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Dear fellow General Aviation community member,

I want to introduce you to PEGASAS, the Partnership to Enhance General Aviation Safety, Accessibility and Sustainability, the six core university consortium that is the Federal Aviation Administration’s Center of Excellence for General Aviation. As the following pages describe, our team has great strength in aviation and engineering with a broad spectrum of facilities, equipment, research interest and expertise well suited to General Aviation (GA) research. Affiliate universities provide PEGASAS with geographic diversity, specialized expertise, and additional capacity as we support the FAA’s GA research needs. Industry and organizational partners interact with PEGASAS in a variety of roles, and we continue to add new partners.

As we developed our Center of Excellence proposal, we agreed upon three themes. Safety drives us to mitigate the risk facing general aviation pilots, passengers, and property. We strive for accessibility across general aviation from light sport aircraft to fully equipped business jets. Sustainability allows GA to serve future stakeholders, encompassing environmental, economic, and educational concerns. From these, the PEGASAS name emerged.

From our selection through FY 2013, PEGASAS embarked on trips to the FAA Tech Center, FAA Headquarters, and the Small Airplane Directorate, and we hosted FAA researchers and leadership at our universities. PEGASAS researchers participated in the General Aviation Joint Steering Committee, with roles on the Safety Analysis Team and in the Loss of Control Working Group. From these interactions, PEGASAS developed research proposals to satisfy FAA-generated requirements. As Fiscal Year 2013 ended, our efforts led to three awards: “Heated Airport Pavements”, “Rotorcraft ASIAS (Aviation Safety Information Analysis and Sharing)” and “Angle of Attack Systems in General Aviation Aircraft”. These projects involve close cooperation with our FAA counterparts and include researchers from multiple PEGASAS universities. Descriptions of these appear later in this report.

As we prepare this year’s report, PEGASAS is developing more proposals. These proposals address flight data monitoring and analysis, pilot training, Weather Technology in the Cockpit (WTIC), general aviation fuels, airport lighting, tracking aircraft runway centerline deviation, airport pavement marking, and human factors concerns for GA. We look forward to reporting on progress on these new research efforts in next year’s annual report. PEGASAS has a web presence at www.pegasas.aero that provides a means for us to share our activities and progress in our current and future efforts.

We are proud that the FAA selected PEGASAS as the Center of Excellence for General Aviation, and we are excited to be supporting the FAA with research to “Enhance the Safety, Accessibility and Sustainability” of general aviation.

Regards,

William A. Crossley
PEGASAS Mission

The mission of PEGASAS is to enhance general aviation safety, accessibility, and sustainability by partnering the FAA with a national network of world-class researchers, educators, and industry leaders.

Value of PEGASAS

PEGASAS is comprised of world-renowned universities and institutes with top-tier aviation programs as well as highly respected schools of engineering, science, and policy. PEGASAS has the unique ability to recruit and engage students and faculty that may not yet be directly involved in the general aviation arena but are top in their respective core fields with interests applicable to aviation.

Three of the six core members own and operate their own airports (Purdue, Ohio State and Texas A&M). Other PEGASAS members have well-established relationships with their community airports where they maintain facilities and aircraft.

Research Areas

- Flight Safety
- Communication, Navigation, Surveillance
- Human Factors
- Weather
- Airport Technology
- Propulsion and Structures
- Continued Airworthiness
- System Safety Management
- Other Research Areas
COE Universities

CORE UNIVERSITIES
- Purdue University
- Ohio State University
- Georgia Institute of Technology
- Iowa State University
- Florida Institute of Technology
- Texas A&M University

AFFILIATE UNIVERSITIES
- Arizona State
- Florida A&M
- Hampton
- Kent State
- North Carolina A&T
- Oklahoma State
- Southern Illinois University, Carbondale
- Tufts
- University of Minnesota, Duluth
- Western Michigan
# Industry and Organizational Partners

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<thead>
<tr>
<th>Category</th>
<th>Partner</th>
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<tr>
<td><strong>Industry</strong></td>
<td></td>
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<tr>
<td>Airframe</td>
<td>Cessna, Cirrus, Embraer, Gulfstream, Piper</td>
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<tr>
<td>Propulsion</td>
<td>GE Aviation, Rolls-Royce</td>
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<tr>
<td>Operators</td>
<td>Jet Aviva, NetJets</td>
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<tr>
<td>Aircraft / Aviation Systems</td>
<td>Avidyne, CAPACG, Guardian Mobility, Harris Corporation, Raytheon, Rockwell Collins, Woolpert</td>
</tr>
<tr>
<td><strong>Airports</strong></td>
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<tr>
<td></td>
<td>Columbus Regional Airports, South Bend Airport, Fort Wayne Airport</td>
</tr>
<tr>
<td><strong>Government Agencies</strong></td>
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<tr>
<td></td>
<td>Departments of Transportation in Florida, Georgia, Indiana and Iowa; NASA Flight Deck Display Research Laboratory</td>
</tr>
<tr>
<td><strong>Stakeholder Organizations</strong></td>
<td>GAMA, Take Flight Solutions, National Business Aviation Association, National Intercollegiate Flying Association, Ohio Aerospace Institute</td>
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<table>
<thead>
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<th>Position</th>
<th>Institution</th>
<th>Email</th>
</tr>
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<tbody>
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During Fiscal Year 2013, three research projects were awarded. These projects involved five of the six core universities and resulted in a total of eight grants. Purdue University, as the PEGASAS administrative lead, also received a grant for managing the Center of Excellence.

The three projects are:
- Project 1—Heated Airport Pavements
- Project 2—Rotorcraft ASIAS
- Project 3—Angle of Attack Systems in General Aviation

Following the language of the legislation that initiated the FAA Centers of Excellence, PEGASAS efforts must provide a 1:1 matching; so, for every dollar of FAA support, one dollar of non-federal funds provide cost share.

The sources for this cost share include our industry partners and the universities themselves.
PEGASAS Projects

Project #1—Heated Airport Pavements
Core Universities: Iowa State University and Purdue University
FAA Technical Contact: Don Barbagallo
PEGASAS Technical Contact: Halil Ceylan (Iowa State)

Lead at each Core University:
Halil Ceylan—Iowa State
Jason Weiss—Purdue University

Project #2—Rotorcraft ASIAS
Core Universities: Georgia Tech, Purdue University and Florida Institute of Technology
FAA Technical Contact: Charles (Cliff) Johnson
PEGASAS Technical Contact: Hernando Jimenez (GA Tech)

Lead at each Core University:
Hernando Jimenez—Georgia Tech
Karen Marais—Purdue University
Steve Cusick—Florida Institute of Technology

Project #3—Angle of Attack Equipment
Core Universities: Purdue University, Ohio State University and Florida Institute of Technology
FAA Technical Contact: Michael Vu
PEGASAS Technical Contact: Brian Dillman (Purdue)

Lead at each Core University:
Brian Dillman—Purdue University
Shawn Pruchnicki—Ohio State University
Project 1: Heated Airport Pavements

Lead Investigators: Halil Ceylan (Iowa State University) and Jason Weiss (Purdue University)

Maintaining operational safety and status of airport runways during snowfall events is a challenging issue that many airports are grappling with. The surface traction of pavement is dramatically influenced by frozen precipitation in the form of ice, snow, or slush. This can seriously hamper smooth air traffic management operations and cause traffic delays at other airports. It is imperative that both small and large airports maintain operational status during snowfall events to support the existing operations.

Over the past decade, a number of national and international research studies have investigated the use of alternative energy for anti-icing, deicing, and snow removal from bridge decks and highway pavements. Reportedly some efforts have been investigated using geothermal hydraulic and battery based electrical systems with limited success. The Federal Aviation Administration (FAA) has expressed an interest in investigating the concept of heating pavements at airports to assist with snow and ice removal, recognizing the limitations of current practice and research on heated pavement technology.

In this project we propose a three-pronged approach to investigate the efficacy and cost effectiveness of new heated pavement technologies. We propose to investigate:

1. The relative energy and monetary needs to remove snow from a slab by conducting energy and financial viability analyses under Task 1-A “Energy and Financial Viability”.
3. The application of phase change materials (PCM) with the intent of preventing ice and slush formation are included under Task 1-C “Investigating the Potential to Use Phase Change Materials (PCM) to Store Heat in Concrete Pavement Thereby Reducing the Need for Anti-Icing”.

These three tasks will run in parallel.

The expected benefits of the project are:

- A better understanding of the relative costs of installing and running heated pavement systems with respect to the current systems, along with benefits to worker safety and operating efficiency to the airport,
- An approach to decision making regarding whether or not to install such a system, and selection of the systems that may be beneficial,
- Improved operational efficiency at airports, reduced costs and impacts of snow and ice removal,
- Expedited and efficient snow and ice removal operations that can reduce traffic delays, especially at large airports,
- An approach by not possessing any environmental concerns like the contamination of nearby bodies of water and foreign object debris/damage (FOD) to aircraft engines,
- Reduction of downtime required to clear ice and snow,
- Improve safety for ground crews servicing the aircraft at the gate area, improve safety of passengers embarking/disembarking the aircraft.

The overall impacts of this research will make winter air travel faster, more affordable, more accessible, more sustainable and safer for all parties involved.

Start Date: August 2013
End Date for Task 1-A: November 2014
End Date for Task 1-B: August 2015
End Date for Task 1-C: August 2015
Flight Data Monitoring (FDM) is the systematic collection and analysis of digital flight data from routine operations for proactive aviation safety improvements. FDM is realized as a voluntary safety program by an operator to assist in the identification and quantification of safety hazards, and in the assessment and implementation of corrective actions to mitigate operational risks. FDM is of key interest for rotorcraft because safety figures, while showing improvement over recent years, are not yet at an acceptable level. In addition, rotorcraft FDM practice stands to gain significantly from lessons learned in the broad implementation within the global fixed wing aircraft fleet. In the United States FDM efforts by individual airlines have been integrated into a larger information-sharing program, the Aviation Safety Information Analysis and Sharing (ASIAS) System initiated by the FAA in 2007. A centralized database of rotorcraft FDM data with accompanying analytical capabilities for safety research by the FAA and other stakeholders would be of immense value to the rotorcraft community but currently does not exist. This project seeks to enable the creation of such a resource, inspired and modeled in great part after ASIAS, and named accordingly. To do so, the project will examine the current state of the art in rotorcraft FDM practice, products, and services, implement a system for rotorcraft flight data collection and analysis, and enable improvements in FDM practice supported by data analysis and engagement with subject matter experts. More specifically, the research objectives of this project are:

- To benchmark the current state of the art of rotorcraft FDM practice, products, and services as a voluntary mechanism for safety
- To enable the procurement of an integrated rotorcraft FDM database and data analysis capability, secure the collection of rotorcraft FDM data for analysis, and establish connectivity and access to this resource for participating research parties, rotorcraft operators, and the FAA
- To review the current events, parameters, and corresponding exceedances and recording rates of rotorcraft FDM systems, identify additional ones wherever needed, and synthesize a recommended minimum standard FDM list vetted by stakeholders
- To disseminate results of this investigation and promote the adoption and utilization of FDM as a means for improving rotorcraft safety

The research team for this project is comprised of faculty and graduate students from three PEGASAS institutions: Georgia Institute of Technology, Purdue University, and Florida Institute of Technology. In addition, the team is joined by FDM service provider CAE Flightscape as an industry partner, and by the University of North Dakota. Research efforts for Rotorcraft ASIAS began in September 2013 and will continue through the end of July 2014 for its first year.
**Project 3: Angle of Attack Equipment in General Aviation Operations**

Lead Investigators: Brian Dillman (Purdue), Shawn Pruchnicki (Ohio State), & Dennis Wilt (Florida Institute of Technology)

Angle of attack (AOA) displays may reduce general aviation accident rates by providing a more comprehensive picture to the pilot concerning the flight dynamics surrounding the aircraft and better equip the pilot to make informed decisions for necessary control inputs.

Although angle of attack displays have been available for several years, little formal research has been done to quantitatively assess their benefit for general aviation operations – particularly for single-engine, single-pilot operations. Following its reestablishment in January 2011, the General Aviation Joint Steering Committee (GAJSC) formed the Loss of Control Working Group (LOCWG) to identify safety enhancements to assist in the mitigation of Loss of Control accidents. AOA was one of the twenty-three enhancements selected for further study.

In September 2013, the PEGASAS team was selected to investigate the use of Angle of Attack (AOA) displays and their impact on stabilized approaches. This research project seeks to determine the statistical significance of the impact of AOA displays on stabilized approaches and to assess the ideal methodology for incorporation and adoption into the operating environment.

The expected outcomes of the project are:

- **Analysis of Best Practices and Development of Educational Materials**
  - Evaluate best practices and develop materials for utilization of Angle of Attack displays during stabilized approaches.

- **Attitude awareness enhancement**
  - Evaluate the relationship between angle of attack and the potential for precision approach paths during the approach and landing phases.

- **Stabilized Approach Analysis**
  - Perform a comprehensive analysis of the differences in the degree of stabilization between individuals with varying access to AOA displays and AOA education.

- **Cost / Benefit / Risks**
  - The FAA does not require AOA displays; therefore, individuals may choose whether to install and use them. The team will perform a detailed analysis of the return on investment for the enhancement of safety to help pilots and owners determine whether to invest in the equipment.

**Start Date:** September 2013  
**AOA Display Installation:** December 2013  
**Beginning of Data Collection:** February 2014  
**End Date:** September 2014

For this project, the PEGASAS team has been engaged with several partners and stakeholders, including Avidyne, who have provided discussion and input. Additionally, CAPACG, Alpha Systems, Safe Flight, and Wilt Aviation Consulting are supporting the effort through matching contributions.
Purdue University offers several paths to aviation-related graduate degrees, primarily through the College of Engineering or the College of Technology. All of the schools and departments within Purdue's College of Engineering are accredited by the Accreditation Board for Engineering and Technology (ABET) for their undergraduate programs and by the North Central Association Commission on Accreditation and School Improvement for their graduate programs. Purdue’s undergraduate and graduate programs are both ranked sixth in the aerospace engineering programs in the nation by U.S. News and World Report. Purdue’s Aviation Management and Professional Flight programs offered through the Department of Aviation Technology are both accredited by the Aviation Accreditation Board, International. The Aeronautical Engineering Technology program is accredited by Engineering Technology Accreditation Commission of ABET. The graduate program in aviation and aerospace management has recently added a concentration in aviation sustainability. Currently the second busiest airport in Indiana, the Purdue Airport (LAF) has two runways and an FAA tower. In 1930, LAF was the first university owned and operated airport in the country.

Representative of Laboratory, Test and Evaluation Facilities for PEGASAS Research

Zucrow Laboratories – Fuel thermal management, fuel/air heat exchangers, endothermic fuels, and supercritical fuel injection are current areas of emphasis for traditional aircraft markets.

National Test Facility for Fuels and Propulsion (NaTeF) – Turbine and reciprocating engine test cells and materials laboratory for engine and aircraft components that provide data related to fuel compatibility, gaseous and particulate emissions, and sustainability assessment.

Pankow Materials Laboratory. - Evaluation and development of infrastructure materials exposed to mechanical and environmental loading. The laboratory is dedicated to evaluating the service life of materials that can be used in runways, taxi areas and hangars.

The Aerospace Sciences Laboratory (ASL) – Includes four wind tunnels used for aerodynamics research on topics spanning low-speed flows to hypersonic boundary layer transition.

AirTIES Research Center – The Air Transport Institute for Environmental Sustainability is a Purdue University Center which supports the multi-disciplinary effort at Purdue and across the aerospace industry to develop, test, and implement new sustainable aviation fuels.

The Control Systems Laboratory – Designed to enhance student awareness of control systems by providing hands-on experience using dynamic systems representative of air and space vehicles.

Aviation Technology Operations Center - Collects and analyzes operations, air traffic and maintenance data to proactively improve engine health, fuel consumption, and safety.

Hangar of the Future – Designs human-friendly, visually intuitive and contextually relevant technical data delivery systems, delivered on-demand to the point of maintenance or assembly.

Safety Management Systems (SMS) Program – Collects and studies potential airport related hazards via internet, email, and safety boxes under a confidential structure.
PEGASAS activities associated with The Ohio State University is a collaborative effort among multiple departments with the university’s College of Engineering.

Ohio State's College of Engineering and Knowlton School of Architecture strive to foster a learning culture that prepares students to be key contributors to society through their technological, professional and personal skills. Our faculty and our students thrive in an environment of new ideas and concepts that expand the understanding of science, engineering and architecture.

In addition to being an innovative leader in engineering and architecture education, the college endeavors to fulfill the university's land-grant mission of advancing Ohio's economic mobility, competitiveness and standard of living through our contributions toward technology and creativity, continuous improvement, a diverse workforce and lifelong learning. The College also is firmly committed to and a catalyst for the University's Discovery Themes: Energy and Environment; Food Production and Security; and Health and Wellness.

Housed within The Ohio State University College of Engineering, The Center for Aviation Studies is the university home for education, research and outreach in aviation. Committed to advancing the future of aviation, the center focuses on training the best pilots and aviation managers, utilizing the latest aviation technologies, developing cutting-edge research, and creating new business models and policies.

The Center for Aviation Studies offers both Bachelor of Science and Bachelor of Arts degrees in Aviation, with specialties in Aviation Management and Air Transportation. An Aviation Minor is also available. Depending on the student’s interests, degrees can be earned through one of three colleges: The College of Engineering, The College of Arts & Sciences, and The Fisher College of Business.

The Ohio State University offers Flight Education through degree and non-degree options. Academic students may pursue their flight training as part of their coursework in the Professional Pilot Specialization, or can take advantage of their programs electives by taking the flight laboratories. Ohio State offers its flight training under an FAA approved Part 141 curriculum. This curriculum provides the students with a structured syllabus to learn from, and allows for monitoring of progress through each course.

The PEGASAS Site Director for The Ohio State University is Dr. Seth Young. Dr. Young is on the faculty of the OSU College of Engineering as the John McConnell Chair of Aviation and Associate Professor in the Department of Civil, Environmental, and Geodetic Engineering with a courtesy appointment in the Knowlton School of Architecture’s Department of City and Regional Planning. Dr. Young has been with Ohio State since 2008.
The Georgia Institute of Technology is one of the nation's top research universities offering undergraduate and graduate degrees in engineering, sciences, computing, business, architecture, and liberal arts. The College of Engineering has a long tradition of scholastic and research excellence, with its schools consistently recognized among the best in the nation and worldwide. In recent years all engineering schools have ranked in the top 5, with the School of Aerospace Engineering ranked #2 (US News and World Report). Georgia Tech is the largest producer of engineering degrees awarded to women and underrepresented minority students according the ASEE. Through its faculty and students at the School of Aerospace Engineering, Georgia Tech continues to support the FAA with meaningful research efforts and strong collaborative relationships.

Representative Laboratories and Research Facilities at Georgia Tech for PEGASAS Research

The **Aerospace Systems Design Laboratory** (ASDL) addresses a broad research portfolio in civil aviation, propulsion and energy, defense and space, advanced concepts, and systems engineering, by developing and implementing methods for systems analysis and design in a multi-disciplinary context. It is home of the Collaborative Design Environment, Collaborative Visualization Environment, and computational resources that include a processor cluster and terabyte storage.

The **Georgia Tech Advanced Structures and Structural Diagnostics Laboratory** brings together a number of facilities for structural testing and research, including the Aerospace Computational Solid Mechanics Laboratory, the Vibration and Wave Propagation Laboratory with state-of-the-art ultrasonic and vibration testing equipment, and the Structural Testing and Characterization Laboratory featuring servo-hydraulic combined loading fatigue and various non-destructive inspection capabilities.

The **Experimental Aerodynamics Group** operates a number of facilities including the 7'x9' John J. Harper Wind Tunnel, 9' Hover Facility, 16' Aeroelastic Rotor Test Chamber, and the Low Speed Aero-Controls Tunnel.

The **Aerospace Engineering Combustion and Fluid Mechanics Laboratory** is a state of the art research facility using the latest diagnostic tools for the study of combustion and fluid mechanical phenomena ranging from micro-combustion to experiments as large as 25 MBtu/hour.

The **Georgia Tech ASDL Unmanned Air Vehicle Shop** supports the design, manufacture and testing of small unmanned vehicles that can be used for GA equipment testing, leveraging on multiple propeller test stands, wood metal and composite construction, and telemetry equipment.

The **Georgia Tech UAV Research Facility** (UAVRF) performs advanced Unmanned Aerial Vehicle Technologies research, including flight testing with a variety of airplane and helicopter research vehicles.

The **Collaborative Design Environment (CoDE)** is a dedicated facility enabling the analysis and conceptual design of complex systems that foster multidisciplinary collaboration by collocating subject matter experts, hardware technologies, and relevant software tools. The CoDE features a Reality System with stereoscopic capabilities on a 10’ by 29’ screen, and is linked to a 256-processor cluster.

The **Collaborative Visualization Environment (CoVE)** provides engineers with the capability to present detailed and complex analysis results on a very large visualization real estate, enabling a rich and interactive visualization experience of technical results with unified 10’ by 18’ display.

The **Cognitive Engineering Center (CEC)** provides a wide range of facilities and equipment to enable both fast-time and as human-in-the-loop (HITL) simulation via the a reconfigurable flight simulator as well as detailed measurement instruments for the metrics of human-automation interaction and error.
The College of Aeronautics mission is to prepare students for success and advancement in the aviation professions; advance aviation knowledge through faculty and student research, scholarly activity and projects; and encourage and enable student and faculty service to the university, community and aviation professions. The seven baccalaureate degree programs of the College of Aeronautics include aeronautical science, aviation management and aviation meteorology, each with flight and non-flight options, and aviation computer science. The aeronautical science, aviation computer science and aviation management programs are fully accredited by the Aviation Accreditation Board International (AABI). The college offers a Master of Science in Aviation (MSA) with options in airport development and management, applied aviation safety and aviation safety (online); a Master of Science with options in aviation human factors and human factors in aeronautics (online) and a PhD in Aviation Sciences.

Florida Tech recently received its letter of authorization from the FAA stating all future graduates and graduates from the past five years in all three flight degree programs are eligible for the restricted ATP. This special authorization by the FAA grants Florida Tech the opportunity for its aviation management with flight and aeronautical science with flight graduates to apply for an ATP certificate upon reaching 1,000 flight hours and be eligible to work for commercial airlines sooner. These two programs represent 92 percent of all College of Aeronautics flight students.

<table>
<thead>
<tr>
<th>FIT College of Aeronautics Modern Aircraft Flight Training Fleet</th>
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<tbody>
<tr>
<td>25 Piper Warrior III single engine aircraft</td>
</tr>
<tr>
<td>8 Piper Archer TX new single engine aircraft</td>
</tr>
<tr>
<td>6 Piper Seminole multi-engine aircraft</td>
</tr>
<tr>
<td>2 Cessna 172 single engine aircraft</td>
</tr>
<tr>
<td>2 Piper Arrow single engine aircraft</td>
</tr>
<tr>
<td>1 Aurora Citabria for Acrobatic training</td>
</tr>
</tbody>
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Representative Laboratories and Research Centers

**Harris Institute for Assured Information** – This Institute promotes interdisciplinary approaches to computer security and trustworthy computing through education, research and outreach by providing a single point of contact for students, faculty, funding agencies and businesses, and by crossing traditional academic disciplines to promote innovation.

**FAA Center of Excellence for Commercial Space Transportation** – The center is a partnership of academia, government and private industry addressing the current and future challenges for commercial space transportation. The center encompasses four primary research areas: (1) space traffic management and operations; (2) space transportation operations, technologies and payloads; (3) human spaceflight; and (4) space transportation industry promotion.
Iowa State University offers several paths to aerospace- and airport-related graduate degrees through the College of Engineering. The college is dedicated to the education of tomorrow's engineers and conducting research that addresses today’s greatest challenges. All of the college’s departments are accredited by the Accreditation Board for Engineering and Technology (ABET) for their undergraduate programs. The undergraduate program is ranked twentieth in the nation and the aerospace and civil engineering graduate programs are ranked twenty-sixth and thirty-second, respectively, by U.S. News and World Report.

The Center for Non-Destructive Evaluation at Iowa State has a long history of working with industry to provide cost-effective tools and solutions which address relevant problems for a variety of industrial sectors including commercial and military aviation. Iowa State is also home to the US DoE Ames Laboratory whose key areas of expertise are materials design, synthesis and processing; analytical instrumentation design and development; materials characterization; catalysis; computational chemistry; condensed matter theory; and computational materials science and materials theory.

Representative Laboratory, Test and Evaluation Facilities at Iowa State

Integrated Testing/Simulation Laboratory for Ice Protection—Experimental diagnostics, modeling and simulation

Center for Non-Destructive Evaluation—Evaluation of aging and composite aircraft structures and engines, health monitoring of airport pavement systems

Engine & Fuel Characterization Laboratories—Experimental diagnostics, combustion stability, fundamental spray combustion diagnostics; Numerical modeling, vaporization of complex fuel blend, fuel spray dynamics, detailed chemical kinetics, thermal stress

Virtual Reality Applications Center—An interdisciplinary research center focusing on the rapidly expanding interfaces between humans and computers; expertise in guided virtual training and mixed-reality stress inoculation

Institute for Transportation—The mission of InTrans is to develop and implement innovative methods, materials, and technologies for improving transportation efficiency, safety, and reliability, while improving the learning environment in transportation-related fields.

National Concrete Pavement Technology Center—Through its national partnerships, the Center is able to shorten the time it takes for scientific research to become day-to-day practice, getting new approaches and technologies into the hands of users more quickly and efficiently.

Hybrid Heated Pavement System

To design a hybrid heated airport pavement system that can keep airport pavement surface temperature above freezing during winter weather operations.
Texas A&M University is proud to be among the top Aerospace Engineering programs in the United States providing unique cutting-edge educational and research opportunities, including space exploration, national defense, air transportation, communications and sustainable energy. We currently enjoy an enrollment of nearly 700 undergraduate and 150 graduate students, with our undergraduate program ranked 7th and the graduate program 6th among public institutions by U.S. News and World Report. Our students are offered a modern curriculum that is balanced across the three principal disciplines of aerospace engineering: Aerodynamics and Propulsion, Dynamics and Control, and Materials and Structures. The undergraduate experience culminates with a capstone design, build and fly sequence, where, for the first time, our students choose between airplanes, helicopters, rockets and space missions. Our graduate students and post-doctoral scientists are offered an advanced curriculum, exposure to current events through an active seminar series, and state-of-the-art research supported by the externally funded research programs of our faculty. Research topics include manned and unmanned aircraft, satellites and constellations, aerospace sciences, propulsion and energy, robotics and sensing, rotorcraft, hypersonic vehicles, autonomous morphing vehicles, advanced materials and structures, plus many more.

Laboratory and Test Facilities

Aerospace Vehicle Systems Institute - works with academic institutions and industry to improve and to reduce the costs of complex subsystems in aerospace vehicle systems, architectures, tools and processes.

Flight Research Laboratory - uses research aircraft as the platform for multiplying the "reach" of both in situ and remote sensors. Flight experiments in the area of flow control; boundary-layer stability and transition to turbulence; laminar-turbulent transition.

Materials and Testing Lab - processing and evaluating high-temperature metal matrix composite (MMC) materials.

Oran W. Nicks Low Speed Wind Tunnel - closed-circuit, single-return tunnel, with a 7’ x 10’ rectangular test section in a two story building.

Propulsion lab - a fully instrumented and working gas turbine engine

Structural Dynamics Testing Lab - dynamic testing of components and assemblies.

Texas Institute for Intelligent Bio-Nano Materials and Structures - biotechnology, nanotechnology, biomaterials for aerospace vehicles.

Vehicle Systems & Control Laboratory – flight control, flight simulation, human machine interfaces, vehicle management systems

Wave Propagation Lab - nondestructive evaluation of adhesive joints, composites, thin coatings, multi-layered media and granular media.

An internal-balance test of a 6-ft wingspan jet model in the Texas A&M Low-Speed Wind Tunnel. Tests of this type can accommodate pitch between -15° and +90°, yaw between ±30° and any roll angle.
PEGASAS Annual Meeting at The Ohio State University: September 16-19, 2013

PEGASAS at EAA AirVenture, Oshkosh, WI, July, 2013