2022 Design and Prototype Finalists

Powered Zero-g Bulk Transfer System

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STEPS TO ASSEMBLE AND FUNCTION

1. With caution unscrew your Red Lid (Part 2) from the bag that contains your food particles without any food flying out.


2. Quickly screw your main container (Part 3) to the bag that contains (Part 1)

THE APACHE 3

Less Bulk More Space

Zero G Bulk Transfer System

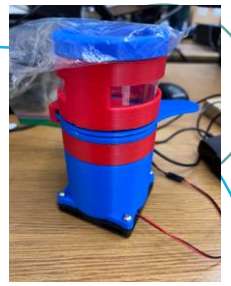
PLTW Engineering

Team Members: Angeles Lopez, Isabella Perez, Anshpreet Phangureh

An easier way to enjoy your food without having to worry about them flying away. With Zero G in space this transfer system allows your food to stay in place. Easy and simple steps doing enjoying your daily snacks.

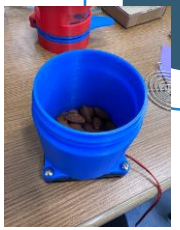
3. Push your food into the container Quickly screw your main container (Part 3) to the bag that contains (Part 1)

4. Open the blocker.

5. Connect your container to the outlet so fan can turn on.

6. Finally open your container and enjoy your snack without them floating into the air.



Our Solution

Write up / Research

Prototype 3

Prototype 2

Materials

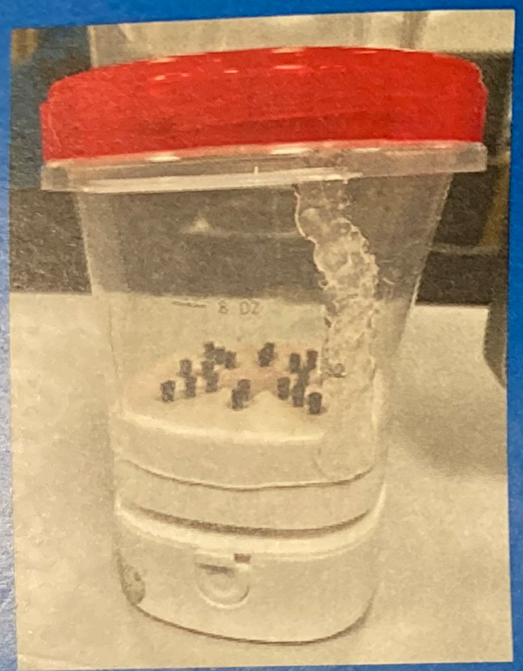
Prototype 1
- 1 Liter plastic soda bottle
- Mini desk vacuum from Amazon
- Hair clips
- Packing tape
- Tule

Prototype 2
- Large Ziploc Twist top Tupperware containers
- Mini desk vacuum from Amazon
- Hair clips
- Sewed tule filter bag
- Top of a water

HUNCH

High

The Vacuum

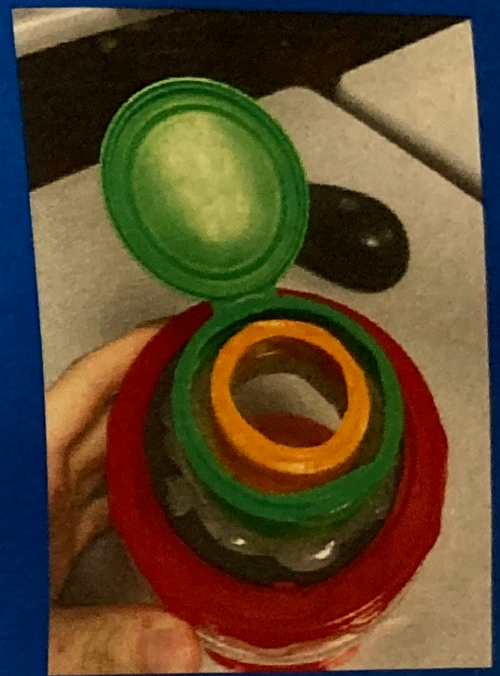


Our idea to use a vacuum has come a long way, we first we're looking at small hand held vacuums but quickly came to the conclusion that they would be too big for the space station and wouldn't be adaptable to what wanted to create. Thats why we came up with using a small desk vacuum, which was much smaller and had lots more flexibility with adding additional containers on it to create the device etc.

The Filter

We added a filter in the middle of our prototype to create a way to separate the crumbs from what they actually will be eating/ using from the transfer bag.

The Cap



The idea for the cap wasn't thought of till the second prototype, we wanted to add one so that when the astronauts aren't using the device nothing would escape from either the transfer bag or the device as well since the device will allow for them to store the items (with crumbs removed).

Task

Zero gravity in space makes it difficult to transfer small snacks like almonds, m&ms and little nuts. These items also come with crumbs which can float into the astronauts' eyes, noses and ears, that could create health issues. Crumbs can also float into electrical connectors and air vents that can clog and cause problems. Currently, the astronauts are using small plastic bags to transport nuts, bolts, Legos and other small items. These plastic bags being used generate more trash. The odor of said items can also cause health issues for the astronauts on the station.

Justification

Our solution to this problem is to create a device that can easily transfer items on the space station without making extra trash for the astronauts or getting small crumbs in unwanted places. Our device has a vacuum on the bottom, a resealable cap on the top and a filter in the middle. The transfer bag will be attached to the device through the resealable cap and the items inside will float through or be sucked into the device by the vacuum. The filter will then be used to allow the small crumbs to get through the filter into a vacuum bag and whats left will be what the astronauts wanted to retrieve from the bag

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SCAN ME

NASA HUNCH

High school students United with NASA to Create Hardware

Zero G Bulk Transfer

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For
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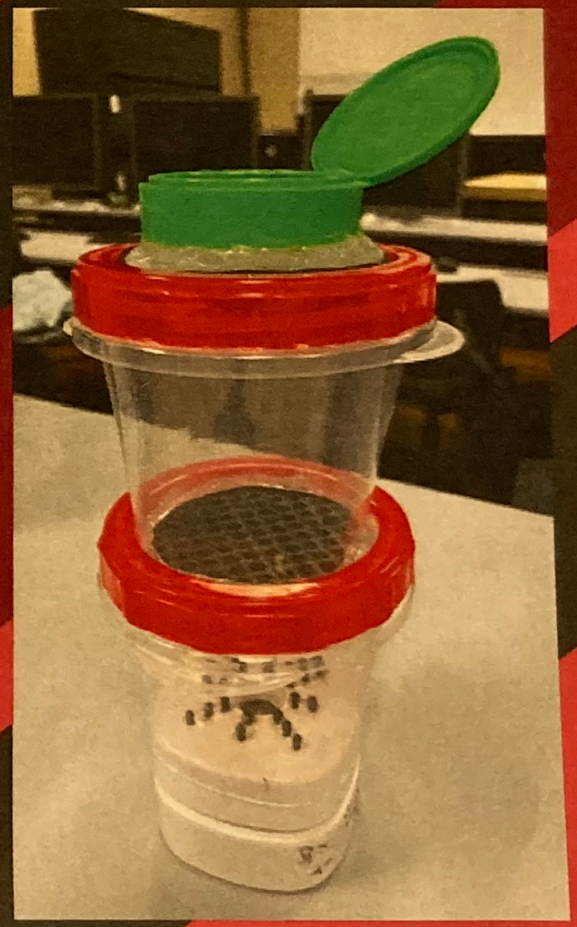

Jaidyn Somers
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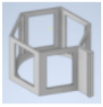
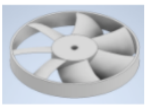
Karson Combs

Zero G Bulk Transfer System

Parts and how our system works:

For our system, we split our idea into three pieces; A large container system, a small container system, and a transfer system. Our transfer system will be made up of four parts, attached to one and other with a circular pattern lock or long bolts. We will differentiate the parts below along with the function, and description of the parts.

Explanation table

Large container system parts	Small container system parts	The transfer system parts
Bag of goods 	The small container Holder 	The motor/vacuum housing 
Transfer tube 	The small container lid 	Rc motor 
The large container adapter 	Container 	The filter(w/cloth) 
Rubber band 		The fan 
		The electronics 

Conclusion:

After all the designing, we have created a working transfer system and plan on making a few more improvements. We have already implemented a button and want to increase its efficiency.

https://youtu.be/4AtOT5l_tTs

This is our video of our working project