

PEGASAS - FAA Center of Excellence for General Aviation

Partnership to Enhance General Aviation Safety, Accessibility and Sustainability

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Quick Overview of PEGASAS







FAA Centers of Excellence

- Legislation from Congress allows the FAA to establish Centers of Excellence (COEs)
- "The Administrator of the FAA may make grants...",
 "Government's share of costs..."
 - Partnership between FAA and University consortiums that have a duration of 10 years
 - Provide a unique funding combination
 - Cooperative Agreements (grants)
 - Matching requirement (\$1 FAA : \$1 non federal)
 - Substantial involvement by FAA
 - IDIQ Contract (can be added by FAA Program Office)
- Once COE is awarded, the competition is over
 - Research team works with FAA to develop research project
- PEGASAS is one of six active FAA Centers of Excellence



PEGASAS membership



AFFILIATE UNIVERSITIES

Arizona State; Florida A&M; Hampton; Kent State; North Carolina A&T; Oklahoma State; Oregon State; Southern Illinois University, Carbondale; Tufts; University of Minnesota, Duluth; Western Michigan

35+ General Aviation Industry and Organizational Partners, represented by a 12-member Advisory Board



Partnership to Enhance General Aviation Safety, Accessibility, and Sustainability

- PEGASAS Themes
 - Safety
 - Clearly the most important theme of the Center of Excellence for General Aviation
 - Accessibility
 - Enable versatile and readily usable general aviation system access for corporate, fractional operators as well as operators of Light Sport Aircraft
 - Sustainability
 - Allow general aviation to serve the needs of future stakeholders
- FAA Administrator announced in Sep 2012; work began in Feb 2013
- FAA comes to PEGASAS with research requirements that involve general aviation issues
 - No Budget Line Item (BLI); no unsolicited proposals
 - Can work for any part of FAA via cooperative agreement
- PEGASAS can also work as a group for other research sponsors



PEGASAS Aircraft, Airports, Labs

- Core universities own nearly 90 aircraft
 - Many with glass cockpits, data recording
 - Turbine and IC; single and twin engine
 - Experimental aircraft available
 - Many affiliates have additional aircraft
- A broad spectrum of lab facilities
 - Flight training devices and simulators
 - Non-Destructive Evaluation (NDE)
 - Communication, navigation & surveillance
 - Human factors facilities
 - Pavement research labs
 - Engine test facilities
 - Fuels characterization and testing
 - Wind tunnels
 - Icing facilities
 - Many others...



- operate an airport
 Ohio State University (KOSU)
 - Purdue University (KLAF)
 - College Station / Easterwood Field (CLL)

Three PEGASAS core universities own and







PEGASAS Expertise and Capabilities

- Infrastructure
 - Transportation infrastructure design and monitoring
 - Health monitoring of infrastructure systems
- Data and analytics
 - Smart sensors, one-of-a-kind sensor
 - Large data collection and analytics
 - Machine learning
- Human factors
 - Human-machine interactions
 - Safety action programs
 - Social psychology and system design
 - Data-driven decision-making
- Safety and efficiency
 - Process optimization
 - Signal detection
 - Aviation accident analysis
- Training
 - Automation, simulations, virtual training
- Aircraft systems
 - Engine test, fuels, comms, navigation, surveillance, wind tunnels, etc.



Project 25: General Aviation 2030 – Exploratory Analysis

- PEGASAS team has generated a report which describes strategic general aviation research topics that can help the FAA and other GA stakeholders better prepare for general aviation issues in 2030
- Seven research areas
 - Airports & Infrastructure
 - Aspects of Connectivity
 - Automation & Autonomy
 - Future Airspace
 - Future Propulsion Systems
 - Passenger Safety and Crashworthiness
- Report based largely upon SME interviews
 - Clearly, not every GA issue addressed
 - Room for discussion about topic priorities
- PEGASAS team intends for report to generate additional discussion and effort to support future general aviation

http://www.tc.faa.gov/its/worldpac/techrpt/tc21-14.pdf

	DOT/FAA/TC-21/14	Partnership to Enhance General							
	Federal Aviation Administration	Aviation Safety, Accessibility, and							
	Aviation Research Division Atlantic City International Airport New Jersey 08405	Sustainability							
	THER AND BY COMMUN	Project 25: GENERAL AVIATION 2030—GA EXPLORATORY ANALYSIS							
		September 2020							
		Final Report							
		U.S. Department of Transportation Federal Aviation Administration							





Quick overview of PEGASAS status and current projects



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PEGASAS Research Awards as of 30 June 2021

- 34 numbered projects
 - Aviation Research Division
 - Airport Technology R&D Branch
 - Software & Systems Branch
 - Human Factors Branch
 - NextGen
 - Weather Technology in the Cockpit
 - Civil Aerospace Medical Institute
 - Flight Deck Human Factors
- \$22.6 million FAA funds awarded for research, prototypes and services
 - \$19.0 million via cooperative agreement
 - \$3.6 million via IDIQ contract
- Additional \$17.8 million matching committed from non-federal sources





• PEGASAS has received about \$3M per FY, until FY 18

FY 15		FY 16		FY 17		FY 18		FY 19		FY 2020		FY 2021 to date	
\$	3,092,624	\$	3,697,891	\$	3,267,686	\$	315,964	\$	1,949,179	\$	3,267,093	\$	539,437

- Table shows year and amount of grant award, not expenditure
- Department of Transportation approval process for all FAA COE project proposals (and all other FAA research awards) introduced for FY 18
 - Multiple approval steps at FAA Tech Center and at Department of Transportation
 - Added months to timeline from PEGASAS proposal idea to award
 - PEGASAS adjusted to process, but not back at previous level of effort with FAA; far fewer active projects – no current projects with Airport Technology R&D



PEGASAS Projects

- Currently active projects
 - Project 1: Heated Airport Pavement
 - Project 2: Rotorcraft ASIAS (Aviation Safety Information Analysis and Sharing)
 - Project 5: Safety Analysis for General Aviation
 - Project 32: Rotorcraft Wire Strike
 - Project 33: WTIC Augmented Weather Interfaces Project
 - Project 34: WTIC Helicopter Operations Weather Information
- Short summaries of all projects, not just the active projects, at https://pegasas.aero



The "Life Story" of a PEGASAS Project (Aviation Rumble Strips)







The Life Story of a PEGASAS Project

- Project 8: Aviation Rumble Strips (May 2014 to June 2017)
- Topic to FAA research project manager from FAA Sponsor
 - Sponsor asks Runway Visual Guidance Program to investigate rumble strips at airports as additional alerting for pilots, perhaps at hot spots
 - FAA needs feasibility study



- FAA researcher coordination with
 PEGASAS program manager
 - Short project description
 - FAA Program Manager sends to PEGASAS director, who distributes to site directors
- PEGASAS capability and resources
 - Three university-owned airports
 - Faculty in Civil Engineering and Airport Management



The Life Story of a PEGASAS Project

- Initial teleconference / web meeting to discuss project
- PEGASAS identifies best team
 - Can be single university, or (often) multiple universities
 - Can also use researchers identified by FAA
- Team works with FAA on proposal
 - PEGASAS already is the FAA Center of Excellence for General Aviation
 - Can discuss proposal content, scope, etc. with FAA Technical Monitor
- Can approach industry for matching / in-kind support during proposal development
 - COE requires 1:1 matching of FAA funds
 - Projects might have initial interest from industry partners
- Proposal submitted via grants.gov followed by award
 - Project "idea" to award usually two months before the 2018 DOT review process



- Construction of prototype rumble strips
 - Airport-qualified contractor needed
 - Prototypes necessary, but not a research expense, so FAA
 Tech Monitor and FAA PEGASAS Program Manager worked
 with PEGASAS team to add Delivery Order to the PEGASAS
 IDIQ contract at Purdue









The Life Story of a PEGASAS Project

- Research performed / significant interaction with FAA
- Able to test durability of rumble strips at National Airport Pavement and Materials Research Center (NAPMRC)
- Industry interaction after annual meeting, Textron provided accelerometers, expert insight into loads on airframe
- Project report submitted
 - Permanent rumble strips are not recommended but temporary rumble strips may be appropriate for further evaluation for a limited term installation
 - Issues include impact, durability, constructability
 - Pilot qualitative feedback and quantitative accelerometer measurements
 - Impact on airframe might be significant







Connecting with PEGASAS







Opportunities for Interaction with PEGASAS

- PEGASAS Annual Meeting
 - Conference-like presentations of projects, interaction with FAA technical monitors and sponsors, industry partners
 - 2021 Annual Meeting virtually co-located with AIAA Aviation Forum, Aug 5 and 6
 - Previous annual meeting presentations available online: <u>https://www.pegasas.aero/meetings.php</u>
- PEGASAS facilitated workshops
 - PEGASAS researchers discuss future research topics with FAA
 - Help prompt thinking about future requirements, expand upon or add depth to efforts supporting current requirements
 - Runway Safety Summit
 - Flight Deck Human Factors
 - Airport Pavements



- PEGASAS provides an effective research tool to FAA
 - Engagement mechanisms with FAA already in place
 - PEGASAS often provides unique facilities and / or capacity to supplement FAA facilities
 - Any FAA researcher with funded research requirements can approach us via the FAA program manager, Paul Tan
- PEGASAS project proposal
 - As part of a Center of Excellence, "the competition is over"
 - PEGASAS will identify interested researchers
 - Teleconference with PEGASAS to clarify ideas and needs
 - PEGASAS team will iterate with FAA technical monitor on proposal content and cost
 - Will identify how to meet matching requirements



PEGASAS Summary

- PEGASAS has contributed to FAA in a wide array of areas
 - Heated pavements, airport visual guidance, Aviation Safety Information Analysis and Sharing (ASIAS), Weather Technology in the Cockpit (WTIC), aviation fuels fire safety, ...
- We have a team that is very strong in aviation and engineering with a diversity of facilities, equipment, interest and expertise well suited to general aviation research
- We work in multi-university teams where possible
- We have several interested and involved industry and organizational partners
- We are proud to be the Center of Excellence for General Aviation and are proud to support the FAA with research to Enhance the Safety, Accessibility and Sustainability of general aviation

