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# Representing military operations in the Land tactical execution domain

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# Opening remarks

- We are interested in the *representation* of military operations in the Land tactical domain:
  - What form of expression is appropriate?
  - What aspects of the military business should be expressed?
- Our aim in this activity has been to develop models for facilitative purposes:
  - Want models capable of being understood, appreciated and critiqued by a military audience
  - Not simply trying to generate technical specifications

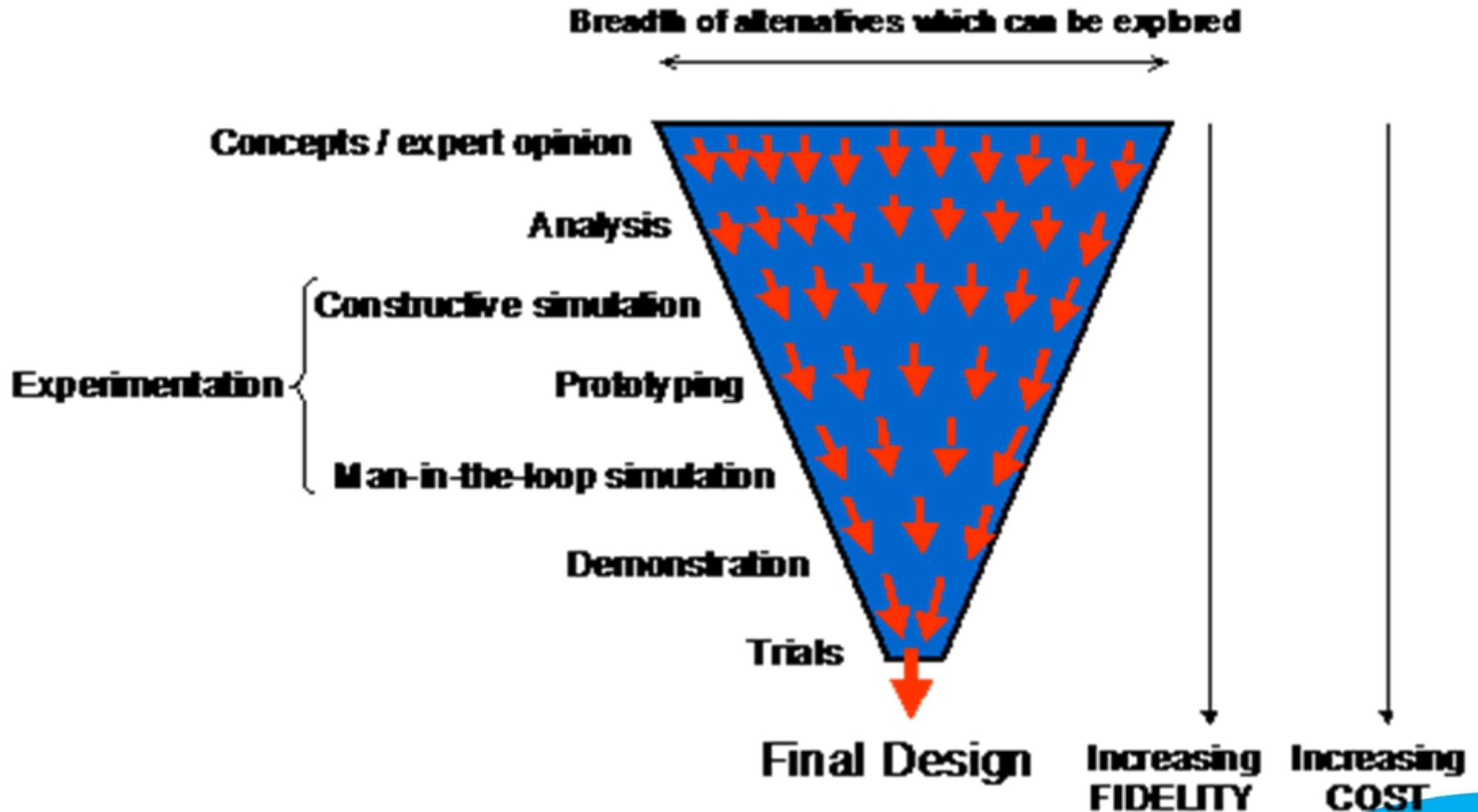
# Characteristics of the Land execution environment

- Inhabited by force elements, staff and platforms which have a functionally-specialised capability
- Need to work co-operatively or collaboratively to achieve typical Land tactical aims
- This implies interworking between specialisms
- The structures for co-operation and collaboration must be flexible to accommodate different circumstances
  - They will change on two timescales (deliberate; dynamic)
  - Structural change to meet unfolding requirements may be modulated by the need to maintain tempo
- Key features (particularly for close combat):
  - Stress; the need to maintain command dominance
  - Some continuing advantages of voice over data
  - Drivers and pressures

# Networking

- Networking is the means of achieving inter-working
- Currently this is vested largely in human and organizational mechanisms
  - Ability to modify formal structures and exploit informal structures (communities)
  - Human networks
- To improve networking, we should be trying to better support and exploit existing networking and reconfigurational activity
  - Rather than replacing it with a completely new technologically-orientated paradigm

# Modelling and experimentation



# Vignettes and episodes

- Vignettes provide a better basis for gaining military SME engagement than static representations – they put things into action
- Vignette models should be built from architectural elements
  - Guarantee of cross-vignette consistency
- How many vignettes are needed?
  - Selection based on ‘stressing events / episodes’ principle
  - Need backroom analysis of completeness / boundedness

# World of information and world of action

- We want models capable of being understood and appreciated by a military audience
- The integration of information does not lead inevitably to better decision-making:
  - There is a need to maintain command dominance
  - There is a need to live with uncertainty
- Hence:
  - “Don’t just model the carrier-pigeon business”
  - Make maximum use of contextual cues to the military thinker, and of map- or schematic- based representations which emphasise time and space
  - Get granularity right – use abstraction
  - Don’t get mechanical and deterministic – think “soft systems”

# Communities

- A community is a set of collaborators with mutual trust
- The tactical organization is built out of a set of such overlapping communities
  - both functional and cross-functional
- Communities of purpose, not just ‘Communities of Interest’
  - include formal and informal structures
- They provide a vigorous abstraction
  - encapsulate the means to maintain a common appreciation of a particular domain or functional specialism (procedures, processes, technology)
- There are a number of different visual representations possible

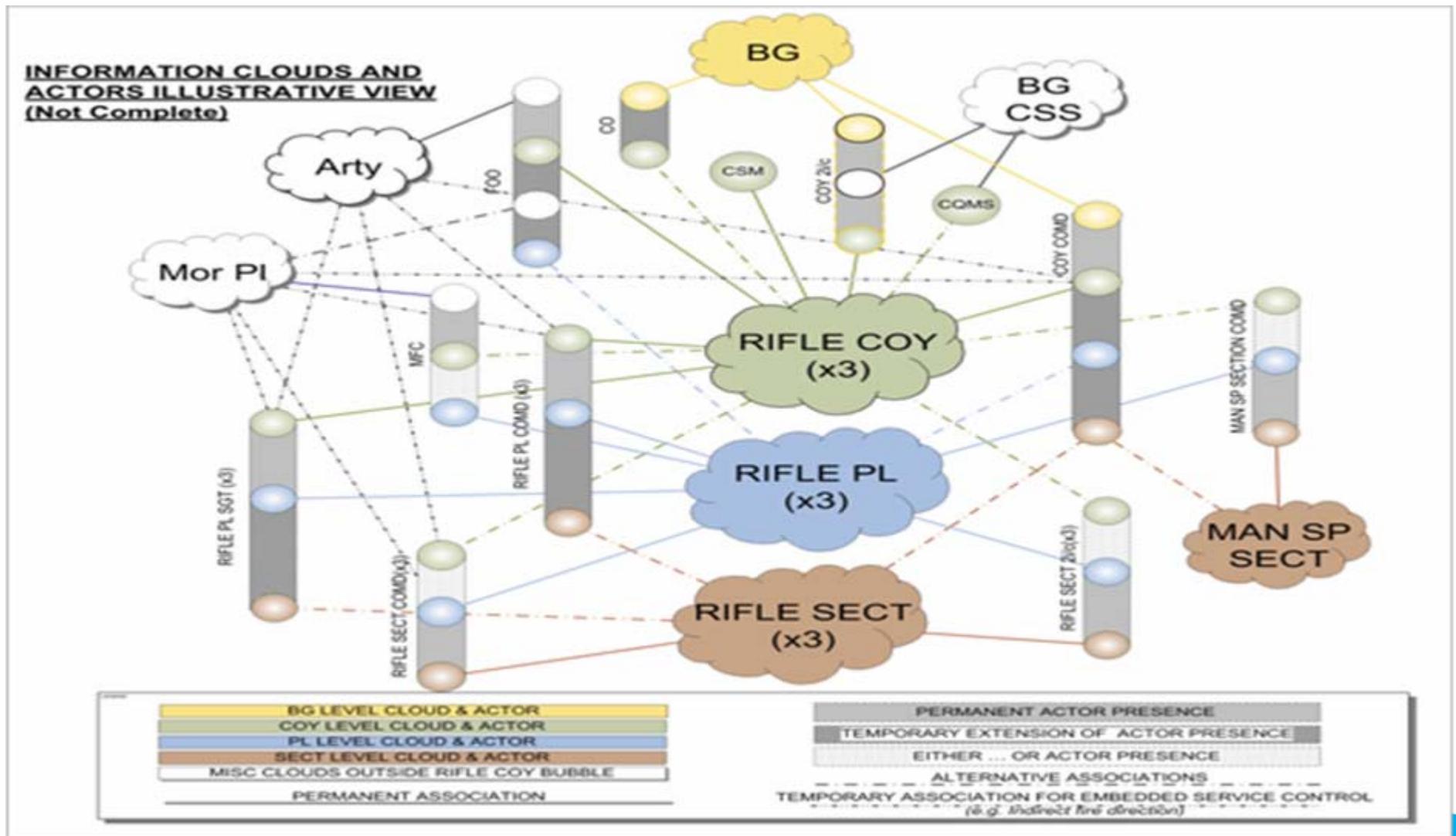
# Affiliation matrices

## Force elements

### Communities

		Force elements								
		Infantry								
		SU				SSU				
		Coy A Comd	Coy A 2IC	Coy B Comd	Coy B 2IC	Coy A CSM	PI A1 Comd	PI A1 Sgt	PI A2 Comd	PI A2 Sgt
Protect	AD	✓	✓	✓	✓		✓	✓	✓	✓
	NBC	✓	✓	✓	✓		✓	✓	✓	✓
CSS	Command		✓		✓					
	ES				✓					
	Log					(✓)				
	Med		(✓)		(✓)					
CIS	BG		✓		✓					
Manoeuvre dismounted	Inf Coy A	✓	✓	✓		✓	✓	✓	✓	✓
	Inf Coy B	✓		✓	✓					
	Inf PI A1	(✓)					✓	✓	(✓)	
	Inf PI A2	(✓)							✓	✓
	Inf PI B1			(✓)			✓			
	Inf Sect A1a	(✓)					(✓)	(✓)		
	Inf Sect A1b	(✓)					(✓)	(✓)		
	Man Sp Sect A1c	(✓)					(✓)	(✓)		
	Inf Sect A2a	(✓)							(✓)	(✓)

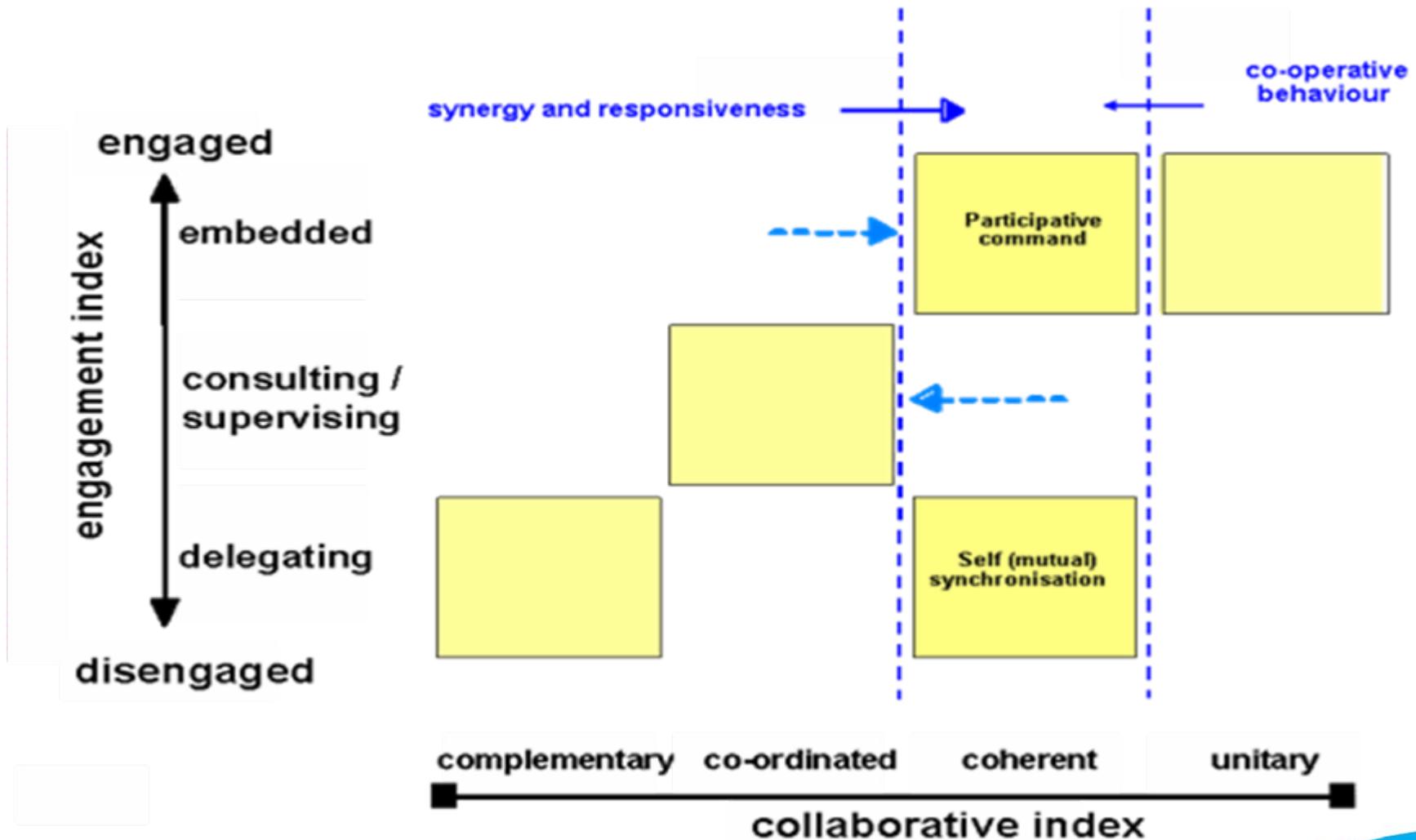
# 'Clouds' diagram



# Interworking

- ‘Working co-operatively or collaboratively within or between communities’ – the essence of tactical operation involving functional specialisms
- We need a language (and a proper conceptual model) to describe, and differentiate between, different types of interworking
  - Expressed in military business terms, not just in terms of the informatic consequences, e.g. information exchanges
  - Includes ‘interoperability of the mind’ – but also structural and functional dimensions of interworking
- The paper describes the characterisation of interworking in terms of two particular dimensions (not the only possible dimensions):
  - Extent of inter-dependence between activities of peer organizations
  - Degree of direction, supervision and monitoring pursued by superior commander
- Identifies a set of consistency rules on logical grounds

# Interplay between two dimensions of interworking



# Modelling rules

- Descriptions of the military business in the Land tactical domain must be situated first and foremost in the world of action, not the world of information.
- Vignettes provide a better basis for gaining military SME engagement than static representations
  - Maximum use should be made of contextual cues to the military thinker, and of map- or schematic- based representations which emphasise time and space
- Vignettes can be modelled selectively, provided that their definition and scope are supported by careful analysis.
  - This backroom analysis will generate diverse representations which will give insight to the analyst but which must not be exposed directly to military SMEs

# Final reflections

- Understandable views come about through abstraction, and abstractions come from the analyst being prepared to commit to particular conceptual representations of military activity.
- It is unlikely that powerful representations can be ‘conceptually neutral’; a purely objective approach to modelling is unlikely to produce useful models.
- A corollary of this is that modellers must declare the conceptual standpoint(s) from which views have been generated.

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