R&D Opportunity

The National Center for Physical Acoustics (NCPA) is currently seeking a development partner to assist with the manufacture of engine nozzle exhaust parts for high-performance military and commercial aircraft.

In addition, we seek partners that have the capability to produce small gas turbine engines ranging from 500 to 5000 lbs. thrust, as well as partners willing to invest in radical engine concepts involving tip driven turbines and electric fans driven by common gas generators.

We also seek a partner that is capable of testing aircraft structures in a large scale subsonic wind tunnel where speeds of (at least) commercial aircraft landing speeds can be obtained.

We envision that partners would be capable of building such parts to aircraft specifications and standards and provide assistance with part endurance testing.

Introduction

Since its inception in 1986, the Jamie Whitten National Center for Physical Acoustics (NCPA) has evolved into the premier university-based physical acoustics research center in the country.

The NCPA programs run the gamut of research from basic studies into the nature of sound and its interaction with solids, liquids and gases to the development of prototype systems through applied studies.

Applied Research at NCPA translates the advanced concepts and ideas from Basic Research into solutions to specific problems.

The Aeroacoustics Research Program is concerned with noise and vibration from aircraft and missiles. The motivation is to reduce the impact of environmental noise and the degradation of aircraft or missiles due to vibration and noise.

Funding

NCPA engages in sponsored research programs supported by federal agencies, private industry and small business concerns. Sponsors of research at the NCPA include the U.S. Army Space and Missile Defense Command, the Office of Naval Research, Air Force Research Laboratories, the National Institute for Aerospace, NASA Marshall, and Northrop-Grumman.

Development Capabilities

Present plans include the design of an advanced airframe and engine to guide the design of future commercial aircraft and airports. Radical changes in airframe and engine designs will allow future aircraft to be environmentally friendly and much less expensive to operate. Concepts for air service transform the current fast bus model to trains in the sky.

An additional area to be pursued in the future is the use of berms and barriers to control traffic noise. Current noise control barriers often ignore meteorological conditions, which can result in poor or negative performance. By including winds and turbulence in the noise predictions, these natural environmental factors might well enhance other noise control strategies.
Research Interest Areas
The primary research interests of aeroacoustics scientists at the NCPA include:

- Compressible and incompressible turbulent mixing.
- Fluid-structure interaction in high speed flows.
- Transverse jets in supersonic flows.
- Jet aeroacoustics.
- Cavity aeroacoustics.
- High speed flow field diagnostics.
- Computational fluid dynamics.
- Directed energy weapons.
- Plume infra-red emission.
- Rocket base flows.

Housed in one of two "high bay" labs (20 and 30 foot clear heights) is a large open bay with a jet noise lab complete with anechoic jet chamber, a supersonic nozzle to test designs, a wave tank, and a wind tunnel. Recently operational is a trisonic (subsonic to Mach 5) wind tunnel with a 12" x 12" test section and advanced optical flow diagnostics.

Facilities and Resources
Research is conducted in the Jamie Whitten National Center for Physical Acoustics, a 78,000 square feet research facility designed with acoustics in mind. Laboratories are isolated from each other with sealed walls and from the outside with noise control doors.

Faculty and Staff
The Aeroacoustics Faculty are appointed to the School of Engineering and conduct research at the Jamie Whitten National Center for Physical Acoustics. Faculty consists of some of the best known scientists and engineers in the world. NCPA's innovative approaches to engine noise reduction and improved efficiency have led to the establishment of the FAA/NASA Center of Excellence in Noise and Emission Research.