Network Enabled Fires - A NEC/NCW Use Case

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NEF Studies

- The current status of Joint Fires
- NEC Themes
- NEF Transitional Epoch Improvements
- Analysis
  - Benefits Modelling
  - Dynamic Modelling
- Conclusions

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Context - What is Joint Fires?

- Fires from two or more Component Commands, co-ordinated to produce effects that are synchronised in space and time
  - What volume of space?
  - What period of time?
- The answers have typically been:
  - 100s of square kilometres
  - Hours

Flexibility and Responsiveness

- Joint Fires has been lacking in the necessary flexibility and responsiveness
  - Lack of Situational Awareness within and between Component Commands hinders collaborative planning in near real time
- Land Component effects systems are now able to reach far beyond the close battle and a flexible, timely means of *integrating* these systems with air systems is more important than ever

NEC Themes

Full information availability

Shared awareness

Flexible working

Agile mission groups

Synchronised effects

Effects based planning

Resilient information infrastructure

Fully networked support

Inclusive flexible acquisition

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NEC Themes - Transitional Epoch

Full information availability

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NEF Transitional Epoch Improvements

- Sharing of Blue & Red Force status, dispositions, intent and deconfliction information would enable production of a ‘Deep Operations Picture’
  - The picture relates to broad areas where forces are not necessarily in close contact
  - The information exchanged would be that which is relevant to C2 of Deep effects systems, which are owned by formations at, or close to, the Operational level of Command
- Collaborative interworking

Analysis

- Analysis of NEF in the Transitional Epoch followed two related paths:
  - Benefits Modelling
  - Dynamic Modelling

Benefits Modelling

- Structured judgement techniques were used to evaluate the benefit of the NEF concept against the following metrics:
  - Time
  - Flexibility (degree of choice in plans, assets and outcomes)
  - Co-ordination (alignment of assets in time, space and purpose)
  - Situational Awareness (degree of awareness and understanding of surrounding battlespace)
  - Optimality (degree to which assets are optimally employed)
  - Mission success (degree to which mission objectives are achieved)

Metrics - Categorisation

	Situational Awareness	Time	Co-ordination	Flexibility	Optimality
Cognitive Domain	Understanding	Time to make decision	Collaboration between people	Choice of CoA and problem solving	Ability to make correct decisions
Information Domain	Availability of information	Time to transfer and display information	Coherence of information	Production and flexibility of alternative plans	Selection and filtering of appropriate information
Physical Domain	Presentation of information	Time to move assets	Synchronisation of physical assets	Choice of assets and ability to change team structure	Utilisation of assets

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Benefits Modelling continued

- Several Joint Fires Use Cases (including a contemporary Joint Air Attack Team mission) were analysed through formal process modelling to extract salient, generic mission elements
  - Each mission element was analysed to determine how it would be affected by the NEF architecture

Benefits Modelling continued

- Mission Elements considered:
  - Communicate
  - Collate and create intelligence product
  - Disseminate Intelligence products
  - Assess target and establish required effect
  - Decide if ISR or effector required
  - Decide which ISR or effector
  - Plan and deconflict
  - Task ISR or effector
  - ISR or effector preparation
  - Transit
  - Find target and gain ISR
  - Engage Target

Benefits Modelling Results

- Improved information infrastructure allows more efficient dissemination of information
- This improves Situational Awareness and Flexibility
- The improved SA allows better synchronisation and utilisation of assets
- Consistent and timely information to sensors and effectors improves synchronisation
- Improved tools and SA provide time savings in dissemination, planning, tasking and execution processes

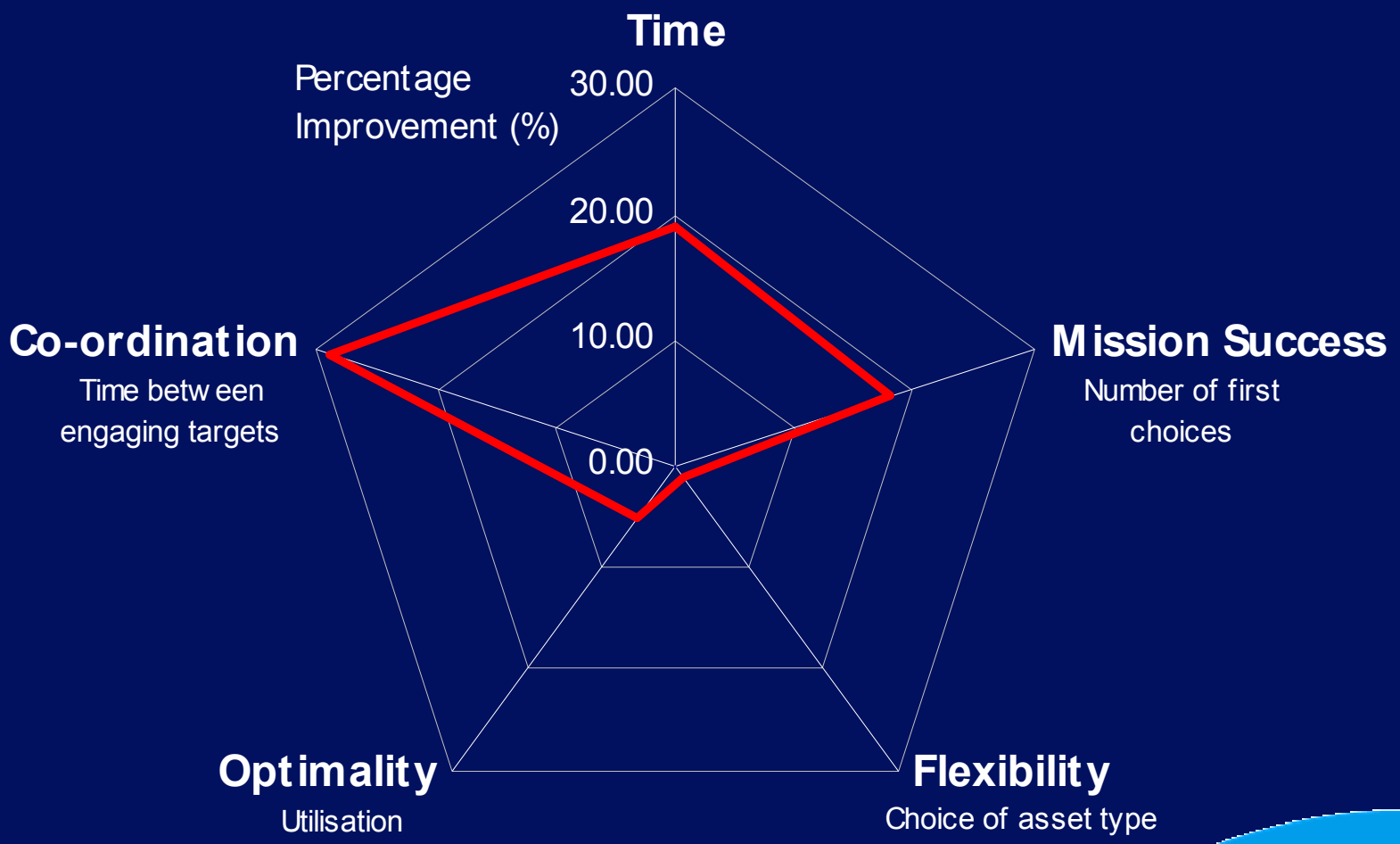
Dynamic Modelling

- A single mission chain Monte Carlo model
  - times and critical path for the mission chain
- A multiple mission chain event-based model
  - to assess a wider range of metrics

Single Mission Chain Results

- 500 runs of the mission chain
  - Execution time reduced by 18.5%
  - Largest time reductions in detailed planning and deconfliction tasks
- Results specific to the mission chain studied

Multiple Mission Chain Results



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Conclusions

- The Deep Operations Picture and collaborative interworking would provide the means for more efficient use of Joint effects towards Joint ends
- The DOP concept is aimed at the ‘Transitional Epoch’ which realises some elements of Network Centric behaviour
- This work has shown that connectivity is not the only issue - common data formats and common doctrine/procedures are essential (and probably just as difficult to achieve)

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Questions?

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