

InteractiveISR

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iSPE MSR



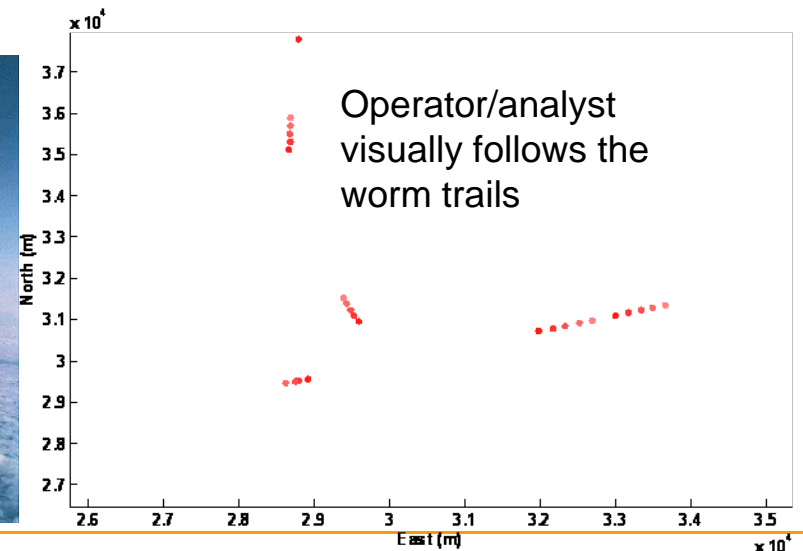
Problem



- **Despite over 25 years of investment, automated data fusion of MOVINT (Moving Intelligence) with itself and SIGINT (Signals Intelligence) has not been robust enough to result in actionable information (i.e., link analysis or targeting).**
- **Human operators/analysts do a reasonable job producing actionable information; but, they are not perfect and have difficulties fusing some types of data.**
- **Human operator/analyst throughput is also an issue.**

Background

- During the first Gulf War, JSTARS demonstrated the tactical and strategic importance of MOVINT (knowledge of moving things) by determining troop positions and supply routes.
- MOVINT has proven to be invaluable in the war on terror by linking locations of enemy activity.
- The MOVINT data was (and still is) exploited visually through a computer display, because fully automated solutions have not been robust enough.



Objective



- **Produce a prototype integrated man-machine exploitation environment that will enhance current manual exploitation of MOVINT**
 - **Need the algorithms to seamlessly fit into the operator's/analyst's thought process**
 - **Need a rigorous validation framework for both operator and computer exploitation products and decisions**
 - **Algorithms should defer control to operator and not attempt to make decisions that are difficult to automate**
- **Incorporate other sources of information, such as SIGINT**

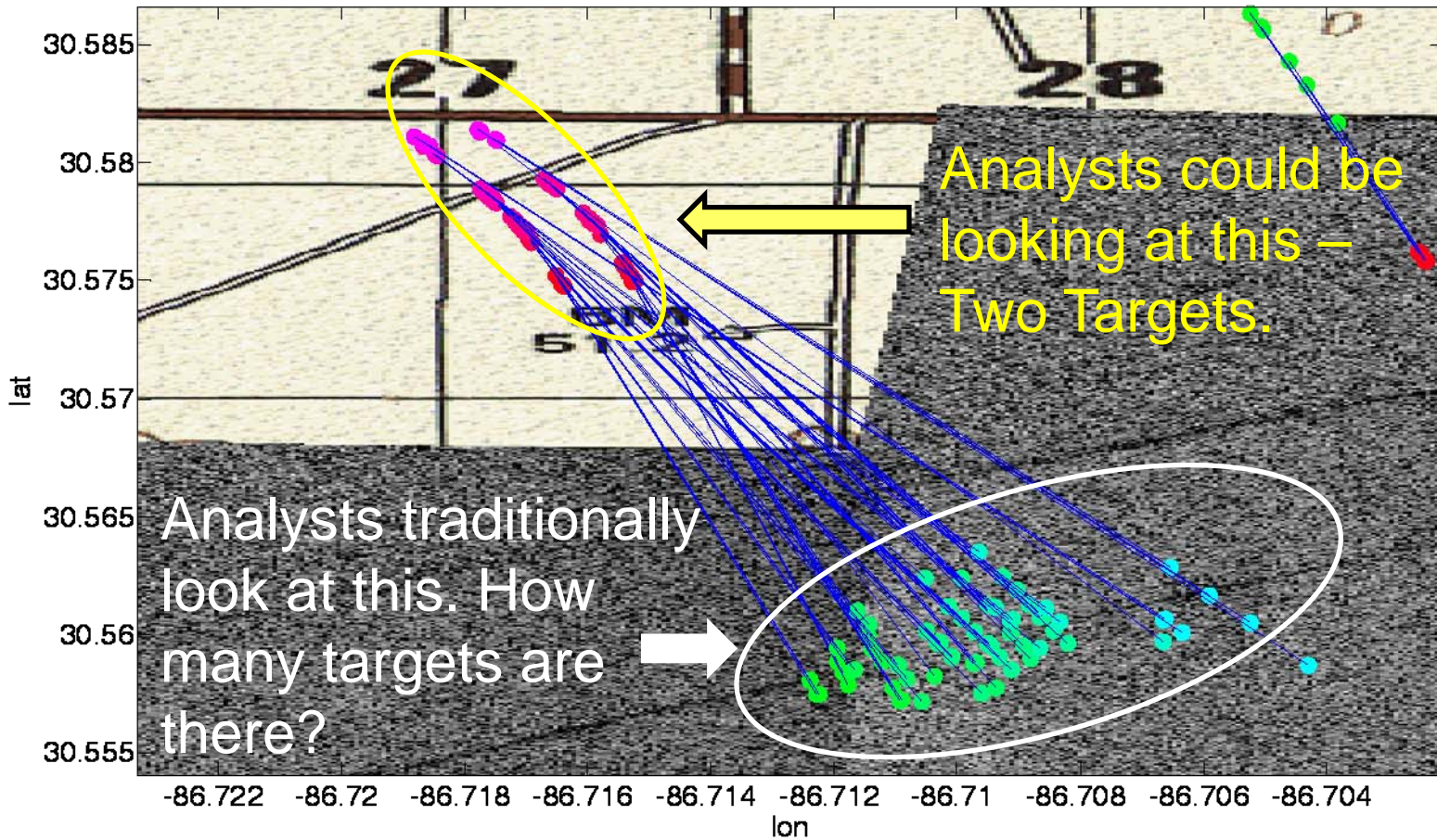
Activities



- **Developed new methods of visualization (including SAR (Synthetic Aperture Radar) coordinates) that allow JSTARS exploitation to be as effective as LSRS (Littoral Surveillance Radar System), and that greatly improve the exploitation of small aperture systems**
- **Developed a new tracking framework that, when compared to Kalman Filter based approaches, achieves the following:**
 - **Allows rigorous hierarchical data fusion**
 - **Matches human reasoning**
 - **Improves track initiation and crossing of track gaps**
 - **Removes dependence on time ordering**
 - **Better testing of consistency of data with hypotheses**

Highlight

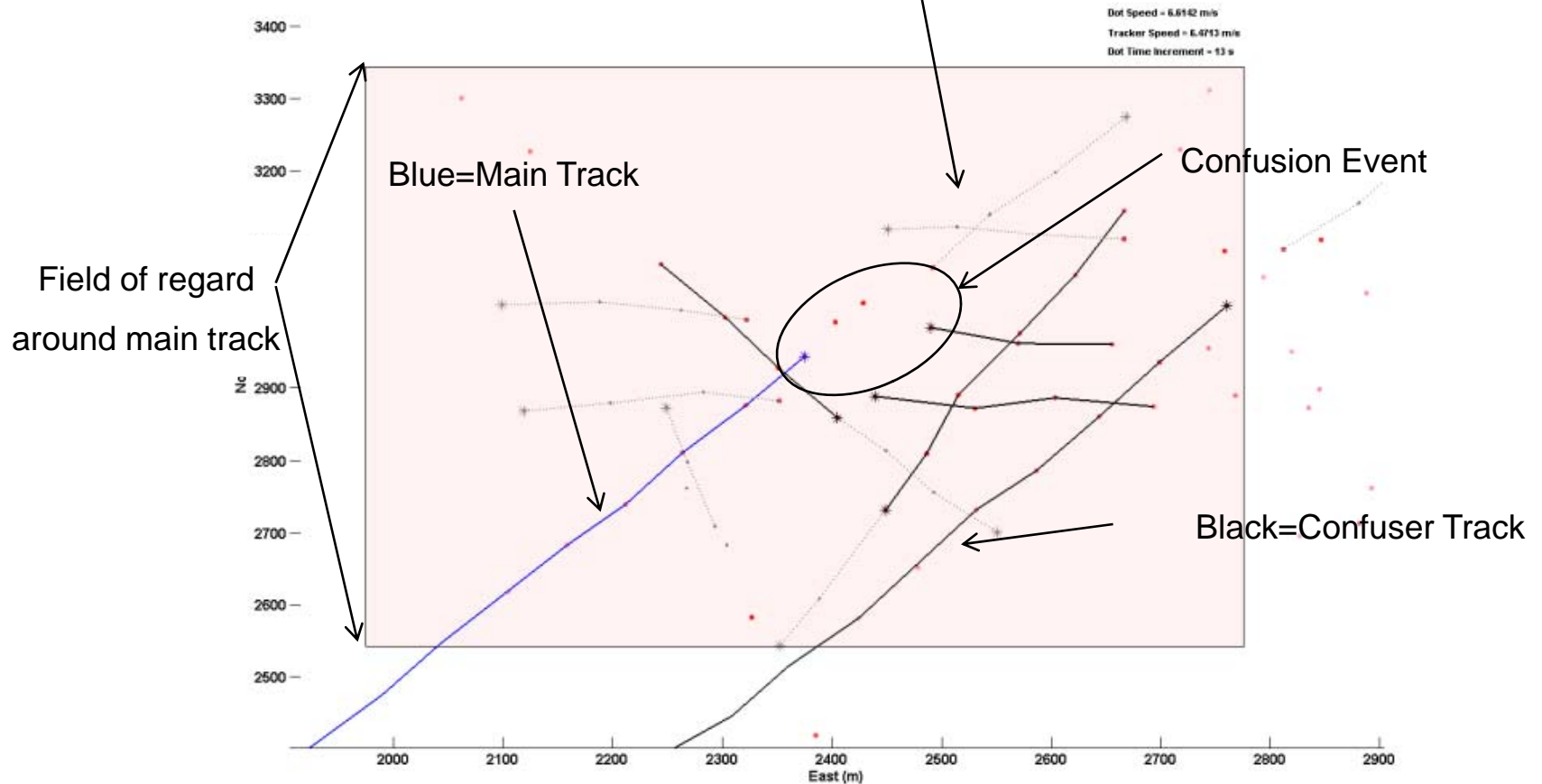
SAR Coordinate Transformation



Demonstration

Optical and radar data can be processed

Gray=Proposed Continuations



Impacts



- **Paid transition of some of the technology to DotMatrix (a government-sponsored exploitation environment)**
- **Influencing decisions about baseline exploitation capabilities for the JSTARS modernization program**
 - **Including decisions about X vs. Ku band**
- **Rigorously addresses sensor/time registration in demonstrations of simultaneous exploitation of data from multiple assets (Constant Hawk + LSRS)**
- **Planned transition to ISR Forensics**

Future Plans

- Fuse MOVINT with SIGINT
- Ruggedize full capability and transition to operational exploitation environments
- Influence the modernization of the JSTARS system (exploitation and operation)

