

FAA Airport Design Competition for Universities

*Presentation to
National Council of Space Grant Directors
October 27, 2006*

Mary Sandy

FAA Competition Goals

- *Raise awareness of the importance of airports to the National Airspace System infrastructure.*
- **Increase the involvement of the academic community in addressing airport operations and infrastructure issues and needs.**
- **Engage U.S. students in the conceptualization of applications, systems and equipment capable of addressing related challenges in a robust, reliable and comprehensive manner.**
- *Encourage U.S. undergraduate and graduate students to contribute innovative ideas and solutions to airport and runway safety issues.*
- **Provide the framework and incentives for *quality educational experiences* for university students.**
- **Develop an awareness of and an interest in airports as a vital and interesting area for engineering and technology careers.**

FAA Competition Partners

- *The American Association of Airport Executives* is sponsoring the award ceremony and providing a forum for winner presentations as well as advice, expert links for teams, assistance in dissemination of the competition opportunity to its members, and participation in design reviews.
- *The Airport Consultants Council* is providing advice, expert links for teams, assistance in dissemination of the competition opportunity to its members and participation in design reviews.
- *The Airports Council International* is providing advice, expert links for teams, assistance in dissemination of the competition opportunity to its members and participation in design reviews.
- *The National Association of State Aviation Officials* is providing advice, expert links for teams, assistance in dissemination of the competition opportunity to its members, and participation in design reviews.

Competition Elements

- **Individuals or teams**
- **Undergraduates and Graduates eligible**
- **Multidisciplinary, multi-departmental or multi institutional teams an option**
- **Good vehicle for collaboration among institutions**
- **A worthwhile aeronautics project for design courses or independent study**
- **Allows for interdisciplinary approach and solutions**
- **Real world applications**

Connections with Airport Operators

- Linkage with an airport operator is required to obtain expert advice and ensure the viability of the proposed approach.
- VSGC can link proposers with airport operators and experts through FAA and Partner Organizations.

Competition Website

http://www.faa.gov/runwaysafety/design_Competition.htm

- Detailed Competition background and guidelines.
- Links to publications and resource documents in each of the broad challenge areas -- a starting point for students and faculty.
- Venue for submitting questions and required Notice of Intent to propose.
- Final proposals submitted electronically through the website.
- Will have detailed evaluation criteria later this summer.

FAA Competition Design Challenge Categories

- **Airport Operation and Maintenance**
- **Runway Safety/Runway Incursions**
- **Airport Environmental Interactions**

Airport Operation and Maintenance Challenges

Exploring new methods for design and maintenance of pavement surfaces. Ideas include but are not limited to:

- Methods for innovative pavement repair.**
- Innovative pavement materials, installation and maintenance techniques, including non-destructive evaluation methodologies.**
- Improved approaches to rubber removal/surface restoration due to aircraft tire friction.**
- New or improved techniques for ice removal from runways.**
- Improved methods for foreign object detection and removal from runway surfaces.**

Runway Safety/Runway Incursion Design Challenges

- A. Expanding situational awareness of pilots and ground operators on the airfield. Ideas include, but are not limited to:**
- **Direct warning systems to alert pilots that they are approaching a runway and if the runway is occupied.**
 - **Development of innovative techniques to record, analyze and display annotated spatial data for improved situational awareness of ground operations.**
- B. Enhancing Airport Visual Aids**
- **Improved lighting, marking, and signage for runways, taxiways and the airport apron.**
 - **Lighting other than traditional incandescent.**
 - **Providing surface navigation guidance to pilots in the cockpit via electronic alternatives in limited visibility conditions (in lieu of outside visual cues).**

Airport Environmental Interactions Design Challenges

- A. Making snow and ice removal more environmentally friendly. Both chemical and non-chemical options can be considered. The FAA is seeking designs that offer:**
- Improved means and methods of complying with aircraft and airfield anti- and de-icing requirements.**
 - Environmentally safe aircraft and airfield de-icing/anti-icing products that are compatible with both aircraft structures and airport pavements.**
 - Improved containment and cleanup of de-icing products.**

Airport Environmental Interactions Design Challenges

- B. Improving methods for containment and cleanup of fuel spills.**
 - **Bioremediation techniques for fuel spill cleanup.**
 - **Techniques/substances for neutralization of toxic components of fuel.**
 - **Techniques/substances that delay the biological and chemical breakdown of fuel, allowing cleanup to occur without causing rapid decreases in dissolved oxygen in receiving waters that result from biological and chemical degrading of the fuel.**
 - **Techniques for prevention of percolation of fuel into ground water.**

Airport Environmental Interactions Design Challenges

- C. Increasing energy efficiency in the management of airfields.
(This challenge specifically excludes consideration of terminal
and other airport buildings.) Topics that might be
considered include:**
- Alternative energy/energy efficient airport equipment such as tow vehicles, emergency generators, power units, heating systems, etc. for use in airfield areas.**
 - Alternate energy sources and approaches to providing lighting at remote airports that don't have access to electrical power.**

Awards

A cash award will be given to the student or student team members in each category as follows:

- **Airport Operations and Maintenance Design Award: First place - \$2,500; Second Place - \$1,500, Third Place - \$1,000.**
- **Runway Safety/Runway Incursions Design Award: First place - \$2,500; Second Place - \$1,500, Third Place - \$1,000.**
- **Environmental Interactions Design Award: First place - \$2,500; Second Place - \$1,500, Third Place - \$1,000.**

Team representatives for first place awards will be invited to accept their award and present their design at the American Association of Airport Executives Annual Conference and Exposition, June 10 – 13, 2007 in Washington, DC.

A travel allowance of up to \$2,000 per award will be provided for two individuals (two students or one faculty advisor and one student) from each award winning team.

Notices of Intent

October 23, 2006

Institution	Discipline	Design Challenge
St. Cloud State University, MN	Aviation	Runway Safety/Runway Incursions
St. Cloud State University, MN	Aviation	Airport Operation and Maintenance
St. Cloud State University, MN	Aviation	Airport Environment Interactions
University of Alaska, Anchorage, AK	Aviation & Technology	Runway Safety/Runway Incursions
Florida Institute of Technology, FL	Aeronautics	Airport Environment Interactions
Florida Institute of Technology, FL	Aeronautics	Runway Safety/Runway Incursions
Bridgewater State College, MA	Aviation	Airport Operation and Maintenance
San Jose State University, CA	Aviation & Technology	Airport Operation and Maintenance
University of Virginia, VA	Systems Engineering	Runway Safety/Runway Incursions
University of Minnesota Duluth, MN	Mechanical & Industrial	Runway Safety/Runway Incursions
George Mason University, VA	Psychology	Runway Safety/Runway Incursions
University of Alabama Birmingham, AL	Civil Engineering	Airport Environment Interactions
Middle Tennessee State University, TN	Aerospace	Runway Safety/Runway Incursions
Rose-Hulman Institute of Tech, IN	Civil Engineering	Runway Safety/Runway Incursions
Mt. San Antonio College, CA	Aeronautics	Airport Operation and Maintenance
George Mason University, VA	Systems Engineering	Runway Safety/Runway Incursions
Virginia Tech, VA	Civil Engineering	Runway Safety/Runway Incursions
Wright State University, OH	Psychology	Runway Safety/Runway Incursions
Embry-Riddle Aeronautical University, FL	Aeronautics	Airport Environment Interactions
Michigan Technological University, MI	Electrical Engineering	Runway Safety/Runway Incursions

Getting The Word Out

- Council on Aviation Accreditation
- University Aviation Association
- **Space Grant Network! Thank you!**
- Professional Societies(such as IEEE, NSPE, NSCE, AIAA)
- Broad dissemination to University and FAA key contacts

FAA University Design Competition for Airports

Key Dates

- Competition Announcement – April 2006
- Notice of Intent required and anticipated prior to start of design process. Summer semester deadline is June 15, 2006. Fall semester deadline was September 18, 2006. **Note: NOI's involving fall work will still be accepted through the Spring semester deadline is January 29, 2007.**
- Design submittal deadline is 5 p.m. Eastern Daylight Time, April 20, 2007.
- Winners will be announced by May 15, 2007.
- Award Ceremony and Presentations – June 10 – 13, 2007. Exact date(s) within this time frame to be determined.
- Competition web site:
http://www.faa.gov/runwaysafety/design_Competition.htm



Known Space Grant/FAA Interactions

- An informal survey indicated many Space Grants are interfacing with FAA for balloon and sounding rocket projects.
- Vermont Space Grant has undertaken educational projects with FAA.
- Virginia Space Grant has partnered with FAA for General Aviation Design Competition and FAA University Design Competition for Airports.
- Oregon Space Grant has Lane Aviation Academy as a member. They work with FAA for Human Factors training.
- Plenty of room to build interactions!

Potential for Collaboration

Leveraging of Resources and Opportunities

- FAA career materials and resources can be made available to Space Grants and vice versa
- Potential for collaboration on FAA summer student camps
- FAA could provide portions of Space Grant teacher workshops/institutes and vice versa
- FAA could participate in career days and public outreach programs and vice versa
- Build higher ed collaboration beyond FAA University Design Competition for Airports

Potential for Collaboration (2)

Relationship Building

1. Shelia Bauer presents at October National Council of Space Grant Directors Meeting
 - Directors learn what FAA does in education.
 - Directors learn what kinds of activities State Space Grant consortia are already doing with FAA.
 - Suggest ideas for collaboration.
 - Make connection to Space Grant Aero Working Group.

Potential for Collaboration (3)

2. Building Regional Collaboration

- FAA Regional Coordinators connect with Space Grant Directors in their regions to explore potential for collaboration. Relationships first. Potential to leverage.
- Direct contact/meetings following Shelia's presentation.
- Participation in Regional Space Grant meetings.

3. Potential for collaboration with national Space Grant Network as a whole. VSGC can provide link.