

**Radar Detection and Tracking of Small Maritime Targets at High Grazing Angles**

Demonstrates the feasibility of utilizing AESA technology's innovative pulse interleaving techniques to enable long integration times while maintaining search area rate. Enhanced high-grazing-angle sea surface surveillance radar mode performance was developed to detect and discriminate small maritime targets and maintain overall situational awareness.

**Automated Ship and Small Craft Classification Tools for ISAR**

RDRTec is working closely with SAIC in developing innovative ISAR classification tools. This includes image processing and image selection algorithms. Feature extraction algorithms of individual images include length estimation and determination of whether the image is a profile or plan view. Depending on the view, additional feature such as height, superstructure and upright size/shape/location as well as width and bow and stern shape are estimated. Over multiple frames these feature estimates are accumulated. Estimates of vessels natural roll period and weight as well as the presence and location of rotating antennas are extracted. Ship feature classification will be extended to include AIS consistency check capabilities. The AIS code obtained is checked against the features that are consistent with the vessel that is assigned the AIS code. In addition, is the position reports consistent with where the vessel would most likely be located (i.e., large vessel in shallow water or away from shipping lanes). This activity supports the Ocean Surveillance Initiative and transition paths include Fire Scout, MH-60R, P-3 and P-8.

**Sense And Avoid (SAA)**

For the past two years RDRTec under NAVAIR SAA SBIRs has developed radar SENSE concepts to meet Fire Scout SAA requirements. The concept uses advanced AESA technology and proprietary signal processing to provide actionable collision warning information with over 30 sec lead time for a 1 sq. meter RCS non-cooperative aircraft travelling at speeds from 0 to 400 Kts. This includes 2 Hz track update rate and angle accuracies of one degree with false alarm times greater than 1 hour.

**Adaptive Active Electronically Scanned Arrays (AESA)**

RDRTec Inc. is developing adaptive multi-channel phased array manifold concepts that reconfigures by radar mode for optimum performance. The emphasis will be on candidate multi-mode X or C-band radars with phased arrays that support modes with both high and low bandwidth requirements. High bandwidth modes include Synthetic Aperture Radar (SAR), Inverse Synthetic Aperture Radar (ISAR), and High Range Resolution (HRR). Relatively low bandwidth modes include Ground Moving Target Indicator (GMTI), Maritime Moving Target Indicator (MMTI), Air-to-Air (AA) and Sense and Avoid (SAA) modes. The target initial transition platform is the Fire Scout but the lessons learned may impact other future Navy ISR radars.