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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19 June 2007
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

<table>
<thead>
<tr>
<th>JFCOM provides:</th>
<th>DARPA provides:</th>
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<tbody>
<tr>
<td>• Concepts for campaigning and tool usage</td>
<td>• User oriented tools that support decision making</td>
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<td>• Subject matter expertise for domains and processes</td>
<td>• Baseline knowledge bases and models</td>
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<td>• Experimentation facilities and personnel</td>
<td>• Drop-in software that augments current capabilities in existing environments</td>
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- Periodic experimentation and intensive user interaction guides technology development
- JFCOM and Services sponsor transitions

Combining DARPA Technology and JFCOM Operational Expertises
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

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
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

Line of influence from the US to the ISF Changed
Syria removed: Relationships changed
Agent, representing the Sunni population of Iraq at a national level added
Change the values for parameters that describe any or all of the Agents
Compare Leaders Vision(s) Of The Conflict with Models

- 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 desribes the possible, not the probable

- 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

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

<table>
<thead>
<tr>
<th>Mar 2015</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
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<tbody>
<tr>
<td>Security</td>
<td></td>
<td></td>
<td>+ Improve Security Forces</td>
<td>Baghdad Brotherhood Increase Attacks on Police</td>
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<td></td>
<td></td>
<td></td>
<td>+ Transfer Responsibilities</td>
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<td>Reconstr.</td>
<td>Ramp up POL Production</td>
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<td>+ Insurgent Attacks</td>
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<td></td>
<td>+ Restore Key Infrastructure</td>
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<td>Rule of Law</td>
<td>IO Campaign</td>
<td>+ Fund Law Systems</td>
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<td></td>
<td></td>
<td>+10% Inc. Law Infrastructure Capacity</td>
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<td></td>
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<td>Inc. Positive Perception of ISF</td>
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<tr>
<td>Economy</td>
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<td>+ Invest</td>
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- Specific Information for Each Action

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<tr>
<th>Agent</th>
<th>Action</th>
<th>Duration of Action</th>
<th>Entity actions is taken against</th>
<th>Resources required</th>
<th>Expected Effect</th>
<th>Duration of effect</th>
<th>Inter dependencies</th>
<th>Key Assumptions</th>
<th>Metrics</th>
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P1 Pressure

Reduced Support for Current Government

Allows the leader to visualize and manage complex plans
Campaign Planning Tool: Displays an operational campaign plan utilizing all elements of power

Action with Duration

Desired Effect

Action

Red action
Campaign Plan involves multiple actions across multiple lines of effort

- **Lines of Effort**
  - JFCOM
    - Rule Of Law
      - May: Create Line of Influence, Create Line of Influence, Add Goal: National Police
      - June: Create Line of Influence, Create Line of Influence, Create Line of Influence
      - July: Create Line of Influence, Iraqi Government to MOI
      - August: Reduce RoL Funding, Reduce RoL Funding
      - September: Set mil, pol and econ cap of Iraqi govt
    - Security
    - Consent
      - March: For Shia Triumvirate, Issue message: Support for Shia Triumvirate
      - April: For Shia Triumvirate, Issue message: Support for Shia Triumvirate
      - May: For Shia Triumvirate, Issue message: Support for Shia Triumvirate
      - June: For Shia Triumvirate, Issue message: Support for Shia Triumvirate
      - July: For Shia Triumvirate, Issue message: Support for Shia Triumvirate
      - August: For Shia Triumvirate, Issue message: Support for Shia Triumvirate
      - September: For Shia Triumvirate, Issue message: Support for Shia Triumvirate
    - Regional Stability
      - April: Issue message: Support for Democratic Rule, Issue message: Foreign Investment
      - May: Issue message: Support for Democratic Rule, Issue message: Foreign Investment
      - June: Issue message: Support for Democratic Rule, Issue message: Foreign Investment
      - August: Issue message: Support for Democratic Rule, Issue message: Foreign Investment
      - September: Issue message: Support for Democratic Rule, Issue message: Foreign Investment

- **Actions**
  - Baghdad
    - Total Black Economy Output
    - Total Food Sufficiency
    - Total Legitimate Output
    - Total Unemployment Pct
  - Iraqi Government
    - Armed Power Capital
    - Political Capital
  - Shia
    - Sectarian Deaths
  - Sunni
    - Sectarian Deaths
  - Runs
    - Baseline
    - Final COA

**Effects: Changes from Baseline**
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