

## AFRL CALL FOR RESEARCH

1. **Research Title:** Risk Quantified Structural Design
2. **Individual Sponsor:**  
Dr. Eric Tuegel, AFRL/RBSM,  
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3. **Academic Area/Field and Education Level:** Structural Mechanics, Reliability, Probability (MS or Ph.D. level)
4. **Objectives:** The objective of this effort is to develop and demonstrate a procedure for repeatably establishing a fault tree-like, or reliability block diagram-like, map for an aircraft structure. The emphasis is on analyst-insensitivity of this process. Elements of the process can be mathematical formulas, or computer algorithms.
5. **Description:** The proposed project will develop procedures for quantifying the risk of failure for highly redundant structural systems, but are not purely parallel systems. An important element of the process is the ability to identify the redundancy of structural components in a complex structure such as an aircraft wing, and determine the importance of each component in establishing the reliability of the structure. This will enable a robust fault tree-like, or reliability block-like diagram, to be established for the structure that will describe how individual component reliabilities influence the overall system reliability. The resulting process should not be highly dependent on the skill and expertise of the analyst in order to achieve a satisfactory result.
6. **Research Classification/Restrictions:** This research is unclassified and for public distribution.
7. Interest in Summer USAFA Cadet: No

### Eligible Research Institutions:

Universities (DAGSI)       AFIT (only)       USAFA