2019 Global Innovation Award Semi-Finalists

Alamo Area Co-op T2 (Quadships) – San Antonio, Texas, USA

Quadship Space Shower

Quadships is a dynamic group of 4 friends that have a diverse set of skills. Besides enjoying spending time together developing and refining new ideas, they also enjoy spending time reaching out to the community by volunteering at a local food bank and singing and doing crafts with the residents at nursing homes. They also travel to Puerto Rico to support youth camps.

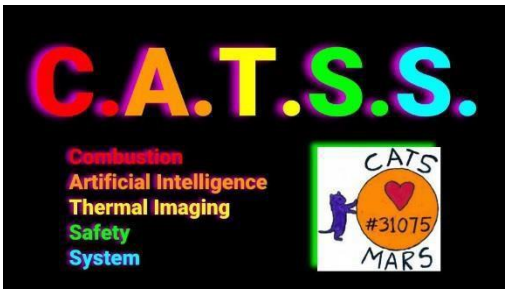
The Quadship Space Shower utilizes vortex airflow to move water and air through a space shower. It also purifies and recycles water, enabling astronauts to enjoy a long shower for comfort and relaxation.

Blue Box – Windham, New Hampshire, USA

SALT: Spacecraft Air Leak Technology

Current Blue Box team members are the second generation of the team, and their previous members come back to help mentor. After working so well together, they now consider themselves a family instead of a team. By embracing the *FIRST* Core Values, they have learned that friendly competition and mutual gain is a common goal.

SALT (Spacecraft Air Leak Technology) is made up of the Hole Trap and the Electronic Circuit with RFID (Radio Frequency Identification). Each SALT is laid on a one foot by one foot flexible PCB (Printed Circuit Board), and each PCB can be placed on the walls of a spacecraft to create a wallpaper grid covering the entire interior of the spacecraft to prevent leaks.



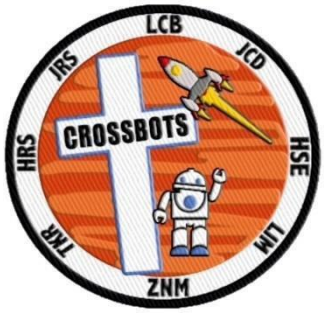
Cats Love Mars – Santa Clara, California, USA
C.A.T.S.S. - Combustion Artificial Intelligence Thermal Imaging Safety System
Cats Love Mars team members are excited about learning new things. They work collaboratively, share ideas, learn from each other, and ALWAYS HAVE FUN. The team was prompted to focus on creating a solution that prevents fires using detection and monitoring after seeing the effects of the sixth deadliest wildfire in U.S. history broke out in Paradise, California.

CATSS - Combustion Artificial intelligence Thermal Imaging Safety System detects fires, pre-ignition smoldering, hot spots, cool flames, and leaks on the ISS using radiation sensor thermal cameras and machine learning.

Chaos Crew – Fresno, California, USA
AstroTube Clipper

CHAOS CREW is an acronym of the team member's last names. They describe themselves as a creative, fun, enthusiastic, and hardworking team of 9 students.

Without gravity, the task of clipping finger and toenails in space is extremely tedious, inefficient, and sometimes messy. It may not be an aspect of space travel given much thought, but keeping fingernails short is directly tied to astronauts' health.The AstroTube Clipper catches nail clippings and allows for easy disposal in zero gravity.

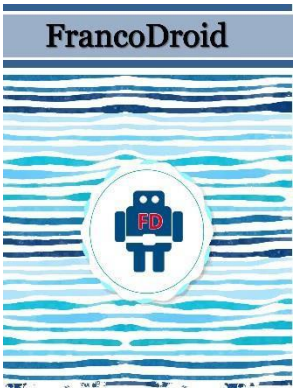


CrossBots – Searcy, Arkansas, USA
Cryo and Thermal Suit (CAT) Suit
The CrossBots are in their fourth year with *FIRST* LEGO League. They continually challenge each other to think beyond what they already know to become better versions of themselves. The team has two team member CEOs that run their team meetings in a business-fashion, but they are also sure to have a lot of fun!

The Cryo & Thermal (CAT) Suit uses warm pants to encourage fluid flow to legs and a cool shirt to regulate core temperature and torso/arm cell constriction to avoid Puffy-Face Bird-Leg Syndrome.

FrancoDroid – Rio de Janeiro, Brasil

CosmoCup



Started in 2009, this year's FrancoDroid team members are the 10th generation. The team says that they work like a system on gears: each of them is different, but together, they make the system work. They have learned a lot this year and hope to continue learning and sharing their experiences not only with the next generations of their team, but also with their friends, family and community.

The CosmoCup consists of a menstrual collector with a membrane at its top, preventing the blood from dissipating.

Happy Dave – Juneau, Alaska, USA

Astro Greens

Team Happy Dave is in its last year of *FIRST* LEGO League as the team members will be graduating to *FIRST* Tech Challenge next season. The team members are full of creative energy and enjoy working together. Through the *FIRST* Core Values, they have learned to fully respect each other and work together as a cohesive team.

Astro Greens are microgreens for space travel that provide a vitamin packed vegetable option that is fast growing and can be harvested as needed for up to two weeks.

Heschel RoboHawks – Northridge, CA, USA

Pinacal

The Heschel RoboHawks team values each of their team members' individual strengths and works together by listening to everyone's ideas. They begin each event with a dedication to honor victims of hate, and they show their appreciation for all the help they receive by always looking for ways to lend a helping hand.

Pinacal is a portable, comfortable "hat" that produces light therapy to slowly light up during the Astronauts' work-day hours. It then mimics sunset and nighttime by dimming down during their planned sleep hours to stimulate a proper amount and balance of serotonin to melatonin as is naturally produced by the brain during the day and night.

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iDB TECH-NO-LOGIC – Verona, Italy
WEMIT

iDB TECH-NO-LOGIC started three years ago with 8 team members who shared passion and the excitement at the idea of working and spending a lot of time together. They credit *FIRST* LEGO League for helping to shape who they are and who they want to be and for showing them that by following their dreams, they can achieve great things.

WEMIT is a machine that unknits the specially made garments, passes the whole thread to a series of cleaning materials and then arrange the clean thread on a spool, which can then be put into a 3D knitting machine and turned back to a piece of clothing.

Mindbuilders – Folsom, California, USA
Urilizer

Through their time in *FIRST* LEGO League, the Mindbuilders have learned teamwork, organization, discipline, hard work, and respect for each other, their mentors, and their community as a whole. They work very hard as a team to develop solutions that improve lives in significant ways.

The Urilizer is a special fertilizer (consisting of human urine, purified water, nitrifying bacteria and potassium supplement) that produces food, oxygen and water while using carbon dioxide and urine waste from the astronauts.

QuickBots – Dayton, Ohio, USA
Space Rx

QuickBots is a second-year team made up of nine homeschoolers. They are passionate about *FIRST* and the prospect of changing the world with their Project. The team members felt that their 2017 season Project was so important that they filed for a patent to keep pursuing it after the season ended.

The Space Rx Kit is created specifically for long-duration space travel. It is a multi-layered, flexible fabric container designed to protect against vibration, radiation, and extreme temperature fluctuations in space.

Rambunctious Astrobots – Spokane Valley, WA, USA (Representing Idaho)

Scroot Voot 2000

Rambunctious Astrobots is a team of 6 members that come from a wide range of ages and backgrounds. They use each team members' skills and experience to work and learn together. Each team member has their own part that they like best, but everyone works on all parts of the Challenge as a team.

The Scroot Voot 2000 fully contains your foot while you remove your sock and has scrubbing brushes to help get more skin off your foot. It works under vacuum, so all the dead skin is sucked up and kept out of the cabin.

Redstone Mechanics – Germantown, Maryland, USA

Growing Food in Space

Redstone Mechanics is made up of team members from 6 different schools. During the season, they realized that each team member worked differently and had varied interests and talents, which they used as a team. In addition to learning about space and programming, they learned about synergy, using each others' expertise to achieve a bigger objective, and that through this, they can complete the goal much quicker when working together.

Growing Food in Space uses an organic, lightweight, compact material as the medium for crops. The process uses drip irrigation and does not depend on sunlight for growing plants.

Robo Flow – Hilliard, Ohio, USA

The Space Onesie (S-1Z)

Robo Flow has three members who have a lot of fun—their favorite Core Value—as a team. Though serious in their work, they recognize that sometimes joking around can cause ideas to spark, which leads the team to innovative thinking and ideas.

The space onesie (S-1Z) is a full body suit with adjustable tension bands to provide gravity like resistance to support bone loss prevention and contribute to a healthy psyche.

Robotic Wolverines – Palm Beach Gardens, Florida, USA

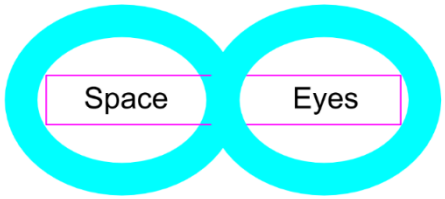
Hand Exoskeleton - A Solution to Astronaut Dexterity in Space

The Robotic Wolverines are involved in many aerospace-related activities including engineering design, rocketry design and construction, and CubeSat development, testing, and launch. Team members annually participate in state and national advocacy for space education in Tallahassee, Florida and Washington, D.C.

The Hand Exoskeleton - A Solution to Astronaut Dexterity in Space has two attachments. The palm wrench attachment allows for an untethered, easy-to-use tool. The other attachment is the finger extension. Located on the thumb, index finger, and middle finger, the extensions makes it easier to grab small objects to increase dexterity.

Smart Cookies – Charlotte, North Carolina, USA

Space Eyes



Smart Cookies is an all-girls team that has been involved in *FIRST* LEGO League for nearly 4 years. During their time on the team, they have developed great teamwork, friendship, and Coopertition skills. After learning that there is a high risk of blindness for astronauts on extended space voyages, the team decided to focus on battling increased cranium pressure and eye health. The topic is familiar to the team, as two team members have personal connections with the effects of eye pressure issues.

The Space Eyes fits closely over the eyes to prevent the float away drop effect in space and the dripping problem on Earth. With a gentle tap of a button, the medicine reaches the eyes resulting in an accurate dosage.

TalentumSAP – Kosice, Slovakia

CUL - Clean Your Laundry

TalentumSAP has been a team since 2011, with an aim to create opportunity for students to do interesting extracurricular activities and develop their talents. Outside of participating in robotics competitions, the team plays and watches sports together, participates in various science exhibitions, and engages in other fun activities such as hiking and cooking.

CUL - CLEAN YOUR LAUNDRY is a disinfection technology for cleaning textiles and clothes of astronauts in space, based on a method of disinfection with the help of UVGI germicidal radiation.

The Eight Magneteers – Pittsford, NY, USA

Magnetic Dodgeball

Made up of fifth graders,The Eight Magneteers generated their team name after deciding on their Project solution, Magnetic Dodgeball. The team has LOTS of energy and likes to have fun. They like to end each meeting by running outside and playing tag, and their team cheer is: All for fun and fun for all!

Magnetic Dodgeball uses magnets embedded in clothing and color-coded, magnetically polarized balls in a challenging game that builds muscle and bone strength.

Tiger Techs Team Orange – Sharon, Pennsylvania, USA

Shape Shifter

STEM is as important to the Tiger Techs Team Orange as is their community, and they host many STEM education events where they “engage others in [their] fun!” The team motto, coined by a former team member is, “We are like LEGOs. We build upon each other.”

The Shape Shifter solves fluid shift by reversing fluid shift with a one -piece compression suit. It pushes fluid from the upper body to the lower body and the extremities because the conditions of space cause it to travel back toward the head on its own.

Virus – Tallinn, Estonia

Using useless dust for useful plants

Team VIRUS has six team members who all have different interests on the team, which they use to work together, and hobbies outside of it.

Using useless dust for useful plants grows plants inside used air filters filled with collected dust. This dust contains almost all the minerals and nutrients plants need for growing, and those that aren't in the dust can easily be added with normal fertilizers. The plants would give the astronauts a constant supply of fresh, healthy food and provide a therapeutic activity.