



Australian Government

Department of Defence

Defence Science and Technology Group

Wargaming in Land Capability Analysis

Fred DJ Bowden

Content

- Background
 - What we do
 - How we do it
- Roles of our wargaming

Problem Types

- Decisions Relating to:
 - Major Systems
 - Force Structure changes
 - Future concepts and procedures
- Problems are Wicked/Messes/Complex
- Active adversaries undermining progress

- There are no correct solutions

Analytical Campaign Approach

- Philosophical Validity
 1. **Data Triangulation:** multiple sources of data
 2. **Investigator Triangulation:** multiple analysts from the same field
 3. **Theory Triangulation:** multiple perspectives to interpret the same data
 4. **Methodological Triangulation:** applying multiple methods to the same problem
 5. **Environmental Triangulation:** ensure different settings are considered when addressing a problem
- Internal and External Validity

Internal Validity
Identify cause and effect

External Validity
Applicability to real world

Mathematical
Models

Closed-Loop
Simulation

Human-In-the-
Loop Wargaming

Facilitated
Discussion

Training
Exercise

Certification
Exercise

Real Event
Analysis

- Requires Multi-Methods and Trans-Disciplinary Approaches
- Iterative approach

Fred DJ Bowden, Peter B Williams, **A framework for determining the validation of analytical campaigns in defence experimentation**, in Piantadosi, J., Anderssen, R.S. and Boland J. (eds) MODSIM2013, 20th International Congress on Modelling and Simulation. Modelling and Simulation Society of Australia and New Zealand, December 2013, pp. 1131–1137.

Motivation

- *You can't predict the future, all you can do is prepare for possible futures.*

Brandon Pincombe

- *Prediction is difficult, particularly when it is about the future.*

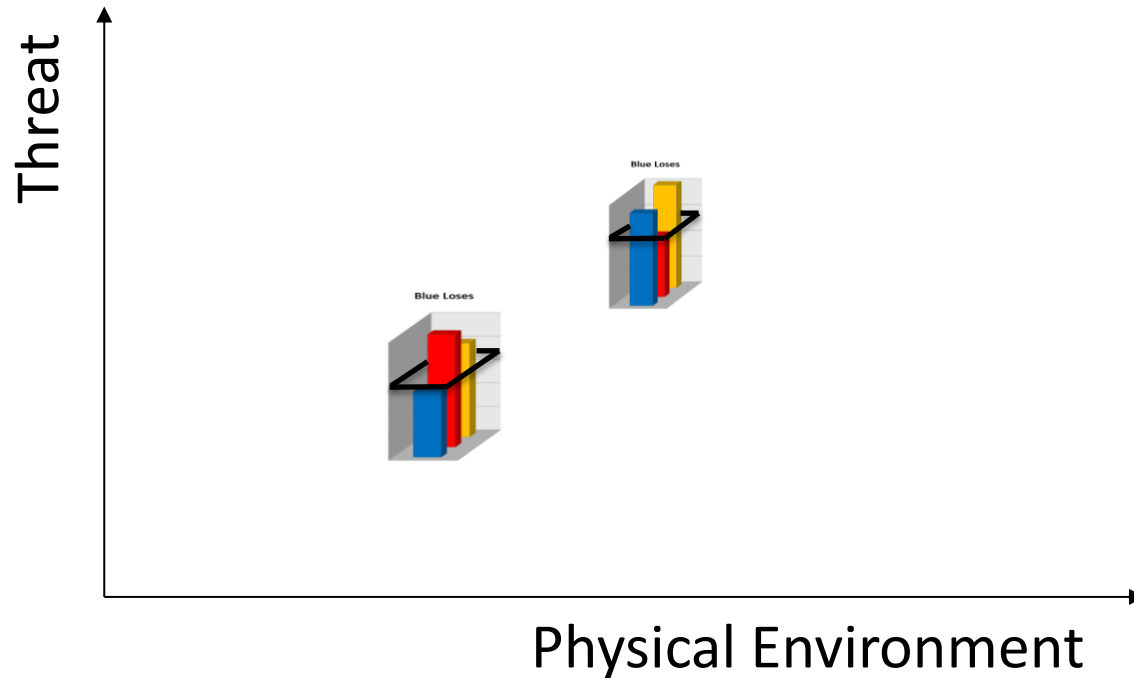
Danish Proverb

Multi-Dimensional Scenario Space

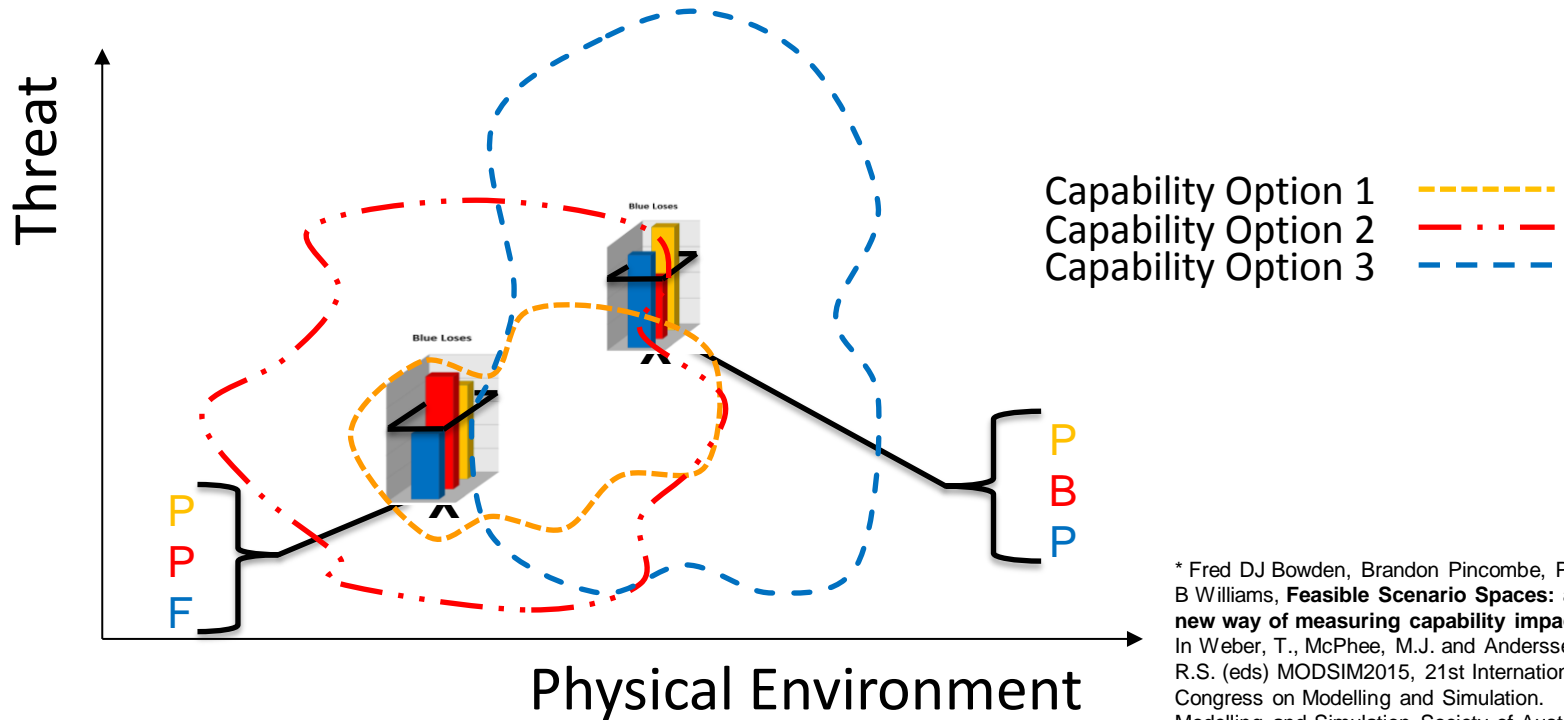
- Dimensions*
 - Own Force Capabilities
 - Physical Environment
 - Human Terrain
 - Operational Partnerships
 - Socio-political Issues
 - Nature, Diversity and Intensity of Threat
- Thresholds of success or **Breakpoint**
 - Acceptable Risk

*B Pincombe *et. al.* (2013), **Ascertaining a hierarchy of dimensions from time-poor experts: Linking tactical vignettes to strategic scenarios**, *Technological Forecasting & Social Change*, 80, 584-598.

Defining the Feasible Scenario Space

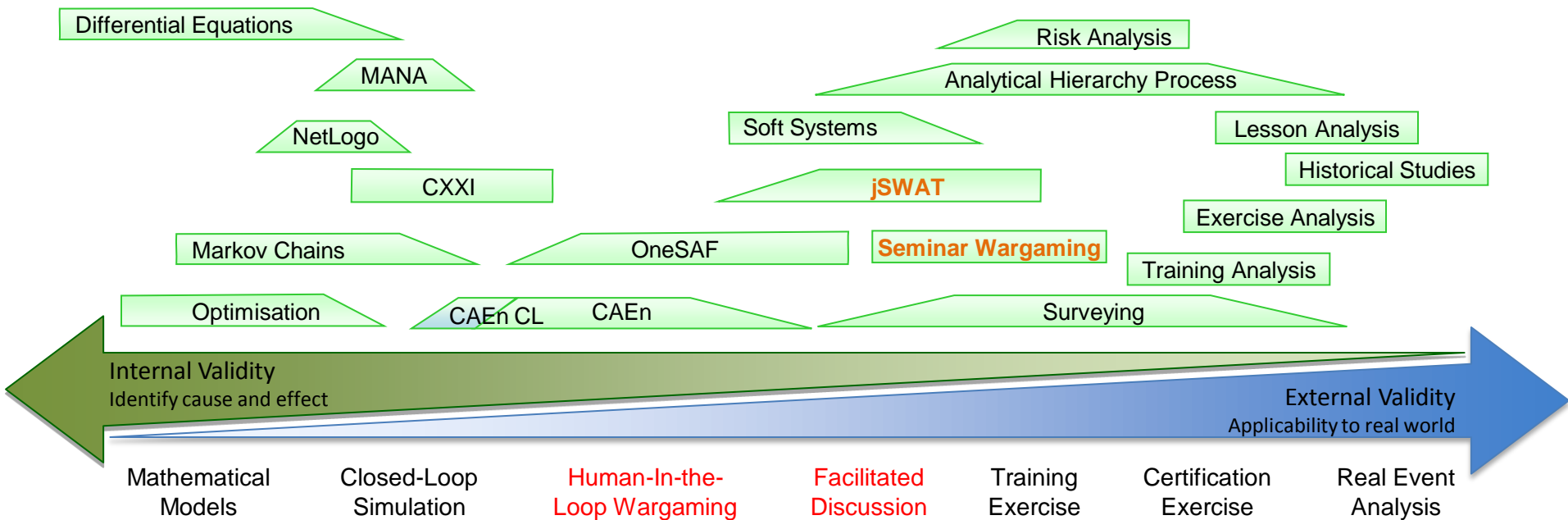


Defining the Feasible Scenario Space



* Fred DJ Bowden, Brandon Pincombe, Peter B Williams, **Feasible Scenario Spaces: a new way of measuring capability impacts**, In Weber, T., McPhee, M.J. and Anderssen, R.S. (eds) MODSIM2015, 21st International Congress on Modelling and Simulation. Modelling and Simulation Society of Australia and New Zealand, December 2015, pp. 836–842.

Wargaming Within our Continuum



Our Purpose for Analytical Wargaming

- **Define:** problems and conditions for more detailed analysis.
- **Performance:** analyse the performance of systems in context.
- **Validate:** confirm results of previous analysis.
- “Quickly” find the limits of operational performance with acceptable risk.

Why Analytical Wargaming?

- To understand the causes of failure
 - Capability
 - Context
 - Actions
- To identify the feasible scenario space
- To determine how the force operates on the boundary of success
- Determine effectiveness, robustness, and flexibility through explicit consideration of
 - Environmental impacts
 - Impact of the enemy
 - Capability inter-dependencies

Analytical Wargame – Our Definition

- **Model** - of a military event (hence the term “war”).
- **Competitive** - involves two (or more) competing intellects attempting to solve a problem or complete a task – coercive.
- **Contextual** - set within a context that presents the opponents with the same (or a representation of) data, dilemmas and decisions that would be made within the actual event.
- **Iterative** - potential solutions to the presented problems can be tested and iterated within the game.
- **Independently adjudicated** - the results of the interactions between the competing participants (or between the participant and the environment) are resolved by an independent adjudication process.
- **Analytical** – the purpose of the wargame is to achieve an analytical outcome.

Discussion/Questions

