



# SUCCESS

WITH

EDUCATION PARTNERSHIP AGREEMENTS

## COMPANY NAME:

University of New Mexico  
Albuquerque, NM

## TECHNICAL PROJECT OFFICE:

Directed Energy and Space Vehicles Directorate  
Kirtland AFB, NM

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## WORLD'S LARGEST LAUNCHED Amateur Rocket Built Through Air Force Educational Partnership Agreement

**KIRTLAND AIR FORCE BASE, New Mexico** — Students from the University of New Mexico's Rocket Engineering Team built the world's largest launched amateur rocket through an Educational Partnership Agreement with the Air Force Research Laboratory, Directed Energy and Space Vehicles Directorate.

Under the agreement, students utilized Air Force facilities for building a similar version of the PGM-11 Redstone rocket for real world and predicted performance comparisons. The PGM-11 Redstone rocket was the first United States Army short-range ballistic missile used to carry a live nuclear warhead in West Germany during the Cold War.



*Students from the University of New Mexico's Rocket Engineering Team built the world's largest launched amateur rocket through an Educational Partnership Agreement with the Air Force Research Laboratory, Directed Energy and Space Vehicles Directorate. Under the agreement, students utilized Air Force facilities for building a similar version of the PGM-11 Redstone rocket for real world and predicted performance comparisons. (U.S. Air Force photo)*

UNM supplied the materials for constructing the rocket and the AFRL provided UNM temporary access to an Air Force facility with enough space to assemble the 48-foot tall rocket and launch tower. The rocket took more than six months to construct and weighed 260 pounds.

The project provided program management experience for students and the opportunity to work with professionals and acquisition processes across Kirtland AFB. Students used a computer program to calculate the design of the rocket, such as center of pressure, mass and weight to ensure the rocket could fly and predict its real world performance launch of 200 mph for velocity, or speed and an altitude of 3,000-feet high.

On the morning of the launch, UNM students and faculty met before sunrise in a remote area in Rio Rancho, New Mexico, to assemble the rocket and tower for takeoff. Due to a mechanical failure shortly after takeoff, the rocket reached an altitude of only 300-feet and additional metrics, such as velocity were unable to be tracked for calculating predicted to real world performance comparisons.

“Solving complex, real world engineering problems ‘on the fly’ taught me invaluable lessons about adapting and being flexible when working in a group,” said Ben Urioste, UNM mechanical engineering student, structural design lead.

“The most exciting aspect about this collaboration was the opportunity to work on Kirtland Air Force Base. The AFRL staff was very accommodating and supportive of our efforts and their facility provided plenty of space for creating the world’s largest amateur rocket,” said Urisote.

EPAs are a form of technology transfer between an Air Force laboratory and an educational agency, college, university, or nonprofit institution for encouraging and enhancing the study of science, technology, mathematics, and engineering education.

“This unique opportunity was a tremendous success and an excellent use of an EPA. The students did a great job and I was very impressed with the quality and detail of their work,” said Dr. Imelda Atencio, section chief, Laser Division, AFRL Directed Energy Directorate.

“The agreement also enabled the AFRL to continue forming relationships with UNM professors and students. I believe our willingness to work with the students made a lasting impression,” said Atencio.

For additional information about EPAs, technology transfer, or how to partner with the Air Force, please contact the Air Force Technology Transfer Program Office at 937-904-9830, [af.techtransfer@us.af.mil](mailto:af.techtransfer@us.af.mil), or visit the T2 website at [www.wpafb.af.mil/t2](http://www.wpafb.af.mil/t2).

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**U.S. AIR FORCE TECHNOLOGY TRANSFER PROGRAM OFFICE**

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