Wargaming for 21st Century Challenges

The Education of a Wargamer

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Bethesda Gazette
July 13, 1989

"Once you've got the information in the computer, the 'war' can start with the push of a button. But programming all parameters of the 'war,' if begun from scratch, would probably take up to a year, Vandiver said."

July 13, 1989 Bethesda Gazette Page 57

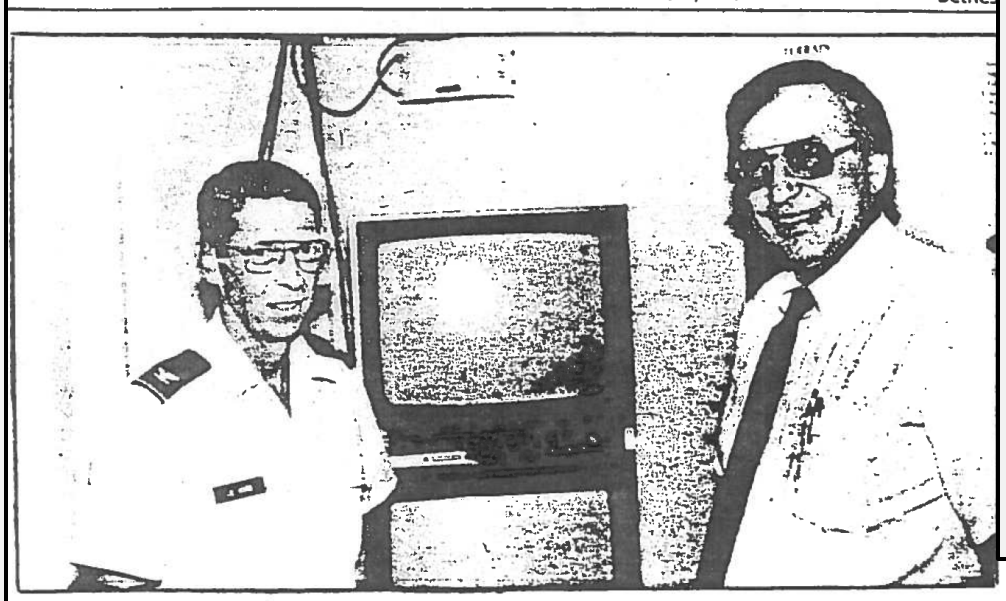


Photo by Louis Jacobson

Concepts Analysis Agency director Edgar Vandiver, right, and Col. Jim De Wire with computer monitors used for planning war strategies for the U.S. military. CAA is located on Woodmont Avenue.

"Luckily for programmers, only about 5 to 10 percent has to be changed year to year."

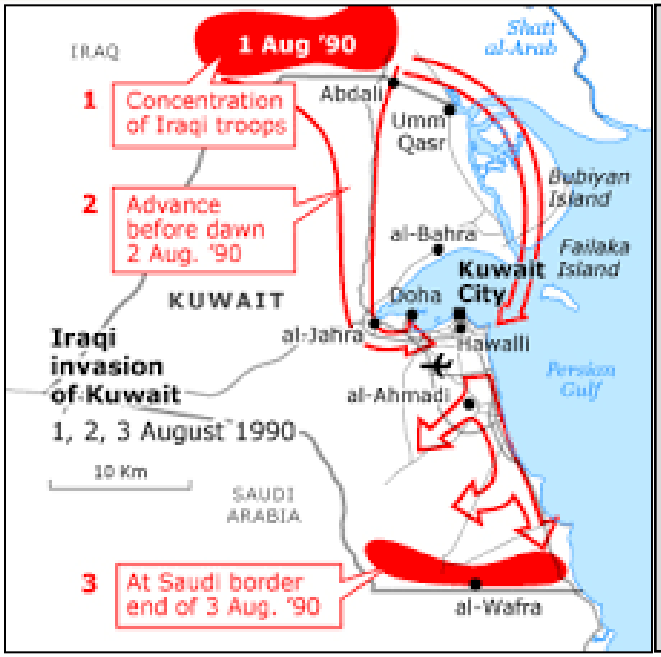
Computerized, high-tech war games are being waged in Bethesda

by Louis Jacobson
Special to the Gazette

In a nondescript building in the CAA does is to feed innumerable variables—troop strength, support staff, terrain and ammunition—into a computer system reach 300,000 lines of computer commands—"a very large computer program by anybody's standards." Vandiver said—a four hours a day. (Even if there were no uniformed guards, the complex is often inhabited by computer programmers at odd In addition to budget responsibilities, CAA is frequently asked to do studies on logistics and personnel, as well as studying

'Data' is a four-letter word…

Operation Desert Storm (1990-1991)



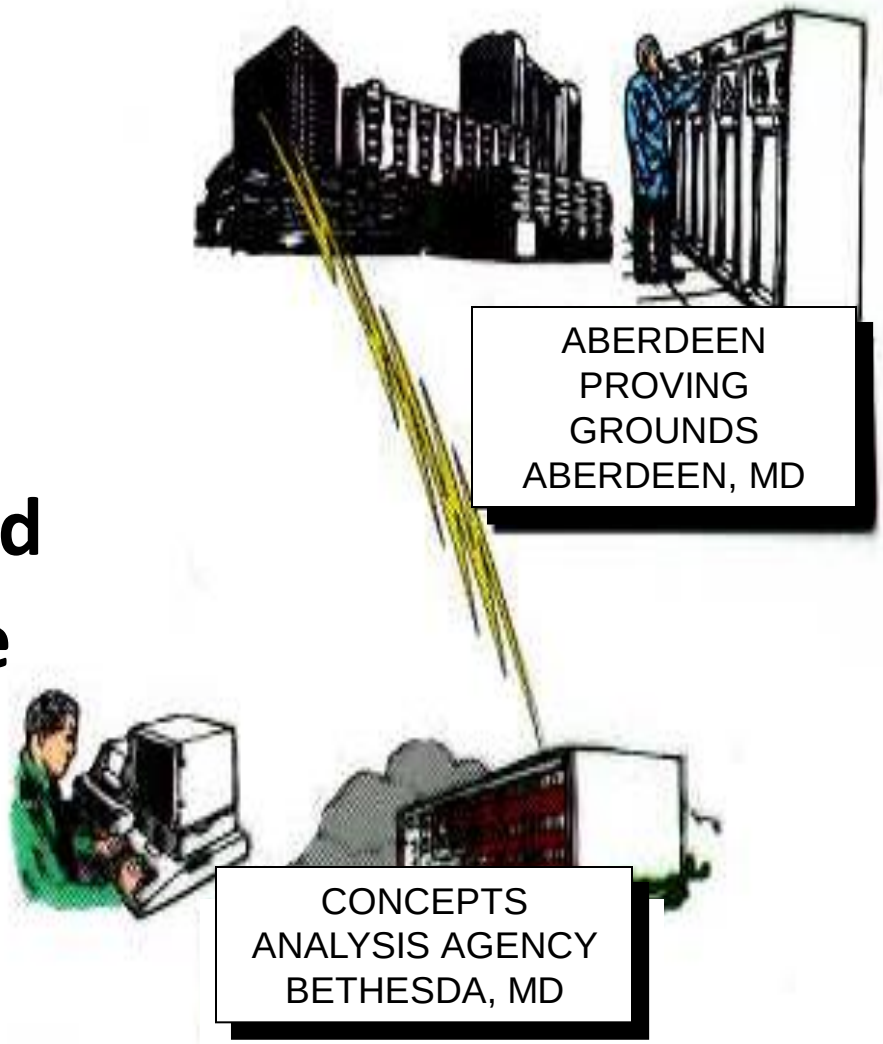
"Right now there's a bunch of money being cut loose for this war [First Gulf War] in the Building [Pentagon] and the Beltway Bandits [Defense Contractors] will be tripping over each other to do the simulations for the US military. Well, we're going to beat them to the punch. We're going to turn something around in <u>two weeks</u>, and you (pointing to CPT(P) Appleget) are going to get it done."

-- COL Art Parker, Forces Directorate, CAA, August 12, 1990

- **Actions at CAA:**
  - **2 August - Man in the Loop wargaming ISO war begins.**
  - **12 August – Closed form simulation prep begins.**
  - **21 August – First Quick Reaction Analysis (QRA) results briefed.**

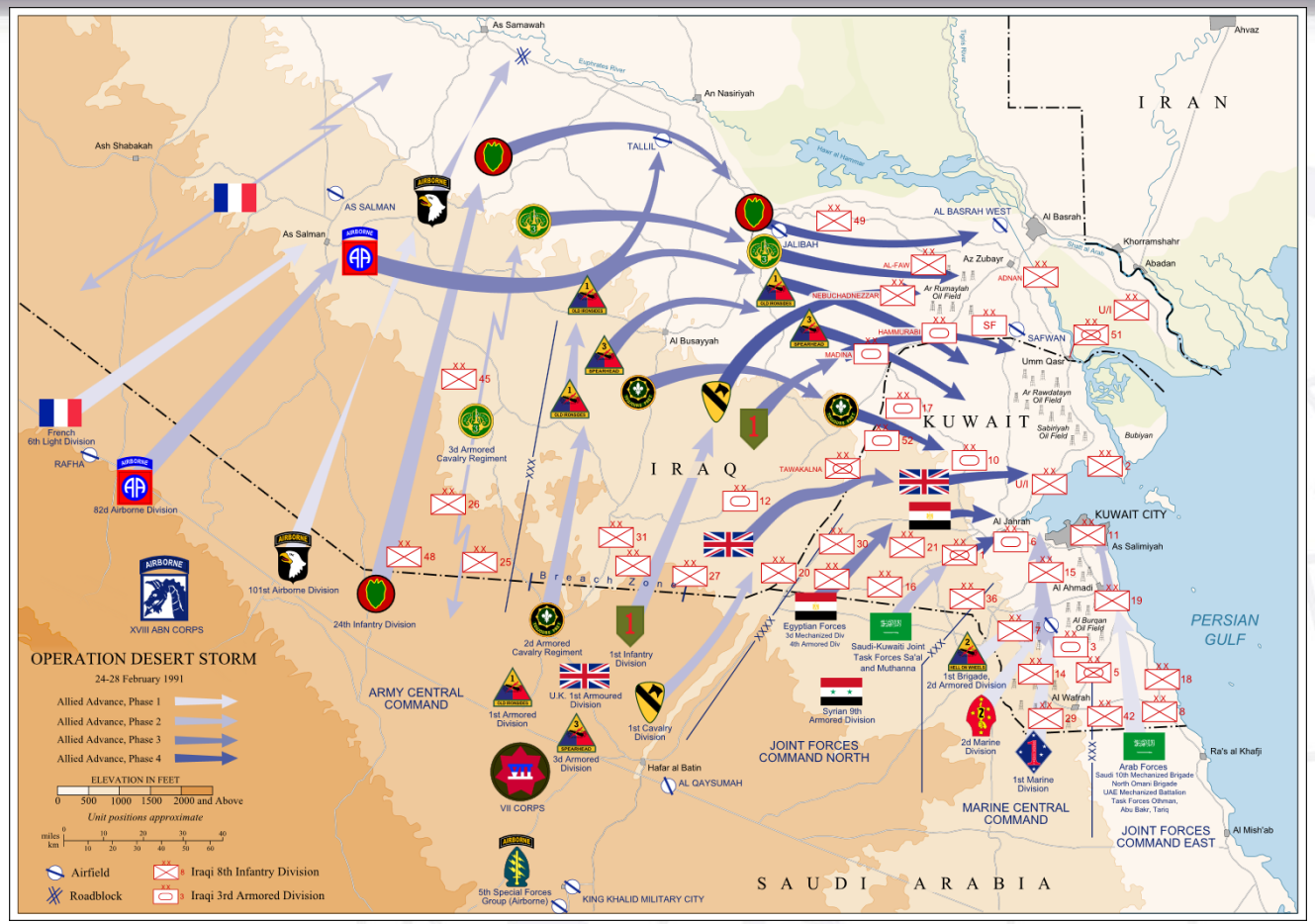
Simulating Operation Desert Storm

- **CEM used to simulate ODS from 12 AUG 1990 through ground war termination**
- **Over 30 Quick Reaction Analyses were completed**
- **Over 500 CEM runs were made on the Cray II Supercomputer to support the QRAs**



Span of QRAs and Issues

- **Mid-August: Can we hold the "Line in the Sand," keep Saddam out of Riyadh and Dhahran?**
- **Mid-October: How many days and how many US casualties will "freeing Kuwait" take?**
- **Mid-winter: How many days and how many US casualties will defeating the Republican Guards take?**
- **Other QRAs:**
  - **What is the number of US Divisions needed?**
  - **What is the impact of replacing M1 and M60 with M1A1?**
  - **Can we keep the "end around" forces resupplied?**



Land Warrior Training Initiative (1999-2001)

- **Land Warrior has three priority objectives:**
  - **Improving the lethality of an individual soldier**
  - **Increasing the survivability of a soldier**
  - **Providing full command, communications, and control to a soldier**
- **Land Warrior has seven main subsystems:**
  - ***Weapon***
  - ***Integrated helmet assembly***
  - ***Protective clothing and equipment***
  - ***Computer***
  - ***Navigation***
  - ***Radio***
  - ***Software system***
- **Later features of the Land Warrior system included:**
  - **providing dismounted soldier combat identification for en route situational awareness and power recharge to reduce 'friendly fire' incidents**
  - **Commander's Digital Assistant leader planning tool**
  - **weight and power reduction**
  - **scalability and tailorability for operational missions**

Land Warrior Training Initiative (1999-2001)

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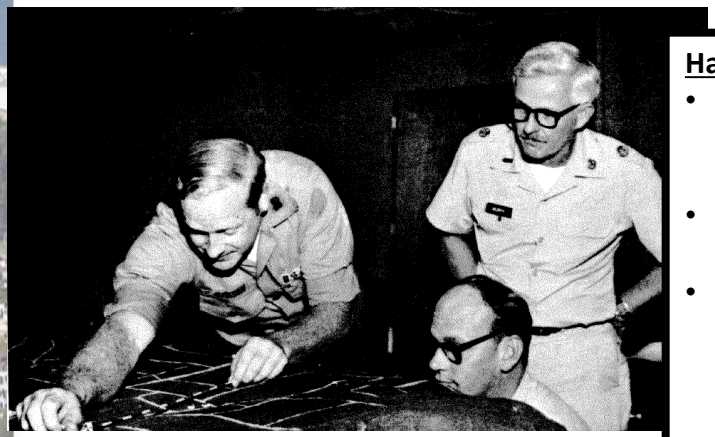
BATTLE Wargame (1976)

- Developed in late 1976 for use by V Corps in Germany as an analysis and training tool.
- An open, two-sided, time preserving, computer-assisted, Monte Carlo, manual wargame played on a three-dimensional terrain board with resolution to the individual weapon system.
- A minicomputer is used <u>to calculate results of direct and indirect fire engagements, to preserve a continuous timeline, and to perform bookkeeping.</u>

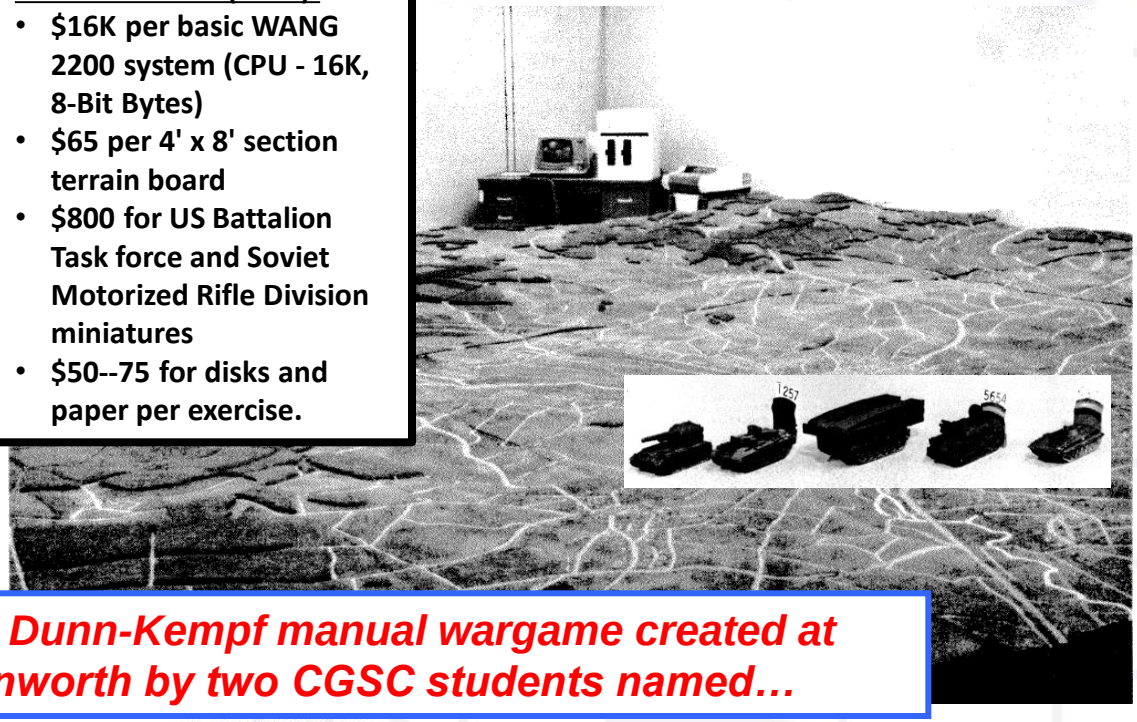
WANG 2200 and peripherals



Line of Sight Adjudicators

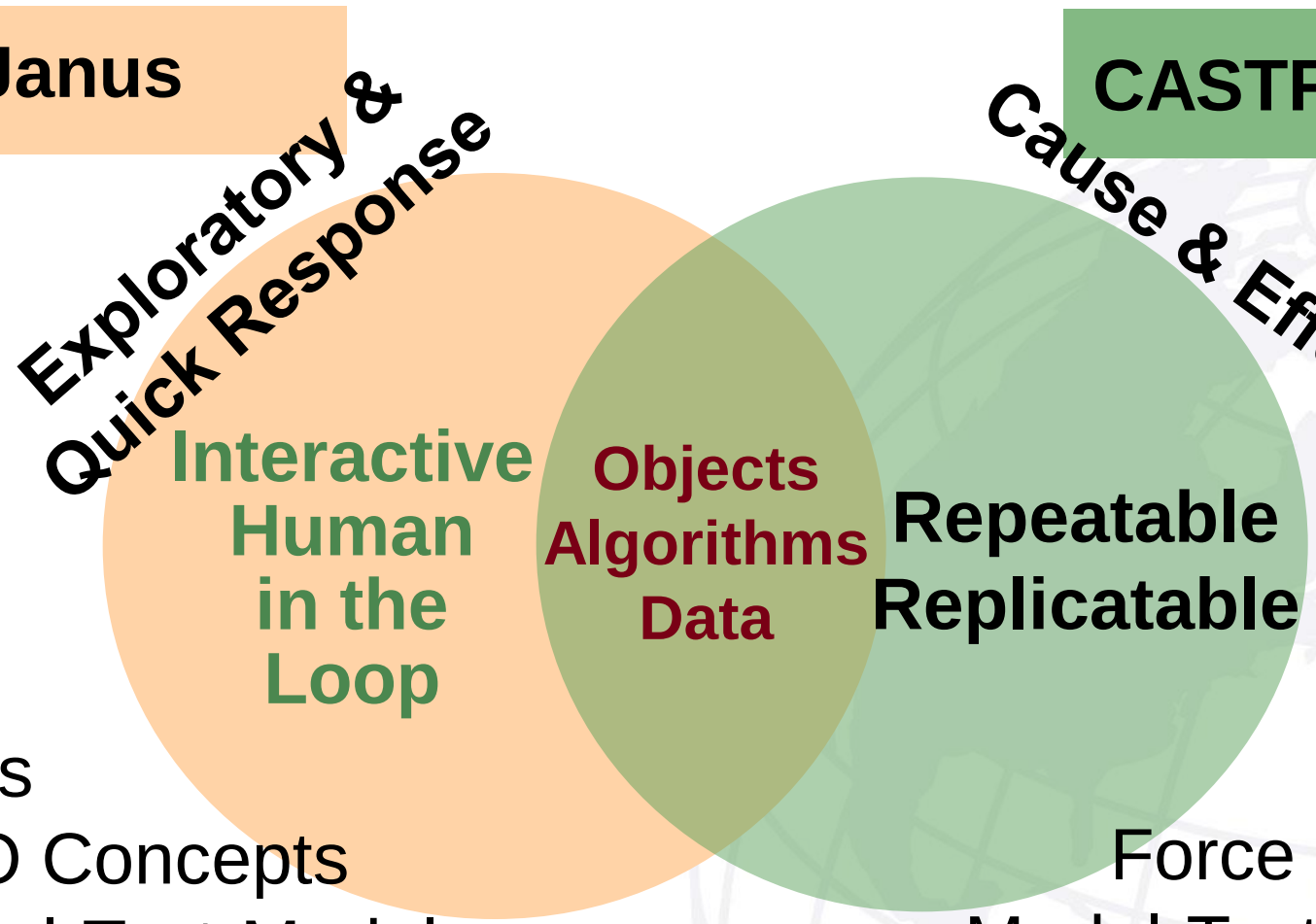
<u>Hardware costs (1976):</u>

- $16K per basic WANG 2200 system (CPU - 16K, 8-Bit Bytes)
- $65 per 4' x 8' section terrain board
- $800 for US Battalion Task force and Soviet Motorized Rifle Division miniatures
- $50--75 for disks and paper per exercise.



Modification of the Dunn-Kempf manual wargame created at CGSC, Ft. Leavenworth by two CGSC students named…

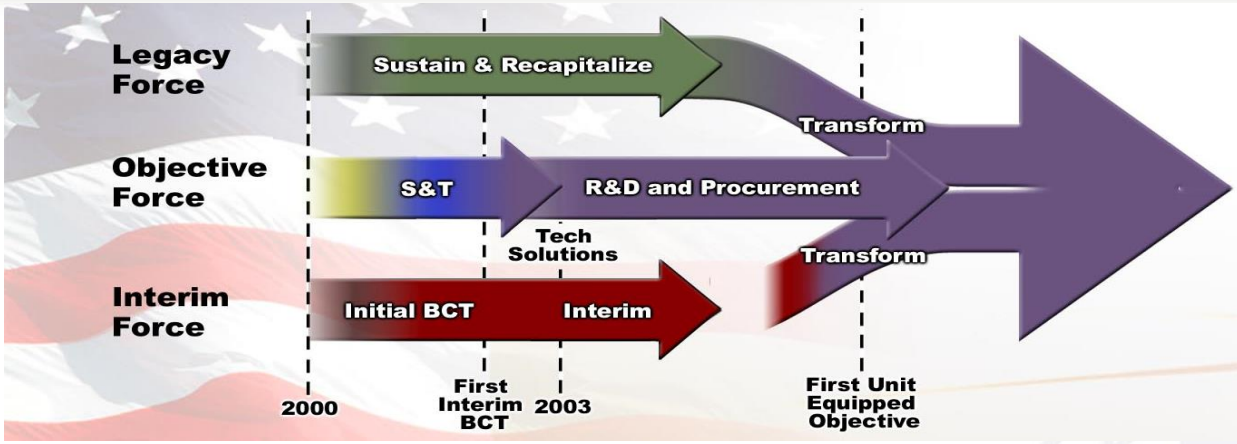
Complementary Tools



TTPs
O&O Concepts
Model-Test-Model
C4ISR Stimulation

AoAs
Force Design
Model-Test-Model
Parametric Analysis

The Army Transformation (2001)



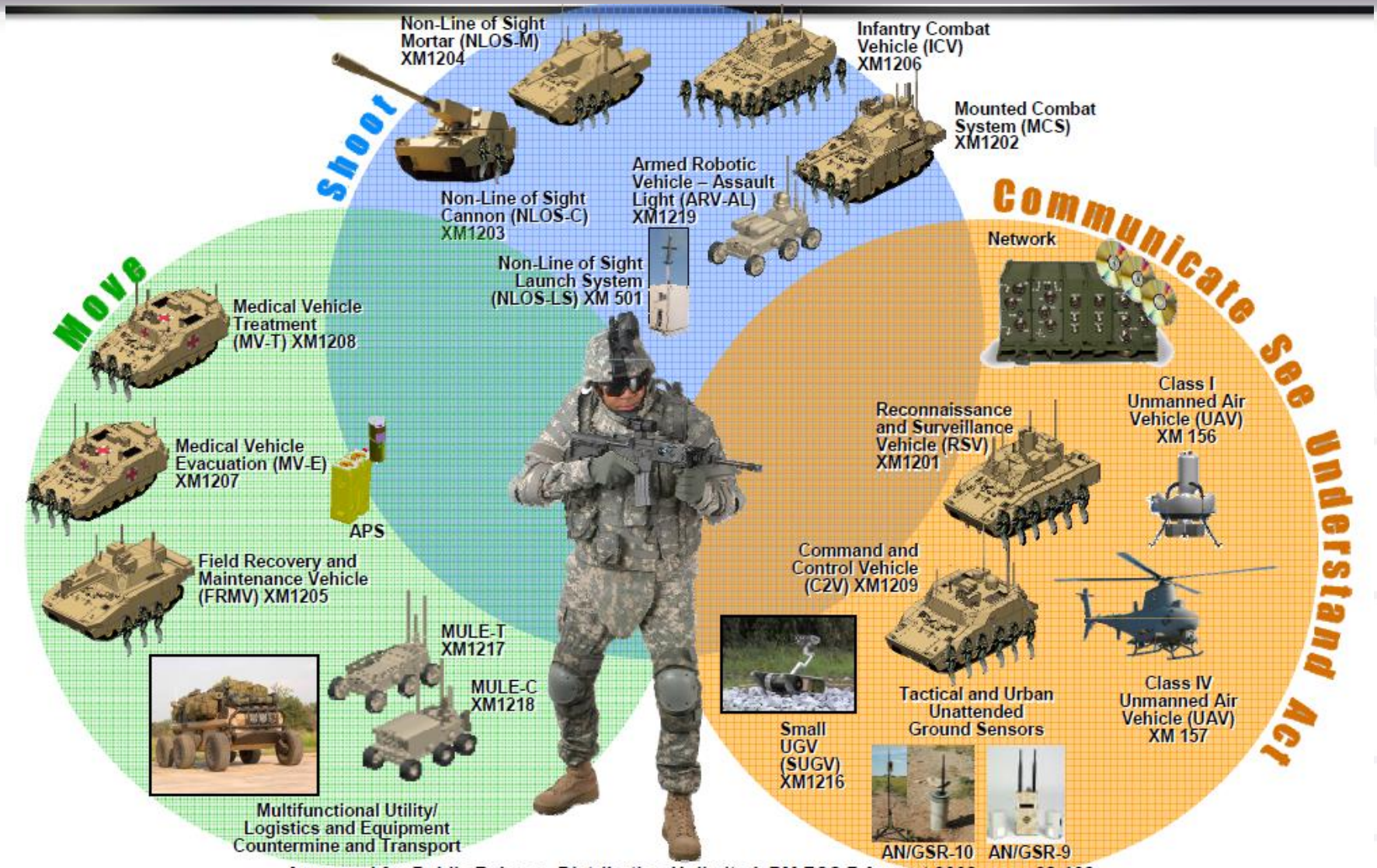
- Responsiveness
- Deployability
- Versatility
- Agility
- Lethality
- Survivability
- Sustainability

These three reasons mandate Army transformation:

- **A future operational environment that poses complex, adaptive and asymmetric threats equipped with advanced technologies.**
- **The requirement to employ land forces that are decisive at every point on the spectrum of operations, in any terrain - in all weather.**
- **The Army must be far less reliant on forward stationing and pre-positioned stocks. It must be capable of deploying anywhere in the world on little or no notice to fight and win.**

Quality of firsts: See First, Understand First, Act First , Finish Decisively

FCS – Network Enabled, Soldier-Centric

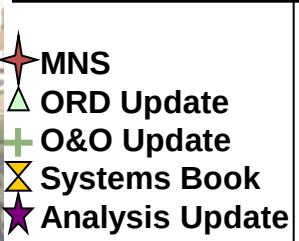


Approved for Public Release, Distribution Unlimited, PM FCS 7 August 2008, case 08-122

2 of 16

FCS Overview (2000-2005)

	2000-2001	2002-2003	2004	2005
Phases of Major Analysis	Support to Industry (DARPA)	O&O Analysis MS B AoA May 03	AoA Update Oct 04 KPP Analysis May 04	AoA Update May 05
Significant Changes	DARPA Initiative Terminated ★	Cost Constrained ★	★ Comanche Termination ★ Program Restructure	
Scenarios	Balkans NEA Europe	Balkans Caspian SWA	Caspian	Caspian NEA
Comparisons of Alternatives	Industry Proposals	Heavy Light SBCT SBCT (PIPd)	KPP Analysis	Heavy (MOD)
M&S	CASTFOREM Janus	VIC CASTFOREM Janus	VIC CASTFOREM Janus	CASTFOREM Janus



FCS AoA Alternatives

	Category of Alts	AoA Force Alternatives	Force Description
Base Case	Legacy and Interim Forces	Heavy Force (POM)	Legacy Armored/Mechanized Force based on 2009 POM
		Light Force (POM)	Legacy Light Infantry Force based on 2009 POM
		Interim Force (POM)	SBCT Force based on 2009 POM
New Start	FCS Equipped Unit of Action	Block II UA (2014)	Full-up "objective" FCS capabilities (with technologies achievable in 2014)
		Block I UA (2010)	Initial "cost-unconstrained" FCS capabilities (with technologies achievable in 2010)
		Increment 1 UA (2010*)	"Affordable" FCS capabilities based on payoff, risk, affordability (with technologies achievable in 2010)
PiP	PiP'd Stryker BCT	Mod SBCT (2010)	SBCT modernized with C4ISR capabilities and unmanned systems and munitions available in 2010 to Increment 1 UA

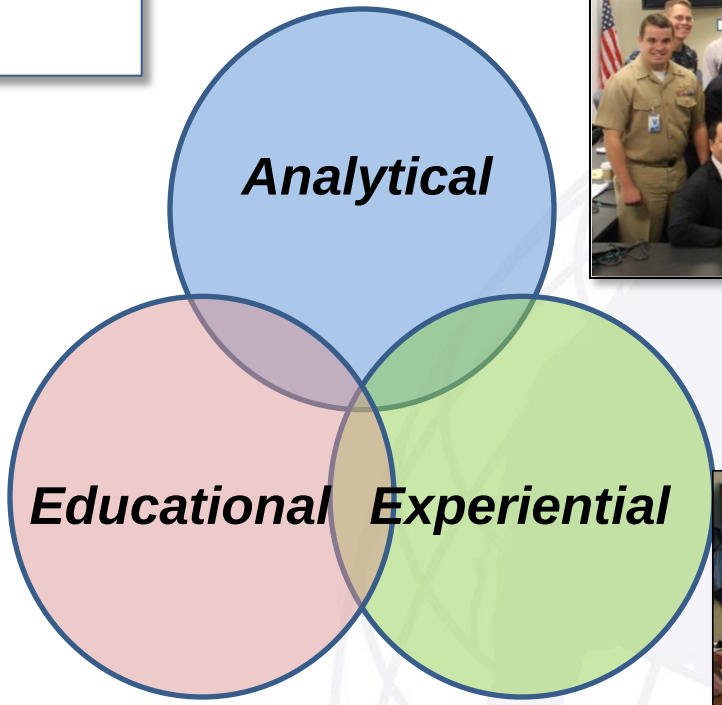
Block I and II options enabled AoA to proceed pending definition of Increment 1

Wargaming at NPS

NPS has been teaching Wargaming for over three decades…

To extract insights from players dealing with complex problems

To educate players on security sector issues



To provide players practical experience performing activities such as training

The Naval Postgraduate School conducts about 12 Wargaming events a year

Wargaming Applications Resident Course

- **Wargaming Applications: The first half of the course teaches the fundamentals of wargaming using a mix of lectures and practical exercises. Concludes with the completion of the "Wargaming Apprentice Certification Exam."**

Playtest of EWTGLANT game

- **Wargaming Capstone Project: The second half of the course focuses on applying wargaming fundamentals to design, develop, conduct and analyze a wargame to answer a DoD sponsor's actual requirement.**

DoD Capstone Sponsors : 10 Navy, 7 Joint, 4 Int'l, 3 Army, 2 Marine Corps, 1 Industry.
Wargames (46 total): 20 Navy, 9 Joint, 6 Army, 5 Int'l, 4 Marine Corps, 2 Industry.

Fall 2012: Littoral Flotilla

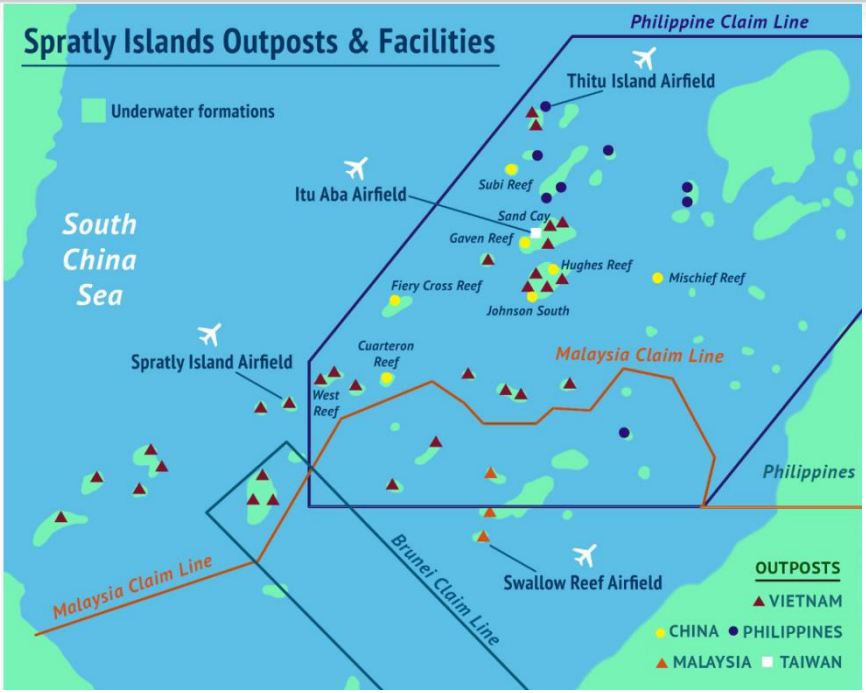
NPS & Sweden (Saab)

Littoral Flotilla is an exploration into the application of innovative joint and combined naval formations conducting combat operations in the littoral environment.

Scenario: A Russian force attempts to seize Gotland Island, with a combined Swedish-US Naval Task Force defending.

Littoral Operations Center stood up at NPS (2014)

Fall 2015 & Spring 2016: Red Teaming Distributed Lethality I and II



Objective

- **Explore through wargame analysis the following derivative questions that stem from the Distributed Lethality operating concept:**
  - How does distributed lethality's employment impact a potential adversary's decisions by allowing blue more deterrent options in phase 0 and phase 1?
  - What actions should be taken during phase 0 and 1 in order to prepare for phase 2 and phase 3 conflict?
  - How could partner nations integrate with distributed surface forces in a joint and combined maritime conflict?
  - Can distributed lethality and more tailored adaptive force options enable de-escalation?

Pre-decisional, theoritical exercise – not for distribution outside of NPS / N96

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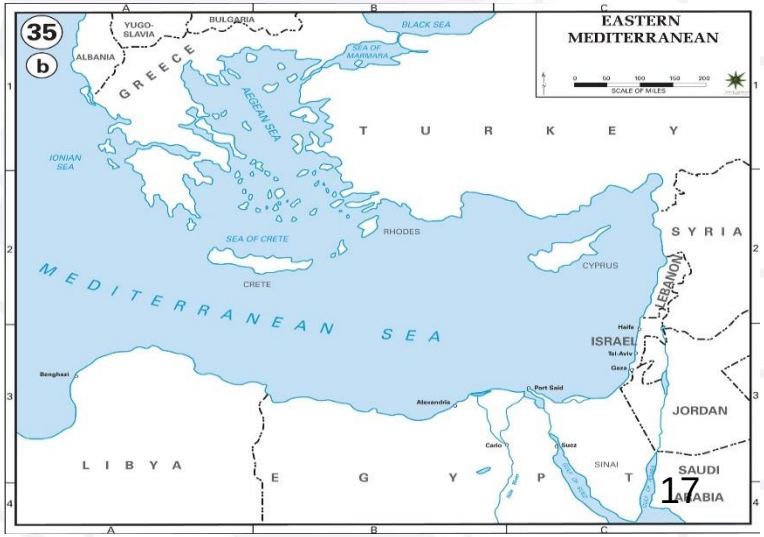
Student Teams:

DL I (SCS): One USAF officer, one USA officer, two Indonesian Naval officers

DL II (E. Med): One USN officer, one USA officer, two Turkish Naval officers, one Turkish AF officer

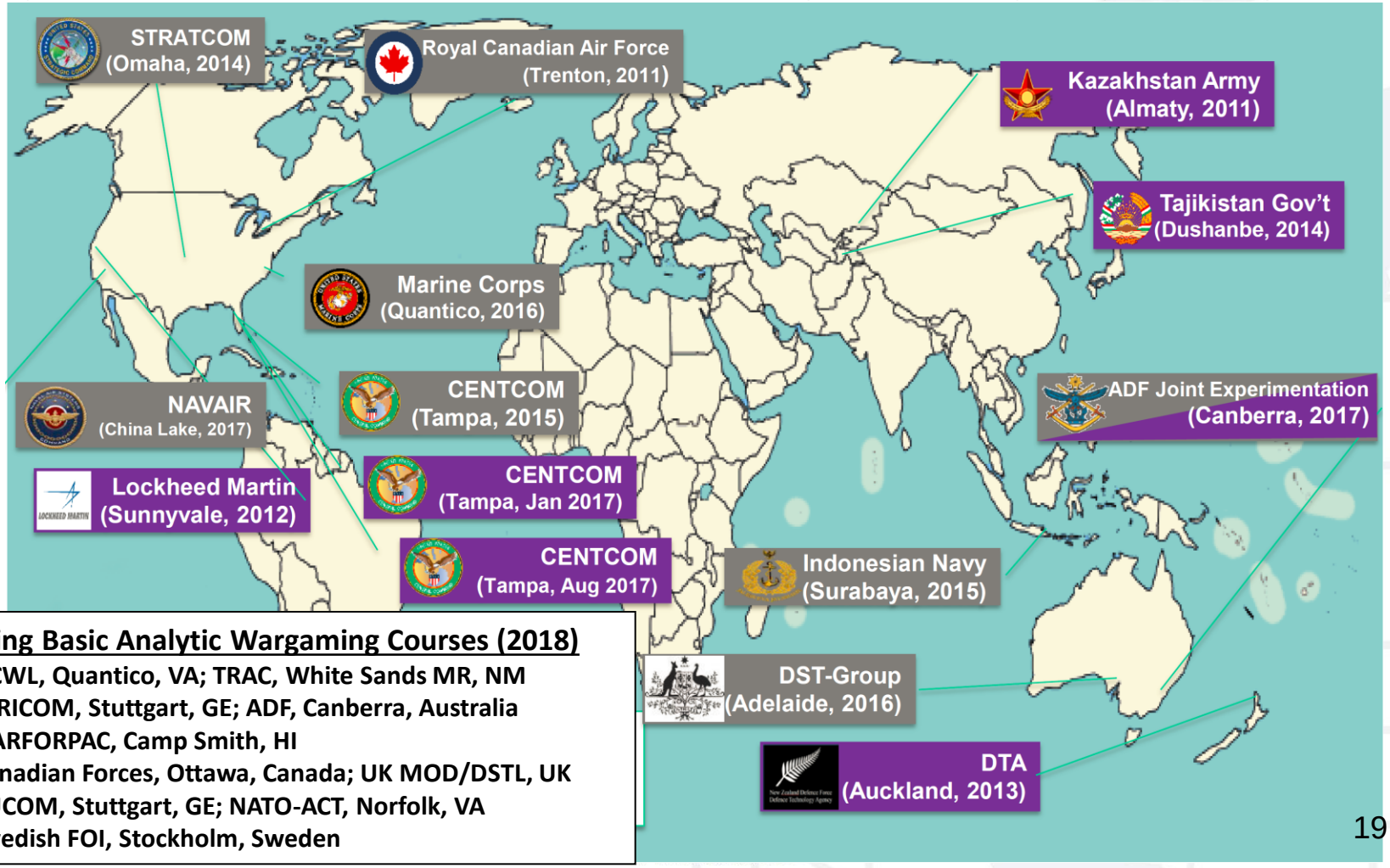


2017 Sponsored Wargames

- **Spring 2017**
  - N-96: Distributed Lethality III (SCS)
  - N-98: Value of Carrier Aviation presence (SCS)
  - Australia (ADF/DST-Group): Future Army Aviation (SCS)
  - Operational Energy: Hybrid Warfare (E. Europe)
  - MCCDC (OAD): Extreme Cold Weather Combat Preparedness (Korea/Europe)
- **Fall 2017 (FY18)**
  - N-96/USFF: Distributed Maritime Ops/Fleet Design (SCS)
  - NSW: Leveraging SEALs in Naval Ops (SCS/Baltic)

NPS Wargaming Mobile Education Team (MET) Courses Delivered

- **Built around hands-on practical exercises coordinated with the sponsor—NOT a lecture-dominated course.**
- **Purpose is to develop a wargaming core competency within an organization.**
- **By the end of the week, student teams conduct a wargame that they designed during the course.**



Upcoming Basic Analytic Wargaming Courses (2018)

Jan – MCWL, Quantico, VA; TRAC, White Sands MR, NM
Feb – AFRICOM, Stuttgart, GE; ADF, Canberra, Australia
Jun – MARFORPAC, Camp Smith, HI
July – Canadian Forces, Ottawa, Canada; UK MOD/DSTL, UK
Aug – EUCOM, Stuttgart, GE; NATO-ACT, Norfolk, VA
Sep – Swedish FOI, Stockholm, Sweden

On Planning

- Moltke the Elder claimed that only “the commencement” of any battlefield engagement was plannable. He continued by saying “no plan of operation extends with certainty beyond the first encounter with the enemy’s main strength." This is now quoted as ***“The plan doesn’t survive first contact.”***
- ***“If you fail to plan, you are planning to fail!”***

  — Benjamin Franklin
- ***“Plans are worthless, but planning is everything.”***

  — Dwight D. Eisenhower

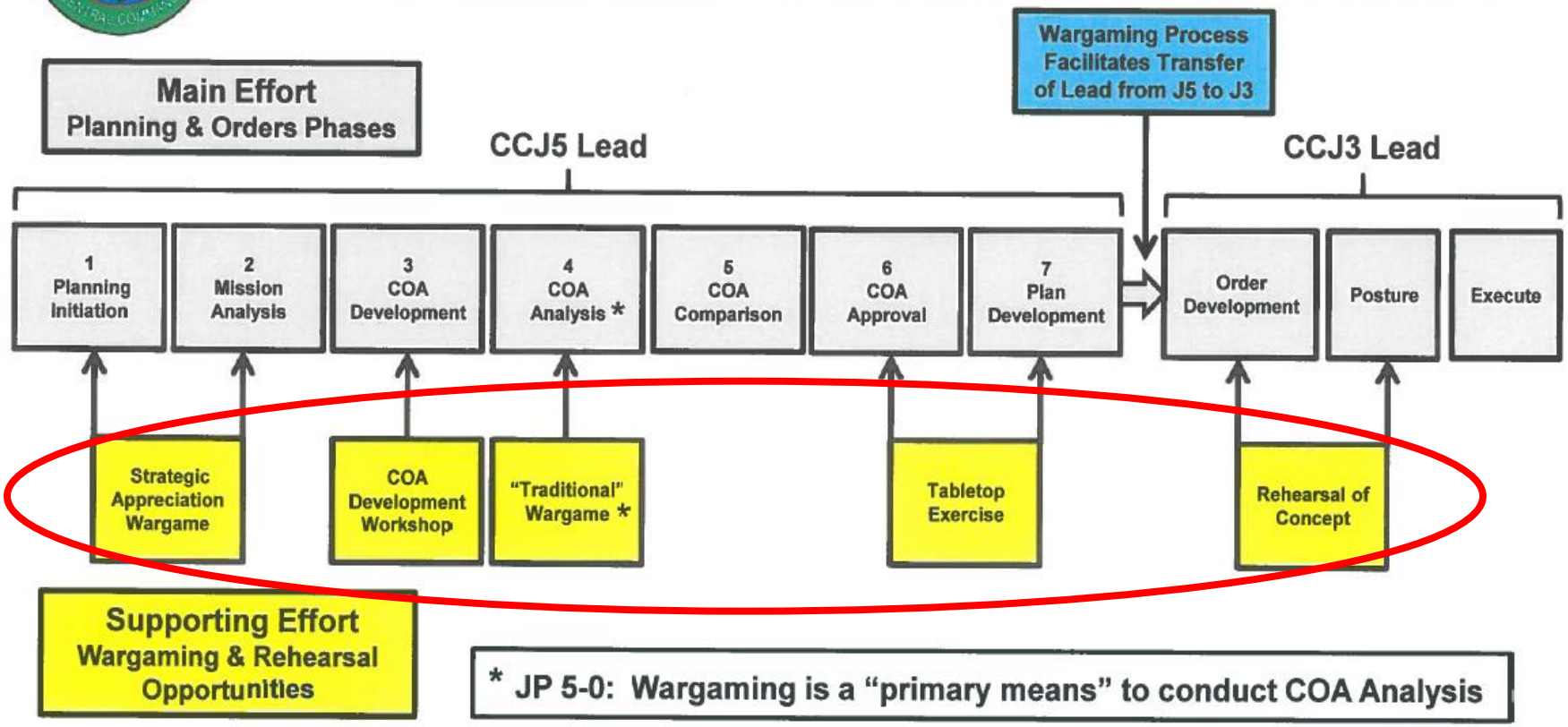
U.S. Doctrinal Wargaming

- **Current construct: "Action – Reaction – Counteraction"**
- **Today's world is much more complex than Blue vs. Red:**
  - **Hybrid warfare**
  - **COIN/CT**
  - **Non-state actors (Al-Quaeda, ISIS, Hezbollah, …)**
  - **Grey Zone**
  - **Multiple actors (e.g. Afghanistan: Taliban, Haqqani network, Pakistan ISI, warlords, poppy farmers, …)**
  - **Whole of government (DOS, USAID, DOJ, CIA, …)**
- **Is COA Analysis wargaming using "Action – Reaction – Counteraction" sufficient for today's complex environment?**

If you were tasked to play Red, is it fair that your opponent gets twice as many moves as you? How motivated are you to provide an adaptive and robust threat to Blue's first move?

Applying Wargaming Principles

Multiple Opportunities to Support Planning and Orders Process



CCJ8 Wargaming Cell (CWC)

TASKS: Advise J5 and J3 planners in development and execution of wargames, workshops, tabletop exercises, and rehearsals of concept and facilitate the application of various wargaming tools and methods as required

PURPOSE: Illuminate elements of complex problem sets to improve planning and operations

Some Planning Wargaming Challenges COCOMs face today

- **Small or non-existent dedicated wargaming organization:**
  - **Analysts: Analytical team is split between M&S and studies, no capacity for wargaming tasks.**
  - **Planners: Plans were wargamed through the "BOGGSAT*" technique (no rigor or analyst participation, "check the block")**
- **Limited integration of staff elements into the wargaming process (e.g. as a minimum, staff officers from the J-5, J-3, J-8*, J-2 shops. Additionally, no interagency or outside DoD support. "Are we drinking our own Kool-aid?"**
- **Unimaginative Threat players who play the developed 'intel estimate':**
  - **Play a scripted enemy that the plan was specifically designed to defeat-perhaps this is 'most likely,' but any sane commander will adapt to the circumstances on the battlefield (<u>their</u> plan doesn't survive first contact either!)**
  - **Do not present a thinking, adaptive adversary for Blue to grapple with.**
- **Little "red teaming" done. Red teaming is having the adversary know what Blue is trying to accomplish (as if they have Blue's plan), and leveraging that information to attempt to defeat the planned operation. (Perhaps this is "most dangerous!")**
- **Personnel conducting 'wargames' who are not trained or educated on how to initiate, design, develop, conduct, and analyze wargames.**

**** BOGGSAT: Bunch of Guys and Gals Sitting Around a Table***

NAVAL POSTGRADUATE SCHOOL

Theory on How Wargame Complexity Affects Novice Wargamers

HIGHER

LOWER

Player Decision Space

Pages of Rules/Number of Counters

Attractiveness to Novice Wargamers

MATRIX games
(few rules or counters, ad hoc adjudication)

COMPLEXITY

Formulaic Hobby Games
(20+ pages of rules, 200+ counters, very detailed adjudication)

“If war were arithmetic, then the mathematicians would rule the world.”

Questions?

The Nation's Premier Defense Research University

Monterey, California

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