**AeroAcoustics Research Consortium (AARC)**

**Proposal Guidelines and Evaluation Criteria**

**February 28, 2022**

# Focus of AARC-Sponsored Research

A key element in accomplishing the mission of the AARC is the support of pre-competitive research with the potential to lead to outcomes which can impact the current technological needs of its members. Generally, these needs include:

1) Identification and characterization of important component noise sources in aircraft engines and the effects of installation.

2) Methods for controlling and/or suppressing the noise emitted by these sources.

3) The development, improvement and application of reduced-order noise prediction techniques for aircraft noise.

4) The development, improvement and application of advanced experimental techniques for the measurement of aircraft noise.

Particular technical areas of current interest to Consortium members include:

- Simulation and modeling of noise sources and their propagation in modern combustor systems.
- Simulation and modeling of the turbulent flow in realistic fan geometries and operating conditions for characterizing tonal and broadband noise sources.
- Low-pressure turbine tone noise prediction that accounts for multistage, three-dimensional and compressibility effects.
- Simulation and modeling of novel acoustic liners for noise suppression with minimal drag.
- Concepts for the design of acoustic liners for absorption of low-frequency noise and their installation in short-nacelle configurations.
- Simulation and modeling of jet noise sources and their propagation in realistic engine exhaust system geometries and flow conditions.
- Noise related to single and counter-rotating open rotors and their installation, including applications to Urban Air Mobility.
- Advanced analysis techniques for interrogation of large simulation and/or experimental datasets for the extraction of physical insights into noise generation and radiation.
- Advanced experimental measurement techniques that can provide data for validation of noise-reduction concepts, simulations and models as well as direct insight into noise mechanisms.
- Concepts, models and analyses of sound-absorbing materials for noise abatement in aircraft engine components.
- Identification, modeling and development of tools for noise issues associated with Urban Air Mobility.

- Airport and community noise. Methods and tools for estimating the impact of aircraft operations on neighboring communities and new metrics for its description.
- Best practices in the use of commercial and/or government software for application to any of the topics above.

In all technical areas, preference will be given to proposals that consider realistic configurations (*ie.* geometry and flow conditions), while still being generic enough to be useful across a range of commercial applications.

Supported projects are expected to have the potential to produce results that are useful to Consortium members and have application to their current research and development needs and interests as summarized above. Projects selected for funding are typically implemented as sus-contract agreements between OAI and the Principal Investigator's (PI) institution. In some cases, consultancy agreements can be made between OAI and individual researchers. Agreements are generally implemented for a one-year period of performance (POP), but potential follow-on or continued work may be described in proposals for consideration by the Peer Review Panel.

Proposals should include specific Deliverables to be provided during the one-year POP (and any proposed follow-on work as appropriate) Sub-contract deliverables are negotiated between PIs and the Peer Review Panel. Examples may include: quarterly and final written reports, technical presentations to the Peer Review Panel, including at the Year End Review, computer codes and scripts and data from simulations and experiments. In lieu of a computer code, detailed documentation of the mathematical formulation, sufficient for consortium members to use in their own implementations, can sometimes serve as a final deliverable.

Researchers whose projects are funded through the AARC are expected to maintain a high level of engagement with AARC members. This includes, as conditions permit, a requirement for funded researchers to spend brief time periods in residence at member institutions to directly transfer knowledge, expertise and research results to members' technical staffs. Proposed budgets should include the cost of travel to these institutions.

# Submission of Pre-Proposals (white papers)

Researchers interested in pursuing funding opportunities under the AARC are encouraged to first submit a brief (up to five page) pre-proposal (or white paper) outlining their idea, technical approach and projected benefits of their work to AARC members. A rough overall estimate of the cost of the project should also be included in the pre-proposal. Pre-proposals will be reviewed by the Peer Review Panel within two months of submission and initial feedback will be provided to the proposer. Feedback may take the form of notice that the Panel declines to fund the proposed research, with suggestions for revisions as appropriate, a request to reply to technical questions resulting from the Panel's review or an invitation to submit a full proposal.

# Submission of Full Proposals

Full proposals submitted to AARC should include a one-page executive summary of the work proposed. Any format may be used but a complete proposal should include the following elements for full consideration by AARC:

An introductory section identifying the technical area of AARC interest addressed, placing the proposed work in the context of the current state of the art and indicating the expected benefits of the work to AARC members.

A detailed work plan for a one-year period of performance listing the technical tasks to be carried out and a proposed schedule for their completion. Potential follow-on work beyond the one-year POP may also be briefly described.

A list of proposed deliverables to be provided at the end of the first-year POP. Final deliverables to be included in a contract (if awarded) will be negotiated with the Peer Review Panel.

A detailed, itemized, budget listing the proposed costs of the project. These should include salary, benefits and indirect expenses associated with labor and the cost of travel to member institutions to fulfill interaction requirements described above. Purchase of general or special-purpose equipment is not generally permitted under AARC funding but may be considered in certain cases with approval of the Panel.

A brief statement describing the qualifications and experience of all members of the proposed research team.

# Proposal Evaluation Criteria

In evaluating proposals, the greatest weighting (30%) is given to the relevance of the proposed work to members' current interests and the potential usefulness of the results to their in-house research. Current areas of interest are listed in a general form above. Researchers may contact the Program Manager with questions as to the relevance of their ideas before submitting a proposal.

The next most important factor (20%) is the technical work plan and its consistency with the proposed level of effort and resources requested. Generally, selected projects are funded for a one-year period, with the potential for follow-on support at the members' discretion. Proposals should, therefore, include detailed work plans, deliverables and costs for a one-year period but may also include a description of projected future work which would build on the first-year effort. Funding levels are expected to be on the order of $100k per year, which would include salary, benefits and travel. For computationally intensive projects, researchers are encouraged to explore external options for securing the required resources, but the use of NASA and/or State of Ohio computational facilities may be possible in some cases.

Another factor (20%) is the proposed deliverables that are expected to result from the project. These are expected to find some use and application to members' research and development

activities. Researchers may contact the Program Manager to discuss the appropriateness of their intended deliverables before submitting a proposal.

The qualifications of the Principal Investigator and research team is an additional factor (15%) in proposal evaluation. A record of successful completion of comparable (or larger) externally funded projects and presentation of results in peer-reviewed publications is highly desirable, although the Consortium will also entertain proposals from early-career researchers. The respective levels of effort and involvement from all team members should be described in the proposal.

The final factor (15%) in proposal evaluation is the level of engagement and interaction between the researcher and consortium members. This should include the submission of quarterly and final reports, occasional technical updates at Peer Review Panel meetings, a presentation at the Year End Review and (conditions allowing) site visits to member facilities for in-person interaction with members technical staffs. Proposed budgets should include travel costs for these visits.