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Project trains future engineers

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For student Ed Brouwers, six months of hard work culminated in an afternoon of flight tests for the ESPRIT project conducted at NASA's Wallops Flight Facility in Virginia.

The tests, conducted on July 22, evaluated the use of a "boom," or flight arm, from a rocket while it spun on a table at speeds up to six rotations per second. The 25-inch boom is designed to shoot out like an umbrella 67 seconds after the rocket launch and take atmospheric measurements using a sensor.

Brouwers (sophomore-aerospace engineering), a team member since his first semester at Penn State, said design for the boom began in January.

"It was really great to see them [the booms] snap out and lock the first time on the table," Brouwers said. "It was great to see them in action after months on a computer screen."

Brouwers is a team leader in a group of 40 Penn State students and 11 Norwegian students working on the ESPRIT project. The team is designing a rocket that will be launched June 2006 in Andenes, Norway.

The ESPRIT project is the third part of the Student Projects Involving Rocket Investigation Techniques (SPIRIT), a Penn State long-term undergraduate research project that acts in collaboration with NASA.

The name for the project, ESPRIT -- the Norwegian word for spirit -- is a nod to the Norwegians' contribution to the project, said structures team leader Bruce Davis (senior-aerospace engineering).

The students are working on the program's third rocket and launch since SPIRIT started in 1995, supervisor and payload manager Timothy Wheeler said.

Penn State's portion of the project is split up into five working groups: experiments, power and wiring, structures, telemetry and publicity.

The next step in the design of the boom will be more serious testing, Davis said. Testing will occur again at Wallops in October, and after final adjustments are made, the 65-foot rocket will be assembled next spring and shipped to Norway, Davis said.

The Norwegian students, who came from three different universities in Norway, are conducting experiments and will also be providing the launch facility and financial support for the June 2006 launch, said Sven Bilen, faculty advisor for the project.

Throughout the project, students work closely with NASA engineers, Bilen said, who mentors the students on the projects.

"We have a pretty close relationship with NASA engineers," he said. "They're interested in students who know how to design and build flight hardware."

Adam Escobar (senior-aerospace engineering), part of the experiments group, said the purpose of the boom is to fling the probe as far away from the rocket as possible because the rocket itself affects the readings. The boom allows the probe to measure undisturbed plasma, a gas.

"The purpose of the whole setup is to measure electrons in the atmosphere," he said. "This detects changes in the ozone."

Escobar said the readings gathered from the sensor will be compared to past data to see how atmospheric conditions have changed.

Wheeler said the project allows students to learn about engineering hands-on.

"Each person on the project gets out of it what they're ready for," he said. "It's a terrific way to train professional engineers. Students respond to it very strongly."

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