

1. **Research Title:** “Waveform Diversity and Design”
2. **Individual Sponsor:**  
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3. **Academic Area/Field and Education Level:** Electrical Engineering / Applied Mathematics (MS or Ph.D. level)
4. **Objectives:** The objective of this research is to develop, design and analyze advanced radar waveform sets incorporating temporal, spatial and/or polarization diversity, and novel coding/modulation techniques that enable simultaneous multi-mode operation, improve ambiguity performance, enhance resolution, and improve interference rejection.
5. **Description:** The proposed project will explore the design and analysis of radar waveforms. The majority of the work will consist of analytical investigations and numerical simulations, although eventual experimental testing of successful designs might be undertaken. Radar modes to be considered include AMTI, GMTI and SAR. Minimum Detectable Velocity (MDV), clutter cancellation, ambiguity performance, and measurement resolution will be important performance criteria.
6. **Research Classification/Restrictions:** This research could be conducted at a variety of classification levels, depending on the specific approaches and applications considered.
7. **Interest in Summer USAFA Cadet (Avg Cost for USAF Cadet for 33 days was \$4000):** A USAF Cadet could be sponsored in the summer of 2008, as this topic is highly relevant to emerging Air Force capabilities.
8. **Eligible Research Institutions:**

Universities (DAGSI)

AF (only)

USAFA