SAND2005-7265P

Sandia Remote Sensing E-Magazine

A publication featuring what's new in Remote Sensing Technology at Sandia National Laboratories

November 2005

Deputy Director: Brett Remund, blremun@sandia.gov
Editor: Armin Doerry, awdoerr@sandia.gov
Business Operations: Katelyn Mileshosky, kmmiles@sandia.gov
Edition 2005 /4th Quarter

Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

NNSA National Nuclear Security Administration

Sandia National Laboratories

Athena Tag Prevents Battlefield Friendly Fire

- Allows immediate identification and tracking of tagged ground assets with airborne radar
- Operates with multiple platforms and with multiple radar modes
- Supports multiple missions: CID, BFT, Search & Rescue
- Operates day/night and all weather at full radar range
- Rugged, compact, lightweight, and low transmit power
- Proven flight success: F15, F16, F18, Lynx

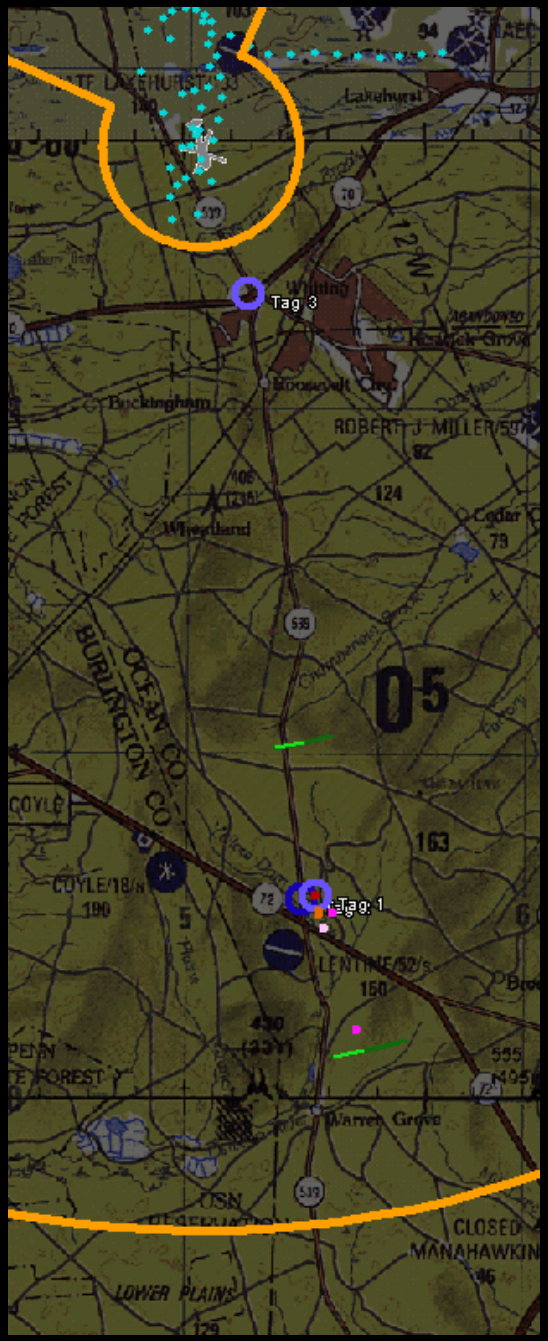
Sandia National Laboratories

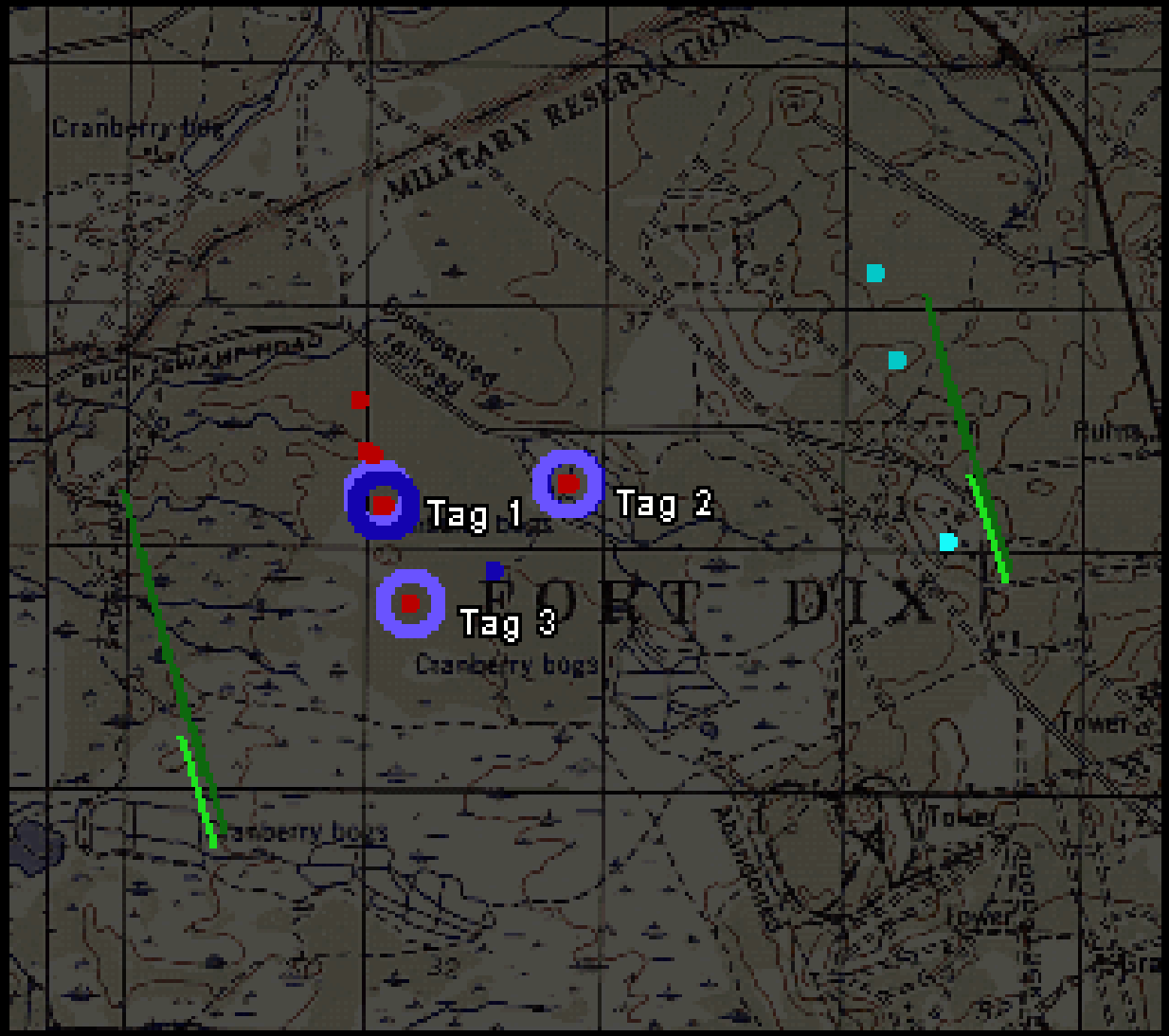
Athena Successfully Tested at Exercise Urgent Quest

- September 2005, U.K.
- Military Utility Assessment highlight of CCID ACTD
- Evaluate technologies for air-ground and ground-ground Combat Identification (CID)
- http://www.sandia.gov/news-center/news-releases/2005/elect-semi-sensors/athena.html
- Contact: Lars Wells, 505-845-8014, lmwells@sandia.gov

Sandia National Laboratories

Radar Responsive Tag Plots





Recent Accomplishments/ Publications/Patents

RECENT PROGRESS:

- Data Collection / Testbed Activities: The first version of the SPH (Sandia Phase History) data format and the supporting software tools for delivering raw phase history data to our customers was completed. This includes documentation of the SPH format, C-code SPH file reader and writer functions, a radar binary file to SPH file converter, a limited Matlab SPH file reader, C-code to apply Differential GPS corrections, and an SPH file image former written in C-code. SPH formatted data files have been delivered to internal SNLA customers where the data was collected from several different radar collection modes.
- Long-range Atmospheric Effects: The modeling of clear-air refractive-index perturbations on SAR images continues. An analytical approach is being developed to calculate the f-function, which is the atmospheric input to the current imaging model we have developed to address the atmospheric problem. Geometrical optics (ray-trace) calculations are also being conducted to corroborate with the analysis. The analysis and geometrical calculations agree very well at some orientations, but both require refinement outside this range. The main result at this point is that both the analysis and geometrical optics calculations show that smaller than expected atmospheric perturbations can cause observable effects in SAR images. Andreas Muschinski, University of Massachusetts/ Amherst, has provided a draft summarizing meteorological phenomena that might be the cause of the observed anomalies in SAR images.
- Image Enhancement: We are continuing an investigation into the use of multi-phase-center IFSAR to resolve phase ambiguities and SAR layover. We have developed a direct phase method for resolving SAR layover that has the potential of being computationally more efficient and more robust than existing methods. The currently used methods involve a computationally expensive search technique that tends to be suboptimal. Our approach is computationally inexpensive and has the potential of being less sensitive to noise.

RECENT TECHNICAL REPORTS/PRESENTATIONS:

- Grant D. Martin, Armin W. Doerry, Michael W. Holzrichter, “A Novel Polar Format Algorithm for SAR Images Utilizing Post Azimuth Transform Interpolation”, Sandia Report SAND2005-5510, September 2005.
- Ana Martinez, Armin W. Doerry, Douglas L. Bickel, “Two antenna, two pass interferometric synthetic aperture radar”, US Patent 6,911,932, June 28, 2005.

Additional Information

Visit the following link for additional information:

www.sandia.gov/radar

Sandia National Laboratories