Computational Requirements of a Non-combinatorial Detection Algorithm of Multiple Targets in High GMTI Clutter

Simon Streltsov, Sergey Petrov, Ilya Muchnik
LongShortWay Inc., Cambridge MA
simon@longshortway.com
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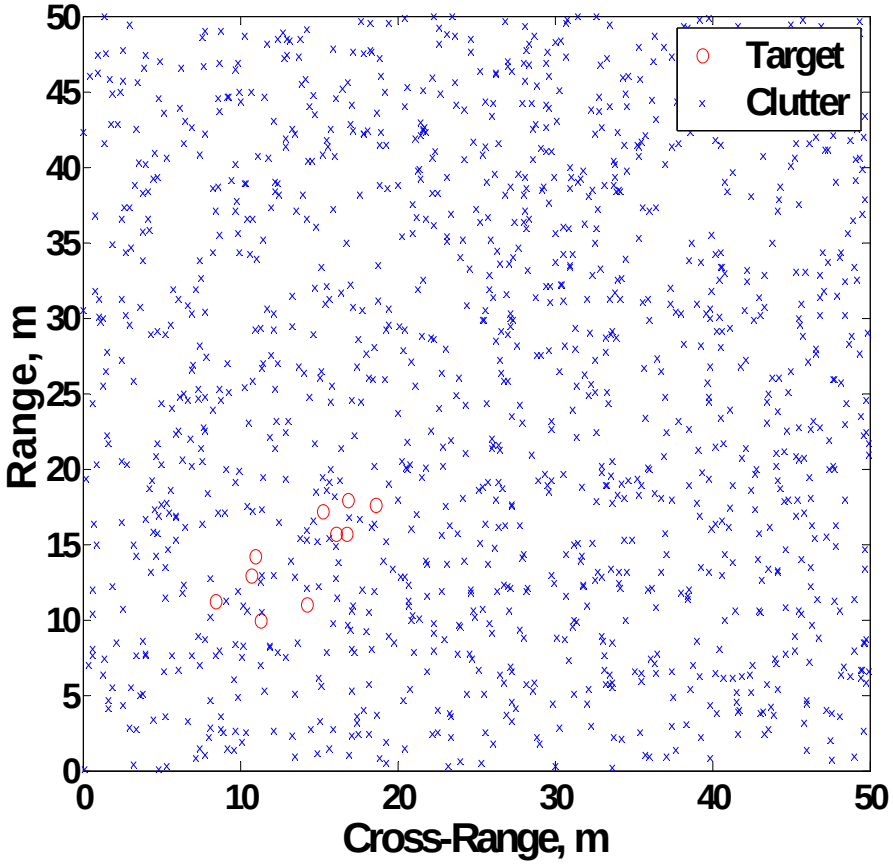
Ross Deming, Leonid Perlovsky
Air Force Research Laboratory, Hanscom MA

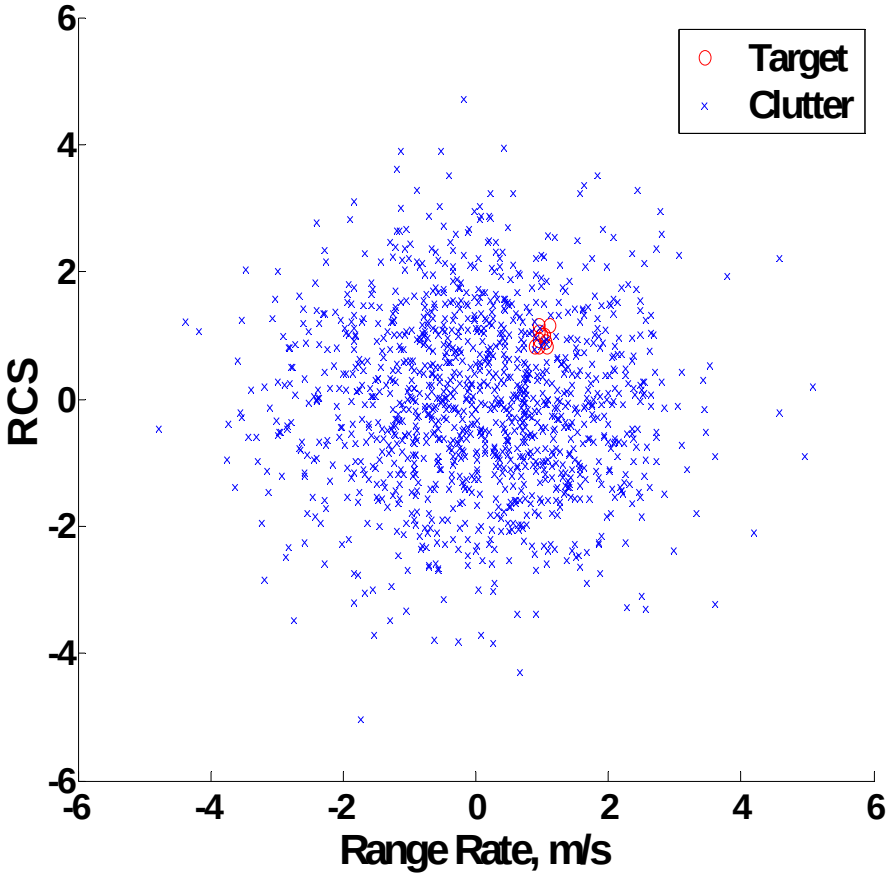
Moving target detection in high GMTI clutter (slow-moving cars or dismount troops)

All GMTI reports in 10 frames: 1 target + 125 clutters pixels per frame

High spatial density of clutter

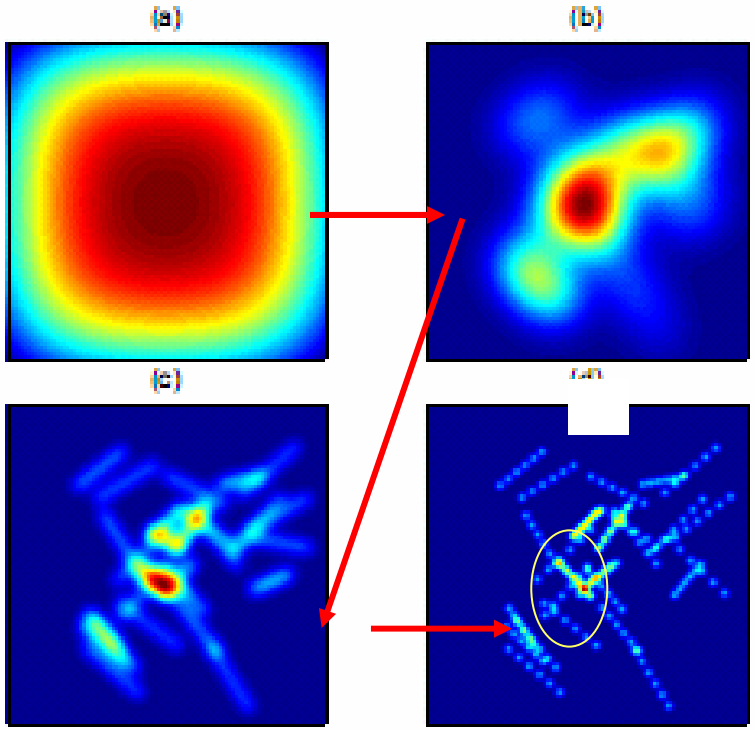


Target RCS & Range Rate are within clutter



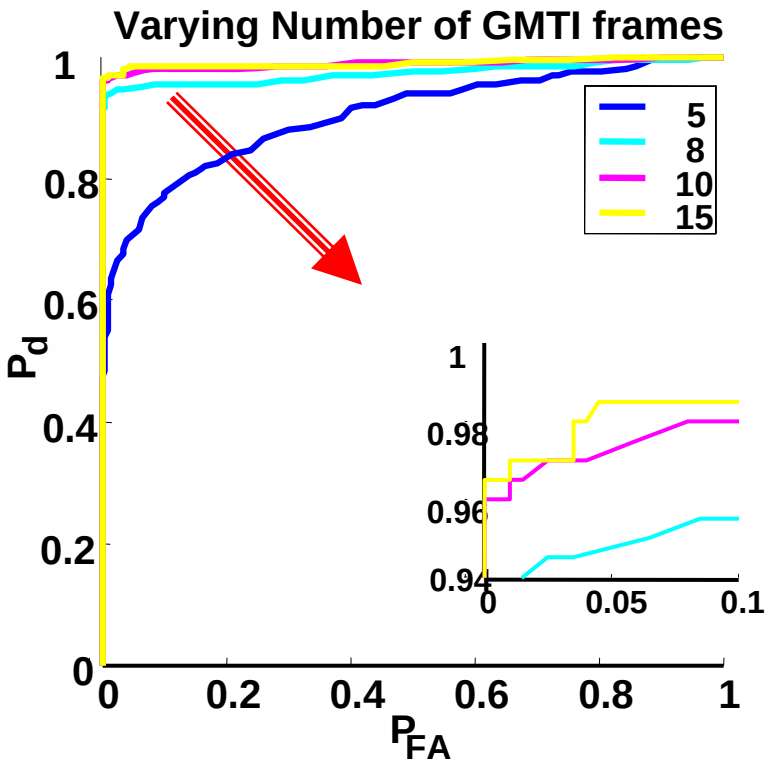
Non-combinatorial tracking by Dynamic Logic

Smoothness of likelihood is decreasing during iterations



Linear complexity

- allows processing large number of frames
- leading to better performance



Linear complexity
50K OPs per GMTI report

Dynamic Logic vs. Multiple Hypothesis Tracking (MHT)

Dynamic Logic Tracker

- Eliminates combinatorial complexity of the tracking problem
- Achieves high probability of GMTI track detections in high clutter
- Can process GMTI data in real time (11 GFLOPs, 3 PPCs)

	Full MHT	Practical MHT	Dynamic Logic
Algorithm Description	Considers multiple associations	Cuts hypothesis tree for non-combinatorial complexity	Solves association & estimation in non-combinatorial manner
Algorithm Performance	Optimal	Suboptimal	Optimal
Computational Complexity	Combinatorial	Non-combinatorial	Linear in number of frames & GMTI reports
Real time implementation	Not possible	Possible	Possible