

A Structured Approach to Developing System Solutions to Military Requirements

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BAE SYSTEMS

ISMOR 18

Future Systems - 2001

Future Systems

Team Composition

- Strike
- Manoeuvre
- Information Superiority
- Strategic Deployment

- Concepts and Technology

- Business / Finance / Human Resources

Team Locations

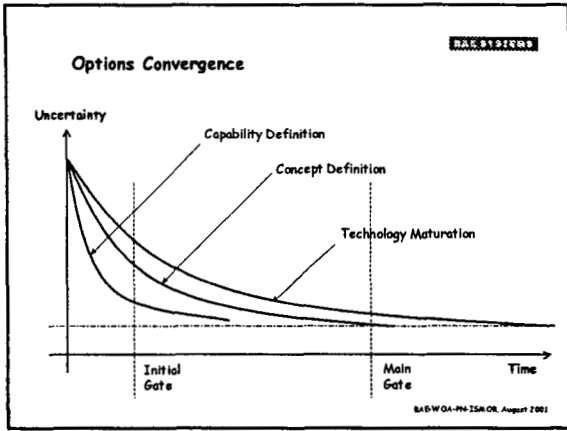
Warton
New Malden
Farnborough
Christchurch
Pitney

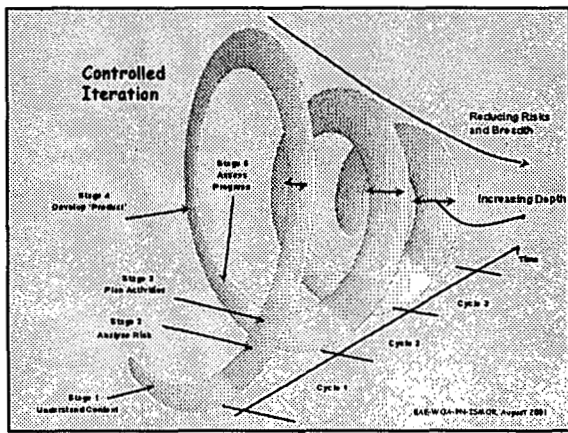
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The Problem

- Transition from Equipment to Capability Procurement
- Broader set of options to consider
 - developments/derivatives
 - new concepts / OTS
 - enablers
- Shortening Timescales
- Demands Rapid, Iterative process covering total system to support decision making

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- RAE SYSTEMS**
- ### Analysis Steps
- Characterise the Requirement
 - Evaluate Customer Current Capability
 - Explore Potential Solutions
 - Evaluate Solutions
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REQUIREMENT

The Requirement

.. to have the desired effect on all potential targets under all operational conditions in a survivable manner ...

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REQUIREMENT

Requirement Characterisation

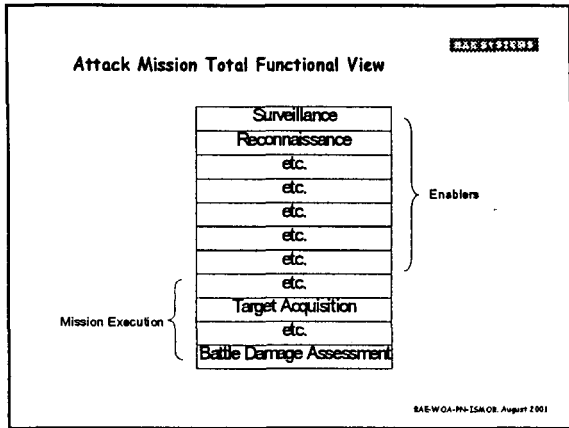
the target...	Easy	Parameter	Hard
	Soft Static Large etc	Hardness Mobility Signature etc	Very Hard Moving Small etc
the natural environment...	Relaxed Nil Clear etc	ROE Collateral Risk Weather etc	Stringent Extreme Cloudy etc
the threat environment...	Few 3rd Gen Point Legacy SHORAD etc	Fighters SAM Density Sophistication etc	Many 5th Gen Blanket Advanced LR etc

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REQUIREMENT

Mission Level Assessment Structure

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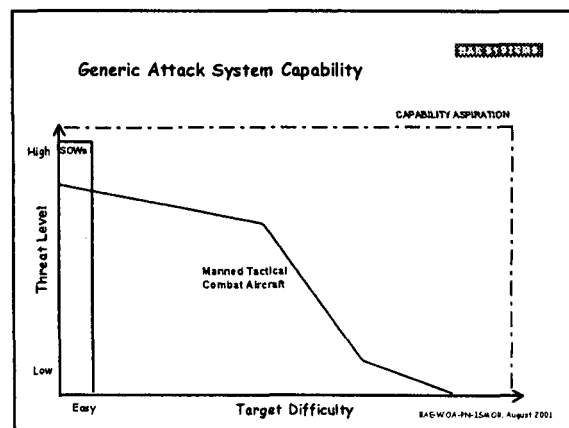


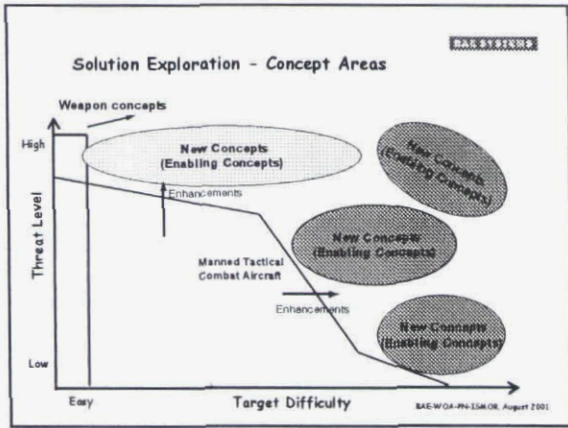
'Use Case' Evaluation

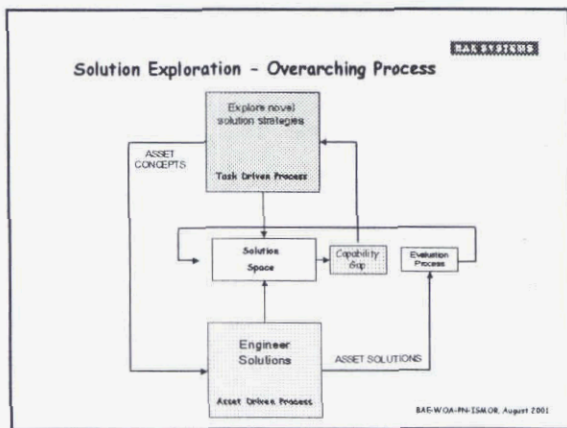
Framework enables evaluation at various levels:

- Does system under consideration possess the necessary functionality?
- Can it be used in a survivable manner?
-
-
- Is the system optimally cost-effective?

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Novel Strategies - Example

Attack / Enabling Functions

Sensing				Deciding				Shooting			
SurvSense	Recon	etc.	etc.	etc.	etc.	etc.	etc.	Target Acquisition	etc.	Combat Assessment	
Survive											
etc.											

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Sensing Options

Passive	Non-Imaging	RP	ESM
		ID	FLIR/Hyperspectral
	Imaging	Visible	Film-Based
			etc.
Infrared		FLIR/ALIR	
		etc.	
RP	MMW Radiometry		
Passive (Bistatic)	Imaging	RP	SAR
Active	Non-Imaging	RP	MTI
			SAR
	Imaging	EO	Scanning LASER
			etc.
Specific	Non-Imaging	RP	MTI
		EO	Vibrometry
		Magneto Meter	
		Gravimeter	
	etc.		
	etc.		
	etc.		

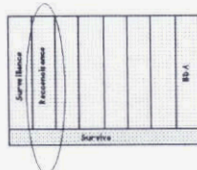
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Survivability Options

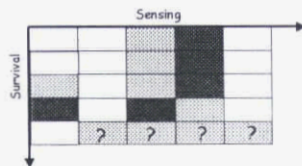
Survivability Strategy	Threat Avoidance (Avoid)	Deny opponent knowledge of platform's presence	Standoff Terrain Screening etc.
	Attack Evasion (Evade)	Deny opponent an attack/firing solution Evade an incoming weapon or fire	Substitution Deception Disrupt communications/data links etc. etc.
	Threat Elimination (Counter)	Destroy/Suppress opponents	Soft Kill Hard Kill
	High Damage Tolerance	Minimize effects of damage caused by opponent	Hardening/Protection Damage Control Measures etc. etc. etc.

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Consideration of Viable Solution Options



Considering 2 Aspects of Multi-dimensional solution space:



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In Summary

REVISION

- Briefly illustrated an approach to developing system solutions to a military requirement
 - uncertainty managed through generically structured, then prioritised requirements
- Illustrated Operational Analysis in broader Systems Engineering context
- Any Questions?

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