

Closely Spaced Object (CSO) Resolution in OPIR Scenes

NDP Research – Tech Note

March 2012

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Tech Note Number	NDP-TN-106
Problem	The full capability of current generation OPIR staring matrix sensors is underutilized. New algorithms are needed to exploit these sensors and provide advanced mission capability. Resolution and tracking of closely-spaced low-observables, such as midcourse ballistic missiles and lower altitude maneuvering targets sets, is one such mission in need of advanced algorithms.
Solution	The NDP model-enhanced super-resolution closely spaced object (CSO) estimation algorithm will improve the ability to resolve and track CSO with current and next generation OPIR sensors. Our solution is designed to meet operational requirements for timely detection, discrimination, tracking and reporting of objects and events for missile warning, missile defense, technical intelligence, battlespace characterization and other missions.
Core Technology	NDP’s algorithms will exploit multi-frame wideband OPIR data utilizing modern super-resolution techniques and an innovative statistical based model feedback loop, resulting in sub-pixel knowledge of objects and the scene.
Benefit	Resolution of objects within a threat cluster will improve state-vector estimates and object discrimination, ultimately resulting in the formation of more accurate intercept solutions and better intelligence gathering capabilities. The NDP base algorithm design resides in ground software, and thus capable of enhancing existing programs with less risk and lower cost. With flight software updates, even greater improvements are possible.
Market	The algorithms and research have direct application on current Air Force OPIR programs, including SBIRS and PTSS (\$1.2B requested over next 5 years). Other military OPIR programs and sensors, including airborne sensors, as well as commercial IR sensors are also within the market space.
Technology Readiness Level	2. Technology concept and/or application formulated
Keywords	OPIR, closely-spaced objects (CSO), remote sensing, super-resolution, discrimination, tracking, space situational awareness, SBIRS

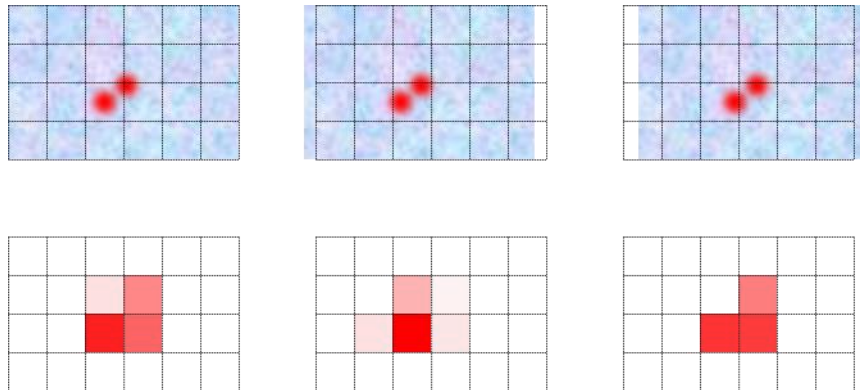
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