1. Objective of Proposed Work

The objective of this Statement of Need (SON) is to optimize technologies for legacy commercial engines for military fighter aircraft (e.g., F414) to achieve substantive engine exhaust noise reductions. Proposed efforts should facilitate a technically sound approach for maturing and testing an economical and practical means of reducing fighter aircraft engine noise at the source while maintaining operational performance, and should improve upon prior efforts to alter the engine exhaust flow. Both near and far field noise impacts should be considered.

2. Expected Benefits of Proposed Work

Successful completion of this work will result in the maturation of noise reduction technologies for commercial engines for military aircraft; the completion of testing of the proposed technology solution(s); and the efficacy (target noise reduction levels) for technology-modified aircraft engines operating at all power settings. Ultimately, this effort will result in noise reduction for communities in the proximity of Department of Defense (DoD) air installations, and reduce the exposure of military and civilian personnel to aircraft noise.

3. Background

The DoD operates increasingly higher performance, supersonic military jet aircraft using low-bypass afterburning gas-turbine engines. Despite increasingly restrictive aircraft operational guidelines, DoD high-performance jets are significantly louder than commercial aircraft in all operational modes. With the growth of communities surrounding DoD installations, noise from the operation of military aircraft is an increasing concern. A number of DoD personnel perform duties in the acoustic near-field of engine plumes and are exposed to very high noise levels that are a known safety concern even with proper hearing protection. Veterans Administration claims related to hearing impairment are the single largest category of claims, and are increasing. This SON meets the DoD’s policy to consider the reduction of adverse effects from noise associated with military test and training operations consistent with maintaining military readiness.

Related research funded by SERDP includes that conducted under projects WP-1583 and WP 1584 where chevron design and fluid injection were shown to achieve ~2 dB noise reduction. The Office of Naval Research (ONR) and F/A-18 and EA-18G Program Office (PMA265) have invested $6M in chevron adaptation for the Hornet and Growler’s GE F414 Engines, and have conducted two full scale tests to acoustically evaluate chevrons, but have not been able to achieve desired results.
The DoD is aware of the issues and impacts on personnel and the environment from noise generated by high-performance supersonic military aircraft such as the F-35 Lightning II Joint Strike Fighter (JSF), F-22, F/A-18 E/F and EA-18G. The PMA265 at Patuxent River continues to proactively determine the best noise reduction techniques for Hornets and Growlers but more research is needed.

4. Cost and Duration of Proposed Work
The cost and time to meet the requirements of this SON are at the discretion of the proposer. Two options are available:

**Standard Proposals:** These proposals describe a complete research effort. The proposer should incorporate the appropriate time, schedule, and cost requirements to accomplish the scope of work proposed. SERDP projects normally run from two to five years in length and vary considerably in cost consistent with the scope of the effort. It is expected that most proposals will fall into this category.

**Limited Scope Proposals:** Proposers with innovative approaches to the SON that entail high technical risk or have minimal supporting data may submit a Limited Scope Proposal for funding up to $200,000 and approximately one year in duration. Such proposals may be eligible for follow-on funding if they result in a successful initial project. The objective of these proposals should be to acquire the data necessary to demonstrate proof-of-concept or reduction of risk that will lead to development of a future Standard Proposal. Proposers should submit Limited Scope Proposals in accordance with the SERDP Core Solicitation instructions and deadlines.

5. Point of Contact
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6. Appendix
Suitable test facilities must be able to support the safe operation of a high performance engine, and make accurate measurements of required noise-related parameters. Government test facilities exist that are suitable and potentially available for purposes of this SON. In addition, military engines exist in inventory that may be used as Government Furnished Equipment for purposes of this SON. For information on cost and availability of assets, points-of-contact from the following services/agencies are provided:

- U.S. Department of Navy – Tom Weiss, 301-757-3420, thomas.weiss@navy.mil
- U.S. Air Force – Barry Kiel, barry.kiel@wpafb.af.mil
- National Aeronautics and Space Administration – Brian Fite, brian.fite@nasa.gov