Temasek Defence Systems Institute

Susceptibility Analysis of Ground Combat Vehicles

Yee Jian Hong, Bryan
Defence Science and Technology Agency

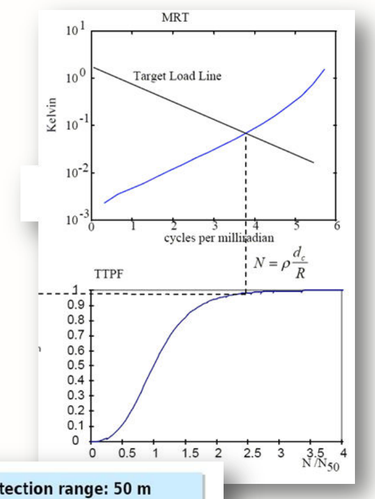
Advisor: Professor Christopher A. Adams
Director, Center for Survivability and Lethality
Second Reader: Associate Professor Jarema M. Didoszak
Department of Mechanical and Aerospace Engineering

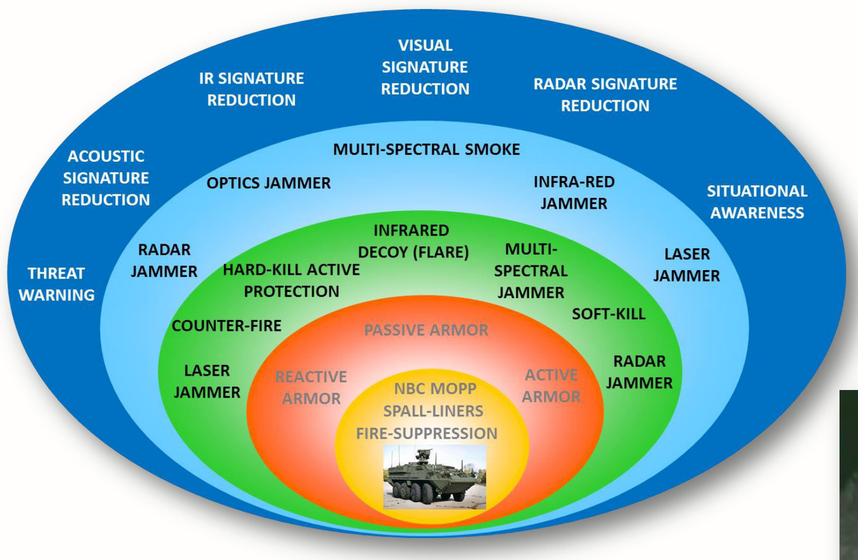
Objectives of Thesis

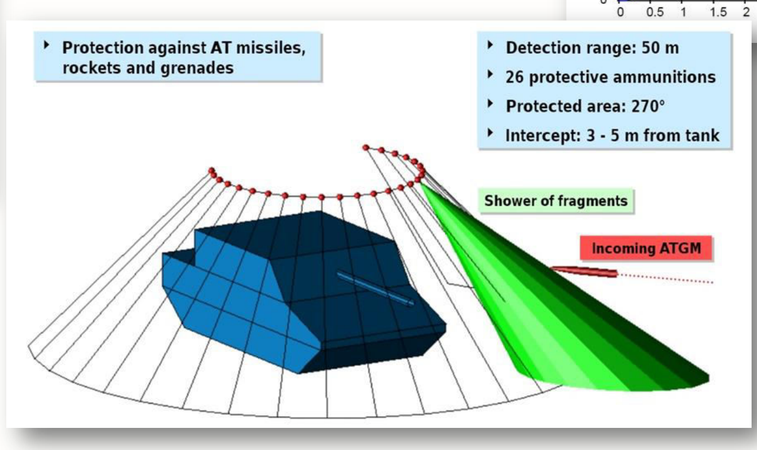
- Expand survivability considerations for Army ground combat vehicles.
- Establish framework for susceptibility analysis and quantification.
- Study trends of emerging guided threats.

Findings and Results

- Quantified reduction in kill probability for ground combat vehicles.
- Identified critical reduction factors.
- Quantified thermal contrast detectability based on target transfer probability function.
- Compared effectiveness of armouring protection versus reducing susceptibility.







Main Research Ideas

- Analysis of threats and tactics.
- Trends in conventional survivability enhancements.
- Susceptibility analysis of ground combat vehicles.
- Focus of susceptibility reduction
  - Signature analysis and management.
  - Active protection system.
- Probabilistic engagement model based on open-source data.
- Quantification of susceptibility factors and reduction.

Benefits and Applications

- Established framework and model for applications in classified domains.
- Quantified susceptibility reduction model for analytical cost-benefit analysis and trade-off studies.
- Expanded OODA loop to beyond armouring protection in survivability enhancements.

Parameter	Unit Cost ($M)	Campaign Loss Rate	GCV Req'd	New GCVs Required	Replacement Costs ($M)	Total Costs ($M)
Baseline GCV	12	0.998	100	100	1,200	2,400
Improved armoring	13	0.927	100	93	1,209	2,509
Reduced susceptibility	16.5	0.189	100	19	380	1,964

NUS National University of Singapore