

Attachment 1 – Research Topic Template

1. **Research Title:** Stress Corrosion Cracking of Landing Gear Steels under Combined Fatigue Modes
2. **Individual Sponsor:** Dr. Kumar V Jata AFRL/RXCM
2230 Tenth Street
WPAFB, OH 45433-7333
Kumar.Jata@wpafb.af.mil
3. **Academic Area/Field and Education Level:** Materials Science/Mechanical Engineering (PhD Level)
4. **Objectives:** The objective of the PhD thesis would be to establish a strong understanding of the fracture mechanics and failure modes of 300 M steel under combined fatigue loads in aircraft relevant environments.
5. **Description:** 300M steel is widely used in aircraft landing gear because of its unique combination of strength and fracture toughness, but is highly vulnerable to corrosion fatigue, and stress corrosion cracking (SCC) failures with potentially catastrophic consequences. The fatigue, corrosion fatigue in salt water, and SCC under different fatigue conditions, such as biaxial fatigue and combined tension/compression with torsion are not understood well at present. Besides there are many other issues as the following
 - a. Fundamental stress corrosion cracking mechanisms in high strength- high damage tolerant steels in aircraft-relevant environments?
 - b. Static and cyclic conditions that will induce SCC mechanisms in notched (varying notch root radii) or pre-cracked specimens?
 - c. H2 embrittlement associated with high strength steels
 - d. Corrosion and SCC fatigue failure laws under combined and complex loads
 - e. Modeling of the above
6. **Research Classification/Restrictions:** Basic research/ Unclassified
7. **Eligible Research Institutions:** Indicate to what organizations this topic should be provided.

DAGSI (Wright State University, AFIT, Ohio State University, University of Dayton, Miami University, Ohio University, University of Cincinnati)
PA Approval #:

AFIT (only)

USAFA (only)

If you are submitting a topic for the USAFA, please indicate if you are also interested in sponsoring a USAF Cadet in summer of 2013 (Avg Cost for USAF Cadet for 33 days was \$5000)

Yes

Include the appropriate Distribution Statement. All topics must have an approved distribution statement.