Decision Support Tools for the Operational Planning Process

Micheline Bélanger, Adel Guitouni, Normand Pageau

Defence R&D Canada – Valcartier

Government of Canada
Outline

• Context of Work
• Collaborative Operations Planning System
• Decision Support Tools
• Conclusion
Campaign Planning Tools

1. Initiating Directive
2. Initiation
3. Orientation
4. COA Development
5. Plan Development
6. Plan Review
7. OPLAN/OP O

STRATEGIC INITIATING DIRECTION

- Mission, intent, tasks, general situation, restraints, constraints, preconditions for success and assigned tasks

Staff Information: geomatics, factors, force information, etc

- Assumptions
- Factors

Strengths & Weaknesses

- Centres of Gravity
  - Lines of operation
  - Force protection
  - Decisive Points
  - Critical vulnerabilities
  - Preferred line of operation
  - Sequencing

- Mission: what will be done to the C of G

OBJECTIVE

- Desired End State
  - Criteria

- Sequel

Further Operations
Conflict Termination
Next Phase
Goal

- Develop and demonstrate concepts supporting time-sensitive operational planning process

CF OPP

Time constraints
Process Support & Collaboration Tools

Initiating Directive

Initiation

Orientation

COA Development

Plan Development

Plan Review

OPLAN/OPO

CFOPP

Time

Same “Asynchronous”

Face-to-Face, Voting, Presentation Support, Etc.

Different “Asynchronous”

E-mail, Voicemail, Document Repositories, Etc.

Same “Co-located”

Different “Virtual”

Video/audio-conferencing, Chat, Instant Messaging, Etc.

E-mail, Threaded Discussions, Document Repositories, Etc.

@ Massey 2008

Defence R&D Canada • R & D pour la défense Canada
Collaborative Operations Planning System
COPlanS

An integrated flexible suite of planning, decision-aid and workflow management tools aimed at supporting Distributed Military Processes (e.g., CFOPP)
Generic Capabilities

**Process Management** – Graphical Design and implementation of Process Templates (e.g. OPP, Crisis Action Planning and Condensed IPB); Automated Staff Check and Activation; Manage staff, roles, activities and workflows; Manage approval process (brainstorming, revision, pre-approval and approval).

**Distributed Collaboration** – Distributed Collaborative Workspace with integrated tools fostering sharing of data and tools across workgroups / agencies; Direct Conduit to MS Outlook and Exchange Serve; Chat with Possibility to integrate SameTime; Possible Interfacing with VTC

**Distributed Document Management** – Automated document management; Distributed document editing (Check in/check out); Change Management (Version control); Handle any document format (doc, ppt, avi, etc.);

**Automated WEB Master** – Self Maintained WEB Consultation Center for Real-Time Information Access; Supports XML/XSL; Document Handling; Possible bridging with CommandView
Enhanced Collaborative OPP Capabilities

**Initiation** – Higher HQ Initiating Directives Review; Initiation Assessment and Commander's Initial Guidance (Initial Wng O in case of time sensitive planning); Planning Staff Check and Activation; Battle Rhythm; Planning tool selection

**Orientation** – Provide Condensed IPB Estimates; Staff Estimates and Deductions; Operational Design Support; Strange Analysis; Initial Forces Estimates; Mission Analysis Brief production; Planning Guidance

**COA Development** – Campaign Designer and Concept Development; Time and Space Synchronization for Friendly and Adversary COAs; OnMap Collaborative Planning; ORBAT and C2 Structuring Tool; Simulation; Analysis; Comparison; Information and Decision Briefs; CONOPs

**Plan Development** – Automated SOR; OPLAN / Campaign Plan; Management of Annexes; Plan Review; Possibility to redo any step and update any output;

**Automated Production** – Automated and Tailored reports and outputs information in accordance with organizational templates; Choice of formats; Web Push and Hide; Interoperability
3 Screens Setup (Planning)

- Tools Shortcuts
- Mission Analysis
- COA Synchronization
- OnMap Planning
- ORBAT Browser
- Document Repository
Decision Support
COPlanS System Architecture Overview

Client

- COPlanS Client

Server

- Web Server
  - TomCat 5.0 or later
  - Lindo 6.1
- MapServer
- Database Server
  - Oracle 9i or 10g

Access to the Web Site (Browser or COPlanS client)
Access to the Maps
Client Requests
Server Notifications
DB Access

COPlanS Architecture

- COPlanS Rich Client
  - OPP Modules
    - Initiation
    - Orientation
    - COA Development
    - Plan Development
    - Plan Review
  - Supporting Modules
    - GIS
    - Workflow
    - Chat
    - Document Repository
    - Administration
  - Application Framework
  - Data Access Layer

- COPlanS Web Client
  - Web Browser

- COPlanS Web Server
  - Services
    - Update
    - Help
    - Sensibility Analysis
    - Consultation Center
  - Data Access Layer

- COPlanS Socket Server
  - Services
    - Transaction
    - Notification
    - Registration
    - Chat
  - Data Access Layer

- GIS Servers
  - Services
    - WMS
    - WFS

- Oracle Data Server
  - Relational Database
Links between elements of the CFOPP

Orientation
- Review Situation
- Review (Higher Level)
  - Assumptions
  - Constraints/Restraints
  - Centre of Gravity (Own/Enemy)
  - Objectives
  - Endstate
  - Criteria for Success
  - Tasks
- Develop Own
  - Critical Facts and Assumptions
  - Constraints/Restraints
  - Key Strengths and Weaknesses (Own and Enemy)
  - Centre of Gravity (Own and Enemy)
  - Tasks (Assigned/Implied)
- Objectives
- Endstate
- Criteria for Success
- Force Capabilities and Groupings
- Command and Control Structures
- Assess Risk
- Propose Timelines
- Battlespace Effects
- Develop Mission Statement
- Prepare Mission Analysis Brief
- Develop/Issue Comd's Planning Guidance and Wng O

COA Development
- Review CPG
- Staff Analyse Factors
  - AOO Situation
  - Opposing Force Capabilities
  - Political Considerations
  - Own Force Capabilities
  - Time and Space
  - C2
- Logistics and Movement
- Rules of Engagement
- Conflict Termination
- Risk
- Tasks (Assigned/Implied)
- Lessons Learned
- Develop Initial Enemy COAs
- Develop Initial Own COAs
- Present Information Brief
- Comd Provides Further Guidance
- COA Validation
  - COA Wargaming
  - Compare COAs
- Deliver Decision Brief
- Comd Selects COA
- Write CONOPS

Plan Development
- Seek CONOPS Approval from Higher Authority
- Identify and Resolve Issues/Shortfalls
- Prepare the Plan
- Synchronize Annexes/SUPLANs
- Develop Branches and Sequels if Required
- Submit Plan for Approval
- Revise Plan if Necessary
- Issue Final Plan

Defence R&D Canada  •  R & D pour la défense Canada
NATO Operations Planning\(^1\) and Force Activation\(^2\)

Political Military Level (NAC/MC and Nations)

- Political-Military Estimate
- Initiating Directive
- Strategic Military Assessment

Initiation
- Cdr’s Planning Guidance
- Force Estimate

Orientation
- Force Activation Directive
- CONOPS
- SOR

Concept Development
- ACTREQ
- Force Generation Conference
- ACTWARN

Plan Development
- Force Balancing

Approval
- Nations
- OPLAN

Execution Directive
- Nations
- OPLAN

TOA

References:
1 - BI-SC GOP
2 - MC 133/3
Dynamic Link Management

The CFOPP elements require a link enforcement concept to create integrity between elements.

The Limitation LI-1 (Limitation 1) has been attached on 151907Z Dec 2008.
Plan Management

This is the capability to manage Operation Plan (OPLAN) and Contingency Plan (CONPLAN).
Center of Gravity Analysis

The Center of Gravity Analysis display is a tool, located in the Orientation stage, to create and visualize links between COGs, CCs, CRs, CVs and DPs.
Decisive Point Analysis

The Decisive Point Analysis allows the planner to graphically manage the sequencing of DPs, their relations, influences and line of operations.
Criteria Management

This computer-based tool provides management functions for different types of criteria related to the CFOPP.
<table>
<thead>
<tr>
<th>Factor</th>
<th>Criterion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor 1</td>
<td>Criterion A</td>
</tr>
<tr>
<td>Factor 2</td>
<td>Criterion B</td>
</tr>
<tr>
<td>Factor 3</td>
<td>Criterion C</td>
</tr>
<tr>
<td>Factor 4</td>
<td>Criterion D</td>
</tr>
<tr>
<td>Factor 5</td>
<td>Criterion E</td>
</tr>
<tr>
<td>Factor 6</td>
<td>Criterion F</td>
</tr>
<tr>
<td>Factor 7</td>
<td>Criterion G</td>
</tr>
<tr>
<td>Factor 8</td>
<td>Criterion H</td>
</tr>
<tr>
<td>Factor 9</td>
<td>Criterion I</td>
</tr>
<tr>
<td>Factor 10</td>
<td>Criterion J</td>
</tr>
<tr>
<td>Factor 11</td>
<td>Criterion K</td>
</tr>
<tr>
<td>Factor 12</td>
<td>Criterion L</td>
</tr>
<tr>
<td>Factor 13</td>
<td>Criterion M</td>
</tr>
<tr>
<td>Factor 14</td>
<td>Criterion N</td>
</tr>
</tbody>
</table>

**Search Evaluation Criteria**

**Search Evaluation Criteria**

**Search Evaluation Criteria**
Decision-Matrix Management

This computer-based tool supports decision-matrixes with the flexibility to use numerical as well as descriptive analytical approaches.
<table>
<thead>
<tr>
<th>Criteria</th>
<th>Weight</th>
<th>Optimization Direction</th>
<th>BRONZE MEDAL</th>
<th>GOLD MEDAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operations Complexity</td>
<td>0.4</td>
<td>Maximize</td>
<td>Very High</td>
<td>Missing Evaluation</td>
</tr>
<tr>
<td>Logistics Complexity</td>
<td>1.0</td>
<td>Maximize</td>
<td>Very High</td>
<td>Missing Evaluation</td>
</tr>
<tr>
<td>Command and Control Complexity</td>
<td>0.3</td>
<td>Maximize</td>
<td>Very High</td>
<td>Very Low</td>
</tr>
<tr>
<td>Sustainability</td>
<td>0.3</td>
<td>Maximize</td>
<td>Very High</td>
<td>Low</td>
</tr>
<tr>
<td>Optimum Use of Resources</td>
<td>0.5</td>
<td>Maximize</td>
<td>Medium</td>
<td>Missing Evaluation</td>
</tr>
<tr>
<td>Impact of the Sensors Coverage Gap</td>
<td>0.5</td>
<td>Maximize</td>
<td>Medium</td>
<td>Low</td>
</tr>
<tr>
<td>Military Personnel Loss</td>
<td>0.5</td>
<td>Maximize</td>
<td>Extremely High</td>
<td>Missing Evaluation</td>
</tr>
<tr>
<td>Collateral Damage</td>
<td>0.5</td>
<td>Maximize</td>
<td>Very Low</td>
<td>Missing Evaluation</td>
</tr>
<tr>
<td>Confrontation Risk</td>
<td>0.5</td>
<td>Maximize</td>
<td>Very Low</td>
<td>Missing Evaluation</td>
</tr>
<tr>
<td>COA Reliability</td>
<td>0.5</td>
<td>Maximize</td>
<td>Missing Evaluation</td>
<td>Missing Evaluation</td>
</tr>
<tr>
<td>Human Reliability</td>
<td>0.3</td>
<td>Maximize</td>
<td>Missing Evaluation</td>
<td>Missing Evaluation</td>
</tr>
<tr>
<td>Covering Enemy’s Courses of Actions</td>
<td>0.5</td>
<td>Maximize</td>
<td>Missing Evaluation</td>
<td>Missing Evaluation</td>
</tr>
<tr>
<td>Covering Mission’s Possible Locations</td>
<td>1.0</td>
<td>Maximize</td>
<td>Missing Evaluation</td>
<td>Missing Evaluation</td>
</tr>
</tbody>
</table>

**Recommendation:** New COA 2

**Justification:**

Therefore, there is evidence that New COA 2 is at least as good as other actions. The criteria that support these findings are the following:

- **Cost**: New COA 2 is ranked first.
- **Flexibility**: New COA 2 is better than other options.
- **Risk**: New COA 2 is safer than other options.

**Why New COA 2 is better than New COA 1?**

New COA 2 is better than New COA 1 because of the lower threshold of the criteria.
The purpose of risk management for CF operations is to effectively identify, analyze, evaluate and control all types of risk.
The Threat Threat 1 has been modified on 16/1892 Dec 2008 by the user admin. The value for the field Probability has been changed.

Last change: The COA COD 2 has been added to the Plan Plan A on 15/7982 Dec 2008 by the user admin.
Conclusion

• 7 tools have been implemented into COPlanS
• Basic Mechanisms are now there to implement more advance concepts for each one of these tools.
• Better visualisation approaches need to be developed