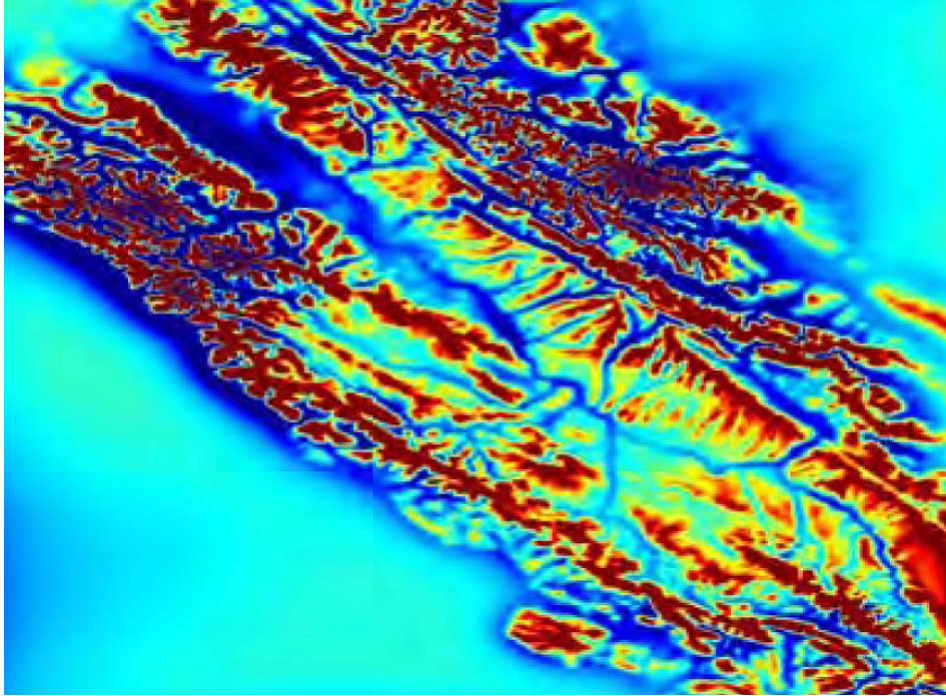


## **Gravity Gradiometry and Map Matching**

**PI:** Lt Col Richard Huffman, Air Force Institute of Technology

**Sponsor:** AFRL/RYRN



Navigation aids generally detract from the most appealing INS strengths (passive, all-weather, undeniable). For example, the Chief of Staff of the Air Force recently identified GPS as a widely-known and exploitable vulnerability, emphasizing a reduction on GPS dependence. Technological advances provide an opportunity for gravity gradient instruments (GGI), which measure spatial derivatives of the gravity vector, to aid an INS and preserve its strengths. Current research is being done in the Air Force Institute of Technology's Advanced Navigation Technology (ANT) Center to identify conditions that make GGI and map matching enhanced (GAME) INS feasible. The methodology includes models in MATLAB, where GAME aids an INS with position updates to a Kalman filter. Simulations cover different terrains, altitudes, velocities, flight durations, INS drifts, map resolutions, and GGI noise levels.

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