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## **Opportunities within NASA's Exploration Systems Mission Directorate for Engineering Students and Faculty**

### **Abstract**

In 2006, NASA's Exploration Systems Mission Directorate (ESMD) launched two new Educational Projects: (1) The ESMD Space Grant Student Project ; and (2) The ESMD Space Grant Faculty Project.

The Student Project consists of three student opportunities: exploration-related internships at NASA Centers or with space-related industry, senior design projects, and system engineering paper competitions. The ESMD Space Grant Faculty Project consists of two faculty opportunities: (1) a summer faculty fellowship; and (2) funding to develop a senior design course.

### **Background Information**

The Student and Faculty Projects are directly tied to ESMD's critical research areas (Spacecraft, Propulsion, Lunar and Planetary Surface Systems, or Ground Operations) for the future of space exploration. The goal of the ESMD Student Project is to train and develop the highly skilled scientific, engineering, and technical workforce of the future needed to implement the Vision for Space Exploration. This project provides opportunities to involve a diverse group of students in substantive, hands-on, engineering experiences to prepare them for future careers in space. Systems engineering experience is a key aspect of all three projects.

During the summer of 2007 the ESMD SG Faculty Project resulted in an accumulation of a large number of ESMD Senior Design projects from ten NASA Centers; however, the faculty commented that to ensure long lasting benefits and maximize their efforts, careful attention should be provided to course development, testing, and distribution. In response to this finding, ESMD solicited a call for proposals to create an ESMD senior design course. In January of 2008, two universities were selected to design and pilot-test an ESMD design course. Faculty from each university will work closely with NASA researchers to develop the class. The course will span an academic year (approximately 32 weeks) and be developed in conjunction with a current ESMD-NASA researcher. The end product will be a "packaged" senior design course that can easily be incorporated into universities across the nation.

The Senior Design Course Development Project complements the current ESMD SG Faculty Fellowship by developing and pilot-testing a viable approach for successfully implementing a senior design course into higher educational institutions throughout the US. The 2008 summer faculty fellowship will fund ten faculty, each of which will be paired with one of the ten NASA centers, for 5 weeks to help gather senior design project ideas and internship opportunities relative to Exploration in support of the ESMD Space Grant Program. The 2008 ESMD Faculty cohorts will review each of the newly developed senior design courses, and provide feedback for improvements and implementation.

**Benefits**

Some of the benefits of these Project are: (1) It provides students and faculty the opportunity to participate in NASA's exploration activities that integrate all disciplines of Science, Technology, Engineering, and Mathematics; (2) The Project brings better awareness of current NASA research to new faculty who have never been previously associated or exposed to the NASA vision and mission; (3) It creates a better awareness of NASA requirements which may enable appropriate shifts in academic curriculum to increase the training and knowledge base of graduating students; and (4) Exposure to new and novel approaches to Space exploration will better prepare students for future demands for qualified engineers and scientists by the NASA workforce.

**Purpose of Presentation**

This PowerPoint presentation will give an overview of the ESMD student and faculty projects to date, and give information on how to apply for 2009.