



# 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)





# FAST: Multi Domain Command & Control (MDC2)



- **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**





# FAST: NEXT



- **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**





# FAST: Cyber and Space (C&S)



- **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**





# Computer Adjudicated Wargames



- **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





