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SPARK

Wargaming and AI for All

Specific Topic #AF241-0001

Data Driven Wargaming at Echelon

A Joint Partnership



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AIR FORCE GAMING

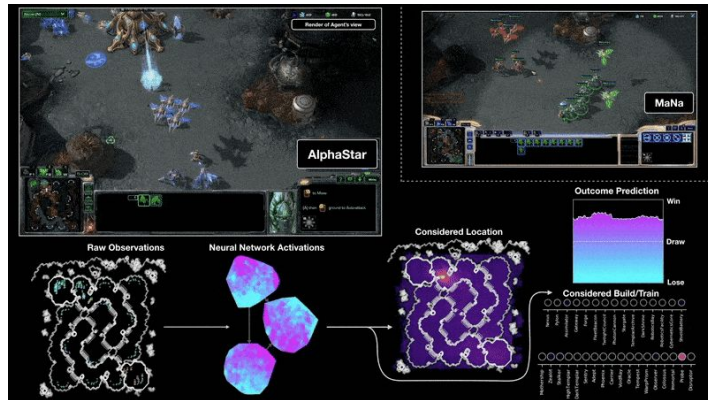
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INTENT

Build games which we can glean information from for agents and educate the force

Previous RL Applications for Commercial Games



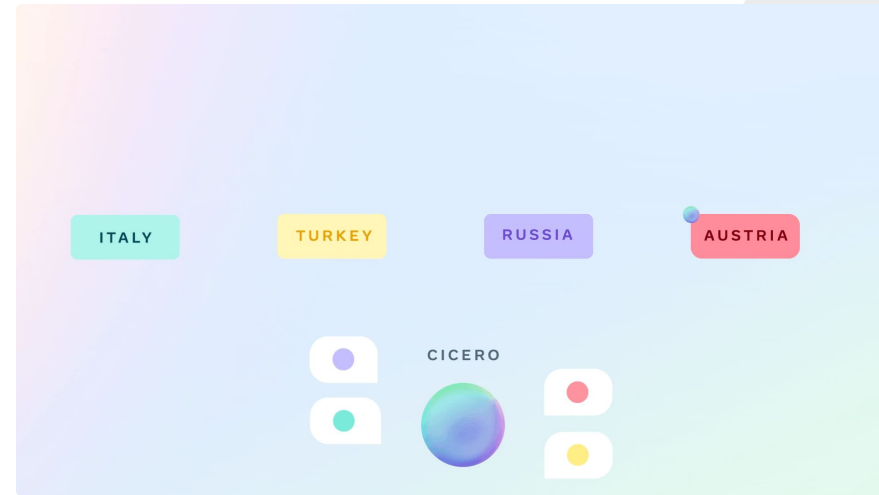
<https://deepmind.google/discover/blog/alphastar-mastering-the-real-time-strategy-game-starcraft-ii/>



A screenshot of Dota 2, a fantasy arena battle game where two teams of five heroes fight to destroy one another's base. Gameplay is complex, and matches typically last more than 30 minutes. Image: Valve

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<https://www.theverge.com/2018/8/28/17787610/openai-dota-2-bots-ai-lost-international-reinforcement-learning>



<https://ai.meta.com/blog/cicero-ai-negotiates-persuades-and-cooperates-with-people/>

Biggest Lesson Learned: Never Build Your Own Games for RL Agents

Biggest GAP: Who has games that we can learn a subset of Operational DoD Lessons from?

Background: Current Wargaming Concepts

- Based on DoD built simulators to glean capabilities
 - Time consuming to design; difficult to iterate on
- Relatively low number of “runs” limiting statistical analysis of different operational courses of action
- Difficult to discern, without a new year plus planned wargame, different best courses of actions from a change in the other players strategy
- Current wargaming fails to invigorate the force and our “gamers” for best of breed ideas.

Long Term Objectives

A Balance Between Them

**Air Force Gaming
Hosted
Competitions**



**Educate at
Echelon**

**Datasets for
Analysis and
Operational Insight**



**RL or Imitation Learning
Prototypes**

**Continuous
Playability for Human
& Bot Insights**

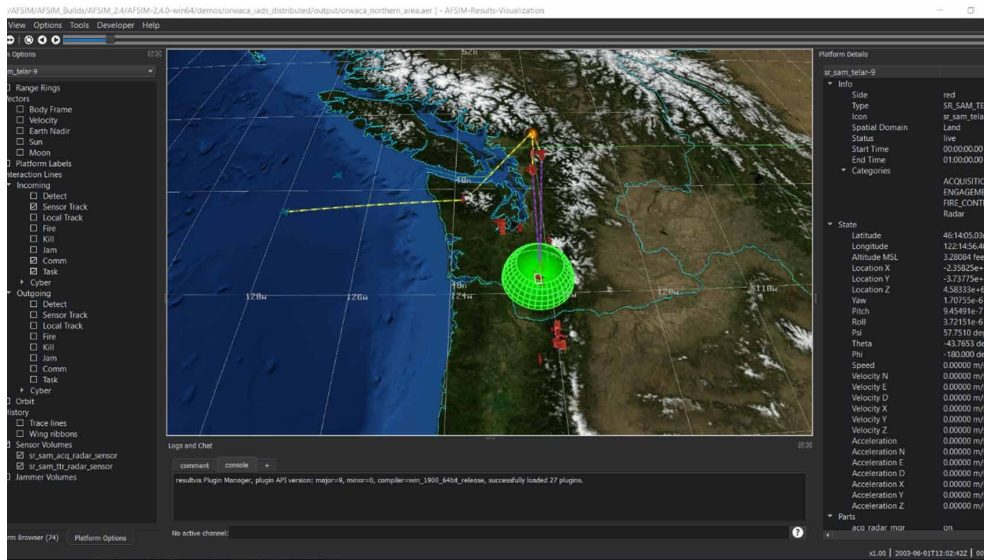


**Dataset API and
Agent API for
Variability**

Playability/Popularity **Military Relevance**

Past Failures to Avoid

Never Build Your Own Games



Top Games By Current Players

Name	Current Players	Last 30 Days	Peak Players	Hours Played
1. Counter-Strike 2	733,513		1,364,902	568,270,339
2. Dota 2	442,002		780,443	328,047,683
3. Baldur's Gate 3	134,687		293,852	97,492,180
4. Apex Legends	122,626		438,349	136,632,204
5. PUBG: BATTLEGROUNDS	106,251		448,932	141,472,916
6. Football Manager 2024	78,458		78,458	926,314
7. Rust	77,554		137,752	53,191,730
8. War Thunder	74,478		114,806	43,148,689
9. Grand Theft Auto V	71,449		166,618	65,688,827
10. Team Fortress 2	65,434		180,283	60,783,852

More

How many worldwide users?

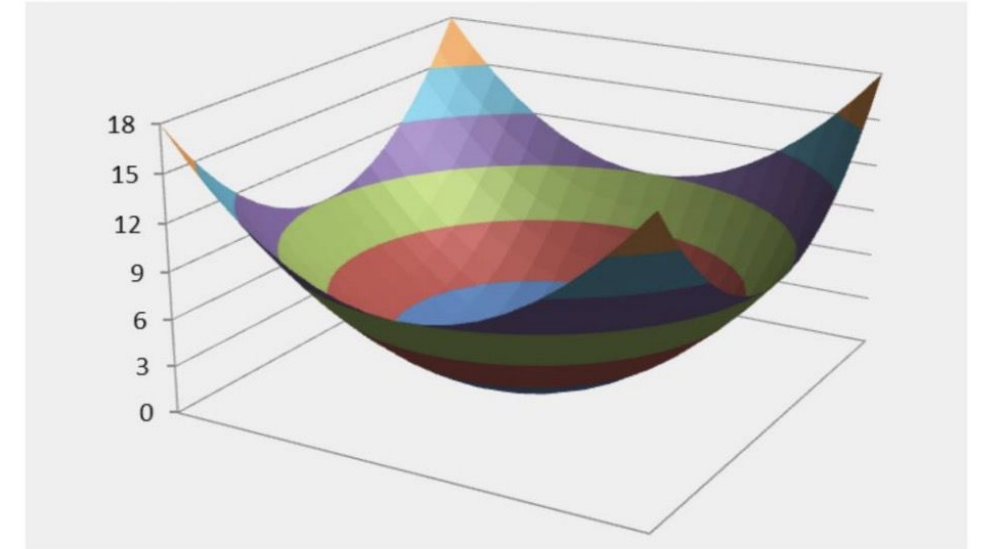
How much real world data is there?

What loopholes have humans or RL agents found in the game mechanics?

Top Games - 7 Nov 23:
www.steamcharts.com

Phase I

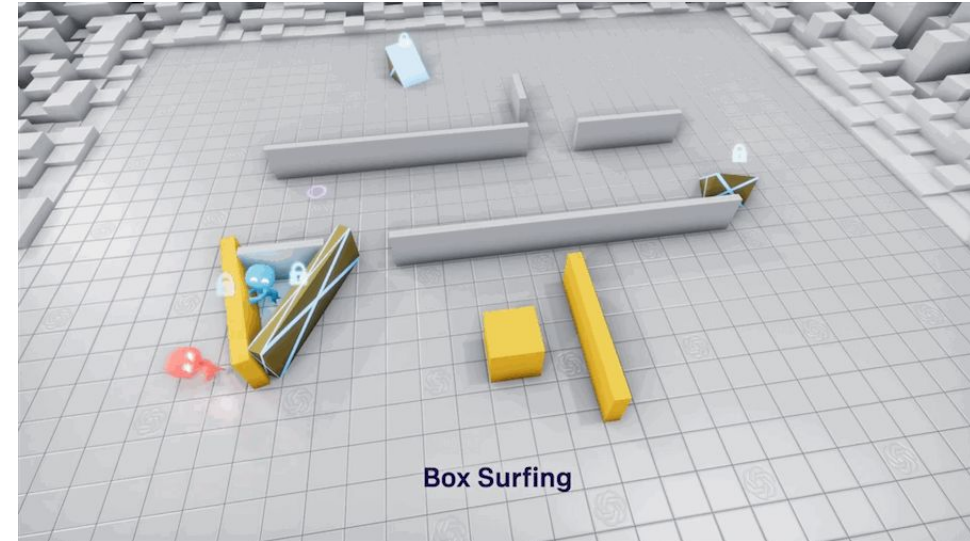
- Projects will demonstrate:
 - Their game's popularity/playability
 - Balance of realism and abstractism
 - DoD relevance for Operations
 - Extensibility (APIs + Agent Modification)
 - Data extraction capability (MDP)
 - Initial Game Dataset in MDP format



<https://web.stanford.edu/group/sisl/k12/optimization/MO-unit2-pdfs/2.9intro3D.pdf>

Phase II

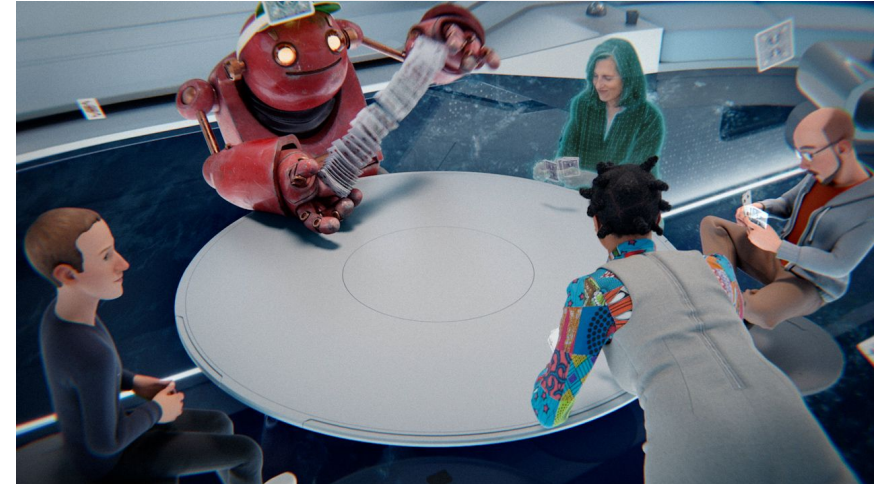
- Projects will perform in close concert with the DAF:
 - Game flexibility (agent modification)
 - Scalability (parallel and faster than real time)
 - Real gameplay (Air Force Gaming Tournaments)
 - Ability to host game on government servers
 - Ability to extend scenarios with user defined assets
 - Ability to inject AI agents as players (Effective APIs)
 - Continuous datasets from public games, DAF collects datasets from internal modified games



OpenAI - Hide and Seek

Phase III Dual Use Applications

- Projects will demonstrate:
 - Extensible, AI ready game for RL Agents (Red or Blue)
 - Employ cooperative and competitive agents as NPCs
 - Inform development of these agents with real gameplay data (think Cicero and Meta)
 - Game is enjoyable and accessible in the worldwide market



**Cicero in the
MetaVerse**

<https://ai.meta.com/research/cicero/>

Questions?

Wargaming and AI for All

If you have additional questions or would like to connect with SALSA and the Spark Team, please email wargaming@afwerx.af.mil.