

Students Design System to Return Astronauts to Earth

December 20 2006

NASA's planned mission to the moon won't lift off for more than seven years, but student engineers at Texas A&M University are already designing the systems that could get it safely back to the ground.

The students designed a system of parachutes and air bags that could slow the crew return vehicle (a capsule similar to the ones used in the Apollo moon missions but much larger) after it enters Earth's atmosphere and cushion its landing on the ground.

They presented their designs — the product of a yearlong senior design course — to a review panel of top level NASA engineers and Texas A&M faculty engineers Dec. 4 in College Station.

William Schneider, a professor in Texas A&M's Department of Mechanical Engineering who, with Tom Lalk, Richard Alexander, and Muhamad Ijaz, supervised the students during the two-semester exercise, said the course is intended to give the students a taste of the process NASA uses to design components for space vehicles.

"The students came up with 50 different concept designs and narrowed that to four — one from each section of the class," said Schneider, a former senior engineer and assistant director for all Engineering at NASA's Johnson Space Center. "Then we down-selected the designs until we got to one."

The systems the students presented consisted of three 120-foot

parachutes and an array of eight air bags housed between the vehicle's heat shield and the capsule itself.

The student engineers calculated how big the parachutes needed to be to slow the capsule through the last 10,000 feet of its descent, the length of the lines that connect the canopies to the capsule and determined the best materials for the canopies and suspension lines and the best method of sewing them.

They also designed an array of eight spherical airbags to cushion the capsule when it gets to the ground. The airbags would be stowed between the capsule and the heat shield until needed. Each airbag is actually two bags, one inside the other. The outer bags are intended to deflate as the capsule compresses them so that the capsule won't bounce when it hits. A second, smaller, bag inside each airbag will complete slowing the capsule to a stop on the ground.

Chris Hansen, an engineer in the NASA Engineering and Safety Center at the Johnson Space Center who attended the review presentation, said that exercises like this benefit both the students and NASA.

"I have been attending these reviews for several years and I've noticed a dramatic change in the students' performance," Hansen said. "They have continually improved their performance while tackling more and more difficult engineering problems.

"It also gives us a very useful head start on creating engineers with the skills needed to help us be successful in the future."

The students' 2007 design project will be part of the lander that will carry astronauts from an orbiting space vehicle to the surface of the moon, Schneider said.

Current plans call for the first manned mission in a series intended to eventually establish a permanent manned base on the moon to lift off in 2014.

Source: Texas A&M University

Citation: Students Design System to Return Astronauts to Earth (2006, December 20) retrieved 20 April 2024 from <https://phys.org/news/2006-12-students-astronauts-earth.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.