



FACT SHEET

UNITED STATES AIR FORCE

Air Force Research Laboratory, Office of Public Affairs, 3550 Aberdeen Avenue S.E., Kirtland AFB, NM 87117-5776
(505) 846-1911; Fax (505) 846-0423
INTERNET: <http://www.de.afri.af.mil/Factsheets>

MARS MISSIONS

A TECHNOLOGY TRANSFER FOR EDUCATION PROJECT



The Air Force Research Laboratory's (AFRL) Mars Missions project is based on "Marsville[®]: the Cosmic Village." Marsville[®] is a classroom-based Mars colonization simulation developed by the Challenger Center for Space Science Education. AFRL's Mars Missions integrate Directed Energy and Space Vehicles Directorate technologies with the Marsville[®] curriculum to provide a unique experiential learning opportunity for elementary (5th grade) students. The space exploration and colonization activities for this project combine the use of math, science, engineering, communication and the arts. Middle school students participating in AFRL's Providing Engineering and Technology Experiences for Students (PETES) project act as mentors to the elementary students preparing for their mission to Mars.

For the 2001 – 2002 school year, the event was named the Mars Asteroid Defense Mission included 62 schools, 124 teachers, and over 2,160 students from throughout the state of New Mexico. Regional Mars Missions Link-Up Days were held in Albuquerque, Clovis, Kirtland, Las Cruces, and Tucumcari, New Mexico. The purpose of the regional sites was to minimize travel distances for each school.

The Mars Missions project has several goals:

- To expose students to technological, scientific and environmental issues related to space exploration.
- To demonstrate problem solving and team learning using a cooperative model.
- To provide students with positive role models from the fields of science and technology.

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The Mars Missions project spans a period of five months. The project begins with an all-day teacher-training workshop hosted by AFRL. During this training, teachers are given information they need for the project. Teachers also participate in the hands-on construction of a scale model Martian habitat and the life support systems used within. Each teacher and student team is assigned responsibility for one facet of a Martian colony. In the interim, the teachers receive a monthly newsletter to keep them abreast of upcoming events and deadlines.

The Mars Missions project includes the following stages:

- **Base Operations (in the classroom):** Through a series of individual and group activities, students learn about the planet Mars and the special challenges it poses to human settlement. These activities include engineering, technology and fine arts components.
 - **Engineering Component:** Students are formed into five- to seven-person teams with each group designing and constructing a model of a life-support system to sustain the Martian colony. These systems include air supply, waste management, food production, recreation, communication, transportation, temperature control, and water supply. Laboratory resource people are available to answer questions that arise as the systems are being built.
 - **Technology Component:** Each student team is grouped with two other teams from different schools to form a habitat crew. Then, each team is responsible for certain parts of the habitat, which they will pre-cut and take to Link-Up Day. Since they are not allowed to meet until Link-Up Day, teams must communicate their construction plans through written or electronic means. E-mail and video conferencing are strongly encouraged.
 - **Fine Arts Component:** Each student team is responsible for creating a mission patch which identifies team members and mission purpose. This team building activity serves as a method of getting to know one another. In addition all teams in a classroom are asked to write a saga describing their journey from Earth to Mars.
- **Link-Up Day (rendezvous with partner schools):** Teams and invited guests from the schools, the New Mexico Congressional Delegation, AFRL, state and local agencies, and the community convene at the Link-Up Day site each Spring. The student teams meet their fellow habitat crew members in person for the first time on Link-Up Day. Each team brings their life support system models and provides briefings on how the systems work. After the briefings they construct their inflatable plastic habitats, each measuring 12 feet by 12 feet by 8 feet. Once construction is complete, connecting tunnels are built linking all of the habitats together. Team members and guests then participate in a walk-through of the entire colony. This year, the large Albuquerque Link-Up Site consisted of 78 habitats; Clovis had 9 habitats; Kirtland had 11 habitats; Las Cruces had 20 habitats; and Tucumcari had 7 habitats.

Student mentors participating in the PETES project assist with the Mars Missions as members of the Mission Control crew during Link-Up Day. Many of the PETES students participated in the AFRL Mars Missions project when they were fifth graders. The goal of the PETES project is to bridge the transition from elementary to middle school by keeping students interested in the study of math, science and engineering.

For more information, contact Gerald L. Mora at (505) 846-6936 or AFRL/techtransferforeducation@kirtland.af.mil.

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