

Rotorcraft Noise Abatement Procedures Development

ASCENT 38

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- Rotorcraft noise becoming an increasingly larger issue with general public
 - HAI’s “Fly Neighborly Guide” helpful for community noise
 - Since publication, new rotorcraft and operations have been developed
 - Need for more detailed data and information about noise produced from the operation of rotorcraft
 - Need for detailed and specific noise abatement procedures
- The purpose of this project is to:
 - Develop noise abatement flight procedures for several categories of helicopters
 - Demonstrate the noise benefits of the flight abatement procedures
- This project will use the noise prediction system developed and validated in Project 6 “Rotorcraft Noise Abatement Operating Conditions Modeling.”

- Long-term
 - Develop rotorcraft noise abatement procedures for various helicopters for various phases of flight
 - Compare noise abatement procedures to representative baseline operations
- Near term (next 6 months)
 - Develop a list of vehicles that should be considered for noise abatement procedures (approximately 4-8 vehicles)
 - Model setup for top 4 helicopters
 - Predict baseline noise levels
 - Test initial noise abatement procedures

Outcomes and Practical Applications



- Outcomes
 - Development of rotorcraft noise abatement procedures
 - Analysis of procedures by helicopter category
 - Assessment of need for unique procedures for different categories
 - Demonstration of rotorcraft noise prediction system
- Practical applications
 - Potentially new or validated noise abatement procedures
 - Guidance about the need for different procedures for various helicopter categories
 - Tool to evaluate the physical noise mechanisms affected by the noise abatement procedure (why does it work, where does it work, etc.)

- Select helicopters for study - several different categories
 - Various takeoff weights
 - Different number of rotor blades
 - Standard vs. quiet tail rotor
 - Etc.
- Analyze noise abatement procedures for each helicopter
- Evaluate whether unique noise abatement procedures should be developed for each category
- Model noise abatement procedures in the physics-based noise prediction system to demonstrate their advantages
 - Map out the directivity with various metrics
 - Provide understanding of why the procedures are effective

Schedule and Status



Schedule:

- Months 1-3: Select helicopters for study
- Months 4-6: Set up models; Analyze noise abatement procedures for each helicopter
- Months 6-8: Evaluate procedures; Assess whether different procedures are needed for different helicopter categories
- Months 9-12: Fully model and analyze noise abatement procedures with physics-based noise prediction system

Status: Just starting

Interfaces and Communications



- External
 - Penn State Vertical Lift Research Center of Excellence
 - U. S. Army
 - NASA
 - Juliet Page, David Senzig, VOLPE
- Within ASCENT
 - None at this time

- Summary statement
 - We have a validated, physics-based, noise prediction system to evaluate noise abatement procedures
 - This project will develop procedures and provide the understanding of when, where, and how these procedures reduce the noise
 - Our industrial partners have good understanding of both procedures and helicopter pilot experience
- Next steps?
 - Get to work!
- Key challenges/barriers
 - Substantial amount of work to be done (~ 4 helicopters, several procedures for each, analysis of lots of data)
 - Short time to accomplish (but we have a GREAT team!)

Contributors



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- Co-Pis: Daniel Wachspres (CDI); Joseph F. Horn (PSU)
- Industrial Partners:
 - Continuum Dynamics, Inc. (CDI)
 - Sikorsky Aircraft Corporation (SAC) – Eric Jacobs
 - AHS International – Paul Schaaf*

* Paul Schaaf is a pilot with 29 years of experience operating military, police, air ambulance and corporate helicopters. He has also been working as part of HAI to develop “fly neighborly” guidelines for pilots and operators.