

## Attachment 1 – Research Topic Template

1. **Research Title:** Signal Processing for Multi-GNSS Authentication
2. **Individual Sponsor:**

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3. **Academic Area/Field and Education Level:** Electrical Engineering, Signal Processing, Satellite Navigation (BS, MS or Ph.D. level)
4. **Objectives:** Develop algorithms and software to uniquely distinguish between valid GPS/GNSS signals and those from a threat emitter.
5. **Description:** Precision navigation is fundamental to Air Force operations. GPS is the primary means for enabling precise navigation. However, as the electronic order of battle grows increasingly complex, Air Force systems need to leverage all signals of opportunity while keeping their navigation solutions robust against malicious threats. Satellite-based navigation signals from other global satellite navigation systems (GNSS) provide a natural first step toward augmenting our reliance on GPS. However, a receiver that leverages GNSS signals is susceptible to deception when those signals are emulated by an enemy transmitter. Therefore a navigation receiver must be able to reliably distinguish between valid and invalid GNSS emissions. This research effort will develop algorithms and software that enable a degree of trust in foreign GNSS transmissions comparable to our trust in our own GPS signal.
6. **Research Classification/Restrictions:** None at this time.
7. **Eligible Research Institutions:**
  - DAGSI (Wright State University, AFIT, Ohio State University, University of Dayton, Miami University, Ohio University, University of Cincinnati)
  - 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)
    - X Yes      No

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