

Mission Evaluation and Assessment, System Understanding, Requirements and Evaluation (MEASURE) ARP - Proposal

Proposed Applied Research Project (ARP)

DRDC Valcartier

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11a: Mission Evaluation and Assessment, System Understanding, Requirements and Evaluation (MEASURE) ARP

- Participants: DRDC Valcartier
- Scientific authority: Alfred Jeffrey
- Project Duration: Apr 12 – Mar 15 (3 years)
- Sponsor:
- Linkages: TDPs, ARPs, Operational and Experimental Communities (CFMWC), TTCP

FTE	Contracts	Total Cost
1.5	\$225 K	\$225 K

Objectives:

- DRDC to develop representative operational scenarios and corresponding vignettes
- Establish weapon system requirements and evaluation criteria to evaluate performance
- Develop capability to evaluate weapon system CONOPs and TTPs, while considering a systems-of-systems analysis including sensors (targeting) and C2.
- Assess gaps in capability and the potential improvements.
- Stimulate the development of requirements / specifications / structure / doctrine.

Technologies (refers to DRDC “Defence S&T Strategy” document):

- 7.2 Assessment of the effects of weapon systems
- 7.3 Tailored precision weapons
- 7.4 Enhanced weapons systems for complex environments including urban ops

Outputs:

- Document defining operational scenarios and vignettes (threat type) for anti-air, anti-surface and naval fire support roles
- Weapon system requirements definition.
- Analysis of proposed weapon system performance in defined scenarios
- Assessment of suitability of proposed weapon system to meet specification (metrics/criteria for evaluation)
- Weapon system CONOPs and TTPs (Tactics, Techniques and Procedures) definition for mission roles.
- Modeling and simulation and tools to support analysis.

Intended Outcomes:

This capability will allow the Navy to better evaluate weapon systems as a function of specific requirements for specific mission roles. This capability will also allow for an assessment of specific weapon CONOPs and TTPs.

Missions

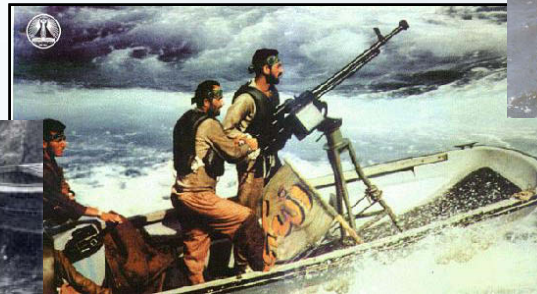
- Anti-air
- Anti-surface (small boat)
- Anti-surface (large combatant)
- Naval fires support

To define requirements and recommend rigorous evaluation criteria.

To define respective CONOPs and TTPs

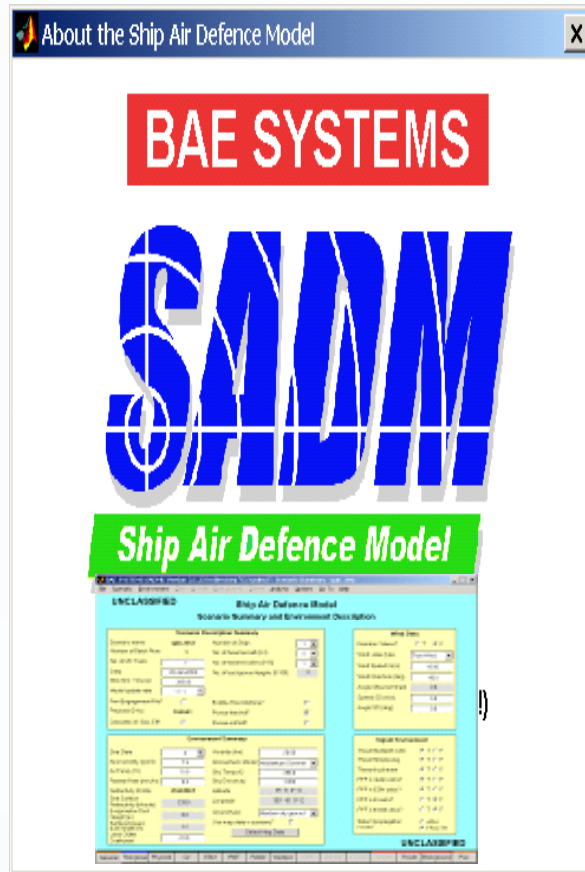
Example: Anti-surface (small boat)

- Engage the small boat threat
 - What are the weapon system (sensors, C2) requirements to defeat the threat?
 - Requirements
 - Able to engage the threat at ‘x’ yards
 - Provide 360 deg coverage
 - Evaluation (performance testing)
 - Dispersion, rate of fire
 - Effect, Phit, Pkill



What is the threat?

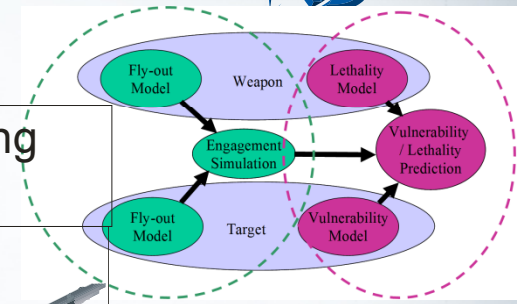
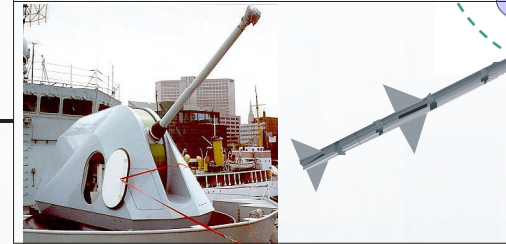
Modeling & Simulation



Inputs

Weapon Modeling
(fly-out)

Outputs
(Burst Point)

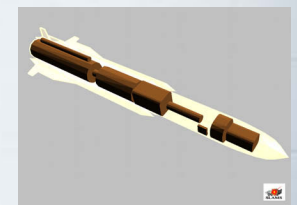
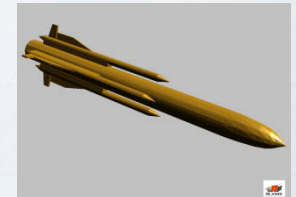


HKEP

Burst Point

Vulnerability / Lethality
Modeling

Kill Probability



SADM (Ship Air Defence Model) allows for single ship or taskgroup defence against single or multiple threats (M&S of complete kill chain: sensors, C2, engage and assess). It is used by many nations, including Canada).

HKEP – Hard-Kill Effectiveness Prediction
SLAMS – Survivability and Lethality Analysis M&S (V/L)

MEASURE

Mission/vision

- Problem
 - The client wants to establish a methodology to define weapon systems requirements and develop a robust procedure for evaluation. The CF requires a better understanding of systems performance, requirements, CONOPS (Scenarios) and TTPs
- Objectives
 - Provide advice and recommendations to CF in developing weapon system requirements and provide the methodology and tools to evaluate weapon performance.
 - Predict the performance of naval weapon system platforms as a function of the specific mission (anti-air, anti-surface, naval fire support); and respond with recommendations

MEASURE

- The CF Navy would like to have a more robust procedure of defining weapon system requirements and assessing performance (evaluation).
- How do you determine if System A is better than System B?
- It is important to adequately define the requirements of the system. What is the mission statement? Does the CF require precision and/or volume fire? What are the range requirements? Does the CF require a gun or missile solution? What are the CONOPs and TTPs required to fulfil the mission?
- A better appreciation of the concepts can be realised thru M&S.
- M&S will permit the development of new concepts thru a trade-space analysis. A rigorous approach using capability based engineering will permit a rigorous formulation of the problem and possible solutions / recommendations.

MEASURE

Impact

The CF will be better informed on system performance and better situated to define weapon system requirements and apply rigorous evaluation criteria to measure weapon system performance

- Better understanding of requirements for systems
- Evaluate system performance (lethality) and target vulnerability
- Define mission roles and scenarios
- Better understanding of CONOPs and TTPs

MEASURE

Major Milestones:

- Define problem and potential solution space, Phase I
- Define missions, scenarios and vignettes, Phase II
- Development of requirements and corresponding evaluation criteria, Develop CONOPs and TTPs, Phase III
- Complete evaluations of weapon system performance, Phase IV
- Reporting, Phase V

A 3 year program with an approximate value of \$225K