

Innovation

SBIR Topic Number:
AF05-211

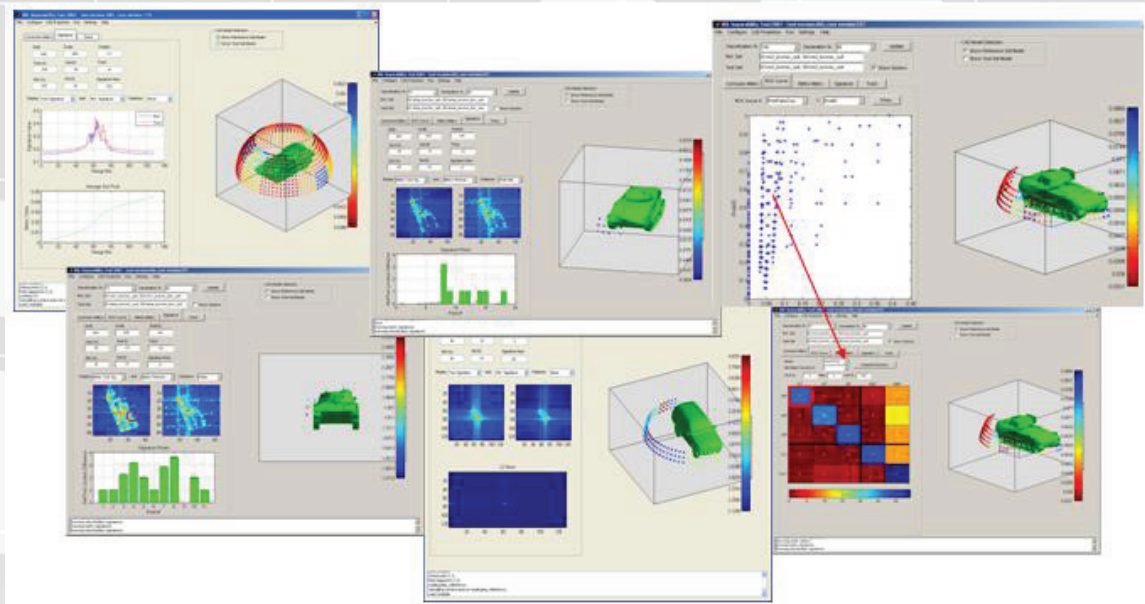
SBIR Title:
Scattering Center Analysis Tools for Database Optimization

Contract Number:
FA8650-06-C-1006

SBIR Company Name:
Etegent Technologies, Ltd. (formerly Sheet Dynamics, Ltd.), Cincinnati, OH

Technical Project Office:
AFRL Sensors Directorate, Wright-Patterson AFB, OH

This Air Force SBIR/STTR Innovation Story is an example of Air Force supported SBIR/STTR technology that met topic requirements and has outstanding potential for Air Force and DoD.



Performance prediction tool visualization for class separability

Scattering Center Toolkit for Automatic Target Recognition Performance and Model Saliency Analysis

- Key enabling synthetic signature technologies are required to support faster development of new target entries in signature databases
- Etegent Technologies, Ltd. (formerly known as Sheet Dynamics, Ltd.) made primary contributions to the state of the art of signature database optimization in the areas of performance modeling and signature saliency
- The technology generated under this contract is being used to support the automatic target recognition (ATR) performance modeling task for a variety of exploitation applications within the Air Force Research Laboratory
- The technology is also being funded internally as a research and development (R&D) project to formalize performance model testing and evaluation for use in Air Force performance evaluation facilities

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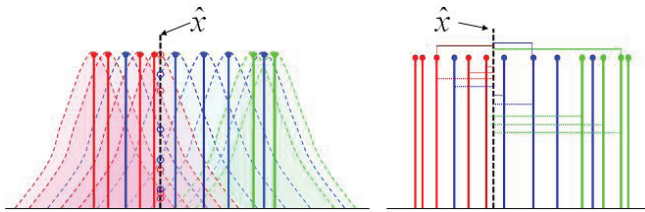
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Air Force Requirement

Emerging radar combat identification (CID) capabilities are dependent upon synthetic signature database development technology. Several CID transition candidates are currently pacing the development rate of companion signature databases. Key enabling synthetic signature technologies are required to support faster development of new target entries in signature databases

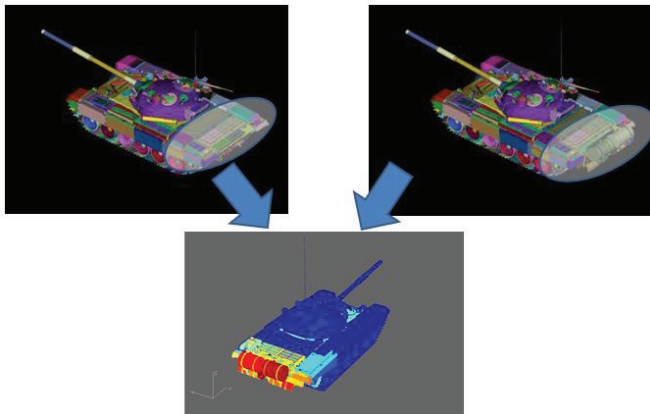
SBIR Technology

Etegent Technologies, Ltd. (formerly known as Sheet Dynamics, Ltd.) made two primary contributions to the state of the art of signature database optimization.



Nonparametric performance estimation utilizing Parzen Windows and K Nearest Neighbor

• The first of these contributions was in the area of performance modeling. Nonparametric estimates of classification performance based on synthetic signatures were developed. These estimates incorporate multiple models of nondeterminism eliminating the need for Monte-Carlo simulation.



Synthetic signature saliency for barrel vs. no barrel class derived linear optimization of required features

• The second major contribution was the area of signature saliency. This provided insight into the key computer-aided design (CAD) model features which were necessary for specific exploitation tasks.

Potential Air Force Application

The technology generated under this contract is currently being used to support the automatic target recognition (ATR) performance modeling task for a variety of exploitation applications within the Air Force Research Laboratory (AFRL). The technology is also being funded internally as a research and development (R&D) project to formalize performance model testing and evaluation for use in Air Force performance evaluation facilities

Company Impact

“Etegent Technologies has been able to leverage the tools developed under this contract into multiple industrial and government R&D efforts supporting fiber optic, radiograph, video, laser vibrometry, LADAR, and ultrasonic sensor exploitation,” observes Dr. Adam Nolan, Chief Technology Officer. “Under this project, Etegent was tasked with providing data acquisition, signal processing, classifier implementation, and performance modeling as a function of noise.”

Sheet Dynamics changed its name to Etegent Technologies, Ltd., in May 2010. Etegent is a high-technology, R&D-focused company conducting state-of-the-art research in a range of areas, including automatic target recognition utilizing radar, LADAR, image, vibrometry and other data types; health monitoring of turbine engines and other assets; nondestructive inspection data management and mining; mechatronic product development; and other areas.



SBIR/STTR

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