



AFRL LA LUZ ACADEMY

“CREATING THE POSSIBILITIES”



INSPIRING FUTURE SCIENTISTS
AND ENGINEERS

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In This Issue...

The Rocket Report	1
What We Did This Summer	1
Mars Missions Flight	2
Mars Missions Teacher Training in October	2
DoD STARBASE Flight	2
DoD STARBASE Teacher Orientation Held	2
Hey, Check Out the New DoD STARBASE Blog!	2
TECH Flight	3
TECH Flight Teacher Orientation Held	3
Hey, Check Out the New Tech Flight Blog!	3
Robot Systems Flight	3
Robot Systems Flight Teacher Orientation Held	3
Hey, Check Out the New Robot Systems Flight Blog!	3
STEM Challenge Flight	3
A New Approach to be Piloted in January 2012	3
Teacher Institute	4
Summer Teacher Institute Satellites Soar Above the Flames	4
STEM Bytes	4
CyberPatriotism	4
Farewell, Shuttles, but the Space Missions Continue	4
Masthead and Important Terms and Acronyms	4
Coming Next Issue...	4



The Rocket Report

What We Did This Summer

School may have been out for the summer, but AFRL La Luz Academy kept busy!



There was the Summer STEM Camp, 13-17 June 2011. Thirty rising fifth, sixth, and seventh grade children of Kirtland Air Force Base families spent the week engaged in a variety of hands-on science, technology, engineering, and math (STEM) activities.

The hands-on activities were designed to get the students motivated to study STEM and expose students to career opportunities at the Air Force Research Laboratory and elsewhere.

STEM activities the students engaged in included exploring robotics by constructing a Bristlebot that uses the bristles on the head of a toothbrush as “feet;” soldering electronic components to a printed circuit board to make a flashing LED badge that reads, “I have the power;” and assembling and decorating a CubeSat satellite with pieces printed from a 3-D printer.

STEM Camp students also got to participate in a simulated outer space research mission at the New Mexico Challenger Learning Center.

Additional STEM Expeditions included:

- The YWCA TechGYRLS robotics expedition on 8 June 2011,
- The University of New Mexico Summer Transportation Institute flight sim expedition on 10 June 2011,
- A Mathematics Engineering Science Achievement (MESA) soldering expedition for over 60 Summer Enrichment Program high school students on 24 June 2011,



- An RVEP flight sim expedition on 14 July 2011, and
- A special STEM expedition for New Mexico Challenger Center students from 1-5 August 2011, in which they built a large model of the international space station (ISS) underwater, to simulate weightlessness.

We also gave a presentation at the Civil Air Patrol Aerospace Extravaganza event on 25 June 2011.



Then we held our annual Teacher Institute, from 18-22 July, for 29 teachers. See the Teacher Institute section on page four of this newsletter.

We hired a new staff member, Mr. Sean Noonan, to be our STEM Outreach Coordinator. Among other things, he’s helping us track data and establish some social media sites and blogs for the Teacher Institute and some of our Flights.

And if that wasn’t enough, we also remodeled our office area over the summer to accommodate more work areas, including one for Mr. Noonan.

Whew! That’s a lot of STEM to take on for one summer. Luckily, we had some fantastic interns helping us, like Priscilla Guzman, Rachel Silva, and our Engineering Technician Rosemary Williams. Thanks, guys! We couldn’t have done it without you.





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 are all tied to New Mexico State Content Standards and Benchmarks, 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, 27 October 2011.

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 Wednesday, 26 October 2011 just for you. We'll give you a copy of the updated Mars Missions Flight manual, too.

Regional Training

Can't make the new or returning teacher training because

Albuquerque is too far? Regional training sessions may be scheduled as needed. We'll keep you posted as to when and where.



DoD STARBASE Flight

DoD STARBASE Teacher Orientation Held

The Teacher Orientation for the DoD STARBASE Flight was held on 23 August 2011.

Elementary fifth and sixth grade teachers attending the orientation listened to a presentation on our program, received some basic

information on how the DoD STARBASE Flight works, and filled out some required paperwork.



Hey, Participating Teachers, Check Out the New DoD STARBASE Blog!



AFRL La Luz Academy has taken another step deeper into the twenty-first century.

STEM Outreach Coordinator Mr. Sean Noonan has been hard at work setting up new blog pages for some of our Flights. Teachers will be able to read Flight information, view Flight photos and videos, and share comments and questions on the blog.

To access the blog:

1. Sign up for a free Gmail ac-

count, if you don't already have one (www.gmail.com).

2. From your Gmail account, send an email to AFRLLaLuzAcademy@gmail.com requesting an invitation to the DoD STARBASE Flight blog.
3. Mr. Noonan will send an invitation via email to your Gmail account. Click on the link in that email to be connected to the blog.
4. To access the blog, go to <http://dodstarbaseflight.blogspot.com> and sign in using your Gmail sign-in information.



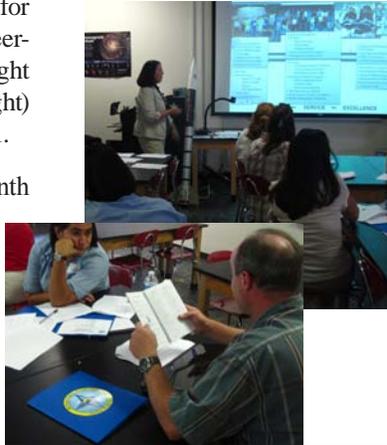
TECH Flight

Technology and Engineering Challenges Flight

TECH Flight Teacher Orientation Held

The Teacher Orientation for the Technology and Engineering Challenges (TECH) Flight (formerly the PETES Flight) was held on 25 August 2011.

Attending sixth and seventh grade teachers listened to a presentation on our program, received some basic information on how the TECH Flight works, and filled out some required paperwork.



Hey, Participating Teachers, Check Out the New TECH Flight Blog!

STEM Outreach Coordinator Mr. Sean Noonan has been hard at work setting up new blog pages for some of our Flights. Teachers will be able to read Flight information, view Flight photos and videos, and share comments and questions on the blog. To access the blog:

1. Sign up for a free Gmail account, if you don't already have one (www.gmail.com).
2. From your Gmail account,

send an email to AFRLLaLuzAcademy@gmail.com requesting an invitation to the TECH Flight blog.

3. Mr. Noonan will send an invitation via email to your Gmail account. Click on the link in that email to be connected to the blog.
4. To access the blog, go to <http://afrltechflight.blogspot.com> and sign in using your Gmail sign-in information.



Robot Systems Flight

Robot Systems Flight Teacher Orientation Held

The Teacher Orientation for the Robot Systems Flight (formerly the Intro to Systems Engineering Flight) was held on 3-4 August 2011.

Attending eighth grade teachers familiarized themselves hands-on with the Boe-Bot® robots they will construct and program with their students back in their classrooms.



Hey, Participating Teachers, Check Out the New Robot Systems Flight Blog!

STEM Outreach Coordinator Mr. Sean Noonan has been hard at work setting up new blog pages for some of our Flights. Teachers will be able to read Flight information, view Flight photos and videos, and share comments and questions on the blog. To access the blog:

1. Sign up for a free Gmail account, if you don't already have one (www.gmail.com).
2. From Gmail, send an email

to AFRLLaLuzAcademy@gmail.com requesting an invitation to the Robot Systems Flight blog.

3. Mr. Noonan will send an invitation to your Gmail account. Click on the link in that email to be connected to the blog.
4. To access the blog, go to <http://robotssystemsfight.blogspot.com> and sign in using your Gmail sign-in information.



STEM Challenge Flight

A New Approach to be Piloted in January 2012

A new approach to the STEM Challenge Flight is scheduled to be piloted in January 2012. Exact details are still evolving, but the basic idea is this:

Teams of three or more students will use a systems engineering approach to complete an Air Force Research Laboratory (AFRL) science, technology, engineering, and

math (STEM) project. Social media will be used to facilitate the interaction of AFRL scientists and engineers with the student teams.



Teams with a qualifying score will be invited to participate in the STEM Challenge Symposium in April. Top performing teams will have an opportunity to participate in a summer workshop to further explore the project.

TARC Support

We will also offer support to student teams that want to participate in the Team America Rocketry Challenge (TARC) competition. Interested teams should have their

adult sponsor contact us.

We will need rocket design and performance simulation data from the student teams. Then we will host four pre-scheduled Saturday rocket launch events (one in the fall and three in the spring), where we will have rocket motors on hand for the teams.

These TARC teams will be eligible to attend the STEM Challenge Symposium as well as the summer workshop.



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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

MELT: Microprobe Evaluation of Lava and Titanium

PRS: Phillips Research Site

PWN: Pinpoint WeatherNet

STEM: Science, Technology, Engineering, and Math

TECH: Technology and Engineering Challenges

T²: Technology Transfer

TTE: Technology Transfer for Education

USAF: United States Air Force



Teacher Institute

Summer Teacher Institute Satellites Soar Above the Flames

The Summer Teacher Institute was held 18-22 July 2011 at AFRL La Luz Academy.

Twenty-nine teachers representing 9 elementary, 10 middle, and 3 high schools participated in this year's Institute.

The teachers listened to guest speakers, went on tours of AFRL facilities, participated in hands-on STEM activities which focused on a satellite mission, and participated in a Teacher Institute blog we set up.

Keynote speaker and astronaut Ms. Anousheh Ansari, the



world's first first female private space explorer and first Space Ambassador, kicked things off with a fascinating discussion of her 2006 space voyage to the International Space Station.

Over the course of the five-day Institute, teachers assembled LEGO® satellite models; experimented with temperature sensors; designed CubeSat cube-shaped satellite frame components on the computer; studied satellite orbits and trajectories; explored satellite attitude control using gyroscopes; and engaged in other hands-on STEM activities relating to satellites.

They toured a satellite support facility on base, and successfully participated in the Challenger Learning Center of New Mexico's *Rendezvous with a Comet* mission.



Teachers listened as a number of guest speakers discussed satellite hardware, software, and firefighting information and issues.

The teachers were grouped into eight teams, or "companies," and developed proposals for the design of satellites that would provide data on forest fire dangers in New Mexico. The companies presented their proposals on the last day of the Institute.

The Teacher Institute teachers are now considered AFRL La Luz Academy Fellows for the school year, and will continue to interact with us through various STEM education outreach activities.

STEM Bytes

CyberPatriotism

Perhaps the top national security concern in our world today is *cybersecurity*—the protection of computer networks and databases.

The biggest challenge in achieving cybersecurity is not technological; it is finding enough technically educated people—the human component.



CyberPatriot is the national high school cyber-defense competition created by the Air Force Association (AFA) to excite, educate, and motivate the next generation of cyber-defenders and other STEM graduates. It is open to all high school students.

Registration will close on 8 October 2011, or earlier if the limit of 1,250 teams in a particular division is reached. A waiting list will be maintained for the two divisions, "Open" and "All-Service," if registration closes prior to 8 October 2011.

There is an entry fee of \$350 per team. This entry fee covers all direct costs, including transportation, food, and lodging for teams qualifying for the in-person competitions.

For more information, see www.uscyberpatriot.org.

Farewell, Shuttles, but the Space Missions Continue

Thanks for everything, Space Shuttles! All gave some, and some gave all...but you've more than earned your retirement. Meanwhile, the space missions are going right ahead.

The *Dawn* spacecraft is orbiting protoplanet Vesta. The *Juno* spacecraft is on its way to Jupiter.

The *GRAIL* mission is all set to launch within the month, to closely measure the moon's gravity. And the Mars rover *Curiosity* is set to launch in November.

See www.jpl.nasa.gov for more information.



For more information, see www.uscyberpatriot.org.

Coming Next Issue...

- Is Mars melting? No, it's just the Mars MELT Mission
- More Flight info
- Rocket Launch prep

Watch for it!

