

19th Annual Student Space Design Competition

*Educational Outreach for the 24th Symposium for Space Nuclear Power and Propulsion,
Space Technology and Applications International Forum (STAIF-2007)*

Competition Guidelines

The Student Space Design Competition is held annually in conjunction with the Symposium on Space Nuclear Power and Propulsion, a conference held within the Space Technology and Applications International Forum (STAIF). The Competition is sponsored by the University of New Mexico's Institute for Space and Nuclear Power Studies and the New Mexico Space Grant Consortium. The goal of the Competition is to enhance mathematics, science, and engineering education through student involvement in the state of New Mexico. Education is the key to ensuring a secure, quality future and remaining competitive in the world community as we become more dependent on science and technology. Students are invited to participate in the Student Design Competition as individuals, team pairs, or classes.

Project Objective

The objective of this year's project is to consider and design a mobile laboratory to be used by human explorers on the surface of Mars. The vehicle must be able to transport and house the crew on long range expeditions to sites of interest. For more details on the project, please consult the project statement.

Contest Rules

Any student entering the competition must be enrolled in a public or private high school, middle school, or junior high school in the state of New Mexico, and must be sponsored by a faculty member, with at least one faculty member per school in attendance at the competition.

Entries can be submitted to one of three divisions:

Division I: Students in grades 9-12 and/or previous competition winners.

Division II: Students grades 6-8.

Division III: Any class project.

Students may enter the competition in Divisions I or II as an individual or as a team of two members. Division III is for class projects and must be represented by **up to two** students within the class and their sponsoring teacher.

Submission of Projects

Any individual student, team, or class wishing to compete must submit an Application Form and proposal through their school faculty member sponsor. A teacher/sponsor is guaranteed space for up to four (4) entries, in any combination of divisions. Additional entries will be accepted if space permits. Forms can be faxed or mailed - see correspondence address and numbers below.

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Prizes

The following prizes are available:

| Division | Place | Prize |
|---------------------------|--------------|--------------|
| Division I ¹ | 1st | \$200 |
| | 2nd | \$150 |
| | 3rd | \$100 |
| Division II ¹ | 1st | \$100 |
| | 2nd | \$75 |
| | 3rd | \$50 |
| Division III ¹ | 1st | \$100 |
| | 2nd | \$75 |
| | 3rd | \$50 |

¹ All prizes will be in the form of a gift certificate to the UNM bookstore for the named amount

Highlights of Preparation

Designs should be in the form of: **(a)** a one-page proposal; **(b)** a poster explaining the main details of their project; **(c)** a scale model of the concept; and **(d)** a written design report and 100-word abstract. The judges will be supplied with copies of the proposals, design reports, and abstracts, and will interview the students concerning key features of the student's project. Students may use notes recorded on a reasonable number of 3x5 index cards during the interview.

The students entering the competition must complete all work themselves. Ideas from published materials or other sources may be used, but must be clearly and appropriately referenced.

Proposals are submitted with the application form and should briefly describe the key features of the proposed design while not exceeding one page. Proposals should be prepared in a 12-pt, easily readable font (Times-Roman or Arial recommended), and must be readily reproducible.

Posters should be free standing, measure approximately 48x36 inches (including wings) side-to-side and be displayed vertically. The top nine inches should include a project title, the name(s) of the students, and their school. The body of the poster should include labeled drawings (3-7 drawings per poster are recommended), use scaled drawings where applicable, illustrate key features of the design, and expand upon difficult points of detail. Scale models (and assembled support equipment, if applicable) must fit on a standard 30x36 inch tabletop space. Contestants can get an idea of what is involved by observing the Space Design Competition Archive Web page, which includes previous years' entries (<http://www.unm.edu/~isnps/outreach/archives.html>).

Design reports should explain the design and provide justification for key choices. Reports are submitted approximately one-week before the contest and are expected to be

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approximately six to eight pages in length, including references, but excluding the cover page. The reports should be prepared in a 12-pt, easily readable font (Times-Roman or Arial recommended), and must be readily reproducible.

Evaluation Guidelines

The following guidelines will be used in judging each project:

1. Thoroughness (40%). Includes presentation and understanding of technical issues; project meets mission requirements; model is built roughly to scale; components and functions are clearly identified; project includes the most recent data available on the Martian environment.
2. Originality and Creativity (30%). The project shows new and original thinking, creative ways of implementing guidelines, new materials and technologies, etc.
3. Quality (20%). The poster format is correct, as listed above, well designed, neat, and clear in presentation; the model is well built, effectively laid out, and attractively presented; the written materials accurately document the results of the project.
4. Engineering Effectiveness (10%). Credit will be given for maximizing functionality of the project while minimizing cost and risk.

Judging

Students must be present at the time of judging, as this is part of the educational process. The judging will be held Monday morning, February 12th, 2007. Tables will be provided for each exhibitor. Auxiliary equipment, such as projectors, computers, etc., used in the exhibit must be provided by the entrants. Parents and teachers will not be allowed in the exhibit area during judging.

Judges have the final decision on issuance of Places and all prizes may not necessarily be awarded.

Deadlines

The following deadline must be observed in order to remain eligible for the competition:

| Deadline | Action |
|---------------------------|--|
| Friday, December 8, 2006 | Application forms and one-page proposals are due to ISNPS |
| Friday, February 2, 2007 | Design reports , 100-word abstract , and Permission Slips ³ are due to ISNPS |
| Monday, February 12, 2007 | Judging will be held at STAIF-2007, at the Albuquerque Hilton (I-40 and University Blvd.) |

³ Failure to provide a Permission Slip will result in automatic disqualification.

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Correspondence

Any correspondence can be addressed to:

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Proposals, abstracts and design reports can be emailed (as an attachment) to Steve Hatton at the above email address. **Application forms** and **permission slips** can be faxed to Steve at the above fax number; however, original application forms and permission slips will need to be submitted either in person or by mail.

Tentative Schedule of Events

This is a tentative schedule subject to change.

| Time | Activity | Comments |
|-----------------------|---|--|
| 7:30-8:10 a.m. | Registration and exhibit set-up | |
| 8:10-8:15 a.m. | Welcoming Remarks | |
| 8:15-8:45 a.m. | Guest Speaker: COL Jeff Williams, Astronaut (Tentative) | Topic: Your future in space |
| 8:45-10:15 a.m. | Judging | Students at their exhibits to answer Judge's questions |
| 10:15-10:30 a.m. | Break | Snacks will be served |
| 10:30-11:00 a.m. | Visit STAIF Exhibits | See STAIF-2007 website for list of exhibitors |
| 11:00-11:30 a.m. | Guest Speaker: Dava Newman, Professor of Engineering, MIT | Bioengineering in human spaceflight |
| 11:30-11:50 a.m. | TBD | |
| 11:50 a.m.-12:30 p.m. | Awards Ceremony | Held in conjunction with the STAIF-2007 Plenary Session |