

1. **Research Title:** I/Q Imbalance Automatic Compensation for Digital Wideband Receiver Applications

RY15-4

2. **Individual Sponsor:**

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3. **Academic Area/Field and Education Level:** Electrical Engineering and Computer Science / Signal Processing (MS or Ph.D. level)

4. **Objectives:** Research and develop a signal processor module to automatic calibrate in-phase (I) and quadrature-phase (Q) imbalance and subsequent signal processing of the I and Q input data to mitigate the imbalance effect to improve performance of IQ-based wideband digital receiver.

5. **Description:** One of enabling electronic warfare (EW) receiver technologies is wideband digital beamforming (DBF) with I/Q channels. It has potential to cut the SWAP burden in half due to the doubling the baseband in signal processing. One of the issues of the receiver with I/Q channels is the magnitude and phase mismatch happening in the down-converter. The amplitude/phase imbalance deteriorates system performance and needs to be compensated. An algorithm has been developed by RYDR to mitigate IQ channel imbalance problem in a static way. This research topic is to continue the development into an automatic calibration to solve I/Q time-dependent imbalance fluctuations, and enabling real time mitigation.

6. **Research Classification/Restrictions:** This research has ITAR restrictions.

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

**AFIT (only)**

**USAFA (only)**

If you are submitting a topic for the USAFA, indicate if you are also interested in sponsoring a USAF Cadet in summer 2015 (Average cost for USAF Cadet for 33 days is \$5000)

Yes

No