



# AFRL LA LUZ ACADEMY

*"CREATING THE POSSIBILITIES"*



Inspiring Future Scientists and Engineers

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## White House Science and Technology Policy Director Visits STEM Camp

On 7 June 2012, Dr. John P. Holdren, Assistant to the President for Science and Technology, Director of the White House Office of Science and Technology Policy, and Co-Chair of the President's Council of Advisors on Science and Technology, visited students attending our annual Summer STEM Camp.

He discussed his important role as the President's advisor on science and technology is-

sues, and about the continuing need our country has for



(STEM) and pursue STEM degrees and careers.

At the Summer STEM Camp, held this year from 4-8 June 2012, close to 40 upper elementary children of military personnel on Kirtland Air Force Base spent the week engaged in hands-on STEM activities ranging from metric measurements to flight simulation.



students to study science, technology, engineering, and math

## AFRL Commander McCasland Visits Booth at PRS Open House

Visitors to the AFRL La Luz Academy booth at the PRS Open House event on 8 August 2012 received information on our program and tried out some of our hands-on STEM activities; namely, cryptanaly-

sis and Tornado Tubes.

Maj Gen William McCasland, AFRL Commander, stopped by briefly to shake hands and chat with staff members from the AFRL La Luz Academy.



## Ribbon Cutting

Congratulations to our STEM colleagues, the new DoD STARBASE facility at Hill AFB in Utah. They held a Ribbon Cutting ceremony on 29 June 2012.



## Branch Chief Wins FLC STEM Award

Ms. Casey De-raad, Chief, Technology and Outreach Branch, was recently selected as the recipient of the STEM Award given by the regional Federal Laboratory Consortium for Technology Transfer. Yay, Casey!



## TARC Competition

In May 2012, STARBASE Director Ronda Cole attended the national Team America Rocketry Challenge competition in Washington D.C. one of our former students was participating in.



## New Teacher On Loan

Welcome to our 2012-13 Teacher On Loan, Mr. Matt McCracken from North Star Elementary!





# Mars Missions Flight for fifth graders

Mars Microbial Asteroid Research Survey (MARS<sup>2</sup>) Mission 2012-13

## Mars Missions Teacher Training in October

### New Teachers

Teachers who have never participated in a Mars Missions Flight before, *welcome aboard!* You and your students are embarking on an exciting journey to Mars, full of STEM activities none of you will soon forget!

The activities all mesh with basic educational standards, so don't worry, it will fit right in with your existing curriculum.

Wondering how to proceed? No problem. We provide a full-day (8:30 am to 3:30 pm) training session for you on **Thursday, 18 October 2012.**

We'll give you instructions and tips on how to do the Mars Missions Flight with your students, and on how to prepare for the big

Link-Up Day event at the end of the school year.

You'll get hands-on experience designing a mission patch, making a life support system, and building a habitat. This should make it easier for you to explain these processes to your students. You will also receive a copy of the updated Mars Missions Flight manual.

### Returning Teachers

Returning teachers, *welcome back!* There's a shorter (1:00 pm to 3:00 pm) "refresher course" training session on **Tuesday, 30 October 2012\*** just for you.

We'll give you a copy of the updated Mars Missions Flight manual, too.



**\* Note: The Returning Teacher Training originally scheduled for 17 October has been rescheduled to 30 October.**



## DoD STARBASE Flight for fifth graders

### Teachers Get Oriented

The DoD STARBASE Flight Teacher Orientation meeting was held 16 August 2012 for schools participating in the 2012-13 Fall semester. Sixteen teachers representing five schools and three districts attended.

Teachers listened to a briefing on the AFRL La Luz Academy, and received an overview of the DoD STARBASE Flight and what's involved in it. Teachers also filled out some required paperwork.

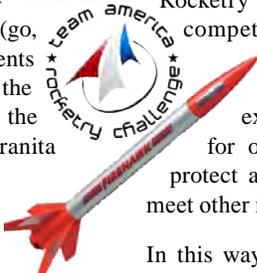


### DoD STARBASE 2.0 News

This year, we'll be extending the DoD STARBASE impact through our DoD STARBASE 2.0 program at Wilson Middle School (go, Wildcats!). The students are in luck, because the instructor will be the wonderful Ms. Claranita Williams!



Then, with the help of scientists and engineers acting as mentors, the students will design and build a rocket to compete in the national Team America Rocketry Challenge (TARC) competition. This year, TARC rockets must reach an altitude of exactly 750 feet, fly for only 48-50 seconds, protect an egg payload, and meet other requirements.



Rocketry will be the focus of this year's program. Students will start out small, building and working with water bottle rockets, Estes® Firehawks™ and other small rockets.

In this way, DoD STARBASE 2.0 will incorporate mentoring and hands-on STEM to increase student knowledge, school attachment, and career awareness.





## TECH Flight Orientations Held

Technology and Engineering Challenges (TECH) Flight orientation meetings for the 2012-13 Fall semester were held in August 2012.

On 22 August, 28 parents, representing 29 students, attended the Home School orientation session, while 10 teachers, representing 9 public schools, 2

private schools, and 4 districts, attended the “regular school” orientation the following day, on 23 August.

At the orientation, the teachers and parents received an overview of AFRL La Luz Academy and the Fall semester’s rocketry-oriented activities and timeframes.

TECH Flight teachers and parents, we’re really looking forward to seeing all of you and your students during the Fall semester of the TECH Flight. During this semester, the fun and the STEM always seem to skyrocket!



## Astronaut Dr. Harrison Schmitt Speaks at Robot-Systems-Flight-Oriented Teacher Institute

In conjunction with scientists and engineers acting as mentors via an on-line environment called CourseSites ([www.coursesites.com](http://www.coursesites.com)), this year’s Robot Systems Flight teachers and students will build and program a Boe-Bot® robot to maneuver through obstacle courses. Challenges for the teachers and students will be posted via CourseSites.



The focus of the 2012 Teacher Institute, 16-20 July 2012, was activities that would prepare 14 Robot Systems Flight teachers

to implement the Robot Systems Flight with their students this school year. At the Teacher Institute, teachers got a hands-on introduction to binary and the BASIC computing language, then built and programmed their Boe-Bot® robots.

The keynote speaker at this year’s Teacher Institute was Dr. Harrison Hagan “Jack” Schmitt. Dr. Schmitt has been a professor, geologist, author, and senator, but he is most famous for being one of the last two astronauts to walk on the moon (so far), as part of the crew of *Apollo 17*.

Dr. Schmitt discussed his jour-



ney to the moon, and talked about the need for STEM education in today’s world. “Math,” he told the teachers, “should be taught as a language.”

2012 Teacher Institute participants who successfully com-

plete the Robot Systems Flight with their students are eligible to participate in the Robot Systems Expo, held in February at our facility on Kirtland Air Force Base, demonstrating how their Boe-Bot® can run through the various obstacle courses.

A Robot Systems Flight Teacher Orientation meeting will be held 11 September 2012.



## STEM Challenge Flight Prepares for Kickoff



The STEM Challenge Flight, where teams of three or four high school students carry out a real-world STEM project using a multi-phase design process, is about to kickoff.

- 6 September 2012 is the date of the STEM Challenge Flight Coach Orientation meeting.
- On 13 September, there will be a STEM Challenge Flight Mentor Meeting.

- And, on 18 September, the STEM Challenge Flight Kick-off Briefing takes place.

Like last year, the project is based on building a launcher to launch an egg remotely through a hoop and onto a target without breaking the egg. (Angry Birds, anyone?) However, there will be a few tweaks to the system this year:

- We’re starting in the fall instead

of spring, giving the teams more time to complete assignments.

- The distance to the target will be increased to 30 feet.
- Student teams submit assignments using an online environment called CourseSites this year: [www.coursesites.com](http://www.coursesites.com).



- Teams earning at least 70% of the points on Phases 1 and 2 are invited to compete at the annual STEM Challenge Symposium on 16 April 2013.

All student teams are invited to share their project results with peers and other invited guests at the Symposium, as they watch competing teams demonstrate how their devices will meet the set objectives of the project.



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### Important Terms and Acronyms

**AF:** Air Force

**AFB:** Air Force Base

**AFRL:** Air Force Research Laboratory

**AFRL/RD:** The Directed Energy Directorate of the AFRL (formerly AFRL/DE)

**AFRL/RV:** The Space Vehicles Directorate of the AFRL (formerly AFRL/VS)

**DoD:** Department of Defense

**KAFB:** Kirtland Air Force Base, Albuquerque, N.M.

**LF:** Leadership Flight

**MARS:** Microbial Asteroid Research Survey

**MM:** Mars Missions

**PRS:** Phillips Research Site

**PWN:** Pinpoint WeatherNet

**RS:** Robot Systems

**STEM:** Science, Technology, Engineering, and Math

**TECH:** Technology and Engineering Challenges

**T<sup>2</sup>:** Technology Transfer

**TTE:** Technology Transfer for Education

**USAF:** United States Air Force

# STEM Bytes

## Curiosity Sticks the Landing

Gabrielle Douglas and other Olympic gymnasts won gold medals in the 2012 Summer Olympics by executing complicated flips, twists, turns, and spins off of balance beams and uneven parallel bars, and *sticking the landing*.

On 6 August 2012, at 05:17:57.3 UTC, the \$2.5 billion Mars Science Laboratory rover *Curiosity*, after traveling for eight months and 352 million miles, executed a complicated series of landing maneuvers, during a period NASA called the “Seven Minutes of Terror,” and *stuck the landing!*

“Touchdown confirmed. We are safe on Mars,” said engineer Allen Chen, as NASA’s Mission Control room erupted in cheers. We “came back with the gold,” said JPL Director Charles Elachi.

The never-before-attempted landing routine involved a precise series of Space Shuttle-style braking tricks, a heat shield, a supersonic



parachute, and the rover being lowered by cable from a hovering rocket-powered backpack.

The landing procedure was so complicated because the rover is too big and heavy to use traditional landing methods. *Curiosity*, the largest and most advanced rover ever built, is the size of a small car and weighs nearly a ton.

It’s packed with scientific instruments and cameras, a robotic arm with a power drill on it, a chemistry lab, a radiation detector to track radiation levels future astronauts might face, and a laser (Directed Energy!) to zap rocks.



It will use those tools over the next two years to look for the basic ingredients of life, such as carbon, nitrogen, phosphorous, sulfur, and oxygen.

It won’t, however, search for actual living or fossil microorganisms. To do that would require a future manned mission with a powerful laboratory established on Mars to examine the rocks and soil very closely. Hmmmm...

*Curiosity* has been testing its systems, which generally seem to be quite healthy, and sending back pictures. It also sent back the first song beamed from another planet: *Reach for the Stars*, by Will.I.Am, a musician who promotes science and math education.

### MSL, EDL, Huh?

Some *Curiosity* rover terms and acronyms you’re likely to see:

**ChemCam:** Chemistry and Camera, otherwise known as *Curiosity’s* rock-zapping laser

**DSN:** Deep Space Network, antenna dishes that communicate with interplanetary spacecraft

**EDL:** Entry, Descent, and Landing, or the “Seven Minutes of Terror”

**JPL:** Jet Propulsion Laboratory

**Mastcam:** Pair of 2-megapixel color cameras on *Curiosity’s* “head.”

**MER-A/B:** Mars Exploration Rover A/B (official name of Mars rovers *Spirit* and *Opportunity*)

**MSL:** Mars Science Laboratory (official name of *Curiosity* rover)

**NASA:** National Aeronautics and Space Administration

**SAM:** Sample Analysis at Mars, *Curiosity’s* chemistry lab

**Sol:** Latin for “Sun;” one Mars day (24 hours 39 minutes).

**Yestersol:** Yesterday on Mars

### One Giant Leap, One Great Ride

We lost two of space’s greatest pioneers recently.

Neil Armstrong, first astronaut on the moon, who said, “That’s one small step for (a) man, one giant leap for mankind.”



Sally Ride, the first American woman in space as a crew member on Space Shuttle *Challenger*.

### Summerfest!

On 16 June 2012, AFRL La Luz Academy helped New Mexico celebrate its state centennial (it was admitted to the union 6 January 1912) by manning a booth at the New Mexico Centennial Summerfest event.



### EESC Poster Contest



The Engineering Education Service Center (EESC)’s 2012 poster contest will include two themes: “Grand Challenges for Engineering” and “Women in STEM.” Posters should be fun, motivational, and inspire students to pursue a degree in STEM.

Grand Prize: \$200, second place: \$100, third place: \$50. All winners get a certificate and inclusion in the EESC Poster Artist Royalty Program.

See [www.engineeringedu.com/postercontest.html](http://www.engineeringedu.com/postercontest.html) for more info.



### Coming Next Issue...

- Is Mars squared? No, it’s the MARS<sup>2</sup> Mission
- More Flight info
- Rocket Launch prep

**Watch for it!**

