

1. Title: Minimally Complete Sensing Grid

2. Individual Sponsor:

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3. Academic Area/Field and Education Level: Topological Analysis (MS or PhD)

4. Objective: Develop a technique for predicting a minimal subset of a sensing network given time/space-constrained search volumes.

5. Description: “The sensing grid” is a surveillance *concept*, evoking the image of a highly interconnected, comprehensive, redundant, all-perceiving network of multi-modal sensors – nothing escapes its view. That is a contrivance of science fiction, far more easily attributable to Hollywood than to Raytheon. “A sensing grid” is a time-variant collection of heterogeneous sensing devices, their historical collections, real-time streams, and their potential for future collection. But how much sensing grid is sufficient for a mission of a given duration and resolution? Is “text analytics” a proper member a sensing grid? How can we know if we have enough “sensing” to even know if we can know all there is to know for a given mission? That’s what this work seeks to explore. The proposal is to apply and extend AFRL/RYAR work in graph power domination to derive some general parametrics about assessing the fitness of a sensing grid instantiation to a given surveillance and detection task set.

6: Research Classification/Restriction: Not Classified/Not Restricted

7. Eligible Research Institutions: All

Keyword: Sensing grid, graph completeness, power domination, graph theory, parametrics, simulation

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