CRISSP - Customizable Recyclable International Space Station Packaging
Tethers Unlimited, Inc.
PI: Rachel Muhlbauer, Proposal#: H14.03-9324

OBJECTIVES

- Develop packaging systems for ISS resupply missions that are compatible with onboard recycling and 3D-printing facilities.
- Evaluate current packaging for compatibility with the recycling and 3D printing processes.
- Identify the plastics that are most desirable for printing on the ISS and adapt common packaging formats to be made with those plastics.
- Create an efficient design methodology for 3D printed packaging that uses cellular structures that are highly optimized for a given payload and environment.

ACCOMPLISHMENTS

NOTABLE DELIVERABLES PROVIDED

- Demonstrated 3D printing of custom recyclable containers with integral vibration dampening
- Demonstrated recycling of, and printing with, current launch packaging materials
- Provided mechanical test data of parts printed with recycled materials
- Identified polymers suitable for fabricating recyclable launch packaging without requiring additional solvents or other chemicals
- Vibration test data demonstrating suitability of 3D Printed CRISSP containers for protecting payloads from the launch environment

KEY MILESTONES MET

- Demonstrated recycling of current packaging materials
- Demonstrated 3D printing with recycled ziploc bag filament
- Tested mechanical properties of recycled parts
- Developed novel 3DP infill structures to provide controllable vibration dampening
- Vibe tested 3D printed CRISSP containers, demonstrating better dampening than traditional foam packaging

FUTURE PLANNED DEVELOPMENTS

PLANNED/Possible Mission Infusion

Replacement of current non-recyclable foam, baggies, and bubble-wrap with CRISSP materials for ISS Cargo missions will enable delivery of approximately 25 lbs of feedstock for in-space additive manufacturing per cargo mission at no additional launch cost.

PLANNED/Possible Commercialization

- CRISSP materials could replace traditional commercial packaging materials, such as the bubble wrap or styrofoam that comes in every Amazon box, providing a shipping material that is readily recycled into additive manufacturing feedstock

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