PROJECT ON NUCLEAR GAMING

Experimental Wargaming for Examining Strategic Impact of Emergent Capabilities

PRESENTED BY

Jon Whetzel

Sandia National Laboratories

U.S. DEPARTMENT OF ENERGY

NNSA — National Nuclear Security Administration

Problems with Wargames

What makes wargaming difficult?

- Expensive to conduct

- Difficult to scale

- Limited insights due to time & personnel constraints

Photo Credit: https://warontherocks.com/2019/08/wargaming-has-a-place-but-is-no-panacea-for-professional-military-education/

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Solution: Create "Experimental Wargames"

- **Experimental wargames:** computer-based games for creating human-derived, large-n datasets for replicable, quantitative analysis

- **Experimental wargames:** rely on scientific methodology for creating various game conditions

How do we create experimental wargames?
- Leverage commercial game development technologies to quickly generate scenarios with reduced financial and time costs

- Allow for personnel of all backgrounds to play simultaneously across the world

- Record data from all games to generate data-driven insights on how emergent capabilities impacted decision-making

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What's SIGNAL

SIGNAL (Strategic Interaction Game between Nuclear Armed Lands)

- First experimental wargame to explore questions on weapon capabilities & strategic stability

Tech stack

- **Game client**: *Unity3D* (WebGL build)

- **Networking**: *Nakama* by Heroic Labs

- **Backend**: *Amazon Web Services (EC2, DynamoDB)*

Features

- Designed to be service-agnostic, can be setup on secure networks

- API available for creating AI agents to play with/against human players

- Scalable to support thousands of concurrent players

- Online database available to determine how conditions impacted decision-making

What can you learn from SIGNAL player data?

Example: How does the introduction of different nuclear capabilities impact conflict escalation and deterrence?

**Questions we can ask beyond
"what's the most effective capability"?**

- How did strategies change when nuclear capabilities were added/removed?

- How did prior experiences influence decision-making (controlling for biases)?
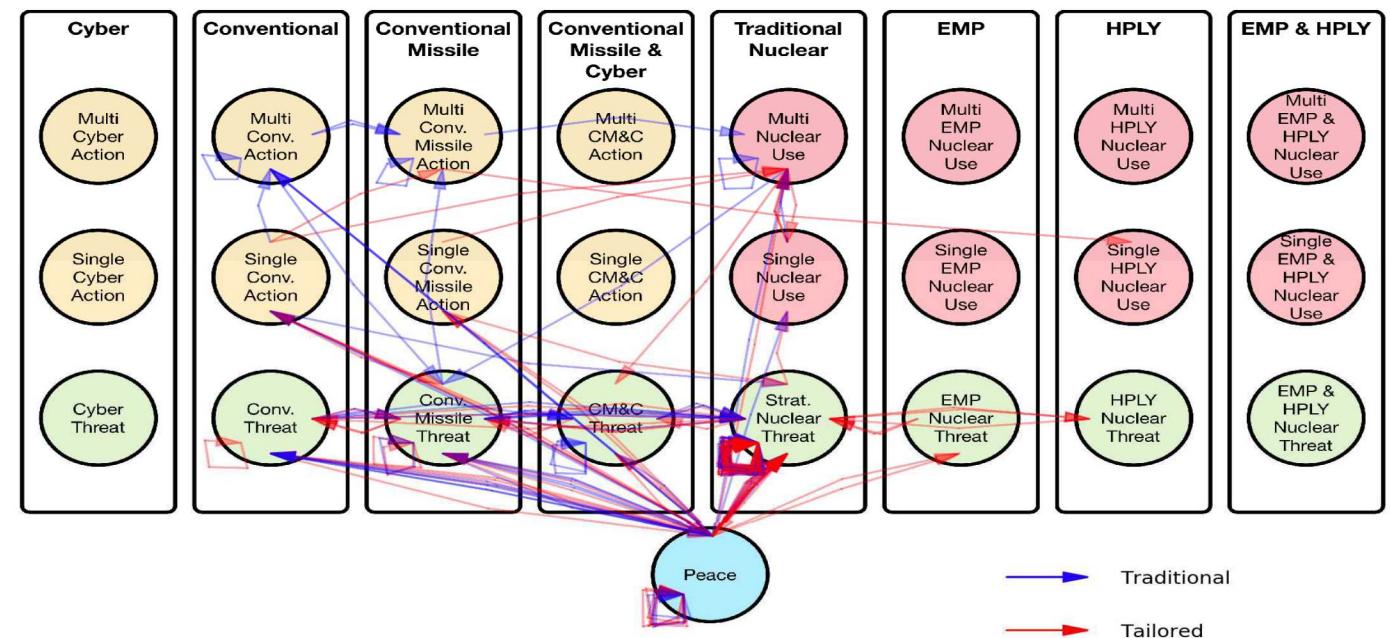
Why this matters? Ability to ask more in-depth questions enables for USAF leadership to have a better understanding of emergent capabilities and what to pursue

Successes to Date

- Over 1,500 players since the May 2019 release
  - Player population from over 70 countries
  - Largest event in Nov 2019 had over 100 concurrent players
  - Play event held at Global Strike Command @ Barksdale AFB
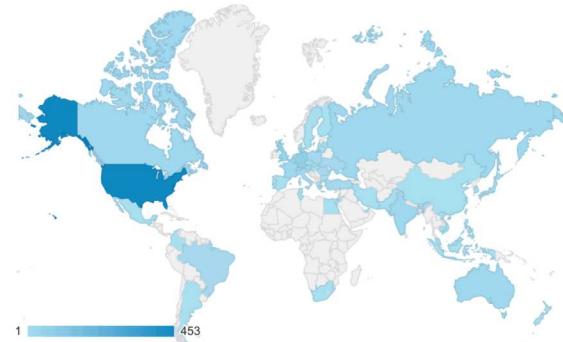
Google Analytics for SIGNAL: 1 Jan 2020 – 22 Feb 2020

- Winner at Serious Games Showcase & Challenge at I/ITSEC 2019

- Press coverage:
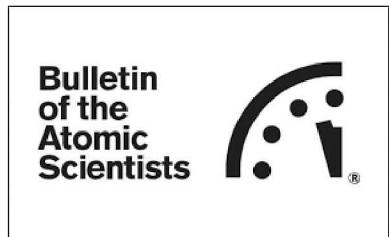
Why is this the Future of Wargaming?

What SIGNAL satisfies

- **Open Development Architecture**

- **Network Access**

- **Distributability**

- **In-game Play Experience**

- **Access to Data for Analysis**

- **Unique or Innovative Approach**

What's in development for SIGNAL

- **Rapid Scenario Generation**
  - Developing tools for configuring new scenarios

- **Scalability of Scenarios and Players**
  - SIGNAL can support thousands of concurrent players across multiple servers
  - Generalizing GUI for supporting varying numbers of players

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Who We Are

Sandia National Laboratories
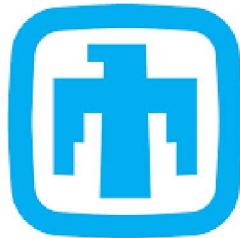
- Systems Analysis & Engineering experience proven to build fieldable technologies
- Expertise in serious game design and game development technologies

Berkeley — UNIVERSITY OF CALIFORNIA

- Bring academic rigor to SIGNAL and experimental wargaming design
- Scientists and scholars with vast knowledge of military wargaming, policy, and complexity science
- Students available to assist with development and testing of new experimental wargaming approaches

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Project on Nuclear Gaming (PoNG)

Next steps for USAF

◦ Investment to add tools to easily configure wargame environment

◦ Develop and prototype new variants of SIGNAL within 3 months

Summary

◦ Experimental wargaming offers ability to create new insights

◦ Development tools available today makes this an greater possibility

◦ PoNG has the knowledge, expertise, and drive to help USAF create the Future of Wargaming

Contact

◦ Web: http://pong.berkeley.edu
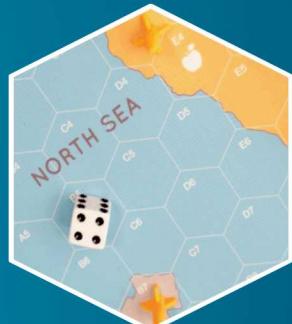
◦ Twitter: @pong_ucb

◦ Email: jhwhetz@sandia.gov

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