



The Rocket Report



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In partnership with:



Collaborator:



Reserving school buses for our activities will only be necessary if and when classes resume in our facility on base.



HOPE!



Well, ya better believe it, Pilgrim: April showers may bring May flowers, but May flowers bring...HOPE!

- The pandemic lockdowns may be winding down and students will be returning at last to their classrooms.



- STEM Signing Day, held 4 May 2021, where high school students sign "letters of intent" to their chosen STEM field and school, has given students—and the

STEM fields and schools—*A New Hope* for the future. May the fourth be with them!

- The recent SpaceX Crew flight to the International Space Station and back was the first to use recycled rockets, giving hope for the future of reusable space vehicles.



- The launch had stuffed animal Guin-Guin the Penguin on board, acting as Zero-G Indicator—which has given hope to flightless waterfowl everywhere...even comic strip *Bloom County's* Opus!



- The UAE's Mars Orbiter *Hope* was the first of three

successful real-world missions to reach Mars in 2021, giving hope to all future space missions.

- One of the three, NASA's Mars 2020 mission, contained an experimental Martian helicopter named *Ingenuity*, which, in April 2021, became the first helicopter to fly and land under its own power on another planet—giving hope to additional extraterrestrial flying craft missions in the future.

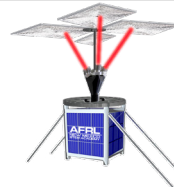
- And, of course, our own Mission to Mars HOPES Mission was successful, too—giving hope to STEM!

Mission to Mars

For Fifth Graders

Mars Hovering Observational Planetary Exploration System (HOPES) Mission 2020-2021

High HOPES: Mission Accomplished



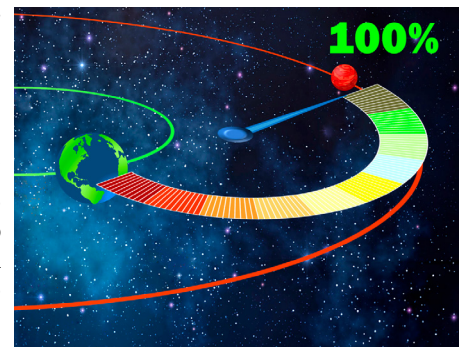
High HOPES paid off! On Friday, 7 May 2021, fifth grade Mission to Mars students successfully completed the Mars Hovering Observational Planetary Exploration System (HOPES) Mission 2020-2021.

The virtual Link-Up Day event on 7 May culminated a school year of virtual preparatory activities.

Using the Mars HOPES Mission [website](#) and their Mission Journal, students spent the

school year preparing for their trip to Mars with such activities as studying Mars Facts, designing and making Mission Patches, Life Support System models, and Habitats; taking online Kahoot! challenges; and participating in a series of Mars Expert Talks.

Along the way, students collected 100% of the *fuel points* nec-



essary to reach the Red Planet.

On Link-Up Day, students shared some of their creations, listened to a presentation from keynote speaker and former Hi-SEAS Crew

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Mission to Mars

For Fifth Graders

Mars Hovering Observational Planetary Exploration System (HOPES) Mission 2020-2021

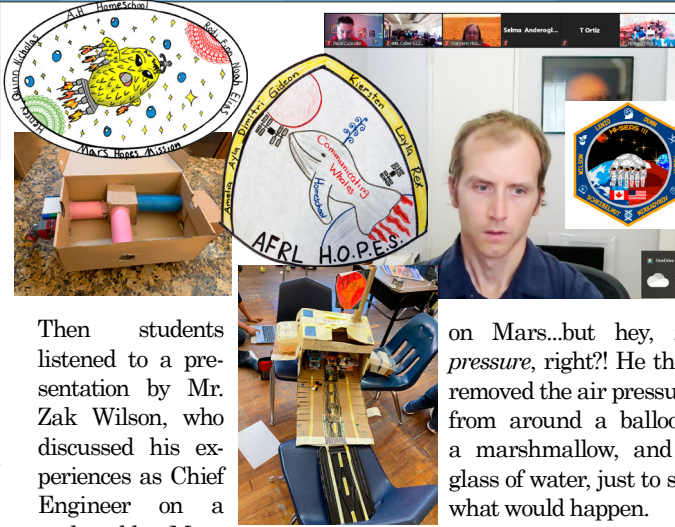


High HOPES: Mission Accomplished

Continued from page 1

Member Mr. Zak Wilson, and with help from their Colony Commanders, solved a logic puzzle together to group teams, and spaceship names to Mars colony locations.

First, students shared some of their creations, such as sagas (songs of the journey to Mars), mission patches, and life support system models, and explained why they chose to design them that way.



Then students listened to a presentation by Mr. Zak Wilson, who discussed his experiences as Chief Engineer on a real-world Mars Mission simulation in Hawaii called Hi-SEAS III. He shared his own mission patch, as well.

Mr. Wilson asked why astronauts would need a space suit

on Mars...but hey, *no pressure*, right?! He then removed the air pressure from around a balloon, a marshmallow, and a glass of water, just to see what would happen.

Students also put their clues together to determine which classes flew on which spaceships to which colony locations on Mars. *Highly logical, Captain.*



Your **commitment** to this mission was **crucial** to its success

Thanks a Lot

Thanks to all who helped make the HOPES Mission and Link-Up Day a success, including:

Expert Talkers: Dr. Jake Grosek, Lt Mary Albrecht, Dr. Ryan Hoffman, Dr. Rob Walters, Dr. Thomas Peng, Mr. Ben Urioste, Ms. Julie Smith, and Mr. Zak Wilson;

Colony Commanders: Lt Col Alex Carothers, Ms. Carri Carothers, Lt Jason Kirkendall, Dr. Theodore Ortiz, Lt Benjamin Shaffer, and Mr. Jeremy Vorenberg; plus all the **parents, teachers, students, and staff** who made this such a HOPEful mission.

We've mastered going to school *and* going to Mars virtually; all that's left is virtual trips to the *dentist!*



DoD STARBASE NM

For Fifth Graders

Chem Space

In DoD STARBASE NM Day 4, Chemistry, students build their own molecules using fruit-flavored snacks and toothpicks, and get groovy mixing oil, colored water, and seltzer tablets to make *lava lamps!*

In Day 5, students get the space to explore the moon, rockets, and space flight. They make their own rockets and

explore Newton's laws, and make delicious Oreo cookie moon phases.



Applications

Fifth grade teacher (and homeschool) applications are now being accepted for the 2021-2022 DoD STARBASE NM Mission. The forms are on our website at www.afrlnm.com/stem/mis-sions/dod-starbase-nm.

All teachers/homeschool parents who are first time participants must attend a New Teacher Orientation in August (for Fall semester) or Decem-



Teacher Application



Hmschool Application

ber (for Spring semester). New Teacher Orientations are held at our facility on KAFB. Returning teachers are required to attend a Zoom Orientation. Each teacher applicant is required to submit their own form. Please do not submit for a school.

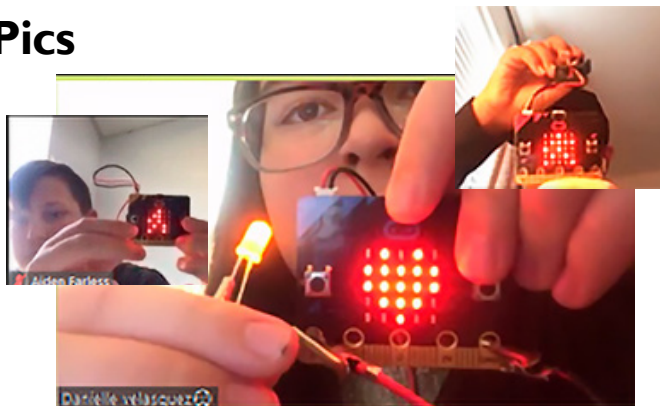


TECH Mission

For Middle Schoolers

Technology and Engineering Challenges—Satellites Mission

Pics



Applications

Middle school teacher (and homeschool) applications are now being accepted for the 2021-2022 Technology and Engineering Challenges (TECH) Mission.

The forms are on our website at www.afrlnm.com/stem/mis-sions/tech-mission.

All teachers who are first time participants must attend a New



Teacher Application



Hmschool Application

Teacher Orientation in August (for Fall semester) or December (for Spring semester). New Teacher Orientations are held at our facility on KAFB.

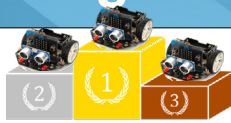
Returning teachers are required to attend a Teacher Orientation via Zoom.



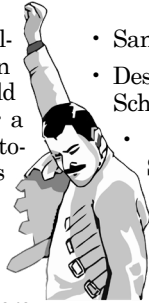


Robotics Challenge For Middle Schoolers

Time to Celebrate



The Robotics Challenge Expo Celebration event was (virtually) held 16 April 2021, and after a school year filled with tutorials, coding, and robotics challenges using the Python language, micro:bit controllers, and Maqueen robots, plus a successful virtual Robotics Expo...there were definitely reasons to celebrate! Congratulations, all!



- Sandia Preparatory School
- Desert Willow Family School
- Piñon Elementary School
- Albuquerque School of Excellence
- Jefferson Middle School
- Peralta Elementary School
- Ruidoso Middle School
- Tres Volcanes Community Collaborative School
- Camino Real Middle School
- The Academy for Technology and the Classics
- Sidney Gutierrez Middle School
- Home School

Participants

In the Celebration event, it was revealed that 330 students and 17 teachers participated in the Robotics Challenge from 14 schools and one home school.

The schools included:

- St. Mary's Catholic School
- Canon Christian Academy
- Jal Junior High School

Award Winners

During the Robotics Challenge and the Expo, students collected points for completing various coding and challenge activities.

There was a *four-way tie* for first place, each with a *perfect score!*

First Place:

- Maizy Galasso, Coby Reynolds, and Brody Johnson, from Desert Willow; and
- Nicolas Leon-Saenz, from Jefferson Middle School.

Second Place:

- Natalie Galasso of Desert Willow Family School
- Corbin Abeyta of Canon Christian Academy
- Jayden Kopacz of Sandia Preparatory School

Third Place:

- Giovanni Martinez, HomeSchool



STEM Challenge For High Schoolers

Small Symposium, Large Eggs

Due to the pandemic restrictions in place during the school year, the STEM Challenge Symposium was a little bit smaller this year...but the eggs were still large, and the STEM was still egg-stra jumbo sized!

After a school year filled with various activities involving building and testing remotely-operated launching and payload protection devices and settings, the high school teams were ready for the Symposium.

Five STEM Challenge teams from La Academia de Esperanza completed the STEM Challenge Symposium on 13 May 2021:

- Eggstravegent,
- Team Lightning,
- Los Huevos,
- The Unbreakable Shelly, and
- The Eggs-traterrestrials.



Team 1: Eggstravegent



Team 2: Team Lightning



Team 3: Los Huevos



Team 4: The Unbreakable Shelly



Team 5: The Eggs-traterrestrials

With volunteer Lt Jason Kirkendall and members of our staff helping judge, student teams were awarded points for



EGG PROTECTION ENCLOSED

the launching device performance and project presentation portions of the event.

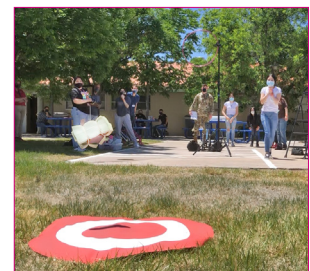
Student teams all got out their eggs and started flinging them through vertically suspended hula hoops towards a target 30 feet away, with the egg-stra condition that the egg shouldn't break (hence the Payload Protection Device).

In addition to scrambling to get their eggs through the hoop during the Performance section, students also presented a project report to the judges, for Presentation points.



Congratulations to **Team 1: Eggstravegent** for winning the top Performance Excellence award, and to **Team 2: Team Lightning**, for winning the Design Process Excellence, Presentation Excellence, and Project Excellence awards!

Thanks to everyone that helped make this year's STEM Challenge and the Symposium so egg-cellent.



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www.afrlnm.com/stem

YouTube Channel:
<https://www.youtube.com/channel/UC-QuOSd1XTkYuXPONZwIAIHQ/videos>

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Mr. Steve Burke, Technical Writer.

Important Terms and Acronyms

AF: Air Force

AFB: Air Force Base

AFRL: Air Force Research Laboratory

AFRL NM: AFRL New Mexico (AFRL/RD and AFRL/RV), on KAFB

AFRL/RD: The Directed Energy Directorate of the AFRL

AFRL/RV: The Space Vehicles Directorate of the AFRL

DoD: Department of Defense

KAFB: Kirtland Air Force Base, Albuquerque, NM

HOPES: Mars Hovering Observational Planetary Exploration System 2020-2021

MM: Mission to Mars

PRS: Phillips Research Site

S&Es: Scientists and Engineers

STEM: Science, Technology, Engineering, and Math

TECH: Technology and Engineering Challenges

USAF: United States Air Force

Remember, Teachers:
Get those EPA
Modification forms in!



NMT MST Program

Did you know? The Master of Science for Teachers (MST) program at New Mexico Tech (NMT) is a unique graduate program aimed at improving the STEM content knowledge of K-12 teachers.

The Grad School Hub website recently ranked NMT's MST program as No. 2 in the *nation* for online master's degree in science education!

The MST program offers a flexible degree option for diverse educators, and includes mostly virtual classes, along with optional summer in-person courses. Science or math educational background not required.

NMT's engineering, science, and mathematics programs are well-ranked nationwide, and the MST program uses the same highly accomplished professors to teach its wide variety of courses. Expert NMT faculty help teachers incorporate STEM in the classroom.

MST students obtain their degree in one of six concentrations (Math, Biology, Chemistry, Physics, Geology, Engineering or Computer Science) with coursework emphasized in lecture classes, laboratory, and/or field exercises that review traditional STEM skills and explore recent advances.

To receive the MST degree, students must complete 30 credit hours of coursework, and either a thesis or independent study research project.

The majority of MST students carry out research projects in their own classrooms, such as using new STEM instruction techniques to measure improvements in their K-12 students' skills.

Students work with a committee of three NMT faculty members to resolve real-life classroom learning issues by using research-based and data-driven approaches.

NEW MEXICO TECH

SCIENCE • ENGINEERING • RESEARCH UNIVERSITY



MST students are encouraged to develop classroom and laboratory activities that will be used with their own students.

This is an affordable degree with scholarship offerings and flexible scheduling, making it "perfect for educators!"

Admission requirements include a Bachelor's degree in any subject area...with NO GRE required.

For questions, and to apply, please contact Program Director Dr. Megha Khandelwal at:

megha.khandelwal@nmt.edu

Toshiba STEM Grants

STEM: Science, technology, engineering, and money.



K-5 teachers can apply online for up to \$1,000 in Toshiba America Foundation grants to bring an innovative hands-on STEM project into their classroom. Deadline: 1 October each year.

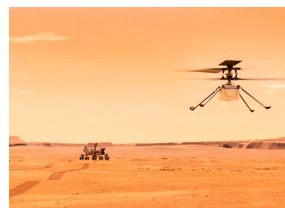
Grade 6-12 STEM education grant requests under \$5,000 are accepted throughout the year; deadlines for grant request applications of more than \$5,000 are 1 November and 1 May.

Applications must be for project-based learning, not computers, laptops or tablets.

They are trying to consider the impact of the coronavirus on teachers and education. See www.toshiba.com/taf/ for more information.

Addendum

Mars News



- Mars 'copter *Ingenuity* has been getting so much air and crushing flying so well (at least *five times* so far!) they've extended its mission.
- Meanwhile, rover Percy has been making its *own* air, separating oxygen out of the Martian atmosphere using MOXIE, the *Mars Oxygen In-Situ Resource Utilization Experiment*.
- And Netflix's *Stowaway* may breathe too *much* air on the way to Mars!

See www.space.com.

Upcoming

- The **STEMY Awards**, 10 June 2021
- Then **Super STEM Saturday**, 12 June 2021
- **Summer STEM Camps**, for KAFB students, are coming!
- DoD **STARBASE NM Camp** (rising 5th/6th), and **Robotics Camp** (rising mid/high): 14-18 June 2021
- **Space Camp** (rising 3rd/4th), and **Tuskegee Airmen Inc. Youth Aviation Camp**: 21-25 June 2021

Coming Next Issue...

- Summer Stuff!
- A WHOLE NEW YEAR of STEM!!



Watch for it!