NewsRelease

National Aeronautics and
Space Administration

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Embargoed For Release Until:
July 29, 2000

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RELEASE NO. 00-060

NASA and FAA announce design competition winners

Oshkosh, Wis. NASA and the FAA today recognized teams of university students for their innovative designs by announcing the winners of the 1999-2000 National General Aviation Design Competition. Five awards to winning university teams were presented at a ceremony held at AirVenture 2000, the Experimental Aircraft Association's Annual Convention and Fly-In at Oshkosh, Wis.

Now in its sixth year, the competition calls for individuals or teams of undergraduate and graduate students from U.S. engineering schools to participate in a major national effort to rebuild the U.S. general aviation sector. For the purpose of the contest, general aviation aircraft are defined as single or twin engine (turbine or piston), single-pilot, fixed-wing aircraft for 2 - 6 passengers. The competition seeks to raise student awareness of the importance of general aviation by having the student address design challenges for a small aircraft transportation system. NASA and the FAA hope to stimulate breakthroughs in technology and their application in the general aviation marketplace.

In addition to cash prizes, the teams also have the opportunity to present NASA Technical Forums at AirVenture.

The first place award was presented to a 28-student team from Virginia Tech, Blacksburg, Va. and its collaborating partner -- Loughborough University, Leicestershire, United Kingdom. The award provides a total of $3,000 to Virginia Tech's design team members and a $5,000 award to Virginia Tech's Department of Aerospace and Ocean Engineering.

The team, which dubbed its design *Pegasus*, undertook the challenge of designing an aircraft that would be "roadable" -- capable of both ground and air travel. The ability to switch from aircraft to car-like operation allows such a vehicle to effectively utilize small airports, while offering true door-to-door service. The team recognized that the cost to actually produce such an aircraft would exceed today's typical general aviation aircraft cost; however, the students believed the additional cost should readily be offset by the convenience of not having to have a car for ground transportation.

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Designing an air/ground vehicle presented unique problems. The students recognized that design tradeoffs were needed in order to obtain good performance in the air and adequate performance on the road, since road use was anticipated to be occasional. The team had to meet safety and operational regulations for both aircraft and automobiles. For one thing, the wing had to be folded, retracted or otherwise stored for road use. The need for a large wing area for flight, a small span for highway use, and low lift in car mode was addressed by the use of a telescoping wing.

Dr. James Marchman, Virginia Tech and Dr. Gary Page, Loughborough University, were the team's faculty advisors. Financial support from Virginia Tech's College of Engineering and The Boeing Company permitted the inclusion of students from Loughborough University, a major British research institution, as international collaborators in the design. The faculty advisors and student team members found that the international and interdisciplinary team design approach added great value to the educational experience and mirrored the kind of international partnerships typical in today's global marketplace.

Second place honors went to a seven-student team from Purdue University, West Lafayette, IN, for the *Silairus 490*, a six-passenger, high-performance piston engine aircraft with an Air Cushion Landing System (ACLS) in lieu of traditional landing gear. The design offers the capability of surface independent takeoff and landing, permitting the vehicle to access off-airways communities thus shortening door-to-door travel time. The *Silairus 490* features a high-tech, electronically data-linked cockpit with a comfortable cabin that is adaptable for many client applications. Dr. William A. Crossley was the faculty advisor. The second place award provides a $2000 prize to the student team.

The Purdue team also won the **Best Use of Air-Force-Developed Technology award** for its incorporation of the ACLS developed by the United States Air Force. For this award, the team will share a $3,000 prize from the Air Force.

Third place was awarded to Pennsylvania State University, University Park, Pa. The team's design, called *Alnighter*, is a modern, composite general aviation aircraft. The six-place, single-engine, propeller-driven vehicle has a conventional layout. It features sophisticated aerodynamics and advanced systems and avionics. The team's faculty advisor was Dr. Barnes McCormick. For third place, the ten-student team will share a $1,000 prize. Penn State has the distinction of winning a place award in each year of the competition.

The Best Retrofit Design Award was presented to a four-student, University of Oklahoma, Norman, Okla., team for development of an innovative, multi-mode tuned exhaust system that offers noise reduction while improving the airplane's performance. The design was undertaken as a part of a larger aircraft design project to show how older aircraft can be retrofitted with more modern technologies for increased performance and safety. The work was done under the supervision of Dr. Karl Bergey, the student's faculty advisor. A $500 award was presented to the student team by the award's sponsor -- the AOPA (Aircraft Owners and Pilots Association) Air Safety Foundation.

The competition is managed for NASA and the FAA by the Virginia Space Grant Consortium. Guidelines will soon be available for the seventh annual competition to be held during the 2000-2001 academic year. Individual or team submissions as well as designs ranging from components and subsystems to complete aircraft designs are encouraged. Guidelines can be requested at 757/865-0726 or msandy@odu.edu.

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Note: Electronic images to illustrate this story are available by contacting Keith Henry at h.k.henry@larc.nasa.gov.