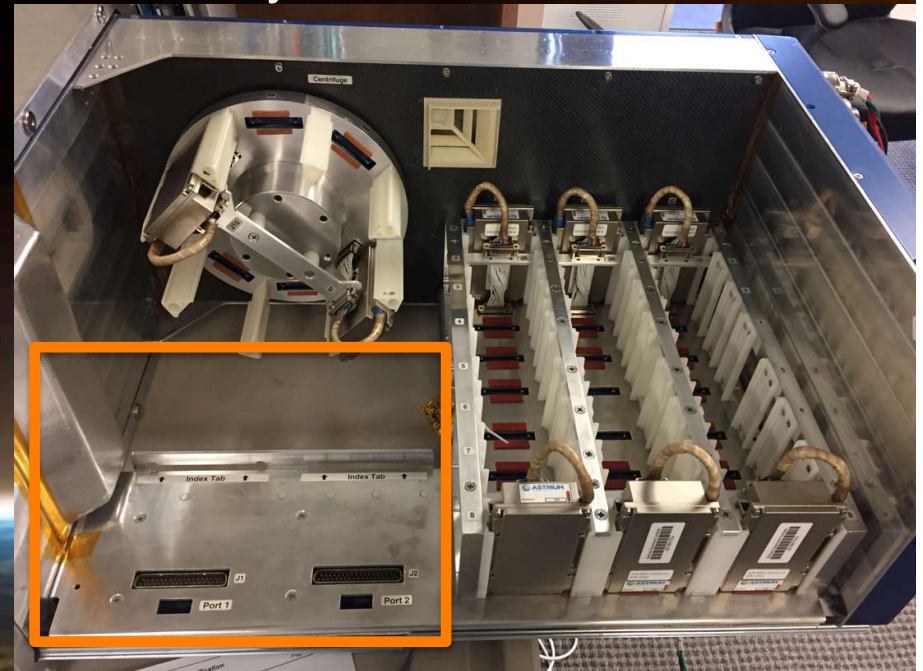
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STaARS-1 Experiment Facility Advanced Hardware Support

- **STaARS and SpacePharma Cube Labs** – advanced, automated labs to increase experiment functionality and provide analytics





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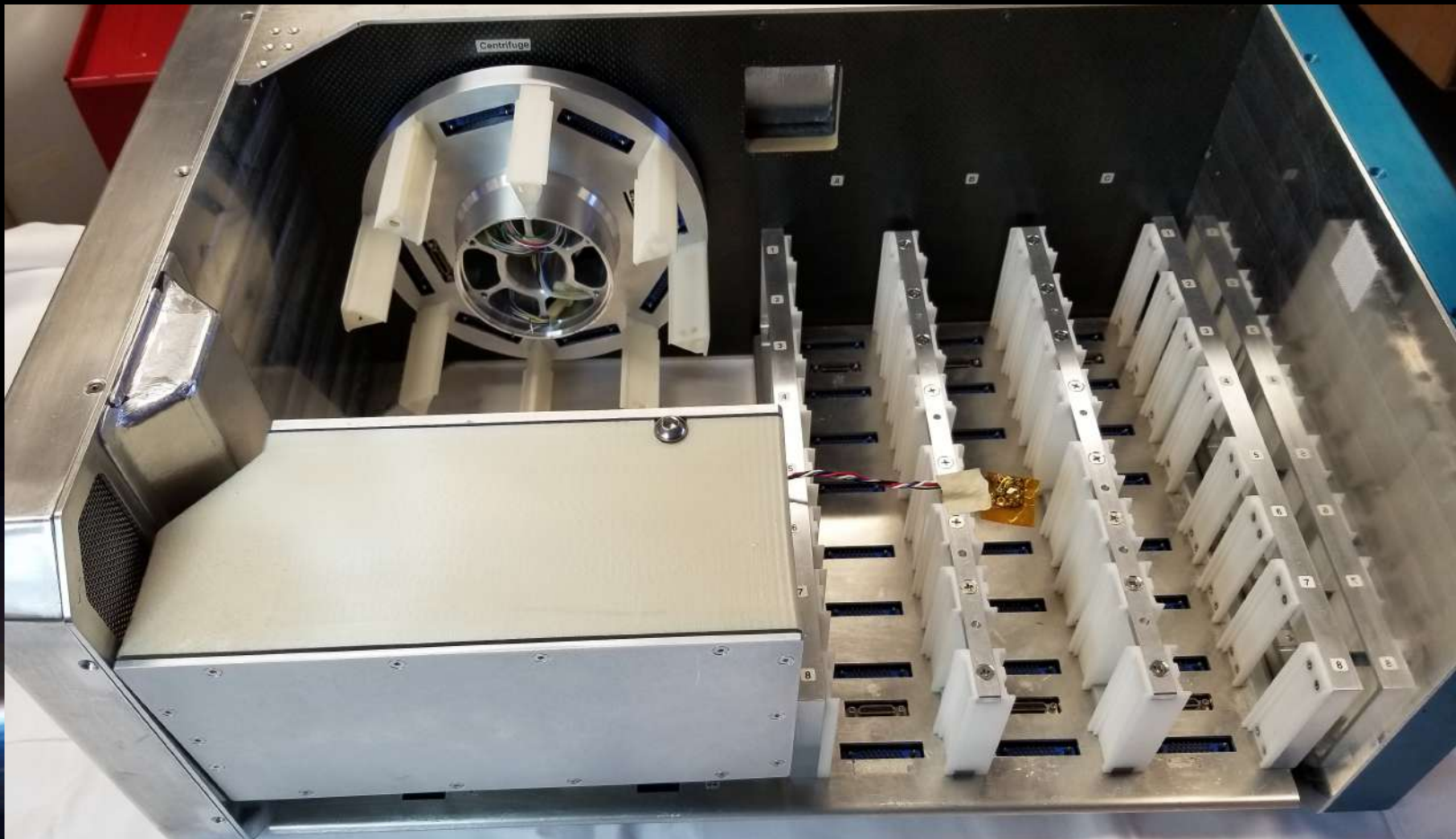
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STaARS-1 Experiment Facility Hardware

SpacePharma Nexus Lab – Successful Operation OA-8





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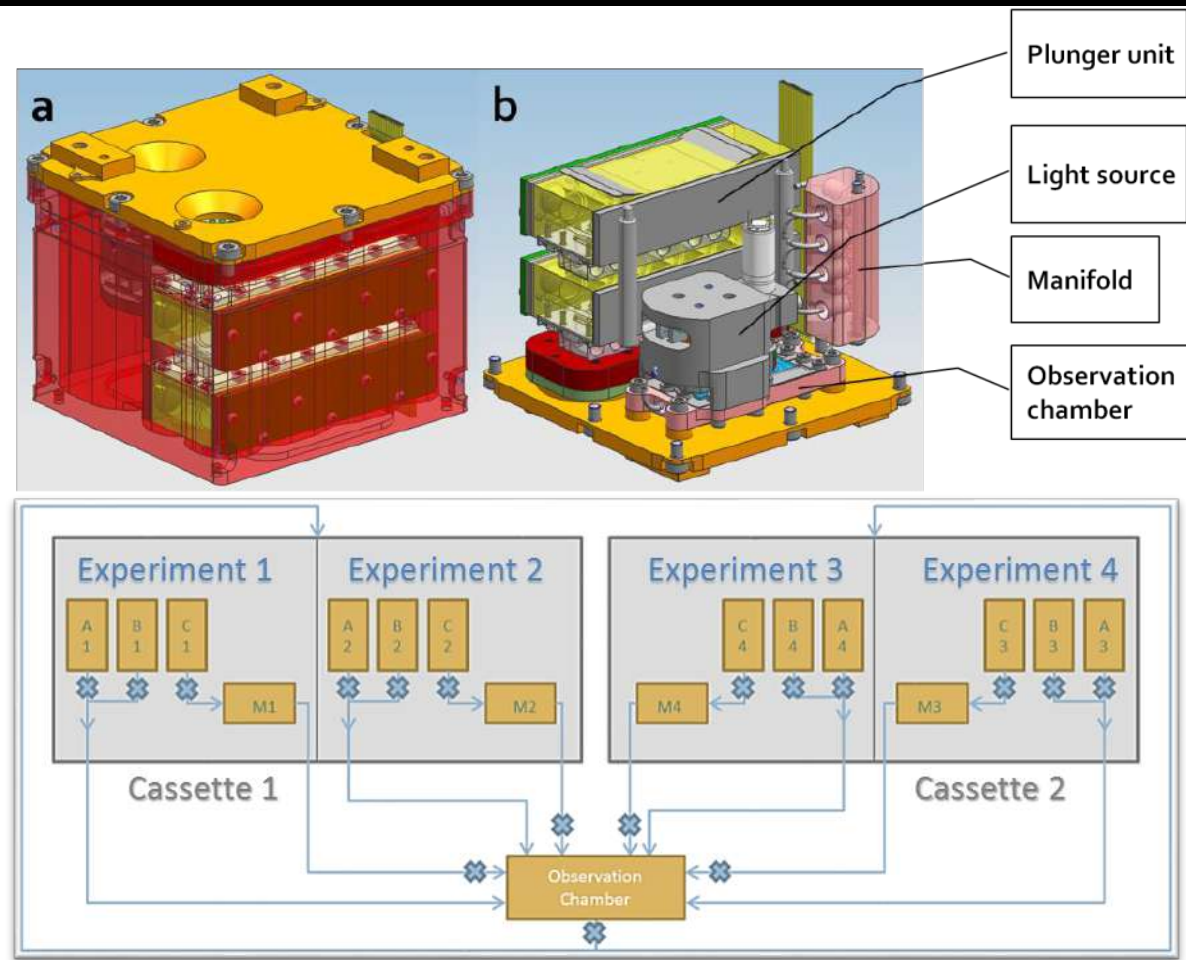
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STaARS Project Support and Development

- **Time to flight** can be as low as six months
- Assistance with **project translation** and **grant writing**
- In flight **control of experiments** will be provided according to researcher and project requirements
- **Manage projects** for NASA deliverables including report writing and **experiment testing**
- Provide support for **terrestrial experiment controls**



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The STaARS Advantage

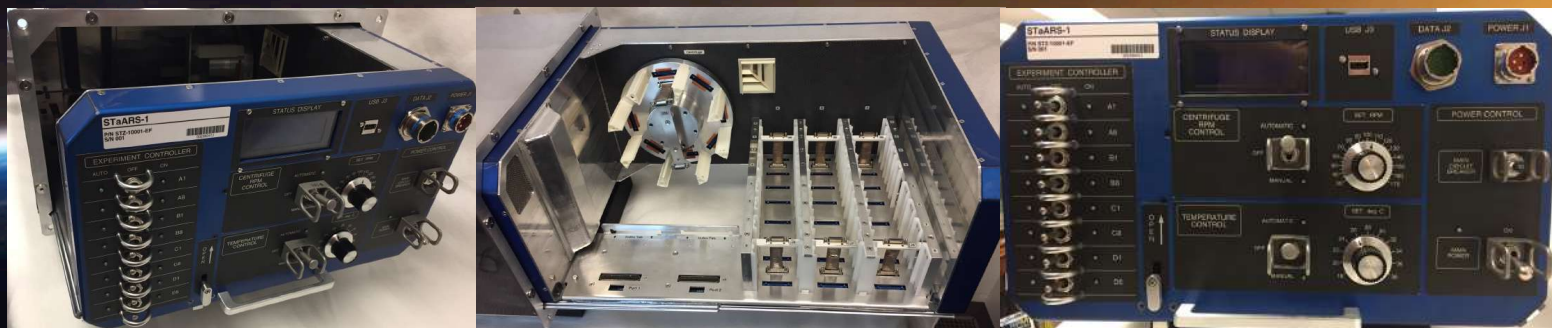


Project connectivity between benchwork and ISS
 Rapid time to flight with established hardware

- Satisfies flight feasibility requirement
- Provides preliminary data to support research plan

Grant writing support

- Mills has published >40 publications and been awarded >30 grants including 2 NIH NCATS Chips in Space proposals





ST_AARS



Where Science, Engineering and Flight Operations come together to produce tomorrow's biotechnology breakthroughs

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Mission Integration and Operation

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