RY18-19

Attachment 1 – DAGSI Research Topic Template

1. **Research Title:** Goal-Driven Cognitive Algorithmic Processing for EW

2. **Individual Sponsor:**

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3. **Academic Area/Field and Education Level**

System Engineering/algorithms and machine learning processes (BS, MS or PhD level)

4. **Objectives:** Create a hierarchy of processes and logic that tie high-level system goals to actionable processes and algorithmic execution

5. **Description:**

Numerous efforts are pushing forward the state-of-the-art in machine learning research, greatly improving the performance for targeted processes. To fully realize a cognitive architecture in Electronic Warfare (EW), multiple algorithms and machine learning processes will need to work together in a dynamic system. Such a system, the Cognitive Mission Computer, is being developed by AFRL as an architecture for next-generation EW processing. For full autonomy, real-time optimization of system performance must be driven by high-level goals and the environment. The use of reasoning to perform this kind of optimization for EW is a new area of interest. Several research efforts in the academic realm investigating "intelligent" reasoners include Non-Axiomatic Reasoning System, Probabilistic Graph Models, and Probabilistic Logic Networks. An essential topic for research then is: how to tie high-level goals down to algorithmic execution, appropriately making use of logic, reasoners, and machine learning. The research proposed here will result in an approach for using a hierarchy of such processes to connect the gap between high-level concepts, decision making, and algorithmic execution.

6. **Research Classification/Restrictions:** None

7. **Eligible Research Institutions:** AFIT, University of Dayton, Wright State University, Miami University, The Ohio State University

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