

Support for the Process of Planning Coalition Operations

Robert J. Smillie Ph.D., C.P.E.*

SPAWAR Systems Center-San Diego
Simulation and Human Systems Division Code 44210
53560 Hull Street, San Diego, CA 92152
Phone: 619-535-8015
Fax: 619-535-9391
rsmillie@spawar.navy.mil

Nancy J. Heacox, Ph.D.

Richard T. Kelly, Ph.D.

Pacific Science & Engineering Group, Inc.
6310 Greenwich Dr., Suite #220, San Diego, CA 92122
Phone: 858-535-1661
Fax: 858-535-1665
heacox@pacific-science.com
rtkelly@pacific-science.com

Jens A. Jensen, M.S.

Crisis Operations, USCINCPAC
P.O. Box 64013, Camp H. M. Smith, HI 96861
Phone: 808-477-4650
Fax: 808-477-7402
jjensen@spawar.navy.mil

Abstract

The response to international crises typically involves extensive interaction and coordinated activities among multi-national coalitions of military and civilian organizations. This interaction is often complicated, however, by cultural differences among coalition partners, creating roadblocks to the successful execution of coalition operations. Because the U.S. military often takes the lead role in coalition operations, mission success often depends upon the ability of U.S. military personnel to effectively plan and coordinate with military and non-military personnel from diverse cultures. Unfortunately, there are few information systems in place to support effective coalition planning and coordination, leaving these important missions vulnerable to embarrassing misunderstandings and costly errors. To facilitate close cooperation among coalition partners, the Decision Support Systems for Coalition Operations (DSSCO) research and development project is working on providing information management and planning support tools. DSSCO is taking a user-centered design approach in which the decision support tools are based on key factors that make coalition operations successful and on a thorough understanding of the cognitive processes used by experienced crisis action planners. These tools support information presentation, knowledge management, distributed cognition, and modeling and simulation. The features and functions of the tools will be discussed, and plans for further development will be summarized.

* This project is sponsored by the Office of Naval Research (ONR).

Importance of Coalition Operations to U.S. DOD

In today's complex geo-political world, coalitions have become the key to successful military operations. The U.S. Navy Chief of Naval Operations, ADM Jay Johnson, stated in November 1999: "...we expect coalitions to play an increasingly important role in international security...this shift toward coalition operations...demands the greatest degree of transparency in our (U.S.) operations..." (Johnson, 1999).

The complexity of any coalition operation is greater than that of a unilateral response. Effective command and control during coalition operations demand extensive interaction between the U.S. and the foreign militaries that make up the coalition. As the U.S. military often takes the lead role in coalition operations, mission success often depends upon the ability of U.S. military personnel to understand how to effectively plan and coordinate with military personnel from diverse cultures to achieve unity of effort. Within any coalition, it is difficult to determine the end-state for the operation because the respective governments of the coalition partners rarely share a single objective for the operation. Thus, unity of effort becomes a challenge, requiring complex negotiations to determine force mix and frequent re-planning to accommodate organizational differences. In addition, there is no comprehensive knowledge base for coalition forces that lists and compares capabilities, assets, procedures, and protocols (all necessary components for an effective military operation) for capability, flexibility, and deployment alternatives. To obtain effective command and control there is a need for members of the coalition to reach a common understanding of the situation to consequently develop effective courses of action. A decision support system that accounts for organizational differences, facilitates planning interactions among diverse cultures, and provides a common representation of an operation's events and sequences tailored across echelons is needed.

To address this concern, the Office of Naval Research (ONR) initiated the Decision Support System for Coalition Operations (DSSCO) project to identify areas of vulnerability in coalition operations and to design interventions to address these issues. The objective of DSSCO is to develop an integrated set of decision support tools for planning and executing multi-national coalition operations.

Critical Processes in Coalition Operations

The processes that the U.S. military uses to plan and execute coalition operations were studied. An extensive literature review was completed, including doctrine, field manuals, lessons learned, academic analysis, workshop reports, and interviews with recent participants of coalition operations. Accounts of several coalition operations were analyzed within the framework of the planning and execution processes currently used by the U.S. military. In addition, participation in Joint military exercises afforded an opportunity to observe the planning and execution processes in action. After analyzing the data, four processes were identified that are critical to coalition operations (Heacox, O'Mara & Kelly, 1999):

Inter-Group Planning

Inter-group planning has two components:

- Inclusion planning – the degree of inter-group involvement in the planning process.
- Common and consistent goal – the degree of a common target and strategy (role compatibility) for mission accomplishment by all participants in theater.

Inter-group planning serves many important functions for a coalition operation. The involvement of operation participants during the planning phase initiates the building of trust and positive working relationships. Involved non-military organizations, such as humanitarian assistance organizations that will be in the operational theater, should be contacted and included as early in the planning phase as is feasible. The early establishment of a common and consistent goal from multiple perspectives will set a solid foundation for unity of effort as the operation is executed.

Inter-Group Coordination

Inter-group coordination has two components:

- Service orientation – behaviors that reflect mission-appropriate service to the affected populace and to other participating organizations.
- Reciprocity – foster a helping relationship among groups: “You help me do what I need to do, and I help you do what you need to do.”

Effective inter-group coordination is key for successful execution. A service orientation facilitates teamwork, high morale, trust and good will. The goals of the mission, rather than separate agendas, drive the day-to-day operational decisions. Reciprocity is a force multiplier, as it results in highly efficient personnel and materiel resource use.

Inter-Group Communication

Inter-group communication has two components:

- Inter-organizational communication – the degree of information sharing between leaders from different groups (e.g., participating militaries, UN, humanitarian assistance organizations).
- Information transfer – the degree of information flow from group leaders to those performing in the field.

Inter-group communication is essential for consistent, smooth execution of a coalition operation. It is the key for participants to maintain situation awareness. Inter-organizational communication keeps participants “in the loop,” creates ease and speed in accomplishing difficult tasks, improves planning/replanning, and reduces major mistakes. Effective information transfer enhances unity of effort by facilitating efficient task execution. Coalition operations are often executed in highly dynamic situations, and effective inter-group communication is the vehicle for keeping the forces poised for flexible response.

Inter-Group Training

Inter-group training also has two components:

- Cultural awareness – behaviors by coalition participants that demonstrates awareness of and respect for the customs and values of the host nation and participating organizations.
- Joint rehearsal – Specific combined training or simulation exercises prior to or during a mission that allows all organizations to start building unity of effort.

As coalition operations may bring together unfamiliar participants in unfamiliar lands, the presence or absence of cultural awareness may come to the foreground. This factor can be associated with positive goodwill and publicity, and with enhanced ability for effective operations—the converse is also true. Joint rehearsal is unquestionably the best means for achieving a solid foundation from which to build an integrated response force.

Information Management Needs for Coalition Operations

There are several ways to help promote effective inter-group planning, coordination, communication, and training for coalition operations. DSSCO has adopted a technological approach in which a suite of decision support tools can be used to facilitate crisis planning and execution monitoring among coalition partners. DSSCO builds on the web-based information technology systems architecture that is currently being developed for U.S. Pacific Command under existing programs. But most significantly, DSSCO employs a user-centered design process in which the information needs and cognitive processes of coalition planners are used as the foundation for the system design.

Our analysis of past coalition operations and of procedures currently used by expert coalition planners indicates that DSSCO needs to promote an understanding of priorities, roles, and planned actions. This understanding needs to be shared among distributed partners, each of whom may have different backgrounds, training, and procedures. This raises several issues related to the four critical processes cited in the preceding section:

- What are effective information management strategies for multi-group planning?
- How do cultural differences affect decision-making in a cross-cultural coalition?
- How can information integration schemes support cross-cultural, crisis action prediction and analysis?
- Can graphical visualizations support cross-cultural situation assessment and understanding?
- How can information be formatted and displayed for collective (group) understanding in a cross-cultural environment?

We have adopted the following guidelines to address these issues in our initial DSSCO design efforts. Other design guidelines will no doubt emerge during further development.

- Explicit representation of a standardized coalition planning process – While every military and civilian organization has a standard process that they use for crisis action planning, these differ substantially across organizations and few are aware of the

others' processes. A common standard process is needed that can be made explicit and shared with all coalition partners. This process should be outcome-based, focusing on the steps necessary to produce the coalition plan documents and orders.

- Task-based guidelines and references for completing steps in the planning process – Coalition planners often become involved intermittently and on an *ad hoc* basis. Therefore, they need specific guidance on how to complete the various planning steps, who to consult for further information, what was done in the past under similar circumstances, when specific planning actions are required, etc. Rather than appearing as a general handbook, this information needs to be presented to planners as action-oriented procedures and references that are specifically related to the task at hand.
- Context-sensitive support for obtaining required data – Currently, coalition planners must actively request relevant information, need to re-enter data many different times, and have no way to know if distributed coalition planners are working redundantly on the same task. Instead, they need a system that knows what task they are working on and pushes relevant data to them, that remembers core elements of the plan that have already been established and shares this information with everyone, and that manages collaborative work by distributed planners.
- Visualization of the planning process and of the planned tasks – A way to represent both the planning process and the plan itself is needed to facilitate unambiguous communications across distributed coalition partners. Currently, this is done via text-based documents and messages. A graphic display that helped partners to visualize tasks, time sequencing, interdependencies, and performers would be a substantial improvement.
- Baseline templates of action sequences commonly employed in coalition operations – Experienced planners typically use generic action sequences as their basic cognitive building blocks for coalition operations. These action sequences, or templates, consist of a series of tasks and subtasks that are necessary to complete a function (e.g., distribute humanitarian assistance goods). A subset of templates that is appropriate for the current mission is retrieved, evaluated, and adapted for the specific operational needs and constraints of the actual situation.

DSSCO Architecture

A concept of operations was defined for an architecture that supports existing crisis action planning and monitoring procedures, and provides the operations planners with a set of three tools: coalition planning resources, planning process module, and task visualization module. These tools can be related to the areas of information management discussed in the preceding section. One way to consider this relationship is in terms of four higher-level information processing activities: information presentation, knowledge management, distributed cognition, and modeling and simulation. All three tools present information to decision makers in order to supply them with data that they can use to make effective, accurate, and correct decisions. The planning process module, which shows the current status of the planning process and links the user to information that can be used in specific steps of the planning process, plays a role in two

additional activities. It can be used in conjunction with the planning resources tool to facilitate knowledge management. In addition, the planning process module, along with the task manager, supports distributed cognition. The task manager will also support modeling and simulation activities for developing and testing hypothetical scenarios in which coalition members are assigned different roles and responsibilities. Taken together, these three tools support information management, planning, and simulation activities, and provide important decision support for coalition operations. Each of these tools is now discussed in more detail.

1. Coalition Planning Resources - provides guidance on planning, organizing, and executing coalition operations. Within this component are modules that provide a description of the planning process, identify potential problems, and suggest guidance for each step in that process. The resources include templates for specific products of the planning process (see Figure 1), and databases containing information on potential military and non-military coalition partners (see Figure 2), including resources and prior experience, as well as known cultural differences and implications of these differences.

```

                                COALITION COMMANDER'S ESTIMATE ¶
                                ¶
    General. The COALITION Commander's Estimate is submitted by the supported
    commander in response to a COALITION Warning Order. It summarizes the
    commander's assessment of the situation and contains his preferred and
    alternative courses of action. ¶
    The COALITION Commander's Estimate is prepared in the adopted format of the
    supported commander. NOTE: US format is US Message Text Format (USMTF). The
    COALITION Commander's Estimate will normally be transmitted by record
    communication using IMMEDIATE or FLASH precedence. It should be submitted as
    soon as possible after receipt of the Warning Order but not later than the
    deadline established in the COALITION Warning Order. Seventy-two hours are
    normally provided for preparation and submission of the Commander's Estimate.
    Format and items of information that should be considered for inclusion in
    the Commander's Estimate; only those items in boldface are mandatory: ¶
    ¶
    IMMEDIATE ¶
    FM → (SUPPORTED COMMANDER) ¶
    TO → COALITION NCA ¶
    INFO → (CCTF) ¶
           (SUPPORTING COMMANDERS) ¶
           (CHIEF OF DEFENSE FORCE-POTENTIAL COALITION PARTNERS) ¶
  
```

Figure 1: Example of DSSCO Planning Product Template

Priorities <input type="checkbox"/> Protection <input checked="" type="checkbox"/> Acute Aid <input checked="" type="checkbox"/> Long Term Assistance	emergency medical aid, disaster relief, fight poverty and starvation, promote self sufficiency, promote humanitarian law	Priorities www.care.org
Expertise <input checked="" type="checkbox"/> Emergency/Disaster Relief <input checked="" type="checkbox"/> Education/Training <input type="checkbox"/> Humanitarian Advocacy/Protection <input checked="" type="checkbox"/> Community/Long term Development <input type="checkbox"/> Family Tracing/Reunification <input type="checkbox"/> Conflict Resolution/Disarmament	Experience sanitation, water, food, medical, shelter, run refugee camps, communications liaison, promote self sufficiency, health care education, agricultural assistance, engineering, community development,	Expertise www.careaustralia.com.au, www.careaustralia.com.au, www.careaustralia.com. Experience www.careaustralia.com.au, www.care.org
Resources <input checked="" type="checkbox"/> Equipment <input checked="" type="checkbox"/> Basic Needs <input checked="" type="checkbox"/> Supplies	construction, well/pumps, communications, water/sanitation, food, clothing, shelter, medical, farming, sanitation	Resources www.careaustralia.com.au, www.care.org

Figure 2. Example of DSSCO Database Information on Humanitarian Assistance Organization, Cooperative for Assistance and Relief Everywhere, Inc. (CARE)

2. Planning Process Module - shows the current status of the planning process (see Figure 3) and links the steps in that process to information used to create and visualize planning products. Within this component are modules that collect details on the current status of the planning process and modules that link to information needed to perform each planning process step. There is also a conflict catcher that identifies potential cultural or organizational problems during the planning process and suggests interventions to address potential process "derailers".

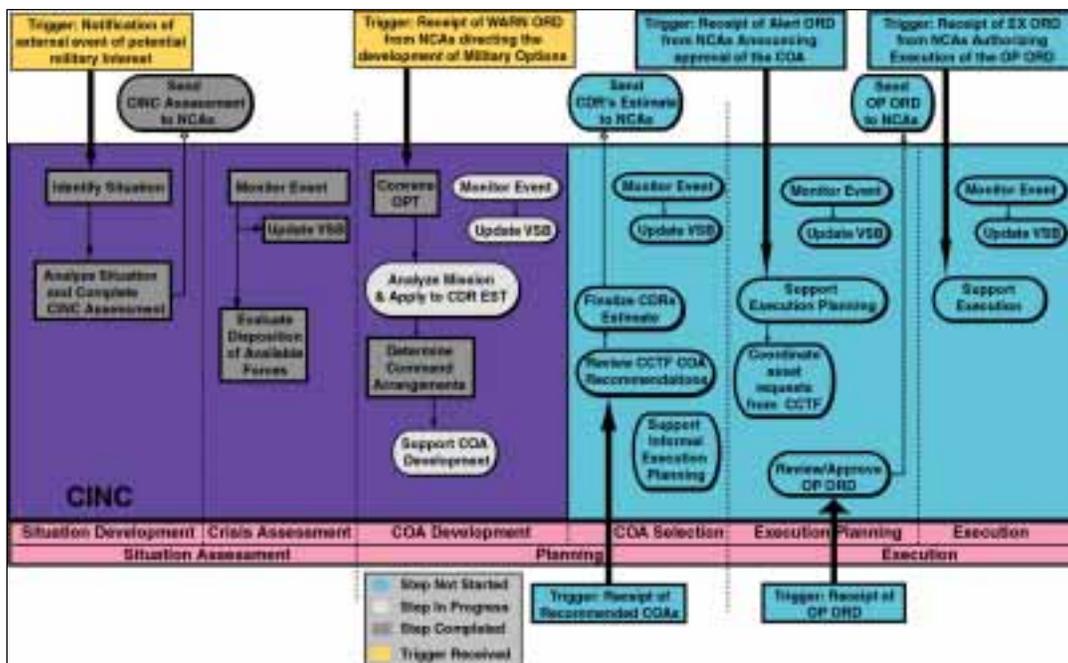


Figure 3: Example View of Planning Process Module

3. Task Visualization Module - displays features of a plan that is being created, modified, and/or executed (see Figure 4). Within this component are modules that provide visualization of tasks, resource assignments, schedules, and performance/scheduling dependencies, a module for evaluating scheduling options and highlighting potential scheduling problems, a module to evaluate the probability of success of individual tasks or "what-if" scenarios based on mission performance requirements and task dependencies, and a monitor to collect real time feedback during execution of the plan (Heacox, Moore, & Smillie, 2000).

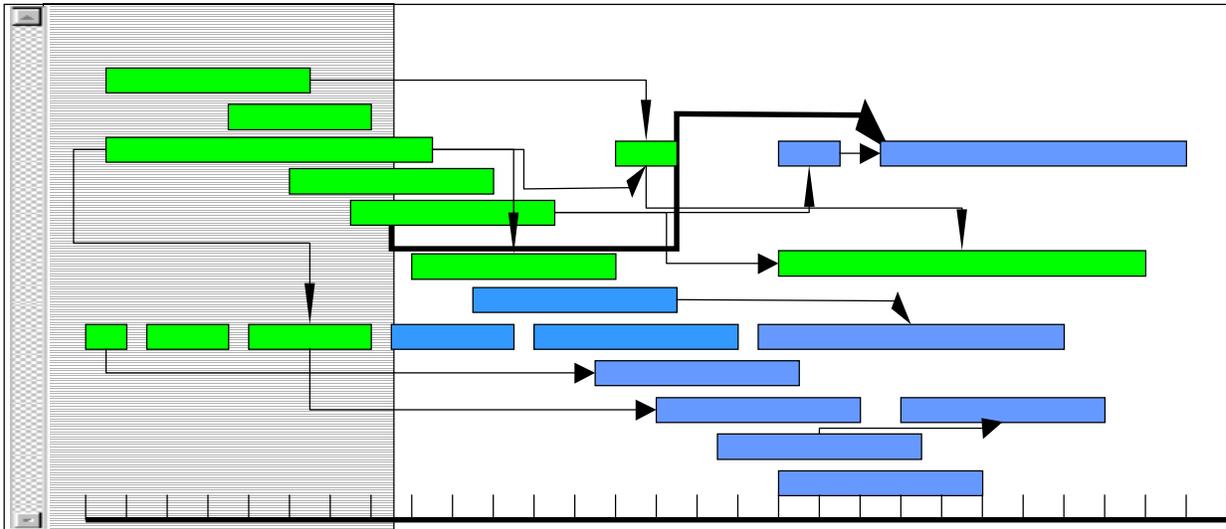


Figure 4: Notional View of DSSCO Task Visualization Module

Summary

From the concept of operations, an effective decision support system is under development that features an easy-to-use, web-based human computer interface, provides a vehicle to access other (non-DSSCO) crisis action planning tools, buffers the user from the necessity of understanding complexities of constantly evolving technology and information infrastructure, and facilitates implementation of new technologies/capabilities as they become available. This support system is intended to be a versatile and powerful tool that simplifies acquiring, interpreting, and organizing complex and dynamic information. The DSSCO tools can be applied to this process to accomplish a wide range of information presentation, management, distributed cognition, and modeling and simulation activities. Further research will examine the issues discussed in this paper in greater detail in order to develop highly effective information management tools for planning, coordinating, and training coalition operations.

References

[Heacox, O'Mara, & Kelly, 1999] Heacox, N. J., O'Mara, W. J., & Kelly, R. T. *Information Support for Coalition Operations Other Than War*. San Diego, CA: Pacific Science & Engineering Group, January 1999).

[Heacox, Moore, & Smillie, 2000] Heacox, N. J., Moore, R. A., & Smillie, R. J. Macroergonomics for Coalition Operations. *Proceedings of the XIVth Triennial Congress of the International Ergonomics Association and 44th Annual Meeting of the Human Factors and Ergonomics Society* (in press). Santa Monica, CA: Human Factors and Ergonomics Society.

[Johnson, 1999] Johnson, J. L. *Keynote Address at the International Seapower Symposium*, Naval War College, Newport, RI, 8 November 1999.