

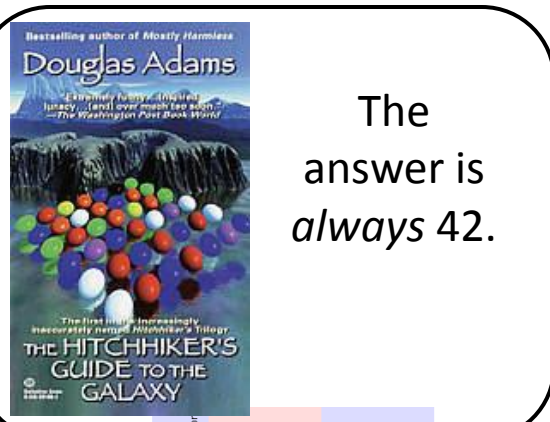
- **Least Squares Software, Inc.**
- Principle Investigator
William N. Reynolds, Ph. D.
- Team
 - Dr. Marta Weber – SME: Sociology, Psychology, Behavioral Profiling
 - Dr. Jim Holden-Rhodes – SME: Intelligence Analysis, Political Science, Open Source Intelligence, IW/COIN

What makes an AM/SAT effective?

- Core Expertise: Analytic Methodology/Structured Analytic Techniques
- Approaches to structure human judgment.
 - Designed to mitigate problems with human reasoning
 - Cognitive Biases
 - Limited Working Memory

Hidden Program	None Exists	Hidden Program		Leadership Mix		Hidden Pathway Financing		Over Pathway Financing	
		None	Exists	Overt Only	Hidden (Overt as Cover)	High	Low	None	High/Low
Hidden Program	None Exists								
Leadership Mix	Overt Only		X						
	Both	X							
Hidden Pathway Financing	Overt as Cover	X							
	High	X		X					
	Low	X		X					
Over Pathway Financing	None		X		X	X			
	High								
Over Pathway Financing	Low								

Morphine: Morphological Analysis

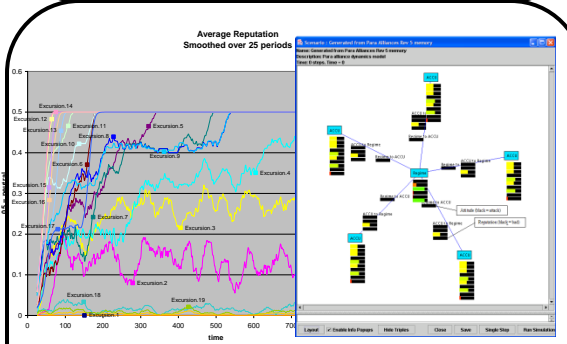


The answer is always 42.

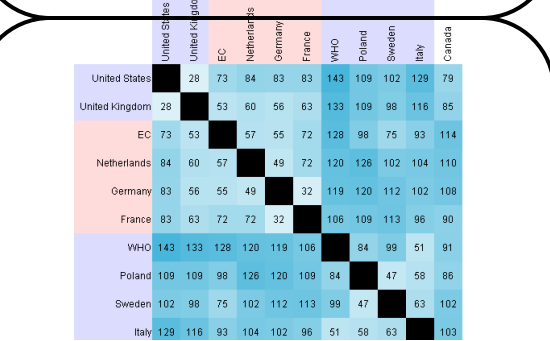
Evidence	H1	H2
1. Structure orientation	+	-
2. Structure dimensions	+	-
3. Military threat perception	-	+
4. Communication deficit	+	-
5. Political leverage of Kafiri military	-	+
6. Adami-Kafiri border	-	+
7. Defector reports on Hula-Hoop radar	0	+

Hypotheses	Findings
1. H.H. a communications structure	1. Hula Hoop a radar installation
2. H.H. a missile guidance structure	2. Hula Hoop a communication tower

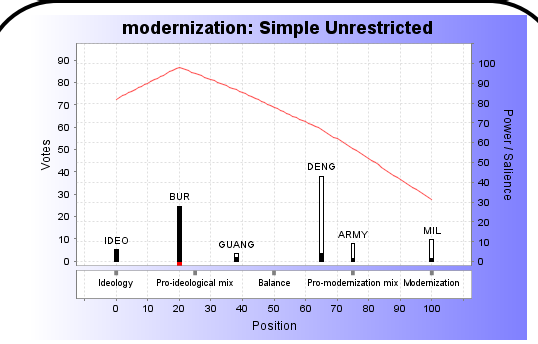
Analysis of Competing Hypotheses



Policrash: Depth Simulation

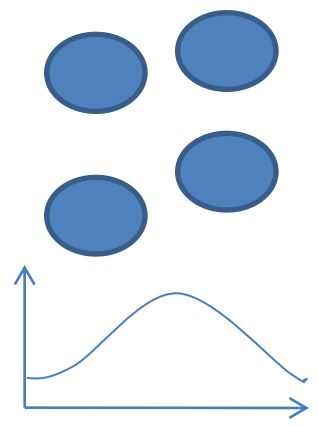


Landscape-Decision: Coalition Analysis

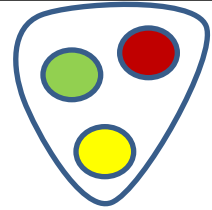


Landscape-Decision: Decision Modeling

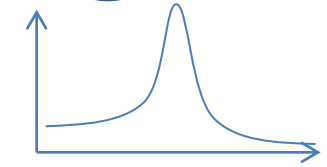
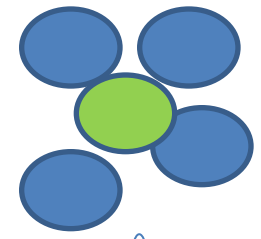
Breadth-Depth: Hypothesized Cost- Benefit Framework for SATs



Pool of Potential Reasoning Elements



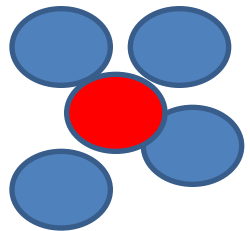
Add high-value reasoning element



Low Uncertainty Argument

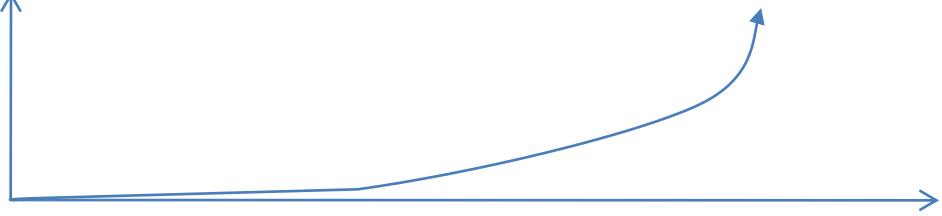


Add low-value reasoning element



Higher Uncertainty Argument

Analytic Cost



SAT Complexity

Recommended Approach:

Low Complexity methods To ***Triage*** High-Complexity methods

- **Desired Collaborations:**
 - LSS would like to work with performers who can provide cognitive architectures that can interface with Structured Analytic Techniques
 - SATs provide an accessible interface for analyst-users.
 - SATs provide a systematic way to capture analyst knowledge to guide automated development of more sophisticated reasoning.
 - SATs can provide coarse-grained reasoning that can be triangulated against machine-generated reasoning for validation.
- **LSS Specific SATs**
 - **Landscape-Decision** – Coalition and Small Group Decision Analysis
 - **Morphine** – Tool for conducting Morphological Analysis

Contact Information

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Backup

- LSS specializes in ***analytic methodology***. Our particular focus is how analysts interact with technology and how this leads to (hopefully) improved analytic products.
 - Strong understanding of complexity theory, software development and computer science
 - Strong understanding of analytic process
 - Proven track record of IC technology insertion and technology/methodology integration.
 - Provider of two analytic tools: **Landscape-Decision** and **Morphine**
 - Strong SME capabilities, expertise from social science, military operations and intelligence analysis.

Breadth-Depth: What are the Cost-Benefits of Structured Techniques?

Why use a tool or structured technique?

- Improve reduction in uncertainty
- Mitigate Cognitive Bias
 - Confirmation
 - Limited Working Memory
 - Availability
- Validation

What are the costs of tools and structured techniques?

- Need to be developed/bought
- Need to be learned/understood/supported
- Need to be populated
- Need to be run
- Need to be understood/interpreted

What Characteristic of a Technique Drives Cost and Benefit?

- SAT Complexity
 - Analytic Cost goes up (super) exponentially with a technique's **complexity**. Define complexity as countable number of elements in SAT (number of variables, pieces of evidence, number of hypotheses, *etc.*).
 - Factors Driving Required Analytic Cost
 - Model Selection
 - Effort to populate
 - Effort to compare to evidence
 - Effort to understand
 - Benefit to Increased Complexity Not Clear. Properties of “magic bullet” reasoning elements not understood.