

## OA Challenges Offered by New Weapon Systems

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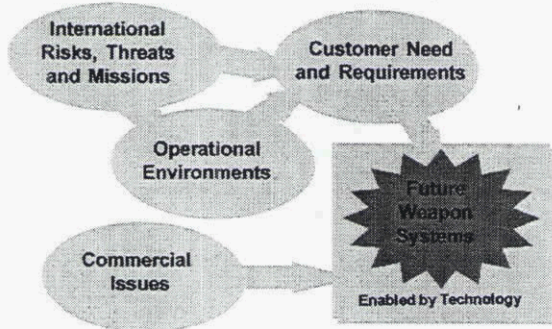
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## Operational Analysis in Matra BAe Dynamics

- Prime Contractor for Guided Weapons
- Anglo-French Organisation
- Products includes Air, Land and Sea weapon systems
- OA conducted in a systems engineering environment

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### Drivers for Future Weapon Systems



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### Drivers for Weapon System Design Operational Environment

- Out of Area Deployments
  - Transportability, mobility, minimum logistics burden
- Rules of Engagement, Media Interest
  - Minimise collateral damage, additional modes of operation
- Joint and Combined Operations
  - Interoperability
- Less Dense Battlefield
  - Longer range, greater emphasis on targeting

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### Drivers for Weapon System Design Commercial Issues

- Consolidation of the European Defence Industry
- Multi-national programmes
- Smart Procurement
  - Through Life Systems approach
  - Customer/Industry partnerships
  - Reduced Risk
  - Affordability

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### OA in Industry - Typical tasks I

- Future Weapon Concepts
  - Provide doctrinal background, possibly equipment concept of operations
  - Initial Operational Requirement definition
  - Initial assessments of military worth
- Why ?
  - 'Big Picture'
  - Improved investment and bid/no-bid decisions
  - Build in operational strengths, reduce weaknesses at an early stage

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## OA in Industry - Typical Tasks II

- **Feasibility Studies**
  - Effectiveness and survivability studies
  - Internal COEIAs
  - Architecture studies
  - Tactics development
- **Development and In-Service**
  - Effectiveness and survivability studies
  - Sales support : studies and brochures
- **Supporting activities**
  - Tool development : models, simulators & methods
  - Doctrine research

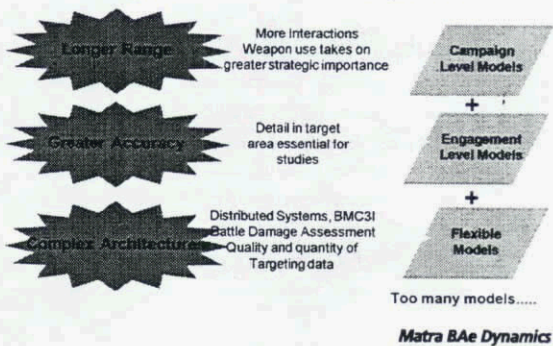
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## Challenge 1 - Asking the right Questions

- **Early in project - Often more important to raise issues rather than quantify answers**
  - Identify benefits, concerns and showstoppers
  - Data often unknown and uncertain
  - 'Are we asking the right questions ?'
  - 'How might we study this in the future ?'
- **Tools develop as projects mature**

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## Challenge 2 - Finding the Right Tools



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## Challenge 3 - Measures of Effectiveness

- **'Counting Kills' remains important**
- **Weapon effects difficult to predict**
  - Physical and psychological effects
  - Collateral damage - highly scenario dependent
- **Weapon systems also provide credibility and deterrence**
  - Can these effects be measured ?

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## Challenge 4 - Representing the Human Element

- **Human decisions have a direct effect on weapon system performance**
  - Tactics, target selection and confirmation, mission planning...
- **Man-in-the-loop approach best for developing tactics**
- **How to represent psychological effects, confusion, 'non-perfect' operators ?**

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## Conclusions

- **Think hard before using models !**
- **Simple approaches often work best - Many limitations on complex approaches**
- **Necessary level of background knowledge for analysts is increasing**
- **Four Challenges -**
  - some answers, still more questions !

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