EW Engagement Modelling for Light Armoured Vehicles

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Problem: How do we protect LAVs?

Layered Survivability:

- Avoid Detection
- Avoid Being Targeted
- Avoid Being Hit
- Avoid Penetration
- Mitigate Effects
Engagement Modelling:
Simulated Scenarios

Missile Threats & Survivability Measures

Unguided Missiles
• Threat warning
  → Manoeuvre

SACLOS Missiles
• Threat warning
  → Manoeuvre
• Threat warning
  → Obscurant smoke
• Signature management

Seeker Missiles
• Threat warning
  → Manoeuvre
• Threat warning
  → Obscurant smoke
• Signature management

Modelling Software: CounterSim Land v 1.3.25 (Chemring, UK)*
*Walmsley, R. & Butters, B. Infrared Smoke Modelling in CounterSim, Proc. of SPIE (Technologies for Optical Countermeasures IV), 2007, vol 6738
Scenario 1: Vehicle Manoeuvre vs. Unguided Missile
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Threat Range 300m (Manoeuvre Delay 0.5s)

Threat Range 400m (Manoeuvre Delay 0.5s)
Engagement Modelling: Simulated Scenario # 2

Missile Threat & Survivability Measures

SACLOS Missiles

- Threat warning
  → Manoeuvre
- Threat warning
  → Obscurant smoke
- Signature management
Scenario 2: Signature Management vs. SACLOS Missile

![Graph showing the comparison between different scenarios and signature levels.](image)

- **Scene**: plain
- **Signature level**: normal - 15, normal - 19, stealthy - 15, stealthy - 19
- **Sum of ASLAV Miss Distance m**

The graph illustrates the comparison of ASLAV miss distances for different signature levels across various turn angles. The x-axis represents the turn angle, while the y-axis shows the sum of ASLAV miss distances in meters.
Engagement Modelling: Simulated Scenario # 3

Missile Threat & Survivability Measures

Seeker Missiles
• Threat warning
  → Manoeuvre
• Threat warning
  → Obscurant smoke
• Signature management
Vehicle vs. Seeker Missile Scenario

Wind direction

Missile System

Manoeuvre angle $\theta$

$\theta = -170^\circ$

$\theta = 170^\circ$

N
Scenario 4: IR Smoke vs. Seeker Missile
Summary: Using Engagement Modelling for...

Deployment of EW threat warning technology
- Is automated response to threat warning necessary?
- What response should the vehicle initiate?
- What threat information is required?

Deployment of IR Smoke Countermeasures
- Must smoke launch be automated?
- How do you need to manoeuvre to effectively deploy smoke countermeasures?

Deployment of Signature Management Systems
- How good does your signature reduction have to be to be effective?