Joint Synthetic Battlespace: Cornerstone for Predictive Battlespace Awareness

Dr. Paul W. Phister, Jr. P.E.,
Dr. Timothy Busch and Igor Plonisch
Information Directorate
Air Force Research Laboratory
Rome, New York 13441-4514
Conceptual Military C2 Operating Environment
The “Big Picture”

- Awareness
- Sensemaking
- Understanding
- Command Intent
- Information Systems
- Battlespace Monitoring
- Battlespace Management
- Synchronization
- The Information “Edge”

Domains:
- Physical Domain
- Information Domain
- Cognitive Domain
PBA Conceptual View

- Situational Understanding
- RBG Awareness
- “Futures”
- Monitoring Ontology’s Feedback
- Monitoring
- Resource Management

Prediction
- Wargaming Modeling
- Commander's Intent
- Game Plans
- Policy QoS Ontology’s Feedback

Cognitive Domain
- Strategic Domain
- Operational Domain
- Physical Domain
PBA Timeline View

“Intel Focus”

Intelligence Preparation of the Battlespace (IPB)
1) Define Battlespace Environment
2) Describe Battlespace Effects
3) Determine Adversary COA
4) Evaluate the Adversary

“Futures Focus”

To Intelligently Predict the Future

Joint Synthetic Battlespace is the Commander’s “Crystal Ball”
JSB and PBA Challenges

• Joint Synthetic Battlespace (JSB):
  • Organizational behavioral modeling
  • Faster than real-time execution
  • Data Mining
  • Distributed Processing/ Distributed Simulation

• Predictive Battlespace Awareness (PBA):
  • Direct, with precision, the location, identification/monitoring of all ground, air & space objects and events
  • Direct the collection of physical environmental and social/political/economic information
  • Direct the instantaneous detection of any red, blue, gray operational deviations
  • Full spectrum aerospace vigilance
  • Predictive and precise battlespace understanding
  • Battlespace wide “Effects-Based-Operations”
  • Brilliant Air and Space Operations
  • Dynamic Virtual Checkmating
  • Autonomous Execution with tethered control
  • Adaptive, continuous rolling execution at all levels with both precision and speed
  • Global Warrior Presence
  • Air and Space Information Exchange
  • Brilliant Workflow/Decision Support
  • Knowledge Sharing
Summary

• Successful military commander must be able to live in the future
• Commanders are constantly forming decisions based on:
  • Their current understanding of the world
  • Ability to forecast the outcome of actions being considered
• Experienced tacticians are only able to consider 2 or 3 possible COAs
• Commanders often don’t have a good “feel” for the sensitivity of their plans

• PBA, like EBO, has the potential to fundamentally transform how Air Force plans, prepares, trains, and fights.

• Joint Synthetic Battlespace is the key to a successful PBA
• Operationally focused simulation - provides augmented reality for the Commander

Key to success is the effective merging of JSB into PBA Provides Commander’s with decision-quality “futures”
"Information superiority becomes a precondition for fighting to achieve air and space superiority,"

Lt. Gen. Liu Shunyao,
Chief, China Peoples Liberation Army Air Force
28 Feb 2000, AW&ST
(“Chinese War Plans Emphasize Air Force's Offensive Role”)