



AFRL LA LUZ ACADEMY

"CREATING THE POSSIBILITIES"



INSPIRING FUTURE SCIENTISTS
AND ENGINEERS

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NMSU President, Dignitaries Tour AFRL La Luz Academy

On 16 December 2011, after signing an Education Partnership Agreement (EPA) between New Mexico State University (NMSU) and the Air Force Research Laboratory (AFRL), NMSU dignitaries and representatives took a hands-on tour of AFRL La Luz Academy's facilities.

NMSU President Barbara Couture; Executive Vice President/Provost Wendy Wilkins; Vice President/Research Vimal Chaitanya; Congressional staff members from Senators Bingaman and Udall and

Congressman Heinrich and Ben Lujan's offices; various Deans; Associate Deans; Department Heads; Professors; and NMSU students, accompanied by Col William T.

"Bill" Cooley, Commander, Phillips Research Site and Materiel Wing Director, Space Vehicles Directorate, and Dr. David A. Hardy, Director, Directed Energy Directorate, toured our facility.

They got a hands-on demonstration of some of the science, technology, engineering, and math (STEM) activities we do with



students, such as Tornado Tubes, Boe-Bots®, Newton's Cradle, rock-ets, LED badge soldering, and many others.

Ms. Jewell New Classroom Sub

Ms. Erin Jewell, wife of AFRL cryogenics expert 2nd Lt Benjamin Jewell, is coming on board to help out in the STARBASE classroom.



Ms. Jewell replaces, for the time being, educator Ms. Claranita Williams, who is going on maternity leave. Welcome, Ms. Jewell!

Happy New Year/ Semester

Our Robot Systems Flight and the Fall semester of our DoD STARBASE and TECH Flights have wrapped.

Happy New Year and Happy New Semester, however, to the Spring semester DoD STARBASE and TECH Flights, and to the STEM Challenge Flight, now kicking off.



STARBASE 2.0 Being Piloted Scalextric Training Held

The DoD STARBASE Flight is expanding! STARBASE 2.0, a new afterschool program targeting middle school students who have participated in the DoD STARBASE Flight, is being piloted this semester. AFRL scientists and engineers and UNM engineering students will act as mentors.

Van Buren Middle School will host two STARBASE 2.0 sessions per week after school on Tuesdays and Thursdays starting 31 January 2012.

The Tuesday sessions will focus on a scale-model racecar design, construction, and racing competi-



tion activity called Scalextric. The Thursday sessions will focus on exploring robotics with Boe-Bots®.

Scalextric training was held on 29-30 November 2011. AFRL's Capt Tae Kim and Lt Eric Bailey, Mr. Mark Harris from the University of New Mexico's School of Engineering, and members of our staff attended the training.



JANUARY

Happy
New
Year





Mars Missions Flight

Microprobe Evaluation of Lava and Titanium (MELT) Mission 2011-12

Uniforms and Nametags

Mars Missions Flight TEAMS must design a uniform to wear to Link-Up Day (TEAMS from the same classroom can have the same uniform).

It doesn't need to be elaborate or expensive; it can be as simple as matching-colored shirts and jeans for each TEAM member. (We're not talking Elton John or Lady Gaga here; it doesn't have to be made from choice cuts of meat or anything, OK?)

Each uniform should include a

nametag, and can also include mission patches and extras such as headgear (see pp. 99-101 in the handbook.)

Teachers and other assisting adults must also wear a nametag. The nametag should include:

- School, Student, and Teacher Name
- Docking Habitat Number (the habitat the teacher is Flight Director for, and has their
- TEAM A at; where students report when departing for Earth)
- Colony Habitat Number (the habitat each TEAM is responsible for building; same as the TEAM number).



TEAM Registration

Blank copies of the Mars Missions Flight TEAM Registration Form are included with this newsletter. Please send us one completed form per TEAM by 17 February 2012.

Please print legibly. These forms will be used to generate the official certificates we distribute to each student at the end of the mission.



Life Support

To support life on Mars, each student TEAM makes one of eight types of **life support system model** (handbook, pp. 61-80). (Note: It's just a model. It doesn't have to actually *function*.)

Once each TEAM has defined the parameters of their life support system, they decide how it will op-

erate and what it will contain.

Incorporate four "Mars Facts" (pp. 57-60) into the system design. Label three of the Facts on the model; label the fourth fact



with a "?" and make it into a multiple-choice riddle on a **poster**.

During the technical briefings, TEAMS will award audience members bonus cards for correct answers to the riddle.

So, in addition to the life support system model and the riddle poster, have students prepare ten **bonus cards** (p. 63) to award for correct answers to the riddle.

TEAMS may want to consider incorporating their **mission patch** (pp. 39-56) into the design of their bonus cards.



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



DoD STARBASE Flight

Students Fly To End of Semester

The days just flew by, and now the elementary fifth and sixth graders attending DoD STARBASE Flight Day 5 have flown to the end of the Fall semester.

During Day 5, the students studied the *four forces of flight* (lift, thrust, drag, and gravity), and *flight control surfaces* like ailerons, wings, and elevators. They explored hands-on with activities like *Bernoulli Bags*, which use Bernoulli's Principle to help the students blow extra air into a tube.

Pilots and flight enthusiasts such as Col Donn Byrnes (retired), who worked on the SR-71 "Blackbird" plane and authored books such as *A Boy Who Loved Airplanes*; Lt Col Jeff Leischner, TSgt Vincente Romero, and pilots from the Civil Air Patrol like Col Roland Dew-

ing, Col Mark Smith, and Maj Ted Spitzmiller, discussed their flight experiences with the students. Sometimes the pilots brought

flight videos and flight gear such as night vision goggles, model aircraft, and flight helmets, for the students to see.

Then the students took to the skies in simulated Cessnas, using yoke and rudder pedal controls to practice taking off, turning, navigating, and landing.

Now, another semester, with a new batch of students, is starting.

Students are exploring Engineering Design and going on a Metric Mission together.



Jedi Orientation

The force was with teachers at the Spring semester DoD STARBASE Flight Teacher Orientation sessions held in December 2011.

Teachers received general information about us, the DoD STARBASE Spring semester curriculum, expectations, and required paperwork.

In attendance on 7 December was Jedi Master Yoda, wearing a Santa hat and resembling Magdalena teacher Mr. Jim Sauer.

When 900 years old *you* reach, look as good *you* will not, *hmmmm?*



At least one week in advance, please give us the name of each adult per driver's license, the last four digits of their Social Security Number, and the estimated number of students you're bringing. Don't forget to turn in your Media Release forms, too!



Fall Semester Rockets to a Close

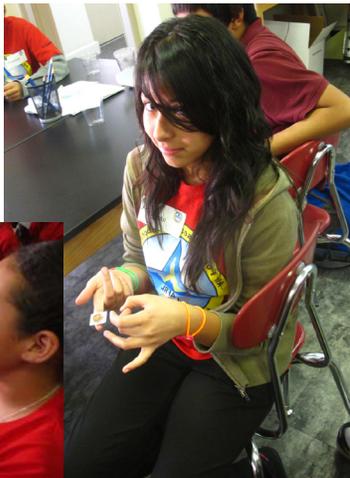
Day 3 of the Fall semester of the TECH Flight is rocketing to a close.

Participating sixth and seventh grade students have finished up the semester, and the 2011 calendar year, by analyzing and graphing the data from the rocket launch on Day 2, comparing it to their rocket flight simulation data, and trying to figure out why reality didn't conform to the simulation.

The students studied Newton's Laws and how they applied to rocketry, then explored the laws further with activities like flicking cards out from under a penny, and experimenting with *Newton's Cradle*.

They also explored forces and their accompanying graphs using Vernier® force sensors and force plates, discovering that a graph can tell the detailed story of an event over time.

Now, a new calendar year and a new semester are starting, and a new batch of students are coming to explore activities related more to satellites than rockets.

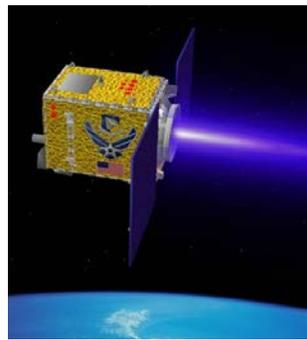


TECH Flight Teacher Orientation

The TECH Flight Teacher Orientation for the Spring semester was held in December 2011. Attending teachers received general information about us, the TECH Flight Spring semester curriculum, expectations, and required paperwork.



Satellite Semester Starting



The new semester of the TECH Flight is going into orbit.

Sixth and seventh grade students attending the Spring semester TECH Flight will be engaging in a variety of hands-on activities related to satellite technology. In Day 1 the activities include building LEGO®-Sats, exploring Laser JELL-O, and making ultraviolet-bead bracelets.

At least one week in advance, please give us the name of each adult per driver's license, the last four digits of their Social Security Number, and the estimated number of students you're bringing. Don't forget to turn in your Media Release forms, too!



Robot Systems Flight

Trophies Awarded at Robotics Expo

The school-based Robot Systems Flight maneuvered to a successful finish on Saturday, 10 December 2011, at the Robotics Expo.

Over fifty eighth-grade students from Christ Lutheran Church and School (Ms. Vera Abresch), Cottonwood Valley Charter School (Ms. Nancy Engler), Grants Middle School (Ms. Kathy Melendez), Valencia Middle School (Ms. Maryanne Hospelhorn and Ms. Martha Beebe), and homeschool, came to the Robotics Expo to demonstrate to judges what they had learned about robotics during the semester.

The small, wheeled robots called Boe-Bots® the students had assembled, programmed, and brought with them had been given some unique names: *Eugene*, *Short Circuit*, *iBot 1.5*, *Awesome Boe-*

Bot®, *Jonny 5*, *R2-D2*, *Roboesale*, *RX-D4*, *Nova*, *Awesome*, *Rainbow Unicorn*, *Bow-a*, *Klover*, *Squirt*, *LBPBot*, *The Terminator*, *Better Bob*, *Christmas in Hollywood*, *Jedik*, and *Death Machine*.

Many Boe-Bots® were decorated with hats, eyes, and other accessories. At least one, named *Bow-a*, even had the cutest little white bow tied to it...thus transforming it into...yes, friends, it's true...

...a *Bow-Bot*!

At the Expo, student teams programmed their robots for practice runs maneuvering through green

(easy), blue (intermediate) and black (challenging) obstacle courses. Then they demonstrated their robot's performance for one of a panel of three esteemed volunteer judges: Ms. Rosemary Williams, Mr. Daniel Pagliaro, and Mr. Tim MacAlpine.

A homeschool-team Boe-Bot® called *RX-D4* did quite well, getting trophies for the lowest score (as in golf, lower scores are better) of 23.35 in the green course and 26.04 in

the blue one. It was a fairly close race in the black course, but *iBot 1.5* from Christ Lutheran nosed out *Bow-a* to take the trophy with a score of 32.65.

Of course, the *real* trophies were awarded to *all* the students...hands-on pizza, and hands-on STEM!





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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



STEM Challenge Flight

Which Came First, the Launcher or the Egg?

As you may have heard, there's a new approach to the STEM Challenge Flight, which kicks off this month. It involves designing/building a mechanism to launch a raw egg through a hula hoop and land on target without breaking.

But there's a catch (sigh...why is there *always* a catch?):

- The launching device must fit in a 2' x 3' x 2' box;
- The egg must be easily removed from its protective container after each attempt;
- The trigger mechanism must be operated from at least 5' away,
- Materials and components we purchase must be available at Home Depot; and
- Total cost/value of all purchased/borrowed/donated components must not exceed \$100.

The four phases of this project occur from January through March 2012. In the first phase, you, the student teams, have

three weeks to do what scientists and engineers do: research, make prototypes, plan, budget, pitch your plan to AFRL experts, and convince them to approve it.

In the second phase, you have three weeks to purchase materials and build a launcher, complete with the means to protect the payload and a remote "trigger" mechanism. You'll need a one-minute video showing the launcher works, protects the payload, and can be safely triggered from five feet away.



In the third phase, you have four weeks to test, modify, and retest your system. Pitch your redesign with sufficient clarity and detail so others could repeat your efforts under similar conditions.

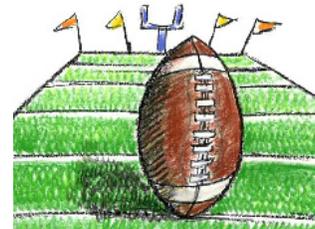
In the final phase, you have two weeks to create a final online presentation showing results, findings, and explanations of what you learned from your *eggs-periences*, including your Symposium competition strategy. Let the shelling commence!

Time for the Opening Kickoff

OK, sports fans, speaking of things getting launched around here...

This year's Kickoff Briefing is scheduled for Thursday, 12 January 2012 from 9:00-11:30 am; that's when the STEM Challenge Flight gets launched like a football at the opening kickoff!

So, all you STEM Challenge Flight participants out there,



launch yourself on over that morning, and see what's in the air besides footballs.



STEM Bytes

Expand Horizons

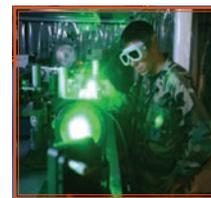
The Albuquerque Expanding your Horizons event, with hands-on STEM activities for girls grades five through nine, is being held on 28 January 2012 this year.

See <http://www.ehreg.org/registration.php?cid=13412&lang=EN> to register.



Phillips Scholars

The Phillips Scholars program is a paid summer internship for upper-level high school and undergraduate students. Students gain hands-on experience working on cutting-edge research and technology, mentoring from Air Force Research Laboratory (AFRL) scientists and engineers, and may lead to part-time student employ-



ment and graduate fellowships.

Application deadline is 6 February 2012. See <http://vsintdev.afrl.kirtland.af.mil/PhillipsScholars/> for more information.

OK, so you're telling me that I can:

- Make school more fun and useful for myself right now by participating in AFRL La Luz Academy and doing hands-on STEM activities;
- Go on to college and pursue a STEM degree while participating in the Air Force Research Laboratory (AFRL)'s Scholars programs;
- Then apply for STEM jobs in places like the AFRL, where I could be paid well to continue doing enjoyable STEM activities for a *living*?

ME GUSTA*.

* 'I LIKE IT!'

Coming Next Issue...

- Telecommunicating on Mars
- DoD STARBASE and TECH Flight Day 1--again
- Chocolate hearts and flowers



Watch for it!