

Attachment 1 – Research Topic Template

RH 15-9

1. **Research Title:** Cognitive and Human Factors of Anomaly Detection

2. **Individual Sponsor:**

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

Experimental Psychology, Perception, Attention, Cognitive Science, Human Factors, Mathematics (BA/BS, MS or Ph.D. level)

4. **Objectives:** Determine the cognitive, perceptual, attentional, and human factors which affect the perception of anomalies. Develop new analysis procedures, aids, and augmentation for people who must notice anomalies in either real-time or text-based data streams. Develop metrics assessing such performance.

5. **Description:** Determine the cognitive, perceptual, attentional, and human factors which affect the perception of anomalies. Develop new analysis procedures, aids, and augmentation for people who must notice anomalies in either real-time or text-based data streams. Develop metrics assessing such performance.

6. **Description:** Many jobs require a person to detect anomalies in routine data input streams. Tasks range from those of Air Traffic Controllers and rush-hour traffic reporters who view video-feeds under real-time pressure; whereas medical researchers and stock market analysts follow large volumes of text data over days to spot new breakouts and trends. Unfortunately, key signals often go undetected and planes crash or markets plummet. We need answers to three questions: How prevalent are failures to detect both "obvious" and subtle items? Why do detection failures occur? How do we improve and aid human monitors? Perceptual and cognitive research shows that people, even when actively looking for anomalies that they have been forewarned about, often miss glaring oddities in dynamic events when they are engaged in information gathering tasks. In addition to psychological research on "change blindness" and "inattention blindness," personality and thinking styles may affect anomaly detection, but the research is still in its infancy. Research projects should focus on the reasons for detection failures and improvement, but also be aware of false alarms and performance quantification.

7. **Research Classification/Restrictions:** Unclassified

8. **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. PA Approval # 88ABW-2014-2960, 711 HPW/XPO 17 June 2014

AFRL FY14 Research Topic Template -DAGSI -AFIT -USAFA

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