

1. **Research Title:** Nondestructive evaluation, characterization and analytics

2. **Individual Sponsor:**

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3. **Academic Area/Field and Education Level**

All Engineering Disciplines, Mathematics, or Physics (MS or PhD level)

4. **Objectives:** This topic addresses fundamental technical challenges toward reliable nondestructive quantitative materials and damage characterization. The intended application of this technology is towards improved nondestructive evaluation (NDE) capabilities that are integral to the sustainment of USAF airframes and engines and to the qualification of new materials with tailored properties. This includes but is not limited to technologies such as electromagnetic radiation across all frequency ranges, mechanical waves (e.g., ultrasound), and thermal diffusion-based methods.

5. **Description:** Examples of potential research topics include the development and utilization of forward models for quantitative prediction and optimization of NDE methods, the development and utilization inverse methods to quantify the material state from NDE data, the application of analytics and statistical methods for data discovery from NDE data, implementation of uncertainty quantification of NDE models and experimental methods, correlative analysis of NDE data with 'ground truth' data from alternate methods, creation of new or significant miniaturization of NDE methods, integration of robotics, spatial registration sensors, machine vision, augmented and virtual reality, autonomous control systems, and other advanced technology with NDE methods, and capability validation of in-situ damage detection sensors (Structural Health Monitoring (SHM)) via probability of detection methods

6. **Research Classification/Restrictions:** None

7. **Eligible Research Institutions:** DAGSI Universities

NOTE: Topics submitted to DAGSI must be approved for public release. Need PA Approval #