Future Analytical Science & Technology (FAST) Wargames

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AFRL & Wargaming

• Air Force Research Laboratory (AFRL)
• Commander is USAF Technology Executive Officer
• Nine Technology Directorates (TD)
  – Six TDs poorly represented in Futures Games
• Historically in USAF Futures Games:
  – First Futures Game 1998, first AFRL vetting of concepts 1999
  – Asserted performance outranked MS&A data
  – Then AFRL asked to “Make it Happen”
AFRL Wargame Lessons
Pre-2016

• AFRL’s Wargaming essential to self-defense

• Providing:
  – Tech (Bad)
  – System (Good)
  – System of Systems (Better)
  – System of Systems with Provisional CONEMP (Even Better)
  – System of Systems with Provisional CONEMP and adjudication guidance (Best)

• Technology Evaluation of concepts from ALL sources
Future Analytical Science & Technology (FAST) Wargames

• Source: AFRL Corporate Briefing on FG15
  – AFRL/CC “Fix Wargaming!!!”
  – Followed by the DSD Work Memos

• Two Primary Missions added
  – Test drive AFRL systems in no-fault wargame environment
  – Research experiments to improve wargame depiction, accuracy and breadth of AFRL technology used

• Small, Cheap, Flexible, Adaptive,….
  – Fast?
A Year Later

From No Clue
to Wargame
in under 7 weeks
First FAST (A2AD)

- 1 July 16 – CC: “Do wargame in support of GE16”
  - 4 AFRL SMEs going to GE16 need WG experience
  - Test drive all AFRL proposed S&T concepts

- Design
  - Narrow Slice of GE16
  - Designed five vignettes, planned to use three
  - Two CONEMPS workshops
  - Three parallel adjudication systems (two failed)
  - Intense usage of participants
First FAST (A2AD) Continued

• Week 5 Sponsor wants to add a defensive system

• Week 7 Capstone, called two audibles
  – Plus a “go back and fix your plan”

• Week 9 Finish analysis and documentation fixes
  – One system sees 4 different upgrades in process
  – All see at least one upgrade

• Week 11 Participants in GE16
  – The one concept actually in the game is game winner
Follow-up FAST Wargames

- Air Base Air Defense (ABAD)
- Multi Domain Command & Control (MDC2)
- ABAD Excursion
- NEXT
- Cyber and Space (C&S)
FAST: Air Base Air Defense (ABAD)

• Evaluate technology impact on air base defense
  – Multiple iterations of technology enhanced vignettes
  – Players chose from a range of technologies
  – They then figured out and executed CONEMPs
  – Identified potential improvements to ABAD
  – Adjudication used Command Professional Edition (PE)
• AFMC/CC request
• Explored potential next generation C2 structures
• Compared
  – Current C2,
  – Evolved C2, and
  – Revolutionary C2 structures
• Used TTX to identify critical C2 risks
  – Informs game design
• Wargame insights lead to revolutionary C2 project
• Explore software based wargaming techniques

• First AFRL wargame primarily dedicated to improving computer wargaming methods.
  – Players were mostly professional wargaming experts and designers.

• Informed development of future software based S&T wargames and methods
• Improve depiction of Cyber and Space in traditionally air-centric wargames
• Capture interactions between Space, Cyber and Air Operations
• Presents them in terms of operational impacts
• Wargame is under development
  – Capstone 10-14 September 2018
Computer Adjudicated Wargames

• Currently using Matrix Games Command PE

• Starting usage of John Tiller Software’s “War Plan” and “Modern Air Power”
Computer Adjudicated Wargames

• Advantages
  – Alleviates traditional wargame limitations
  – ‘Baked-in’ SME and physics-based game rules to minimize S&T concept adjudication errors
  – Player direction during adjudication improves wargame results
  – Player adjudication involvement speeds S&T concept proficiency and understanding
  – Reduction in facilitation errors and improvements in data collection
  – Reduction in personnel participation requirements
• Disadvantages
  – Black Box
  – VV&A of database
  – Expensive to adjust to needs
  – Lead time for all scenario components not in hand
  – New technology not simulated in software
  – “Hardwired” variables
Summary

• Small, Cheap, Flexible, Adaptive,…..

• Two Primary Missions
  – Test drive AFRL systems in no-fault wargame environment
  – Research experiments to improve wargame depiction, accuracy and breadth of AFRL technology used

• MS&A parameters used in computerized games
  – Fast learning curve
  – Quickly reaches the lightbulb point

• Still use Greybeards for fuzzy numbers
  – Developing methods to provide look-up approximations