Comprehensive Thinking & Defense Analysis Transformation

Mark N. Clemente
16th ICCRTS
21-23 June 2011
Québec Canada
Traditional Thinking

Phantom Works | Strategic Development and Experimentation

- Peace
- Crisis Response
- War
- Post-Conflict
- Peace

Major Combat
Comprehensive Thinking –
Needed for all that stuff left & right of boom

Peace

Persuasion
Dissuasion
Deterrence
Presence
Cooperation
Collaboration
Foreign Internal Defense

Crisis

Law Enforcement
Police Operations
Sanctions Enforcement
Blockade
Evacuation
Counterterrorism

Response

Peacekeeping

War

Peacemaking
Strike
Major Combat

Post-Conflict

Counterinsurgency

Peace

Security
Transition
Economic/Political
Stabilization
Social Works

Humanitarian Assistance/
Disaster Relief

Major Combat

Comprehensive Thinking –
Needed for all that stuff left & right of boom

Peace

Persuasion
Dissuasion
Deterrence
Presence
Cooperation
Collaboration
Foreign Internal Defense

Crisis

Law Enforcement
Police Operations
Sanctions Enforcement
Blockade
Evacuation
Counterterrorism

Response

Peacekeeping

War

Peacemaking
Strike
Major Combat

Post-Conflict

Counterinsurgency

Peace

Security
Transition
Economic/Political
Stabilization
Social Works

Humanitarian Assistance/
Disaster Relief

Copyright © 2011 Boeing. All rights reserved.

Use or disclosure of data contained on this page is limited to the restrictions on the title page of this document
“… today’s challenges require a comprehensive approach by the international community involving a wide spectrum of civil and military instruments, while fully respecting mandates and autonomy of decisions of all actors, and provides precedents for this approach”

“… to improve coherent application of NATO's own crisis management instruments as well as practical cooperation at all levels with partners, the UN and other relevant international organizations, Non-Governmental Organizations and local actors in the planning and conduct of ongoing and future operations wherever appropriate.”

Riga Summit Declaration - 29 Nov 2006
“The military and civilian elements of the United States’ national security apparatus have responded unevenly and have grown increasingly out of balance. The problem is not will; it is capacity.

...And various initiatives are under way that will better integrate and coordinate U.S. military efforts with civilian agencies as well as engage the expertise of the private sector, including nongovernmental organizations and academia.”
Increasingly cross domain
Increasingly social
ALL instruments of power must participate
Integrating Disparate Systems
*International Security Assistance Force Afghanistan

Interagency / All of Government

CIA

AID Organizations

NGOs

ACO/ACT

Embassy

States

ISAF*

Insurgents

Neutrals

UN
Diplomacy
Lateral and Vertical Networking

International

Nation State

Department

Agency/Embassy

Section

Foreign Service Officer
**Complicated v. Complex**

**Complicated / Linear**
- Solving
- Whole equal to sum of the parts
- Outputs proportionate to inputs
- Repeatable results
- Predictable chain of causes and effects

**Complex / Non-linear**
- Bounding
- Whole **not** equal to sum of the parts
- Outputs **not** proportionate to inputs
- Results **not** repeatable
- **No** predictable chain of causes and effects
Defense
Lateral and Vertical Networking

International

Nation State

Department / MoD

Operational Command

Tactical Unit

Warfighter
Adversary too
Lateral and Vertical Networking

International
Nation State
Department / MoD
Operational Command
Tactical Unit
Warfighter

Al Qaeda
Regional Franchise
Local Network
Terrorist Cell
Terrorist

Copyright © 2011 Boeing. All rights reserved.
Human Systems are Complex & Adaptive
Will sometimes have competing goals
You do this every day!

Mr. Jones

- Son
- Brother
- Father
- Colleague
- Husband
- Football Coach
- Church Leader
- Boss
- Competitors
- Subordinate
Lateral and Vertical Networking

- Military Levels of War
  - More blurred today
- GOOOAAAAALLLL!!!!!!
  (an analogy)

Emergent functions at operational and strategic levels will require different approaches and tools.
"Complicated" Operations Analysis is mostly
- Normative
- Quantitative
- Seeks optimal solutions

"Complex" Operations Analysis is more often
- Descriptive
- Qualitative
- Seeks bounded solutions
- Non-kinetic & Non-linear

Comprehensive Thinking
Transforming Operations Analysis
No *Big Black Box* but…

- Can bound the problem
- Potential Models to consider
  - Human-in-the-loop
  - Computational → Agent-Based
  - System Dynamic
- Or a “mashup” of different models and data
A Model and Data Mashup Experiment

1. User Selection
2. Deployed Excursion
3. Model Execution
4. Runtime Data Storage
5. Persistent Data Storage

Users choose scenarios to deploy, execute, save, & undeploy

Excursions are scenarios chosen for execution with selected action plans

Models are executed on virtual compute nodes in the compute cloud
Joint Conflict and Tactical Simulation (JCATS)

JCATS is a multi-sided, high resolution, entity level, joint conflict simulation

- Analysis, Training, Experimentation, Planning, & Mission Rehearsal
- Open, Urban, & Subterranean Environments
- Strategic, Operational, & Tactical Levels of Warfare
- Full Spectrum Operational Scenarios
- Theater-to-Foxhole Resolution
- PC Based
- C++/Object Oriented
- Constructive & Virtual Modes
- HLA/DIS Compliant
- 100+ Major JCATS Users at 145+ Sites

JFCOM-managed tool used by Army, Marines, and contractors to simulate dismounted operations and Military Operations in Urban Terrain (MOUT)
Conclusion

- Comprehensive thinking is needed to holistically address real world challenges

- Complexity demands that we design systems that better inform and connect operators, not replace them

- Operations Analysis needs new tools and processes that provide insight on both physical & social networks – and at all levels
“Perhaps oversimplifying, there seem to be two kinds of people in
the world: those who build mathematical models, and those who
focus on the world. The two groups usually don’t talk to each other.
Each plays to a different audience. The modeler gains status by
impressing other modelers and giving talks at professional societies.
Those who focus on the world usually don’t go to such meetings.
They play to an audience of what’s actually taking place on the
battlefield, whether it is located in a foreign land or in a corporate
board room.

In place of modeling complex and thinking simple, net assessment
tries to model simple and think complex. The spirit is one of using
relatively simple models, numbers, and trends, and to think long and
hard about what they mean.”

From Paul Bracken’s “Net Assessment: A Practical Guide”