An Introduction to Wargaming

10 March 2008

Matthew B. Caffrey Jr.
Chief, Wargaming
Plans & Programs Directorate
Air Force Research Laboratory

Case Number AFRL 06-0042
Distribution A: Approved for public release; distribution unlimited
<table>
<thead>
<tr>
<th>1. REPORT DATE</th>
<th>2. REPORT TYPE</th>
<th>3. DATES COVERED</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 MAR 2008</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. TITLE AND SUBTITLE</th>
<th></th>
<th>5a. CONTRACT NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>An Introduction to Wargaming</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6. AUTHOR(S)</th>
<th>5b. GRANT NUMBER</th>
<th>5c. PROGRAM ELEMENT NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wargaming Plans &amp; Programs Directorate Air Force Research Laboratory</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)</th>
<th>8. PERFORMING ORGANIZATION REPORT NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wargaming Plans &amp; Programs Directorate Air Force Research Laboratory</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)</th>
<th>10. SPONSOR/MONITOR’S ACRONYM(S)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>12. DISTRIBUTION/AVAILABILITY STATEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approved for public release, distribution unlimited</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>13. SUPPLEMENTARY NOTES</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>14. ABSTRACT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>15. SUBJECT TERMS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>16. SECURITY CLASSIFICATION OF:</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. REPORT</td>
</tr>
<tr>
<td>unclassified</td>
</tr>
<tr>
<td>b. ABSTRACT</td>
</tr>
<tr>
<td>unclassified</td>
</tr>
<tr>
<td>c. THIS PAGE</td>
</tr>
<tr>
<td>unclassified</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>17. LIMITATION OF ABSTRACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>UU</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>18. NUMBER OF PAGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>57</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>19a. NAME OF RESPONSIBLE PERSON</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

Standard Form 298 (Rev. 8-98)  
Prescribed by ANSI Std Z39-18
Disclaimer

The views expressed in this briefing are those of the speaker and do not necessarily represent those of the Air Force Research Laboratory or the United States Air Force.
My Bio

• Civilian positions
  – Professor of Wargaming, ACSC
  – Research Associate, SAAS

• USAFR Assignments
  – Senior Reservist, AFRL, Info Directorate
  – Chief Wargaming, AF/XOOC (Checkmate)

• Co-author Gulf War Fact Book
Why Should I Care?
Why Should I Care?
Overview

• History

• Definitions

• Applications

• Lessons from the History of Wargaming
Wargames are literally as old as civilization...

...and they have often been credited with making the difference between victory and defeat
What is a Wargame?
What is a Wargame?

- Armed Conflict
- Multi Sided
- Simulation
- Model
- Proportional Representation
- Over Time
- Reality

- Wargame
- Sim Game
What is a Wargame?
What is a Wargame?

Types of Wargames

- Each has advantages and disadvantages
- Some wargames include all three
What is a Wargame?

Methods of Adjudication

Rule Based
or
BOGSAT

Umpires
What is a Wargame?

Methods of Adjudication

- Rule Based or BOGSAT
- Umpires
- Computerized M&S

What is a Wargame?
Types of Constructive Wargames

- Miniatures/Terrain Table
- Map/Chart/Paper
- Computerized
Applications

Civil Use of Wargaming

• Recreational
• Educational

Defense Uses of Wargaming

• Develop Strategist – Professional Development
• Develop Strategies – Decision Support
Spectrum of Military Wargaming Today

Develop Strategies
- National
- Theater
- Local

Develop Strategists
- Strategic: War College
- Operational: Staff College
- Tactical: Branch Schools

Decision Support: Professional Dev
Develop Strategist - Professional Development

Develop Strategists

- Strategic
  - War College
- Operational
  - Staff College
- Tactical
  - Branch Schools
Develop Strategist - Professional Development

Strategic
Operational
Tactical

Initial  Intermediate  Senior
Develop Strategies - Decision Support

Develop Strategies

- National Strategic
- Theater Operational
- Local Tactical

Decision Support
Wargaming as Decision Aide
US Government, DoD/CoComs/Services
Strategic Wargaming and The Defense Planning Systems
National Strategy Pol/ Mil Wargaming

• Joint and Interagency
• BOGSAT adjudicated
• Not only secret – very close hold
Strategic Wargaming and The Defense Planning Systems

Immediate - Orders
Mid term – JSCP*

Campaign Planning
Theater Strategy

Strategic Planning
National Strategy

Theater Wargaming

J SCP = Joint Strategic Capabilities Plan
Adaptive Planning

Activities, Functions, Products

Situational Awareness

Operational Planning

Activities

Planning Functions

Strategic Guidance
Concept Development
Plan Development
Plan Assessment (Refine, Adapt, Terminate, Execute)

Contingency

Products

Approved Mission
Approved Concept
Approved Plan

BASE PLAN
CONPLAN
OPLAN
OPORD

Warning Order
Planning Order
Alert Order

Execute Order
Deployment Order

Approved Mission
Approved Concept
Approved Plan

BASE PLAN
CONPLAN
OPLAN
OPORD

Warning Order
Planning Order
Alert Order

Execute Order
Deployment Order
Strategic Wargaming and The Defense Planning Systems

Strategic Planning
National Strategy

Defense Planning
Guidance

Force Planning
Service Strategy

Title 10
Service Strategy, Title 10 Wargaming
Example Air Force

Execution

Even Year
AF/XOX

Odd Year
AF/XPX

Lessons Learned from Joint, Service, Other Events

Lessons Learned to Further Explore

Service & RCCs

Service Responsibility

RCCs

POM 2 X POM

4 X POM

Actionable Insights

AF Corporate Structure

POM

Lessons Learned to Further Explore
Lessons From The History of Wargaming

So far we have covered:

• What wargames are
• What are their applications

Now we will cover:

• How to receive the maximum benefit from wargaming
More Value From Wargaming

Professional Development

- Efficient
  - Minimize cost in $$$
  - Minimize cost in time
  - Deployable

- Effective
  - Memorable
  - Fits curriculum
  - Avoids “dis-training”

Decision Support

- Efficient
  - Minimize cost in $$$
  - Minimize cost in time
  - Deployable

- Effective
  - Fit to adversary/scenario being considered
  - Probability envelope of outcomes matches actual envelope
Assessing Relative Confidence In Wargame Outcomes
How Accurate Is Wargaming?

• Each wargame is one pass through a series of chance events - play many wargames and a range of outcomes will occur:
• Each *war* is one pass through a series of chance events – as such many outcomes are possible while some are more likely than others.
• Each war is one pass through a series of chance events – however what actually happened is not necessarily the most likely outcome.
At best the outcome distribution of our wargames should match the outcome distribution of reality- then wargames can suggest which outcomes are possible along with relative likelihood.
How Accurate Is Wargaming?

• However BOGSAT adjudicated wargames are so time consuming they typically produce only one outcome. Even if the most likely outcome is determined the range and likelihood of other outcomes is not captured.
Even when there are many runs the outcome distribution of wargames seldom matches the outcome distribution of reality.
Coping with Uncertainty

• Achieve the best accuracy you can given your goals and resources

•Honestly assess and communicate the “standard deviation” of your wargame
Sources of Inaccuracy

White

Situation Never Happens
- Unrealistic Scenario
- Heisenberg Effect

Blue
Blue does not follow plan
- Heisenberg Effect

Red
Red does not follow plan
- Faulty depiction of Red
- Heisenberg Effect

WG
Toward More Effective Scenarios

- Collaborative/Joint Development
- Increased use of “Move Zero”
“Players” during wargame need to be decision makers during actual event

- Combining Deliberate and Crisis Action Planning (CAP)
- Wargames increasingly Joint and Combined
- Increased interagency NGO participation

Also, increased professional development wargaming should increase overall quality of Blue play.
“This is not (exactly) the enemy we wargamed against.”

Lt Gen William Wallace
Commanding Gen V Corps
Operation Iraqi Freedom
Depicting Red More Accurately

Easy

- Study Red History
- Study Red Culture
- Study Red Doctrine
Depicting Red More Accurately

Less Easy

• Determine Objectives
• Determine Training Heritage
• Determine Planning Methods
Depicting Red More Accurately

Hard

- Determine how Red is actually training
- Determine how Red sees Blue
- Anticipate when Red will shift strategy/doctrine
## Assessing the Likelihood of Accurate Adjudication

<table>
<thead>
<tr>
<th>Factor</th>
<th>More Accurate</th>
<th>Less Accurate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executions</td>
<td>Many</td>
<td>Few</td>
</tr>
<tr>
<td>Factors</td>
<td>Physical Sci</td>
<td>Social Sci</td>
</tr>
<tr>
<td>Scope</td>
<td>Detailed</td>
<td>Comprehensive</td>
</tr>
<tr>
<td>Level</td>
<td>Tactical</td>
<td>Strategic</td>
</tr>
<tr>
<td>Adversary</td>
<td>Symmetric</td>
<td>Asymmetric</td>
</tr>
<tr>
<td></td>
<td>Doctrinaire / Centralized</td>
<td>Decentralized</td>
</tr>
<tr>
<td>Technology</td>
<td>Old</td>
<td>New</td>
</tr>
<tr>
<td>Strategy</td>
<td>Attrition</td>
<td>Effects</td>
</tr>
</tbody>
</table>
Achieving More Accurate Adjudication
Historical Challenges

• Command interference in adjudication
• Failure to adjudicate key factor
• Failure to adjudicate full event
• “Bad” data
Achieving More Accurate Adjudication
Emerging Challenges

• New Threats
  – Asymmetric Adversaries
  – Global Terrorism
  – Anti Access

• New (and rediscovered) Concepts
  – Network Central Warfare
  – Effects Based Operations
  – Campaign Planning

• New (and rediscovered) Tasks
  – Rapid Adaptive Planning
  – Expeditionary Air Operations
  – Winning the Peace
Wargaming Today

Existing Models

By

Duration Depicted

“Months to Years”
Conflict Level

“Days to Months”
Campaign Level Models

“Hours to Days”
Mission Level Models

“Seconds to Hours”
Engineering and Engagement Models
Generations of Wargaming

3rd Generation - System on System

2nd Generation - Attrition on Force

1st Generation - Mind on Mind

Evolve the State of the Art
Third Generation Wargaming

• Adjudicates EBO through adding
  - Human Factors
  - System Effects
  - Decision Cycle

• Shrinks warfighter’s Decision Loop
  - Expeditionary hardware
  - Fast to learn and execute interfaces
  - Inherent reach back capability
Third Generation Wargaming’s Contribution

Strategic

Operational

Tactical

3GWG Benefits
Conclusion

- Wargaming can give us an important edge over our adversaries, or they can give our adversaries an edge over us
- Today tactical attrition wargames are more accurate than strategic effects wargames
- Better Blue, Red and White (adjudication) can increase the accuracy of all wargames - especially at the campaign and strategic
- Better Wargames can help us shorten wars - and win the peace
To Learn More

- **History**
  - The Art of Wargaming, Peter Perla, 1990
  - www.airpower.maxwell.af.mil/airchronicles/cc/caffrey.html

- **Current Events**
  - www.msrr.dmso.mil/
  - www.afmsrr.afams.af.mil/
Assessing Confidence in Insights

More Confident

• Tactical
• Physics
• Kinetics
• Red Similar Culture
• Short Duration (battle)
• Many “Runs”
• Attrition

Less Confident

• Strategic
• Human Factors
• Non- Kinetics
• Red Dissimilar Culture
• Long Duration (War)
• Few or 1 “Run”
• Effect
A One Slide History of Wargaming
Forecasting the Future

NATIONAL WEATHER SERVICE/NATIONAL HURRICANE CENTER ADVISORY NUMBER 11
PROBABILITY THAT CENTER OF IRENE WILL PASS WITHIN 75 STATUTE MILES DURING THE 72 HOURS STARTING AT 5:00 PM EDT FRI OCT 15 1999