At a Glance

What is it?
- The Sea-Based Aviation National Naval Responsibility (SBA NNR) Propulsion focus area is a long-term basic and applied research initiative having an objective to maintain the health, currency, and technical superiority of Sea-Based Aviation S&T in propulsion-related technology areas.

How does it work?
- With Academia, Industry and Naval Aviation Laboratories as its source of expertise, the SBA NNR Propulsion focus area will solicit the most innovative and technically sound research topics to fulfill its objective, then develop them through basic and applied research efforts leading to future S&T transitions for Naval Aviation.

What will it accomplish?
- The SBA NNR Propulsion focus area will provide the advanced propulsion, power, and thermal management technologies supporting future Naval Aviation needs. In addition, it will support the technology infrastructure necessary to maintain technology superiority while serving as a pipeline of future Scientists and Engineers.

Research Challenges and Opportunities:
- Innovative fundamental and subsystem technologies for increasing power and thermal management capability
- Advanced thermodynamic cycles beyond the Brayton cycle – principles, tools, and feasibility studies
- Propeller/propfan technologies to reduce noise and provide for high power to weight
- Jet noise analytical tools – source models, measurements, predictions, reductions
- Multi-stream noise reduction database and component technology maturation
- Active jet noise control components/testing to achieve beyond -10 dBA reduction
- Durable thermal/environmental barrier coatings for harsh environments
- Ceramic matrix composites for naval-unique operating conditions, materials/manufacturing/joining
- Turbine rotordynamics modeling tools capturing transient/complex loading
- Diagnostics for bearing/lubrication system degradation detection
- Diagnostics and logic-based tools for “Virtual Inspection” capability
- Pressure augmentation approaches for increased specific power
- Enhanced integration technologies for carrier suitability
- In-situ repair technologies for FOD-susceptible components
- Small UAS propulsion weight reduction
- Electronic fuel injection system improvements

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The Office of Naval Research established the Sea-Based Aviation National Naval Responsibility (SBA NNR) research initiative in Apr 2011 to maintain the health, currency and technical superiority of Sea-Based Aviation S&T. Three focus areas of the SBA NNR have been identified – aircraft research, structures and propulsion – that address important challenges facing naval aviation and provide opportunities for basic and applied research efforts to address them.

Propulsion systems touch on every aspect of air vehicle operations and are the primary source of vehicle performance capability. On the other hand, turbine propulsion systems typically are the primary fleet readiness driver and are the largest cost driver in operational systems since they require extensive development and maintenance/support. With the large affect on performance, readiness and cost comes the greatest opportunity for improvements due to advanced technology.

The Propulsion focus area of the SBA NNR will provide innovative research and technology in five sub-areas of 1) Energy-Efficient Processes and Subsystems, 2) Turbomachinery and Drive Systems with Enhanced Maintainability, 3) Jet Noise Reduction for TACAIR, 4) Hot-Section Materials and Coatings and 5) Small UAV Propulsion. Along with the other focus areas under the SBA NNR, the Propulsion focus area will also support the infrastructure necessary to maintain technology superiority while serving as a pipeline of future Scientists and Engineers.