



# All OR is 'soft' OR !

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# Themes . . . .

- Preamble
- Defence analysis
- Subjective methods in defence
- Guidance for analysts
- Guidance review – guidance for the ‘desk officer’
- Is all OA soft OA?
  
- . . . acknowledges his Socratic Temperament . . . .

# Preamble

- History
  - Engineering : the art of the safely feasible
  - Business : the art of the profitable (increased value)
  - Science : the art of the real and true
  - Economics : the art of marshalling the resources. . . . which create the opportunities for building the safely feasible . . . . .
  - Operational Research : the art of increasing the value of the safely feasible, using the methods which have revealed the real and true, using marshalled resources
- Issues
  - Probable v. certain
  - Meaning v. value / cost
  - Known unknowns v. unknown unknowns
- Ideas
  - Model – abstract surrogate with which we can experiment
  - Reality and truth matter even if we don't know quite why
- 'Analysis' – understanding, can lead to improvement

# Defence

- Operates on several levels :
  - Political
  - Institutional
  - Technical
  - Operational
- Defence 'Analysis' is called for at each level
- What are the proper methods in each level?
- Is there an integrating method that can bridge the levels?

# Analysis Methods in Defence

- ‘Speed – time – distance’ & ‘balance of investment’
- Acknowledged uncertainties – frequencies / probabilities
- Human factor has a ‘toe-hold’ in
  - Ergonomic efficacy
  - Command & control (‘IT’)
  - Combat identification
- Therefore, mostly ‘hard’
- Conducted at the Technical and Operational levels

# Objectivity, and Subjectivity

- Objective, *aka* 'hard', methods
  - Physics and engineering paradigms
  - Realist, external
  - People 'free'
  - Value free
- Subjective, *aka* 'soft' methods
  - No universal / meta paradigms
  - Relativist, internal
  - People dominant component
  - Value is the essence

# Subjective Methods in Defence

- Resisted - technocratic world-view, yet . . . .
- All pervasive !
- Institutionalised : doctrine; scenario definition; concepts of operation; 'traditional' unit structures
- All approached *via* technique very similar to a typical 'problem structuring' method

# Guidance to analysts - current

- Extant guidance (2001) :
  - Strive to maximise objectivity and rigour
  - Gauge the validity of the overall approach in terms appropriate to the problem domain
  - (Remember there will be) distortions deriving from unrepresented effects of interactions between factors
  - The provenance and validity of data has heightened significance because it is derived from judgements
  - Auditability through clear separation (of objective and subjective methods, and of methods and data)
  - There are often subjective phases in otherwise objective approaches,
  - Cost-effectiveness should be based on objective / 'hard' methods. It is unlikely that subjective / 'soft' methods alone will suffice
  - multi-methodology likely the right approach for most assessments . . . consistent with the heritage of OR/OA . . . likely to result in well-structured, rigorous, and quantitative analysis, of maximum utility to the decision maker



# Guidance Review - aims

- Update extant guidance to reflect current structures and processes
- Refresh in the light of evolution of technique
- Seek peer review
- Assist the 'desk officer'
- Process as well as principles
- What are the practicalities – of 'rigour', 'objectivity', 'validity', etc?

# Desk Officer's Day



Create system description / model

Identify scenarios of use and concept of ops

Use subjective method to identify / characterise benefits and their dependence on attributes of likely system components

Design panel & results collection method

Conduct military advice / judgement panel

Structure benefits

What kind of model? – analytic, simulation, hierarchy, network?

If hierarchy or network, run judgement panel of military operators to quantify strengths of association ('weights')

Call judgement panel of technical & operational people to create & rank options for expenditure

Call judgement panel of technical people to 'score' / gauge performance of candidate options in the system model

Use linkage strengths ('weights') and option 'scores' to calculate merit / effectiveness / performance at relevant points in the system model

Assess impact of uncertainties and variability in the system model

N.B. 'scores' could be derived from physical / objective models, theory, or judgement, or a mixture of all three

# Analyst's Actions



# My experience . . .

- A given 'problem' can emerge from anywhere in its dimension space
- It may emerge in several dimensions at once, though often the 'owner' doesn't realise it
- These usually true even in the traditionally 'hard' analysis domains
- Every analyst (should be) obliged to explain what they have left out, and why

# “All OR is ‘soft’ OR”

## Pro

Assumptions  
The Rev. Bayes  
Opinion  
Progress  
Consensus  
Mutuality  
Polity

## Con

Data  
Frequency  
Physics  
Credibility  
Vulnerability  
Responsibility  
Repeatability

# Questions ?



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