

## Attachment 1 – Research Topic Template

1. **Research Title:** “Applications of RF Photonics for Advanced Signal Processing”
2. **Individual Sponsor:**

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3. **Academic Area/Field and Education Level**  
Electrical Engineering /Fiber Optics/RF Photonics (PhD level)
4. **Objectives:** Investigate the use of RF photonics to address needs in different signal processing architectures. These architectures have use in both commercial and military applications. Work will include both theoretical models as well as experimental demonstrations of new architectures that provide system performance improvements. Experimental demonstrations can include both bulk and integrated components.
5. **Description:** This project will explore architectures incorporating photonic components to provide enhanced performance for RF systems. Current RF systems using electronic components are limited in both frequency and dynamic range. To improve performance, photonic components can be used in these architectures. The program will use theoretical models to predict performance of RF architectures based on photonic components. Then experimental demonstrations will be made to validate the models. The experimental setups will use a combination of both integrated and bulk components, in order to compare the effects of different components on the overall performance of the system architecture. The architectures that will be investigated include, but are not limited to, up/down-conversion, radar, signal discrimination, and phase control for beamforming. Theoretical models will guide which architecture can demonstrate the highest performance gains, as compared to current technologies.
6. **Research Classification/Restrictions:** This research has ITAR restrictions.
7. **Eligible Research Institutions:** Indicate to what organizations this topic should be provided



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