



Technology To Assist Leaders in Planning And Executing Campaigns In Complex Operational Environments

Conflict Modeling, Planning and Outcomes Experimentation Program (COMPOEX)

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COMPOEX: A DARPA, JFCOM Partnership

- A DARPA and JFCOM sponsored effort
- Objective: decision aids to support leaders in designing and conducting future coalition-oriented, multi-agency, intervention campaigns employing unified actions, or a whole of government approach to operations
- *The decision aids do not make decisions;
they enhance the human's ability to make decisions*
- Focus: military and civilian leaders at the operational-level

JFCOM provides:

- Concepts for campaigning and tool usage
- Subject matter expertise for domains and processes
- Experimentation facilities and personnel

DARPA provides:

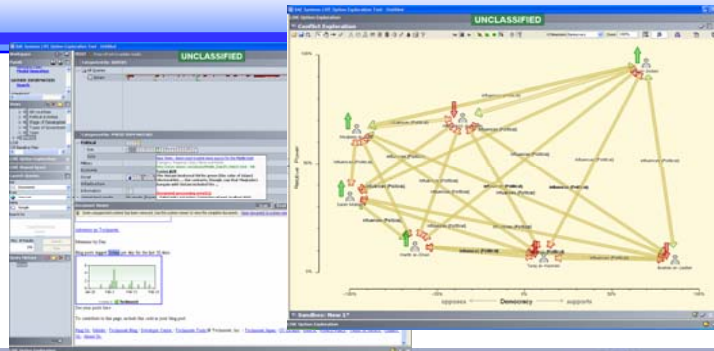
- User oriented tools that support decision making
- Baseline knowledge bases and models
- Drop-in software that augments current capabilities in existing environments

- Periodic experimentation and intensive user interaction guides technology development
- JFCOM and Services sponsor transitions

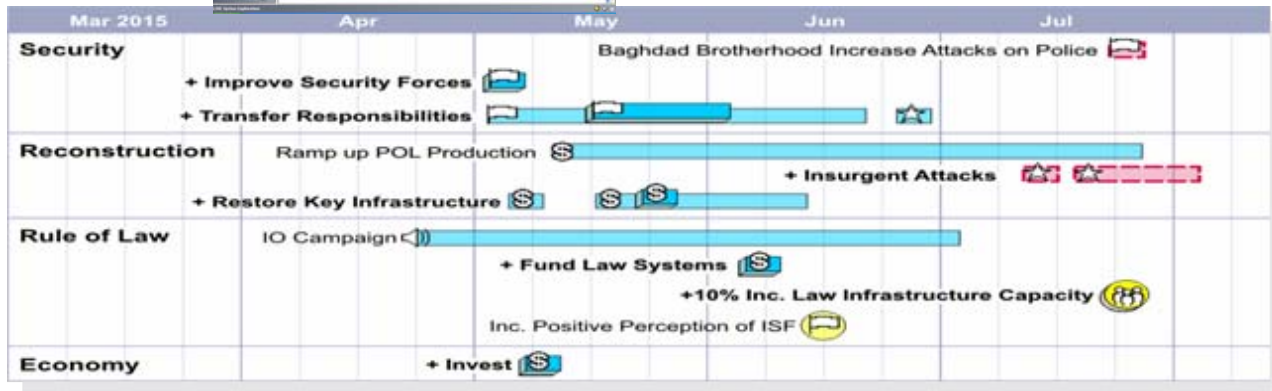
Combining DARPA Technology and JFCOM Operational Expertises

COMPOEX Tools

1. Conflict Space Tool provides leaders and staff the ability to explore and map sources of instability, relationships and centers of power to develop their theory of the conflict.

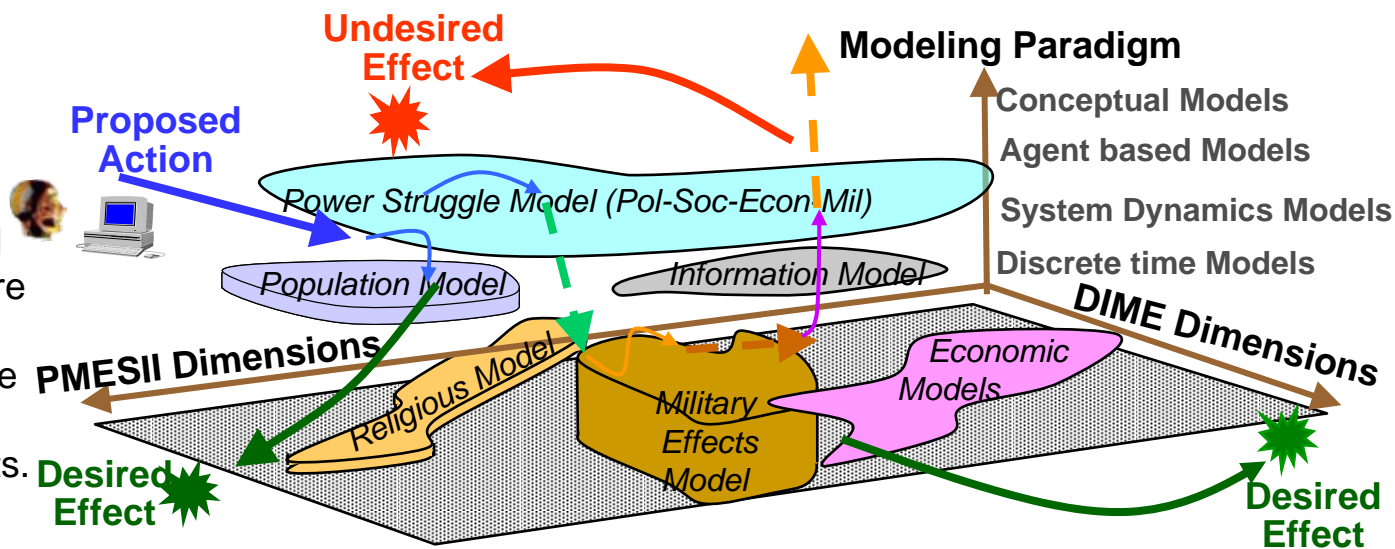


2. Campaign Planning Tool is a framework to develop, visualize and manage a comprehensive campaign plan in a complex environment.



3. Family of models instantiated for the current problem and additional models to more accurately represent the operational environment.

4. Option Exploration Tool that enables a staff to explore multiple series of actions in different environments to see the range of possible outcomes in all environments.



Conflict Space: Enables Staff to search and sort documents and data bases for critical information

The screenshot displays the BAE Systems LIVE Option Exploration Tool interface. The main window shows search results for the query 'Sistani'. The results are categorized by 'QUERIES' and 'PMESII TERM MATCHES'. A 'UNCLASSIFIED' label is visible at the top. The 'PMESII TERM MATCHES' section shows a list of categories including Political, Military, Economic, Social, Infrastructure, and Information. A tooltip for the 'Political' category provides a link to an Asia Times article: 'Asia Times - Asia's most trusted news source for the Middle East'. The article title is 'The Sistani-brokered Shi'ite green (the color of Islam) electoral list, ... Our contacts, though, say that Muqtada's bargain with Sistani included the ...'. Below the search results, a 'Document Viewer' section shows a bar chart titled 'Mentions by Day' for 'Sistani' per day for the last 30 days. The chart shows a peak in mentions around February 3rd. The interface also includes a search bar, a 'Query History' section, and a 'Launch Queries' section.

UNCLASSIFIED

Categorized By: QUERIES

All Queries

Sistani

Categorized By: PMESII TERM MATCHES

Political

Iran

Syria

Military

Economic

Social

Infrastructure

Information

Unmatched results

50 results [Expand]

Document processing error(s):
- Failed entity extraction: Connection refused: localhost:9000

Document Viewer

Some unsupported content has been removed. Use the system viewer to view the complete document. [Open document in system viewer](#)

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Mentions by Day

Blog posts tagged **Sistani** per day for the last 30 days

6

4

2

0

Jan 25 Feb 3 Feb 13 Feb 23

POWERED BY Technorati

See your posts here

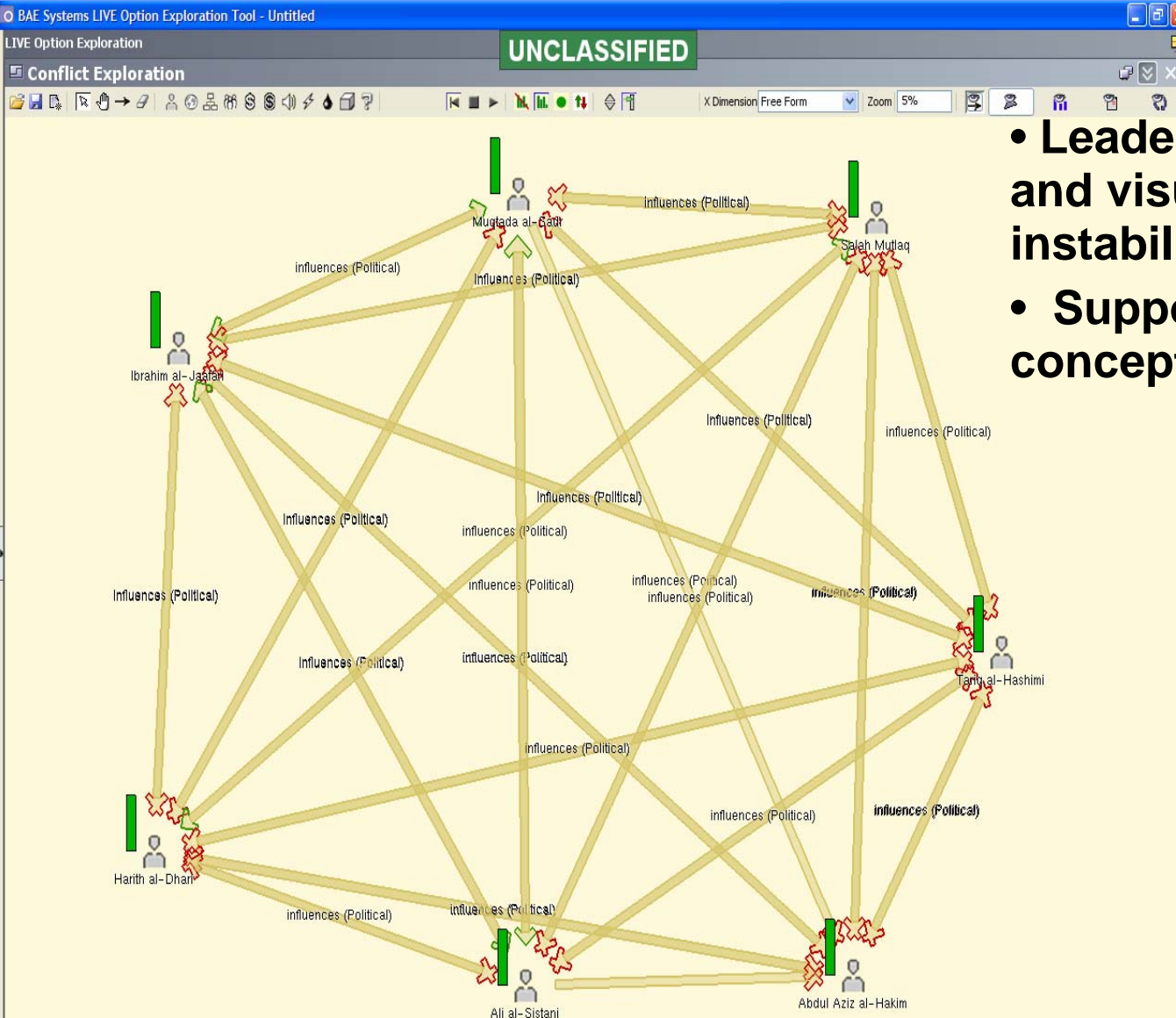
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Provides

- Document retrieval from ONA, other databases, Internet
- Graphical indexing and viewing in PMESII or other environments

Conflict Space: Enables leaders to develop an understanding of the conflict and its key drivers



- Leaders and staff develop and visualize the drivers of instability
- Supports development of conceptual models

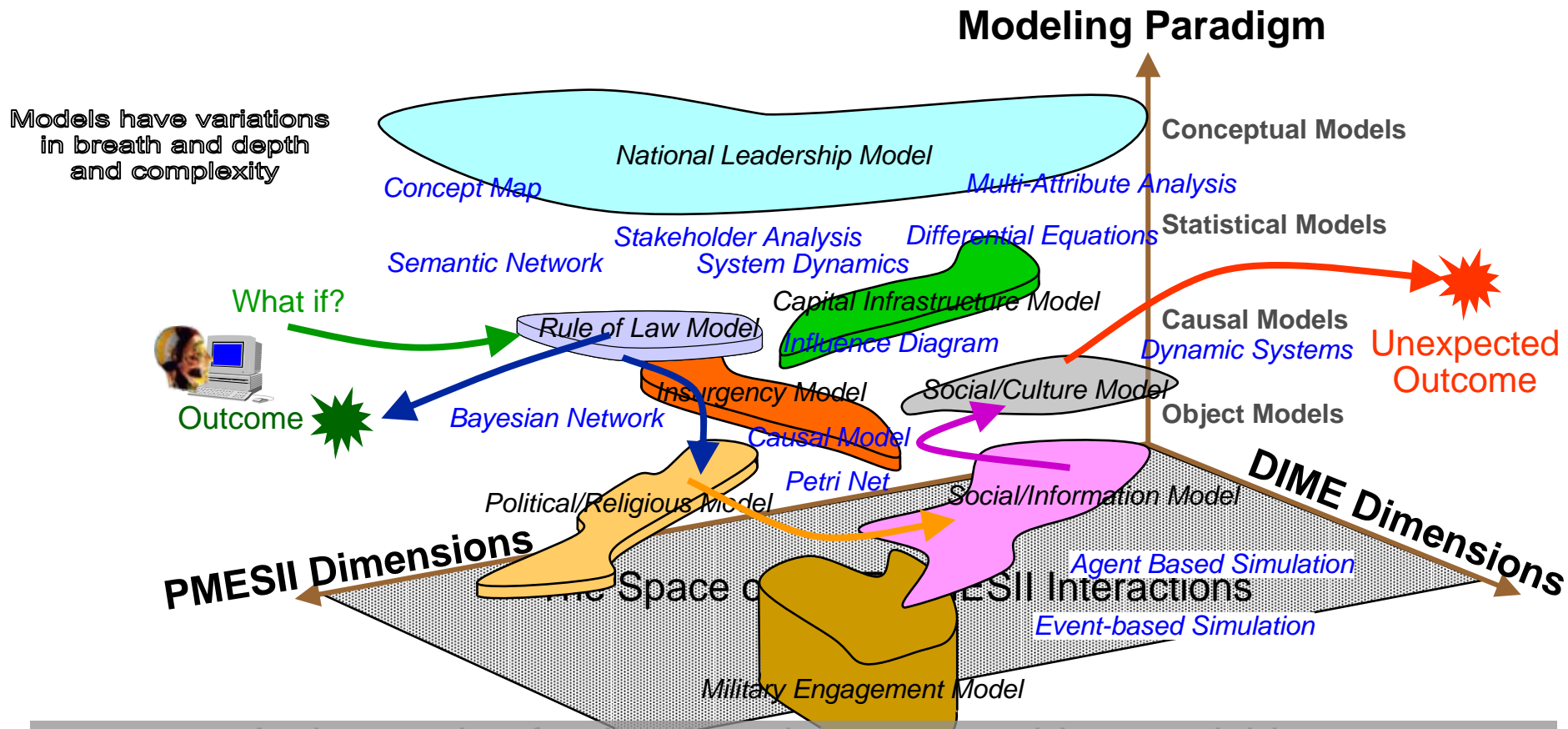
Provides

- Direct feed into more detailed models
- White board capability
- Document retrieval
- Graphical indexing and viewing

Supports commanders, planners and system of systems analysts

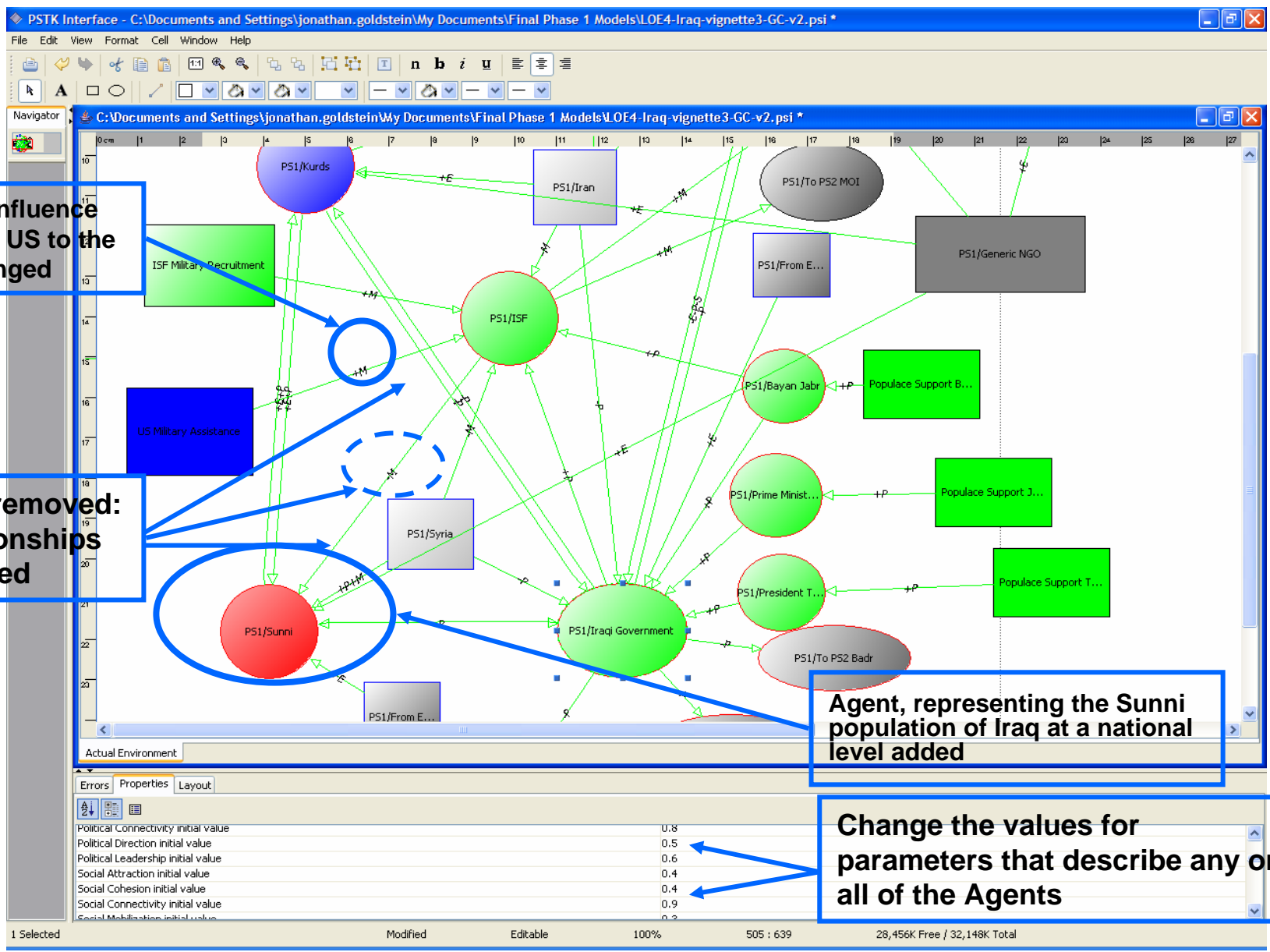
Modeling Post Modern Conflicts

- No single model can completely or adequately describe the entire domain
- Leaders want to understand the alternative theories or explanations
 ⇒ A family of models is needed!

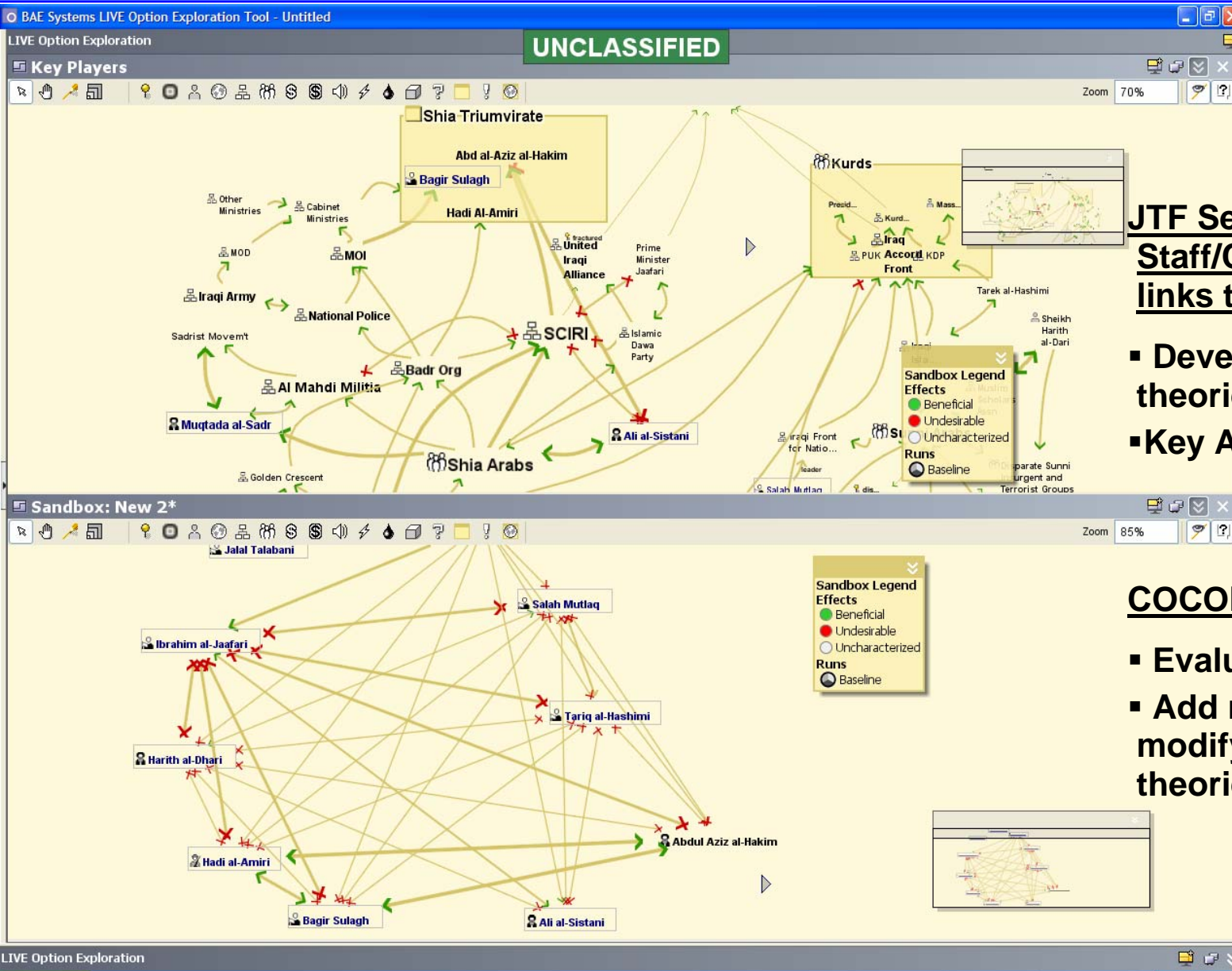


An interacting family of models can provide astonishing, yet legitimate and plausible outcomes

Models: Linkages, Relationships, Nodes are modified by the Operational Staff



Compare Leaders Vision(s) Of The Conflict with Models



JTF Senior Staff/Country Team links to Agencies

- Develop different theories of the conflict
- Key Assumptions

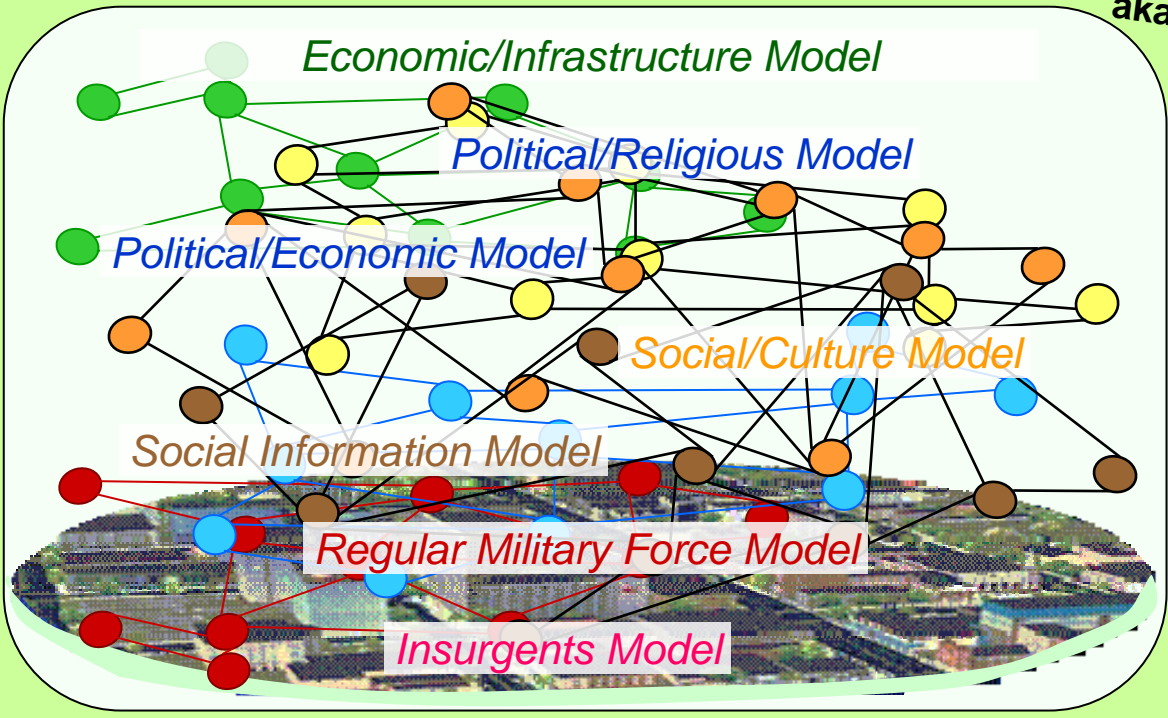
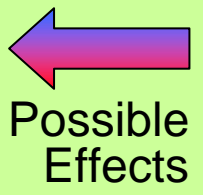
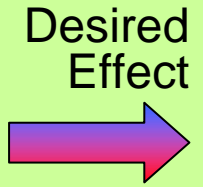
COCOM or Gov Staff

- Evaluate models
- Add new models and modify existing to fit theories of conflict

Option Exploration Tool

aka "SimCountry"

What if?



aka "What If? Engine"



What if?

Purpose: generate the "distribution of all plausible outcomes," not a precise prediction

- Provides a comprehensive family of interacting models that span the relevant DIME/PMESII domain
- Automatically forces models to interact to suggest plausible activities and outcomes
- Allows the user to modify or create models and to import models
- Allows multi sided analysis
- Allows the Leader to visualize the interactions
- Assisted model verification, validation and accreditation

Option Exploration Tool describes the possible, not the probable

Explore Impact of Actions

Economic Action Increasing Investment

BAE Systems LIVE Option Exploration Tool - Untitled

LIVE Option Exploration

UNCLASSIFIED

Plan

Plan... (right-click on timeline for options)

	May 2015	June 2015	July 2015	August 2015	September 2015	October 2015
- Economic						
- Political						
- Security						
- Economic			Invest \$500M Per Week Distributed To 4 Key Districs			
- Social and Rule of Law						
- Infrastructure						
- Information						

ACTIONS

- Different teams explore large DIME actions to see range of possible effects
- Modify the intensity and timing of single and multiple actions to achieve desired effects

Run to Date: Dec 31, 2015

RUN

ACTION

Label: Invest \$500M Per Week Distributed To 4 Key Districs

Category: Economic

Affiliation: BLUE

Implementing Actions:

"Investment - Change: Adhamiya,Construction; Adhamiya,Food and Agriculture; Adham ..."

Applied to:

- {Adhamiya, Construction}
- {Adhamiya, Food and Agriculture}
- {Adhamiya, Industrial Mfg}
- {Adhamiya, Jobs Programs}
- {Adhamiya, Mining and Metals}
- {Adhamiya, Oil and Gas}
- {Khadamiyah, Construction}
- {Khadamiyah, Food and Agriculture}
- {Khadamiyah, Industrial Mfg}
- {Khadamiyah, Jobs Programs}
- {Khadamiyah, Mining and Metals}
- {Khadamiyah, Oil and Gas}
- {Nissan, Construction}
- {Nissan, Food and Agriculture}
- {Nissan, Industrial Mfg}

more...

Value: 25.0

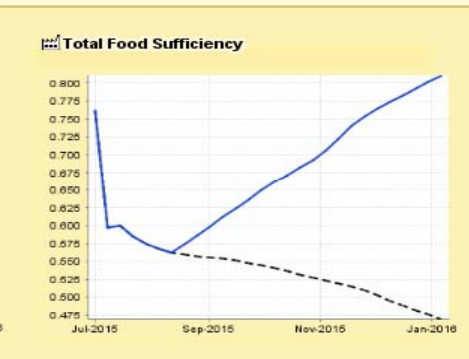
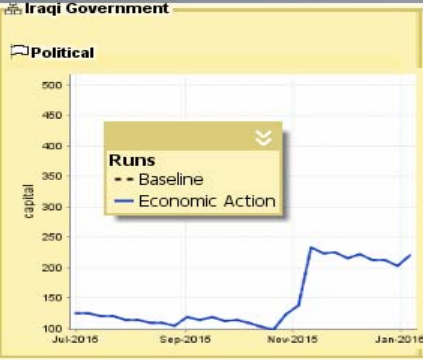
Start Date: Aug 05,2015

End Date: Aug 05,2015

Effect of Economic Action

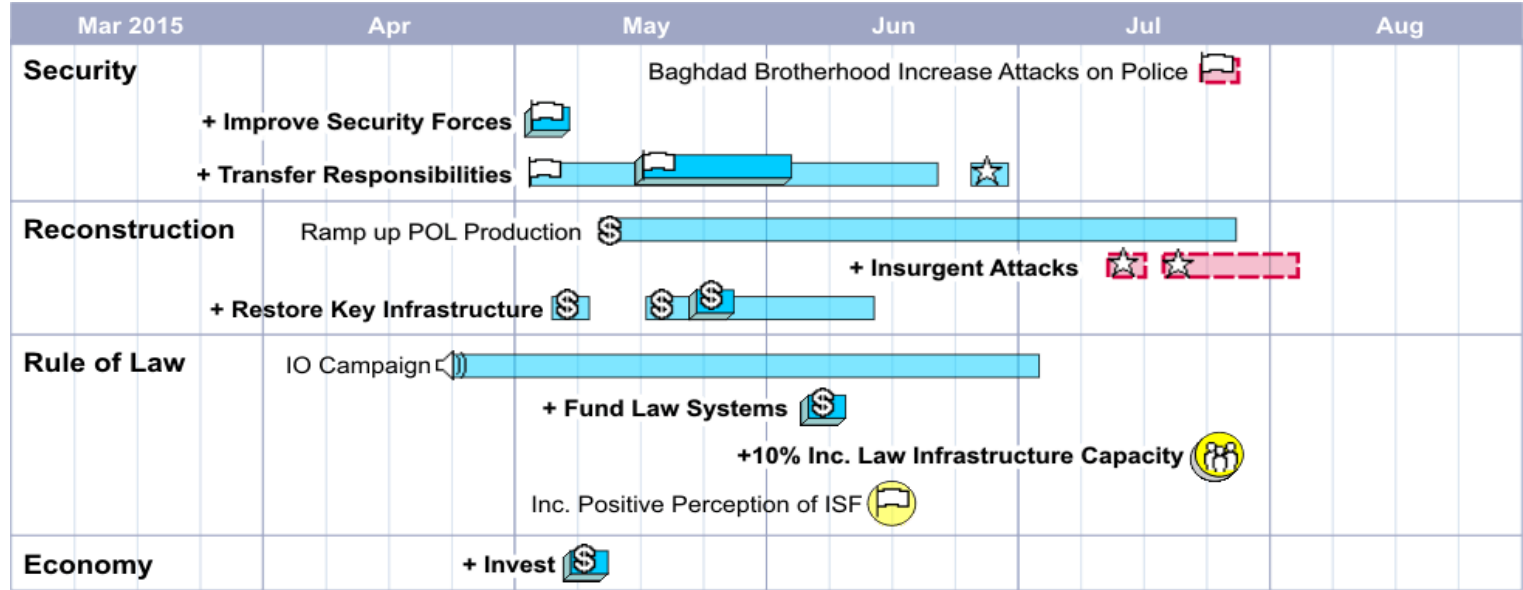
UNCLASSIFIED

Top Indicators
Abdul Aziz al-Hakim

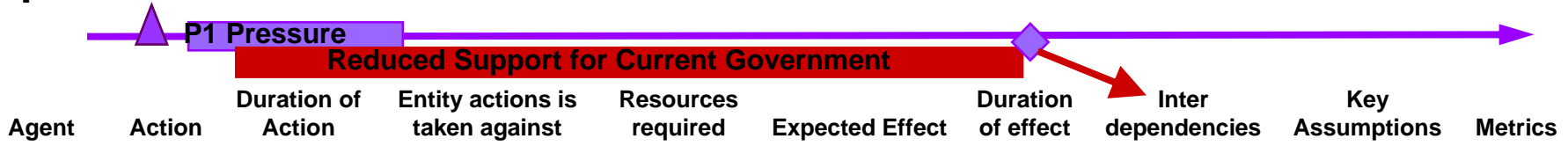


Campaign Planning Tool supports a whole of government approach to planning

- Enables modular development of multiple lines of effort
- Automatically detects and displays interdependencies, assumptions, resources, actions, duration of effects, metrics and next state
- Ability to modify plans, actions, interdependencies, models and next states based on measured performance



• Specific Information for Each Action



Allows the leader to visualize and manage complex plans

Campaign Planning Tool: Displays an operational campaign plan utilizing all elements of power

The screenshot displays the 'BAE Systems LIVE Option Exploration Tool - Untitled' window. At the top, a green 'UNCLASSIFIED' label is visible. The main interface is a campaign plan grid with columns for months from February 2015 to February 2016. The grid is organized into categories: Rule of Law, Economic, Information, and Governance. A tooltip for the 'Restore Electric Grid' action is open, showing details such as 'Label: Restore Electric Grid', 'Category: Economic', 'Affiliation: BLUE', and 'Implementing Actions' including 'Ramp EP Production: BDSS North' and 'Ramp EP Production: BDSS South'. A 'RUN' button is located at the bottom center, with a 'Run to Date' dropdown set to 'Nov 28, 2015'. Annotations with blue boxes and arrows point to various elements: 'Action with Duration' points to a blue bar in the Rule of Law section; 'Desired Effect' points to a bug icon in the Rule of Law section; 'Action' points to a blue bar in the Information section; and 'Red action' points to a red bar in the Governance section.

Action

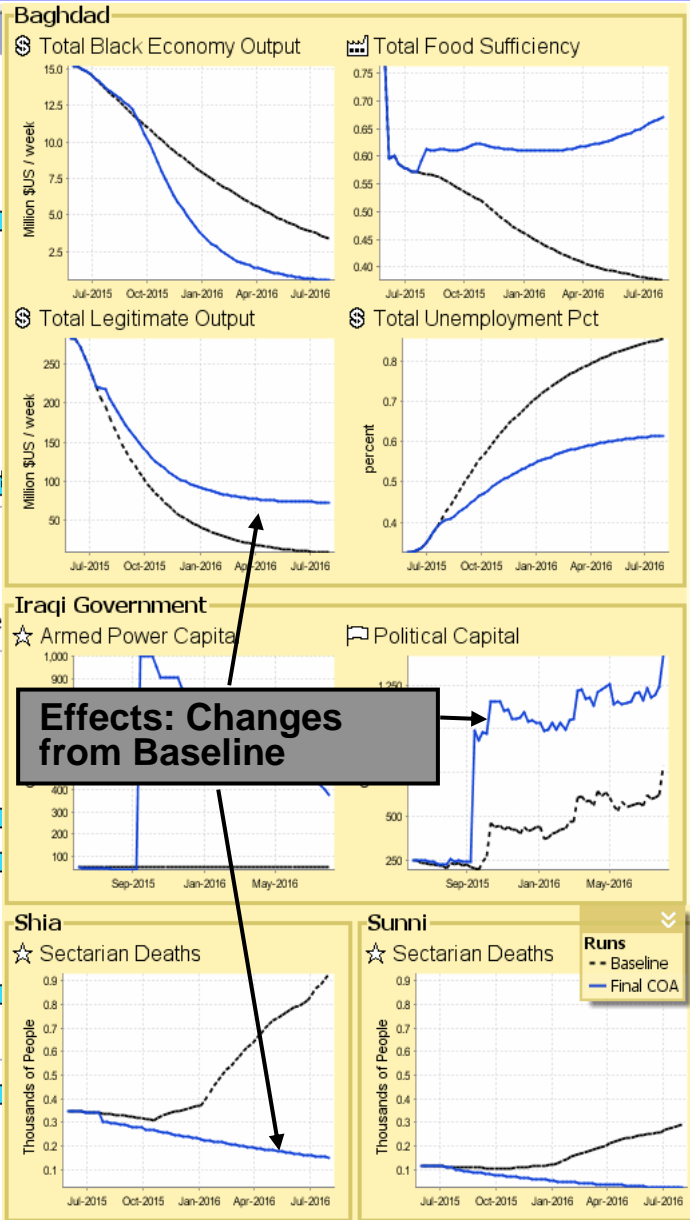
Red action

Campaign Plan involves multiple actions across multiple lines of effort

JFCOM	March	April	May	June	July	August	September
- Rule Of Law		Set Armed Power Capital: National Police, Set Armed Power Ability: National Police					Add G
		Add Goal: National Police, Add Goal: National Police, Add Goal: National Police					
		Create Line of Influence, Create Line of Influence, Create Line of Influence					
		Shia Trimvirate Censorship					
		Create Line of Influence Iraqi Government to MOI					
		Reduce RoL Funding	Reduce RoL Funding				
- Security		Set mil, pol and econ cap of Iraqi govt					
		Reduce Oil Exports	Set Armed Power Capital:				
		Reduce Oil Exports					
		Reduce Oil Exports					
		Reduce Oil Exports					
		Reduce Oil Exports					
- Consent		Goal: Iraqi Army, Add Goal: National Police, Add Goal: National Police, Add Goal: Iraqi Army					
		Create Line of Influence, Create Line of Influence, Create Line of Influence, Create Line of Influence					
		Set Armed Power Capital: Iraqi Army, Set Armed Power Ability: Iraqi Army					Set Armed Power
		for Shia Triumvirate, Issue message: Support for Shia Triumvirate					
		Shia << SCIRI social && Sistani >> Shia social					
		Police Funding - Percent Change: Baghdad					
- Regional Stability		Issue message: Support for Shia Triumvirate					
		Issue message: Support for Democratic Rule					
		Sadr <> SCIRI Pol					
		Set Social Ability: Islamic Dawa Party					
		Issue message: Support for Democratic Rule					
		Issue message: Support for Shia Triumvirate					

Lines of Effort

Actions



Campaign Plan Development

- Initial Operations
 - Refinement of Theories of Conflict
 - Development of Lines of Effort, Objectives, Effects, Next States
 - Exploration of significant DIME actions to understand the effects in all of the PMESII environments
- Initial Development
 - Exploration and refinement of actions by line of effort or PMESII system
- Plan Development
 - Building of multiple, complex actions within lines of effort
 - Combining of lines of effort
- Plan Refinement and Exploration
 - Development of alternative courses of action
 - Execution of all courses of action through each MRM
 - Challenging of key assumptions
- Final Plan
 - Primary campaign plan: metrics
 - Alternate plans

Way Ahead

- Continued development of generic models so there is a full family of generic models with typical behaviors
- Refine and expanded COMPOEX tools. This includes expansion of the light campaign planning tool, increased capability of the Option Exploration tool and fully linking to the full campaign planning tool to
- Host COMPOEX Tools on the appropriate government servers and make them available and Combatant Commands Government Agencies.
- Move to operational experimentation with staffs using the COMPORX tools to build campaign plans to meet current objectives
- Transition COMPOEX to appropriate Combatant Commands, Government Agencies and program of record