

Lunar Dust Baffles

Finalist List

for

NASA HUNCH

Design and Prototyping 2021

Congratulations for being chosen as a Finalist for NASA HUNCH Design and Prototype 2021. Your design was chosen as a Finalist because your team has fulfilled all or most of the requirements for your project along with quality in design and manufacturing the prototype. Your team demonstrated good testing of your prototype and knowledge of the problems and extensive understanding of the environment for your project. There was a lot of really amazing competition for these spots and all people from the semi-finalist

By being a Finalist means that you are a winner but this does not mean your idea will fly to space. This is real engineering. Although it is possible the reviewers could see one design that is exactly what they want, it is more likely NASA may choose one or a few ideas from each team to incorporate into a different design. It is also very possible that requirements or needs have changed since the beginning of the school year and they are not interested in the idea at this time. This is the nature of engineering but it does not diminish your accomplishments.

Design to Flight

The goal of HUNCH is to keep your names attached to these ideas and to have you assist with later developments of your projects when possible. Your projects and information will be provided to Mike Bennett who runs the HUNCH Design to Flight program that will coordinate the sending of your ideas to the engineers as they request it and working with your team to give engineers assistance whenever possible. This might include updating or making new CAD drawings, assembly of prototypes, choosing flight components and/or assisting with presentations. You will receive an email through your teachers in the coming days requesting specific information about your project.

Patents

In general, NASA does not seek patents on materials that are only related to space, however, if there are other potential uses for the device or ideas related to Earth bound applications, HUNCH will ask NASA Tech Transfer to assist in working through patent process. It is our goal that students and schools are included in any patents with as much credit as possible. We do not anticipate this as an income generator but more as value to your resumes.

Presentations:

General:

- Practice your presentation.
- Look sharp and professional.
- Everyone from the team should talk.
- Briefly introduce yourselves including your name and grade and school and state.

- Reviewers will already be aware of the problem and the constraints— I'll take care of that.
- Start with a demonstration of your prototype and briefly describe the testing that has been done.
- Point out details that make your design innovative, more robust, cleanable, repairable or desirable.
- Mention one or two things that didn't work initially but you were able to make changes and move forward.
- Briefly talk about how your prototype is different from the final product would be and include the materials you think will be used on the design that would fly to space.
- Answer questions quickly and concisely but completely so you can answer more questions and receive more comments. If you don't know something, say that you will have to check on it and plan to get back with them with an answer by email.
- Relax. These people are interested in what you have to say and know what its like to be on the spot.

Specific to Dust Baffles

- Show how your design will be easy for astronauts to set up on the moon—the more prep work on Earth, the easier for astronauts on the moon.
- Is there an order for how the soil is applied to your design?
- You will be giving your talk with the other Finalists on **April 29—10:00 to 11:30 CT**
I will be sending out invites for a Microsoft Teams meeting in the next couple of days to the teams.

Lunar Soil Baffle

School: Tri-County Reg Voc Tech HS

Franklin, Massachusetts

Teacher: Ms Magas

Team Members: Tony, James, Tyler, Brian, Max

Description

Our Lunar Baffle idea is designed to hold 5 feet of lunar soil on every square inch of the design. The ring idea is meant to use the soil as a shield to protect the astronauts from extreme temperatures and radiation.

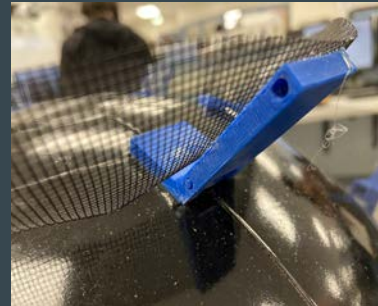


Measurements

Meeting requirements and constraints.

Provides 2-3 inches of coverage that corresponds to 5 feet on a full-size scale.

- Our design is easily collapsible and takes up little room on the ship
- The hinges on the side fold-out once the habitat opens up and lock in place
- The rings have a lot of space so that you can fit many feet of soil





Bag



Strings and supports



supports



Funnel

Thinking Map

Waffle baffles

Spiral



Geo -textiles

Rings only



Bags/ Rings



Emails:
WREI1274@GMAIL.COM
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We thank Eduardo Soto for
his ideas



Cypress Springs High School

Industrial Technology

Engineering design II

Cypress Fairbanks ISD

Cypress, Texas

NASA HUNCH PROGRAM

Lunar Soil Baffle



Team members:

Nhi Vu

Whitney Reinkoester

Instructor:

Steven Marcus

HUNCH Advisor/ Mentor:

Glen Johnson

OBJECTIVES:

Create a baffle to hold 5 feet of lunar soil atop lunar domes

MATERIALS:

Kevlar or nomex (bag)

Nylon rope (rope)

Aluminium (supports)

CONSTRAINTS:

- Hold 5ft of soil
- Easy to assemble/ transport
 - Light weight

TECHNIQUES:

We looked a lot into bags and spirals and how to modify them for the moon to hold soil

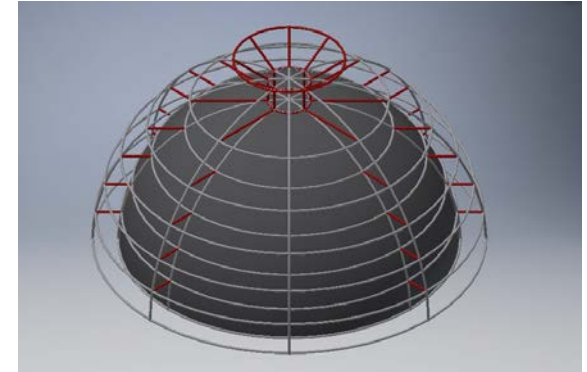
CHALLENGES:

We need to keep the design as simple as possible and make set up quick and easy for the astronauts

Description/general information:

One of the biggest challenges facing astronauts when going on long term lunar missions are micro-meteorites and radiation. By using lunar soil, the astronauts can cover the whole habitat a minimum of 5ft and protect themselves from both the micro-meteorites and radiation.

Solution: We are using a bag-baffle system to protect the habitat. We have multiple rings that will be about 5 ft away from the habitat and will be held in place by supports and rope. There will be a bag on the outside of the rings/ supports that will be made of a stiff, not too flexible material. There will be a funnel on top of the habitat that will allow the soil to be distributed in to all the baffles evenly. Once the astronauts are done filling the baffles, they will remove the funnel and leave the top exposed.



Scaled 1:45

WAFFLE BAFFLE

Newest Model: "The Sunflower"

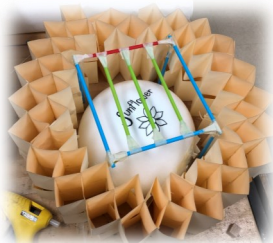
The "Sunflower" is our newest model. It is an oak tag baffle with equal heights (4in x 2in)



Our accordion fold and compression. As you see it unhinges and wraps around the structure as it inflates, then

THREE TIER CONSTRUCTION

The structure is the stabilization for the third tier that will be placed on top of the flat layer you see below it. This allows us to safely fill the top layers of the baffle without worrying about puncture or pressure from a load.



We filled the baffle sand to model with the soil then placed a tape dispenser on top to replicate the possibility of a load (like a rover) being placed on top. (r)

MATERIALS

3 Layer System

- Sodium Polyacrylate filled between 2 layers of Polyester
- Making it this way, so our baffle can be repurposed and provide extra radiation protection

POLYESTER

- Hydrophobic & quick drying
- Contains benzene ring to absorb UV light
- Darker color offer more protection than lighter

SODIUM POLYACRYLATE

- Can be used to keep moisture away
- Since it can absorb liquids, it can prevent rashes
- Aid in the absorption of liquids

OUR TEAM

Dan Krauss

Sydney Mandel

Ava Paulson



Dusty Waffles

(Lunar Soil Baffles/Waffles for Habitats)

Kettering Fairmont High School

Brett Jenkins

By: Madison Reents and Savannah Gross

We have created a “Plinko Board”-like system that has angled pockets that hold and guide the lunar soil to cover the habitat evenly.

