

## Integrating Interagency Efforts – Two Interactive Tools

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### INTRODUCTION

This paper is designed to share information with the participants at Cornwallis XII. The authors, a uniformed member of the US Joint Staff and an ANSER Inc employee on contract to the Joint Staff, have used two interactive tools, described in this paper, to help integrate interagency efforts relating to Iraq and to Afghanistan. The two tools (influence net modeling and effects-based assessment) were used to establish a common framework of shared goals and objectives in the interagency environment.

The influence net modeling description begins with a brief introduction to the concept and uses of influence net modeling. It then provides a brief example of work done in the Joint Staff, Strategy and Policy (J5) on interagency collaboration in a current operation. Participants included DOD and non-DOD agencies, as well as members of J5 trained in the use of an influence net modeling tool.

The effects-based assessment description begins with a brief introduction to the concept and uses of effects-based operations and uses of effects-based assessment. It then provides a brief example of work done in the Joint Staff, Strategy & Policy (J-5) on interagency

collaboration in a current operation. Participants included DOD and non-DOD agencies, as well as members of J5 familiar with the use of effects-based assessment. The paper concludes with a few caveats and ways to assist in future strategy formulation and analysis in the interagency process.

## **INTERAGENCY FOCUS**

The interagency focus was codified as part of the US National Security Strategy shown below.

*“Improving the capacity of agencies to plan, prepare, coordinate, integrate, and execute responses covering the full range of crisis contingencies and long-term challenges.*

- We need to strengthen the capacity of departments and agencies to do comprehensive, results-oriented planning.
- Agencies that traditionally played only a domestic role increasingly have a role to play in our foreign and security policies. This requires us to better integrate interagency activity both at home and abroad.”

National Security Strategy, March 16, 2006<sup>1</sup>

The preceding quote from the National Security Strategy dictates the need for integrated strategies spanning all means available to our national security leaders. The requirement for the integration of the traditional tools<sup>2</sup> of statecraft to meet complex international and domestic challenges impels agencies to search for methods and tools to achieve that integration.

## **INTERAGENCY ASSESSMENT STATUS**

Our Inter-Agency Team is engaged in support of decision-makers. This includes developing additional tools to provide our national leadership with assessments to inform strategic level decisions. Two tools that we used are influence net modeling and effects-based assessment.

## **INTERAGENCY ASSESSMENT PROCESS**

The assessment takes place within the context of an Inter-Agency process. Two examples of the process are shown for Afghanistan and Iraq. The tools we will discuss are generally used by members of the Working Groups.

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<sup>1</sup> Bush, George W. “The National Security Strategy of the United States of America”, Washington, D.C., March 2006.

<sup>2</sup> We refer to the acronym DIME (Diplomacy, Information, Military and Economics).

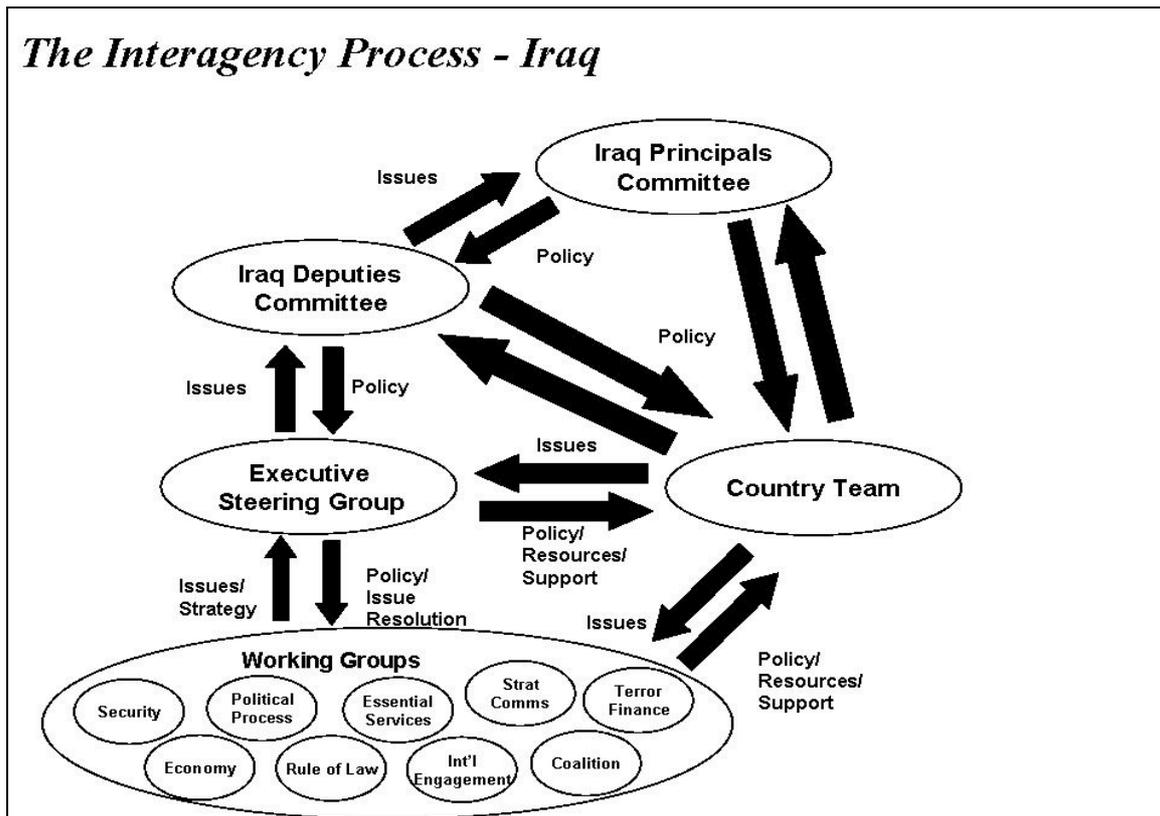


Figure 1: Aligning the Working Groups and the Strategy.

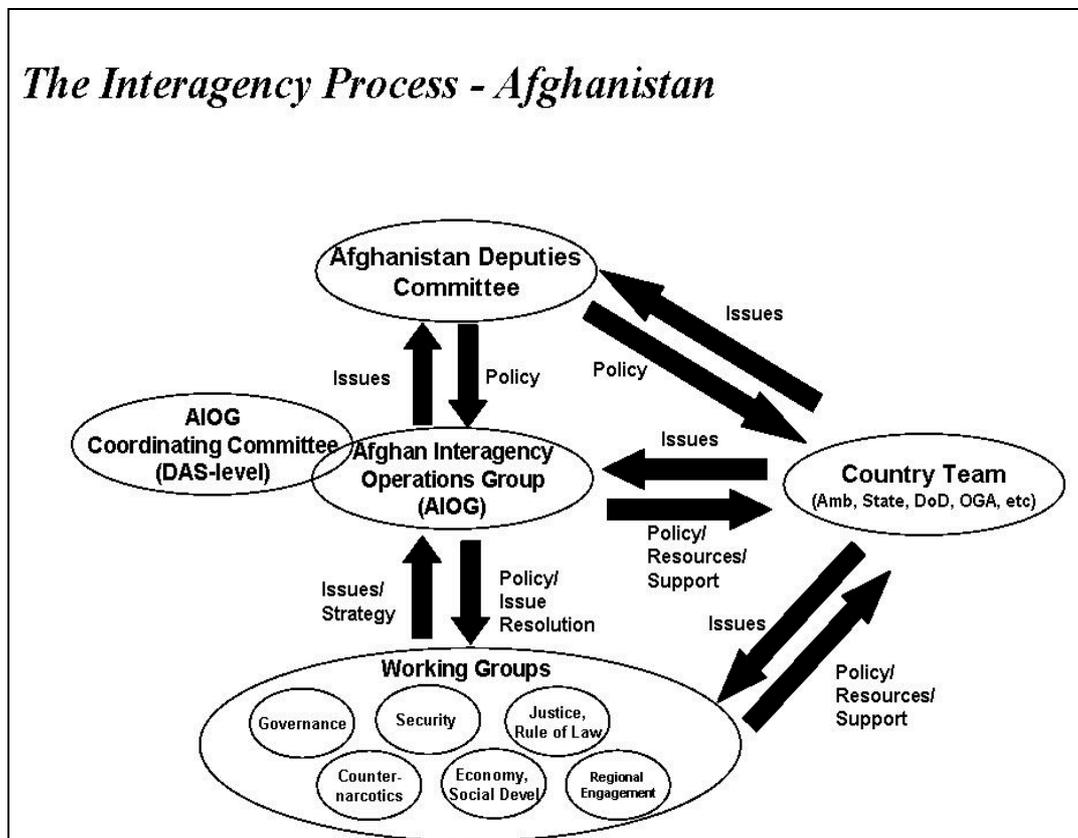


Figure 2: Aligning the Working Groups and the Strategy.

## INFLUENCE NET MODELING (SIAM)

Influence net modeling developed out of the need for a tool to identify networks of actors and events affecting a complex range of interrelated issues – from national security to corporate investments. The actors and events in our increasingly complex world are poorly represented by the wiring diagrams and other hierarchical formats of a previous age. They are better represented by complex networks capable of capturing a range of connections and influences – from the obvious to the subtle or uncertain. This range of relationships generates several issues for the strategy analyst. First, how does one capture the actors and events as nodes in complex networks? Second, how does one define the influences among nodes as links in complex networks? Third, how does one calculate the values of interactions among the nodes and links? Finally, these large networks have too many nodes and influences for human beings to process and retain at once. How to address this problem?

One answer to this set of problems lies in influence net modeling. Under a 1990's Defense Advanced Research Projects Agency (DARPA) contract, The Science Applications International Corporation (SAIC) developed the Situation Influence Assessment Model (SIAM) to assess socio-political influences on potential adversaries. "The objective was to extract empirical expertise and knowledge about adversaries and place it in an analytical framework. Within this framework, influence strategies and their operational implementation could be examined."<sup>3</sup> The resulting tool must meet several requirements. First, it must be a graphical model depicting the networks in a flexible format. Second, it must use robust mathematic and computer-based models/simulations capable of estimating current and future states of "physics-based" phenomena. Bayesian mathematics was the choice for this requirement. Third, it must be user-friendly to subject matter experts unlikely to have experience in current computer-based modeling software. Fourth, it must provide the subject matter experts with immediate feedback and an easily understood depiction of the complex network interactions.<sup>4</sup> Finally, the tool must be able to process and retain a large number of nodes and links.

SIAM, developed over several years, addresses these issues. It is graphical, flexible and mathematically robust; it is capable of processing and retaining large numbers of concepts. At the same time, it is neither daunting nor counterintuitive to the user uninitiated in computer models based on Bayesian mathematics.<sup>5</sup> SIAM has been used by a variety of Defense organizations and undergone several capability upgrades since its inception in the mid-1990's.<sup>6</sup>

SIAM uses a graphic interface to enable the construction of complex networks using nodes (representing events) and links (representing connections). The user builds the network by clicking and dragging elements onto an on-screen canvas. The user labels nodes

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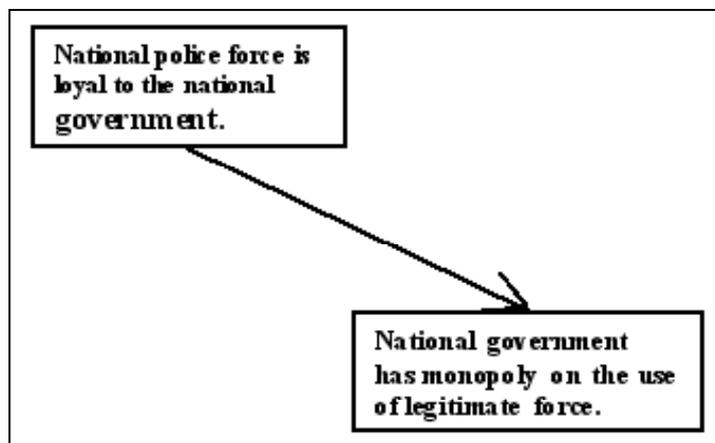
<sup>3</sup> Wagenhals, Lee, Levis, Alexander, and McCrabb, Maris, "Effects-Based Operations: a Historical Perspective for a Way Ahead", Fairfax, VA, System Architectures Laboratory, C3I Center, George Mason University, 2003. p. 2.

<sup>4</sup> Wagenhals, et al., p. 4.

<sup>5</sup> Bayesian or subjectivist statistics maintains that rational beliefs come in varying gradations of strength. Bayesians use their models to estimate the probability of the occurrence of related events.

<sup>6</sup> Other Bayesian-based graphical models are in use in both the public and private sectors. For example, Norsys markets a similar product (Netica) and researchers at George Mason University have developed "Site Profiler" for DOD. The Joint Warfare Analysis Center (JWAC) uses SIAM in its work.

to represent actors or events. An event might be “National government has monopoly on the use of legitimate force.” Links depict a one-way influence between nodes. For example, the node “National police force is loyal to the national government” will have a one-way influence on “National government has monopoly on the use of legitimate force.” (See Figure 3.)



*Figure 3:* A two-node network.

After developing nodes and links, the user defines the influence between nodes using the connecting link. The value given to the link represents the effect (influence) of one node on the validity of the other. In the example depicted in Figure 1, the link represents the importance of the national police department’s loyalty to the national government’s monopoly on the use of legitimate force. If the police were disloyal or indifferent in its loyalty to the government, it is probably unlikely that the government has a monopoly on the use of force. If the police were loyal, the government probably has a better chance at a monopoly.

The next step is to define the validity of the statement in the influencing node. (In Figure 3, “National police force is loyal to the national government.”) Is the national police force loyal to the central government? If so, how loyal is it? Is it very loyal? Is it indifferent? Is it radically opposed to the central government? Users now continue the process, defining the values of links and influencing nodes for the entire network. The result is a model of the network depicting complex relationships and influences between and among its parts. (See Figure 2.)

The network depicted in Figure 4 is a high-level depiction of generic influences on a central government’s monopoly on the use of force. The generic influences are taken from a 1999 Naval War College study using SIAM to examine interagency cooperation requirements for societies in conflict.<sup>7</sup> That study found that SIAM helps to order and prioritize issues at both the generic and specific (sub-network) levels and can be used to “facilitate interagency integration on a national and even international basis.”<sup>8</sup>

<sup>7</sup> Hayes, Bradd C.; Sands, Jeffrey I. “Doing Windows: Non-Traditional Military Responses to Complex Emergencies”, Decision Support Department, Center for Naval Warfare Studies, Naval War College, Newport, RI, September 1997.

<sup>8</sup> Hayes and Sands, “Doing Windows”, p. 201.

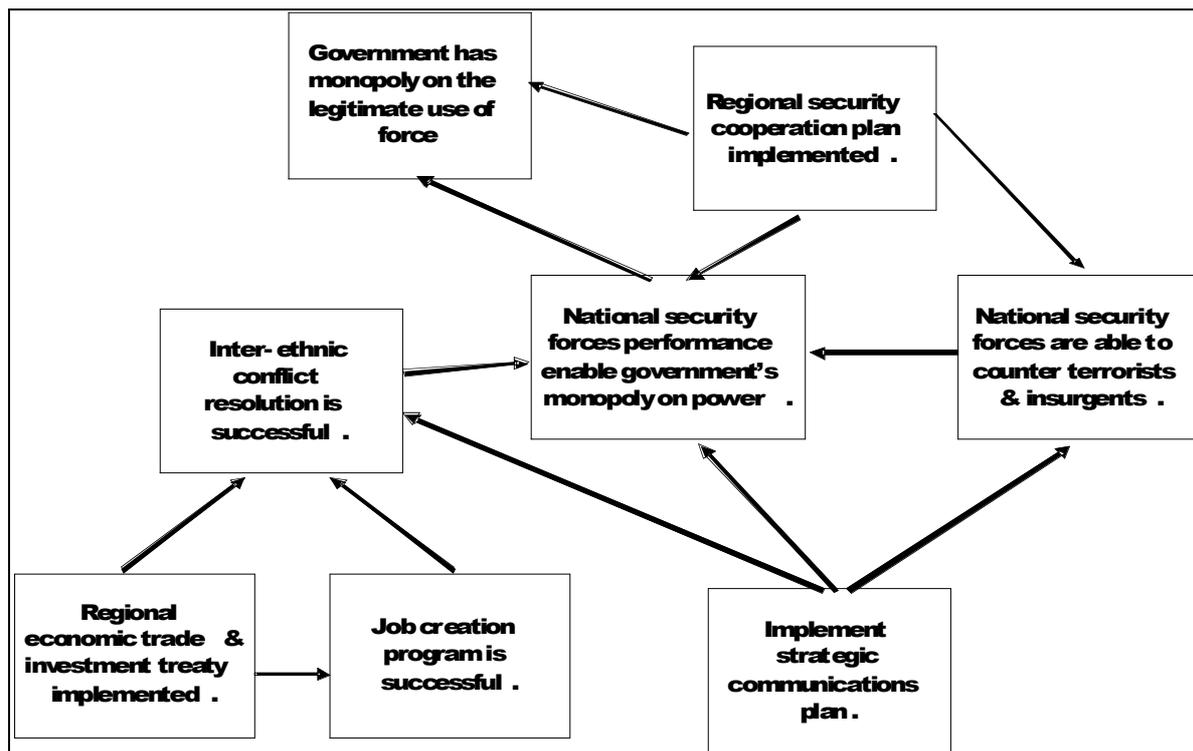


Figure 4: A Sample SIAM network.

#### INFLUENCE NET MODELING USE IN J5

The J5 and its interagency counterparts face a myriad of complex policy and strategy problems best addressed through interagency and international cooperation. The problems call for implementation of all forms of national power. A short list of current problems might range from the wars in Afghanistan and Iraq to the overarching War on Terror to challenges in South America, Africa and the Balkans. The 2006 Quadrennial Defense Review enunciated the need to address such problems with interagency approaches: “It is clear we cannot achieve all we might without significant help from the rest of the U.S. government. Within the Executive Branch, we are seeking ways to achieve greater efficiencies in the interagency, in our work with partners in the Departments of State, Treasury, Justice, and Homeland Security, the CIA, and other participants...”<sup>9</sup>

The Middle East and South Asia deputy directorates in J5 approached the Strategy Integration and Analysis Division (J5/SIAD),<sup>10</sup> for help with an idea. Faced with extremely complex national security efforts, these offices sought a way to prioritize mutually-supporting efforts at the interagency level. Their original idea was to develop a “critical path” method for approaching these intricate issues.

<sup>9</sup> Rumsfeld, Donald, “Quadrennial Defense Review Report”, February 6, 2006, p. ix.

<sup>10</sup> SIAD, operating since April 2006, is chartered to assist the Deputy Directorate for Strategy and Policy (DDS&P) and other Joint Staff entities in the development and measurement of efforts at the strategic and higher operational levels.

After some exploration, it became clear that the critical path method (CPM) is better-suited for well-understood, mechanical processes with documented and known interactions than it is for the dynamic, complex and human aspects of most national security issues. An engineering and project management method, the CPM seeks to determine the optimal duration of a project by analyzing the scheduling flexibility of its phases. A chain of engineering events - consisting of the phases having the least amount of scheduling flexibility - forms the critical path.

The same cannot be said for most national security efforts. Time and timing of national security affairs efforts are usually impossible to determine. For example, what will be the duration of the Long War or Operation Enduring Freedom? How long will it take to capture Osama bin Laden? When will we eliminate or render ineffective radical Islam? Which national security tools will be most effective and how can we prioritize and synchronize their use on a scale of time? “Americans should not expect one battle, but a lengthy campaign, unlike any other we have ever seen. It may include dramatic strikes, visible on TV, and covert operations, secret even in success. We will starve terrorists of funding, turn them one against another, and drive them from place to place, until there is no refuge and no rest.”<sup>11</sup> The critical path method is not the best means to prioritize such efforts.

Joint Staff then turned to a tool recommended by the Joint Warfare Analysis Center (JWAC).<sup>12</sup> This was SIAM. After some in-house familiarization and testing, SIAD suggested that the interested J5 offices consider influence net modeling for their problems. The goal would be to facilitate prioritization of interagency lines of effort on some of the more pressing strategic objectives.

The process was simple and straightforward. National strategies already existed for the efforts in question. The issue was the prioritization of defined lines of effort supporting the strategies. The challenges were:

1. Familiarizing the interagency subject matter experts with SIAM.
2. Building SIAM networks based on existing strategies and lines of effort.
3. Vetting the SIAM networks with the subject matter experts and making necessary adjustments to reflect the current situation.
4. Using SIAM’s sensitivity analysis function to prioritize lines of effort.

Joint Staff and the affected offices met in initial sessions to enable the subject matter experts to understand use of the software. Joint Staff prepared for these sessions by developing a short briefing in PowerPoint and entering the existing lines of effort into SIAM networks as nodes and links. Each initial session – there were individual sessions for the different teams working on different problems – began with the PowerPoint presentation and continued with a review of the prepared networks based on existing strategies.

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<sup>11</sup> President Bush, September 20, 2001 quoted on p. 9 of the QDR.

<sup>12</sup> JWAC is the lead Defense agency in the use of SIAM. Its personnel provided SIAD with significant training and advice on the dynamic uses of SIAM.

Each team met in 1 to 4 hour sessions over several weeks in August/September 2006.<sup>13</sup> All teams found that they had to clarify some tasks to conform to current reality while keeping the basic networks intact. The results confirmed initial assumptions about key lines of effort while identifying some unforeseen influences on them. The following paragraphs provide illustrations based on the 1999 Naval War College model and not on any current national security efforts.<sup>14</sup>

Using the strategic objective, “National government has monopoly on the legitimate use of force”, the highest priorities rested with the capabilities of both the military and national police to operate independently. Loyalty to the central regime was also a key factor. High priority influences, whose weight was originally unforeseen by subject matter experts, were soft power events, e.g. regional diplomatic success in key areas and adherence by internal players to the rule of law.

It is certainly intuitive that capable military and police forces are necessary to the national government’s role as the sole arbiter of legitimate force and that citizens should respect the rule of law. There were, however, other nodes which were thought to be as important before the exercise. These nodes stood out above the others after the sessions. Another unforeseen contradiction to original assumptions was the opportunity for a legitimate alternative livelihood in one country. This node rated very high in one case and was almost inconsequential in others. SIAM allowed participants to make such insights and use them in ensuing deliberations on lines of effort.

## EFFECTS-BASED ASSESSMENT

A definition of effects-based operations that is used as the foundation for effects-based assessment is shown here.

Effects based operations are planned in a systems framework that considers the full range of direct, indirect and cascading effects, which may with different degrees of probability – be achieved by the application of military, diplomatic, psychological, and economic instruments.<sup>15</sup>

We use effects to bridge the gap between objectives and tasks. We also differentiate between assessment of tasks, which tell us if we are “doing things right” and effects, which tell us if we are “doing the right things” (Figure 5). We perform our assessment using a framework shown in Figure 6.

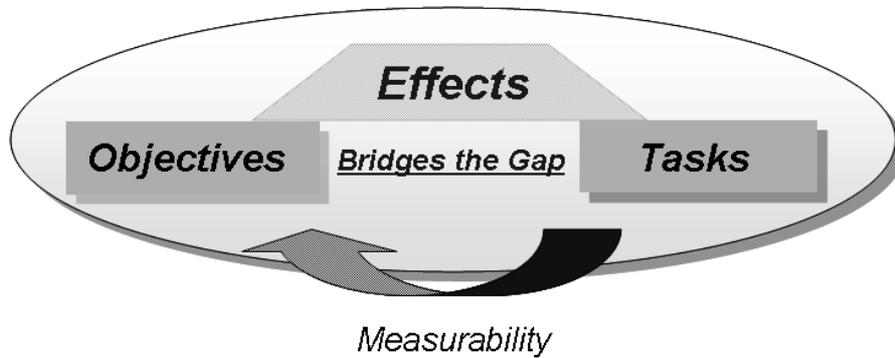
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<sup>13</sup> SIAD estimates that the total time spent in session on the most complex efforts were between 12 - 15 hours. This included the initial session and several working sessions.

<sup>14</sup> Due to the sensitivity of any national security effort, this article uses no information from actual interagency efforts. Note also decision makers considered the results of these SIAM-based sessions among many inputs and made no decisions based solely on the interagency SIAM workshops.

<sup>15</sup> Davis, Paul K. “Effects-Based Operations, A Grand Challenge for the Analytical Community,” RAND, Santa Monica, CA, 2001. p. 7.

**Why Use Effects?**



Objective: A clearly defined, decisive and attainable goal towards which a military operation is directed.

Task: A discreet event or action that enables a mission or function to be accomplished.

Figure 5: Why Use Effects?

**Definitions & Relationships**

**Effect** What we are trying to achieve

*The physical and/or behavioral state of a PMESII system that results from a military or non-military action or set of actions (DIME).*



**Measure of Effectiveness** Progress toward/away

*Trends of system behavior or capabilities; MOE are tied to effects and effects assessment.*



**Indicators** What we are going to measure

*Basis for evaluating the status of an MOE. PMESII system behavior or capability that is being measured. May be associated with a key node.*



**Criteria** The metric

*Specific activity level or measure associated with an indicator.*

Figure 6: Definitions and Relationships.

The tool we used was the Effects-Based Assessment Support System (EBASS). It is a web-based application designed to document and automate the assessment of effects, measures of effectiveness, and associated indicators. EBASS was developed by the US

Military Academy (USMA) Information Technology and Operations Center (ITOC) and Operations Research Center of Excellence (ORCEN). Initially EBASS used to support US Central Command (USCENTCOM) operations in Afghanistan. US Joint Forces Command (USJFCOM) uses EBASS to support training for the Standing Joint Force Headquarters (SJTJFHQ). The Multinational Forces – Iraq (MNF-I) uses EBASS to support their Commander’s Assessment Synchronization Brief.

Examples of the way in which EBASS documents effects-based assessments are shown in Figures 7 and 8.

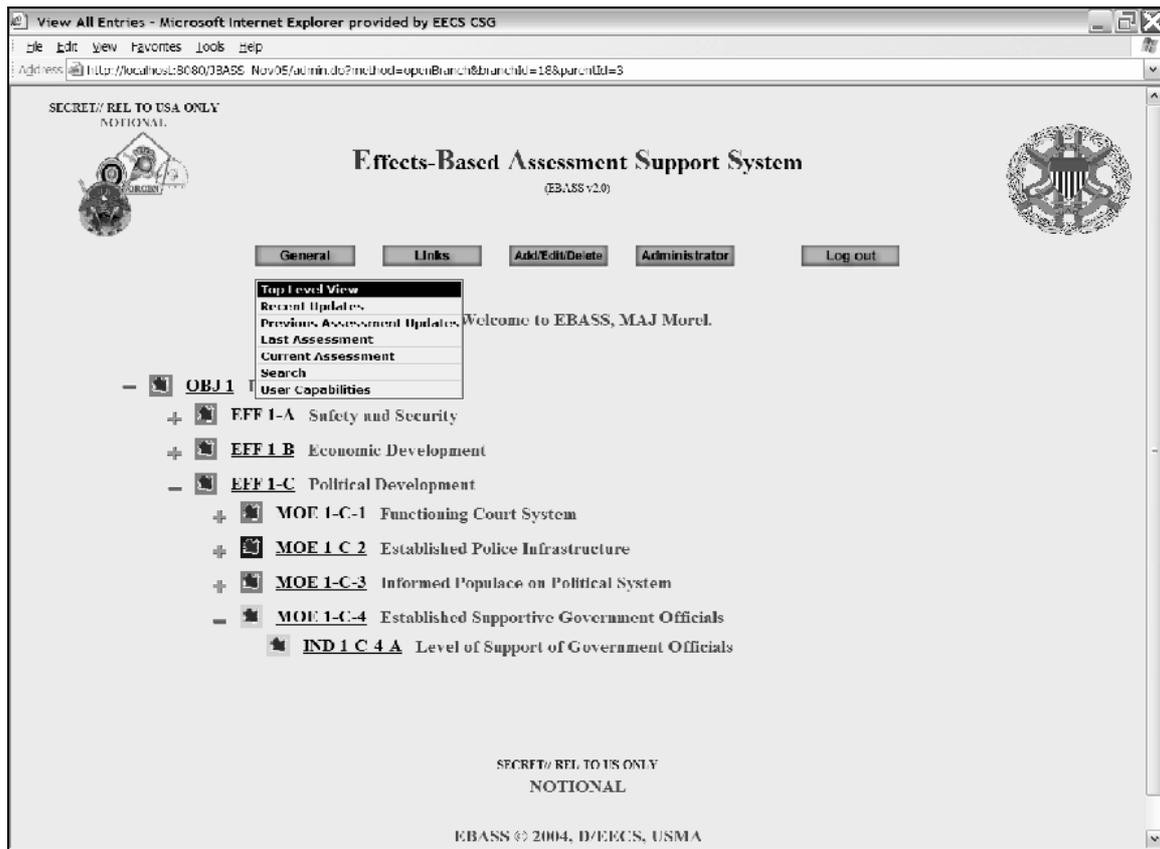


Figure 7: Effects-Based Assessment Support System.

These tools provided allowed the participants in the interagency process to develop, document and automate the assessment of effects, measures of effectiveness, and associated indicators.

## CONCLUSION AND SUMMARY

All participants agreed that these efforts confirmed that influence net modeling effectively informs prioritization for lines of effort in complex national security efforts. Users – both facilitators and subject matter experts – quickly understood the software’s basic concepts. The software maintains the numerous nodes, links and influences – freeing participants to concentrate on decision-making. Users can see the effects of changes to networks immediately, allowing them to make “what if” analyses easily and quickly. Sensitivity

analysis – SIAM’s prioritization enabler – simplifies analysis of the entire network or selected nodes.

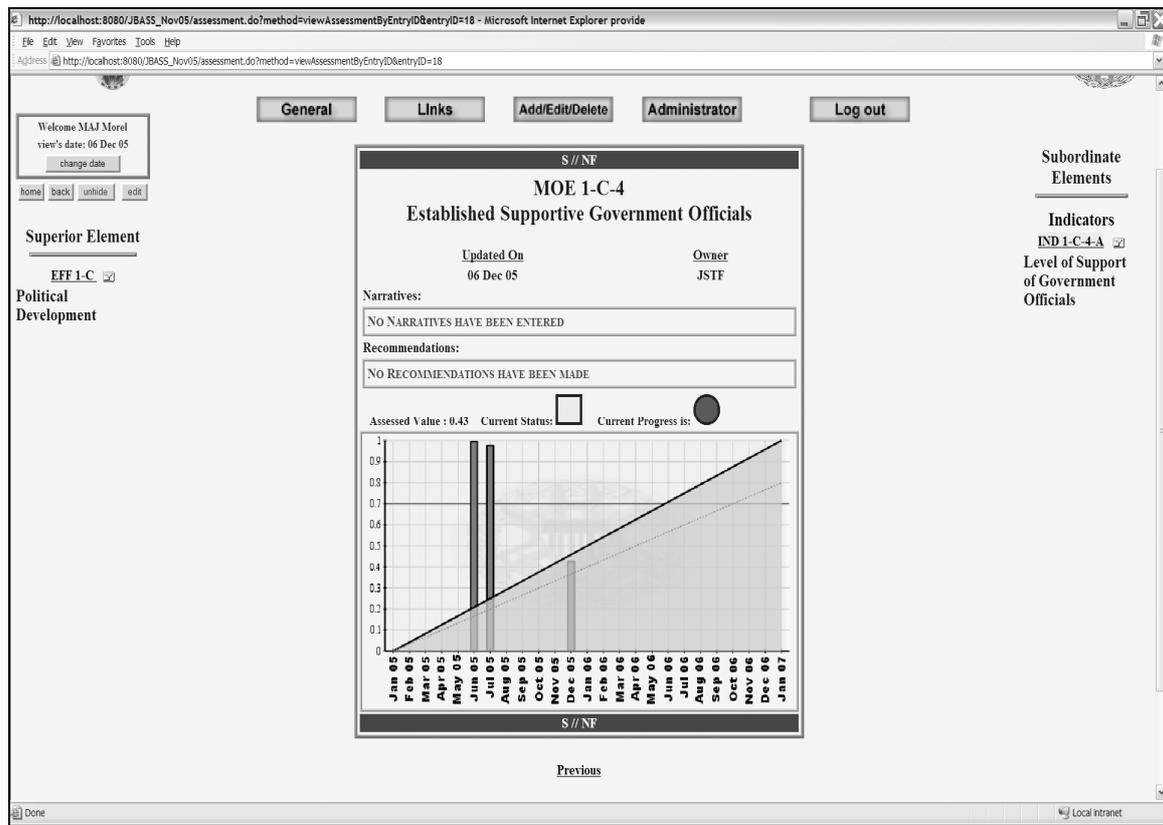


Figure 8: Effects-Based Assessment Support System.

Participants also concluded that SIAM requires an initial investment of time to understand its basic concepts.

Building initial networks also necessitates an investment of time. The more complex the network, the more time is involved. However, networks based upon existing strategies can be prepared by a user familiar with SIAM prior to the participation of subject matter experts. This allows experts to spend more time on substantive work and less on basic network building.

A caution might be that influence net modeling as used here is a prioritization tool. It is neither a replacement for actual decision making nor a panacea for poor decision-making. Influence net modeling is currently most used by the USG at the operational level. Joint Staff believes that it has potential to assist policy makers and planners in the interagency environment at the strategic level.

The complex demands of the Long War dictate that the USG integrate all forms of national power – from diplomacy to economics and information to the military. The successful utilization of that power requires that the USG use tools that capture the intricacies and nuances of power interactions in equally complex environments. Influence net modeling is one such tool.

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