Group Discussion: Formulating the Problem & the Strategy for Solution

23 April 2002
**Group Discussion on Formulating the Problem and the Strategy for Solution**

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<tr>
<td>MITRE 7515 Colshire Drive, MS N650 McLean, VA 22102-7508 USA</td>
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Goals

• Elicit how the draft CoBP might be
  – Added to
  – Subtracted from
  – Modified

• Identify steps that might be taken to further illuminate or clarify the subject

• Identify key issues that might be the subject of future SAS panels
Agenda

• Problem Formulation (What & Why)
  – Context
  – Aspects of the Problem
  – Principles of Problem Formulation
    • C2 Assessment
    • OOTW C2 Assessment
  – Bounding the Problem
  – High Level MoM
  – Tools for Problem Formulation

• Solution Strategy (How)
  – Developing a solution strategy
  – Study Management Plan
Context

• Four *contextual* areas have been identified
  – Geopolitical
  – Analysis aim, objectives
  – Generic C2 issues
  – Relevant prior studies

*Are these areas necessary and sufficient?*
Aspects of the Problem

• Five *aspects* of the problem have been identified
  – Issues to be addressed
  – Assumptions
  – High level MoMs
  – Independent variables
  – Constraints on the variables

• Statement: “The problem is not formulated until the Assessment Team has specified each aspect of the problem” -- *Do you agree or disagree?*
Principles of Problem Formulation: C2 Assessment

• Do it prior to developing concepts for analysis or model selection
• Understand the decisions to be supported and stakeholder viewpoints
• Carefully review previous work
• Do analysis and synthesis
• Be broad and iterative
• Practical constraints are modifiers, not drivers
• Address risks to the study explicitly

Is this list correct and comprehensive?
Principles of Problem Formulation:
OOTW C2 Assessment

• Address the
  – Geopolitical context
  – Generic C2 issues
• Look at the policy level impacts (i.e., MOPEs)
• Recognize that history can be important
• Do not focus in too soon
• Employ a broad range of disciplines on the team

Is this list correct and complete?
Assembling a Multi-Disciplinary Team Can Be Challenging…

“But I don’t want to do C2 assessment!”
Notes for Slide 9

As many of you know, members of the Synthesis Panel have a “daytime job” and a “night-time job”. During the day, each member of the panel is assigned to one of the six mission oriented panels. During off-hours we meet to share insights and develop a holistic view of the subject. Thus, recruiting can be difficult, requiring unorthodox approaches.
Bounding the Problem

• Explore and understand the significance of each boundary before making assumptions about it
• Recognize that in formulating an OOTW problem, we are trying to bound a complex system
• Avoid the trap of over-specification
• Care must be taken to avoid coming to closure prematurely

Comments?
High Level MoM

• In order to construct appropriate MoM, conduct a structured analysis of potential benefits; causally map
  – Lower level MoM (that can be related to investments or other action) to
  – Higher level MoM (that can be valued by decisionmakers)

Comments?
Tools for Problem Formulation

• Several tools were cited; e.g.,
  – Elicitation support
  – Influence diagrams
  – Casual maps
  – System dynamic models
  – Agent based ‘distillations’

Are there any other important tools to cite?
The C2 Assessment Process Can Be Chaotic Without a Solution Strategy
In contrast to the other panels, the Synthesis Panel was very tactical in its operations (i.e., it responded to the “crisis de jour”).
Developing a Solution Strategy

- A solution strategy must be *iterative*, consisting of
  - The detailed specification of the MoM
  - The development of a conceptual model (including the relevant human and organisational factors)
  - The specification of a set of scenarios
  - A data collection and analysis plan (including the methods and tools to be used)

- The strategy needs to be *tested* to see if it addresses the issues at hand
  - Within schedule and resource constraints
  - With acceptable levels of uncertainty and risk

Do you concur?
Study Management Plan

• The team should create and maintain a Study Management Plan that contains
  – Study glossary
  – Analysis plan
  – Tool deployment and modelling and simulation plan
  – Data collection/engineering plan
  – Configuration management plan
  – Study risk register
  – Quality assurance plan
  – Security plan
  – Review plan
  – Plan of deliverables

Is this list correct and complete?
Summary

• Comments?
• Questions?
• Areas of concern?
C2 Problem Formulation Tends to be Complex, Poorly Defined

"Vacuums, black holes, antimatter, C2 problem formulation — It’s the elusive and intangible which appeals to me"
Group Discussion on “Formulating the Problem and the Strategy for Solution”

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