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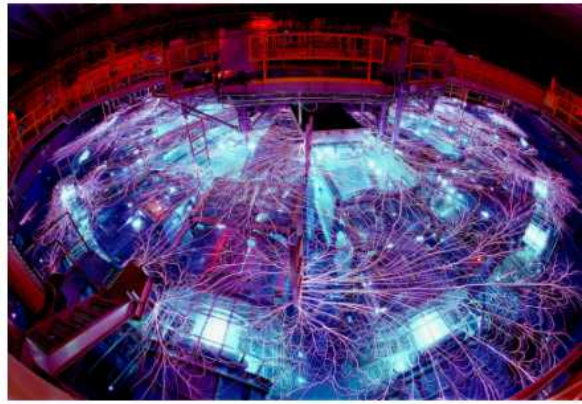

Expanding the Wargaming Toolbox

Current Efforts and Research Focus

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6/6/18

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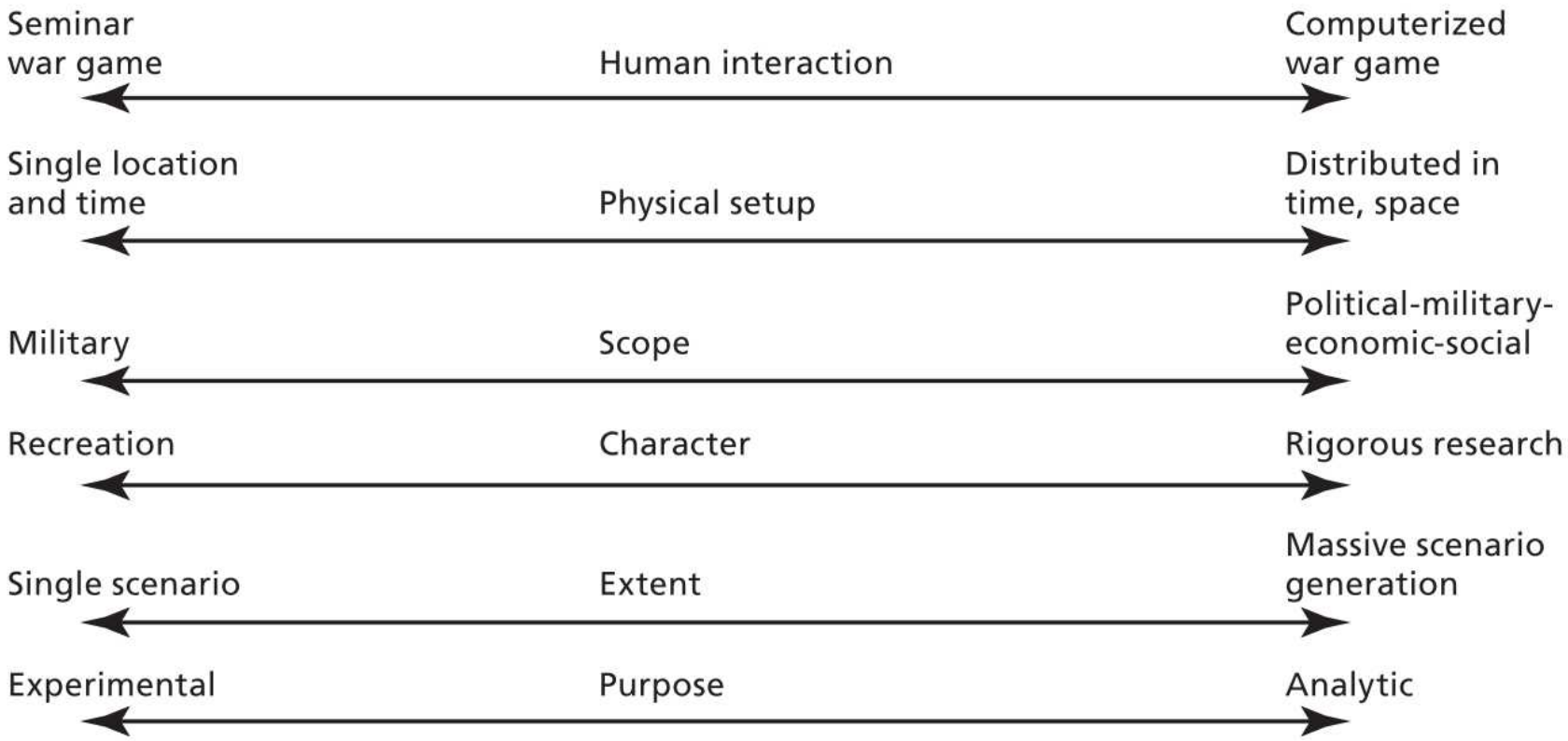
The Problem

1. Conflict has grown more complex.
2. Impact and reach of weapons has grown.
3. Uncertainty, of impact and of provenance has grown.
4. Existing models do not capture this well (i.e., Schelling etc).
5. Our approach: What techniques can help us develop better models of conflict?

Classic wargaming approaches exist on a spectrum.

Figure 4.2
Spectra Distinguishing Among Characteristics of "Games"



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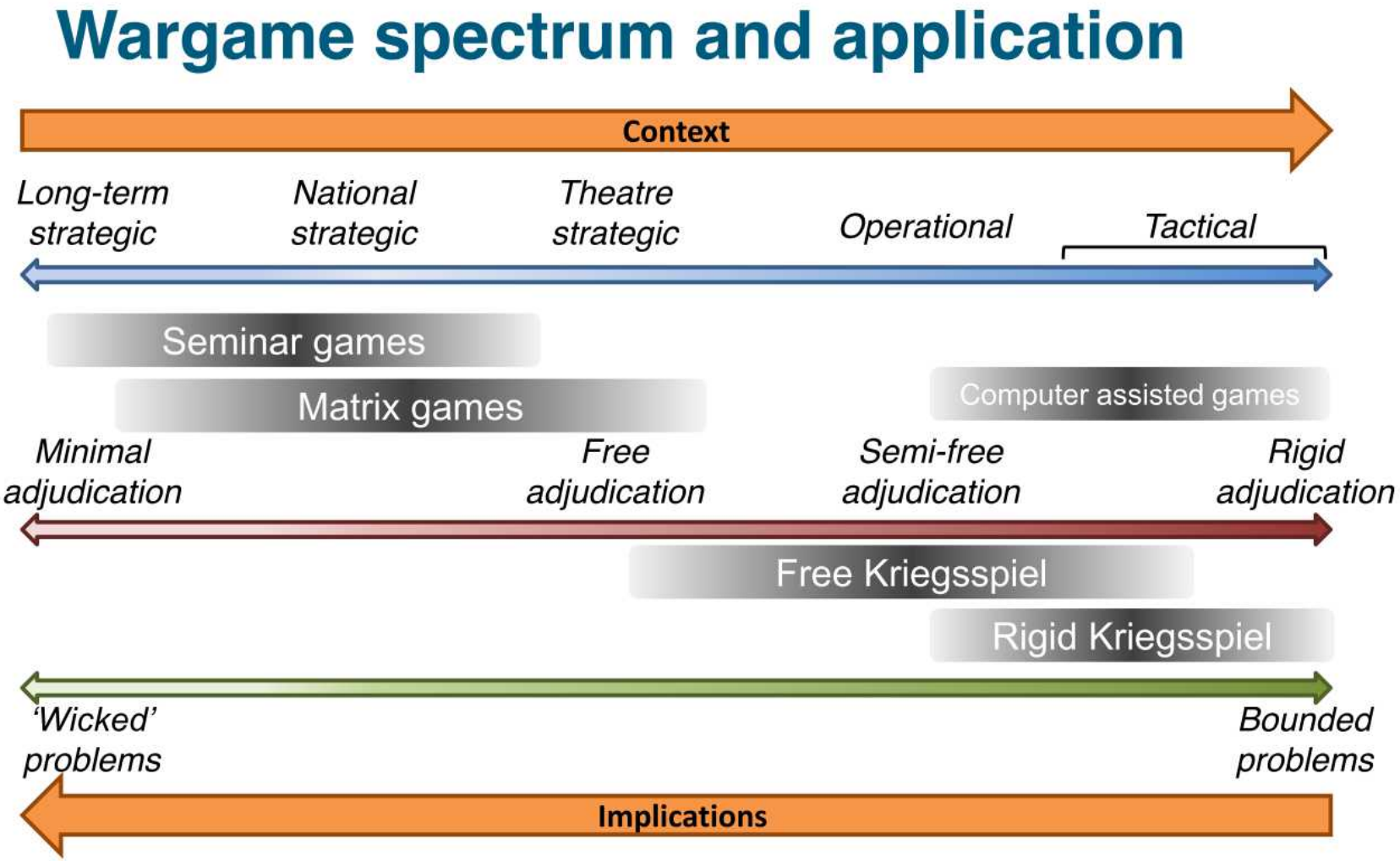
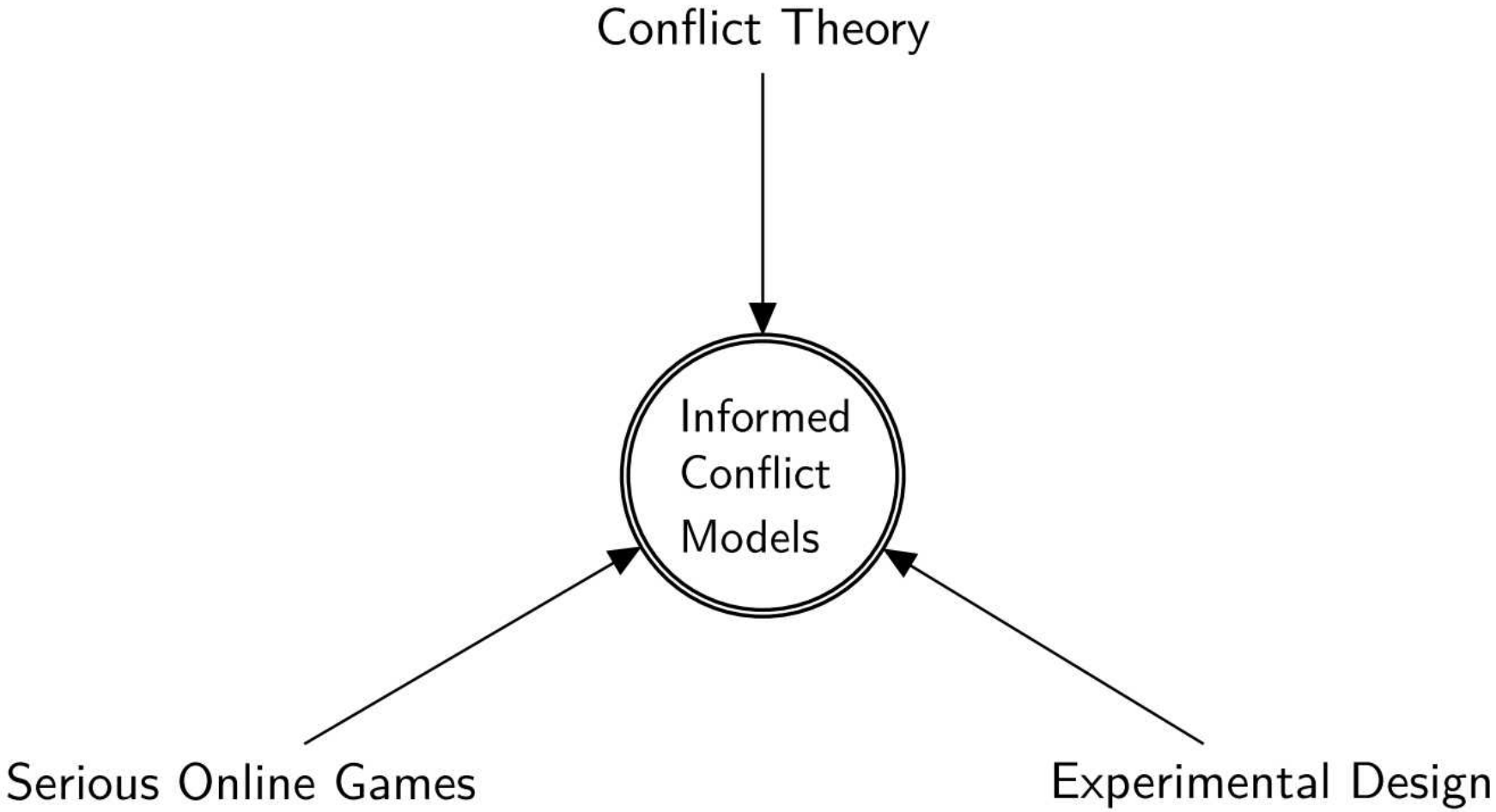
From [PC11]

Classic wargaming approaches exist on a spectrum.

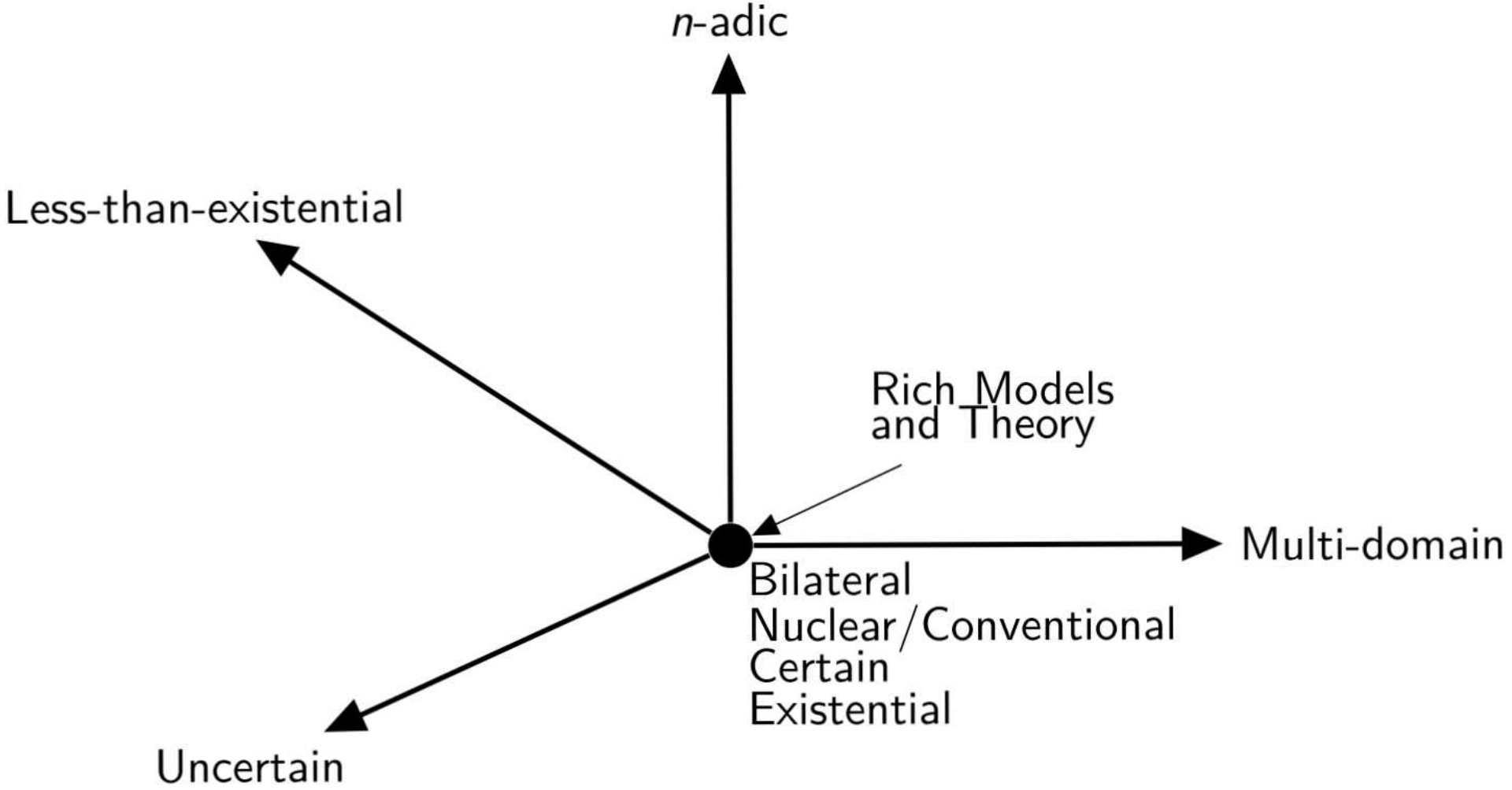


From [PM11]

Our solution: Serious Online Experimental Wargames



We believe that serious games approaches can more efficiently search a complex conflict scenario space.



Why do we think this can work?

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The basic requirements for running experiments to collect data on conflict behaviors are generally met:

- Replicable — Board- and E-Game can be quickly and easily played by any interested party, from the same starting conditions.
- Controllable — It is easy to create new scenarios with different starting conditions that can change the player capabilities.
- Instrumentable — Board- and E-Game have discrete activities that players can execute, and we can track, that are tied to our hypotheses.
- Neutral — Apart from clarifying the rules, the experimenter does not have to do anything else in the experiment.
- High-Fidelity — Includes elements important to strategic stability.

Why do we think we will get anything useful?

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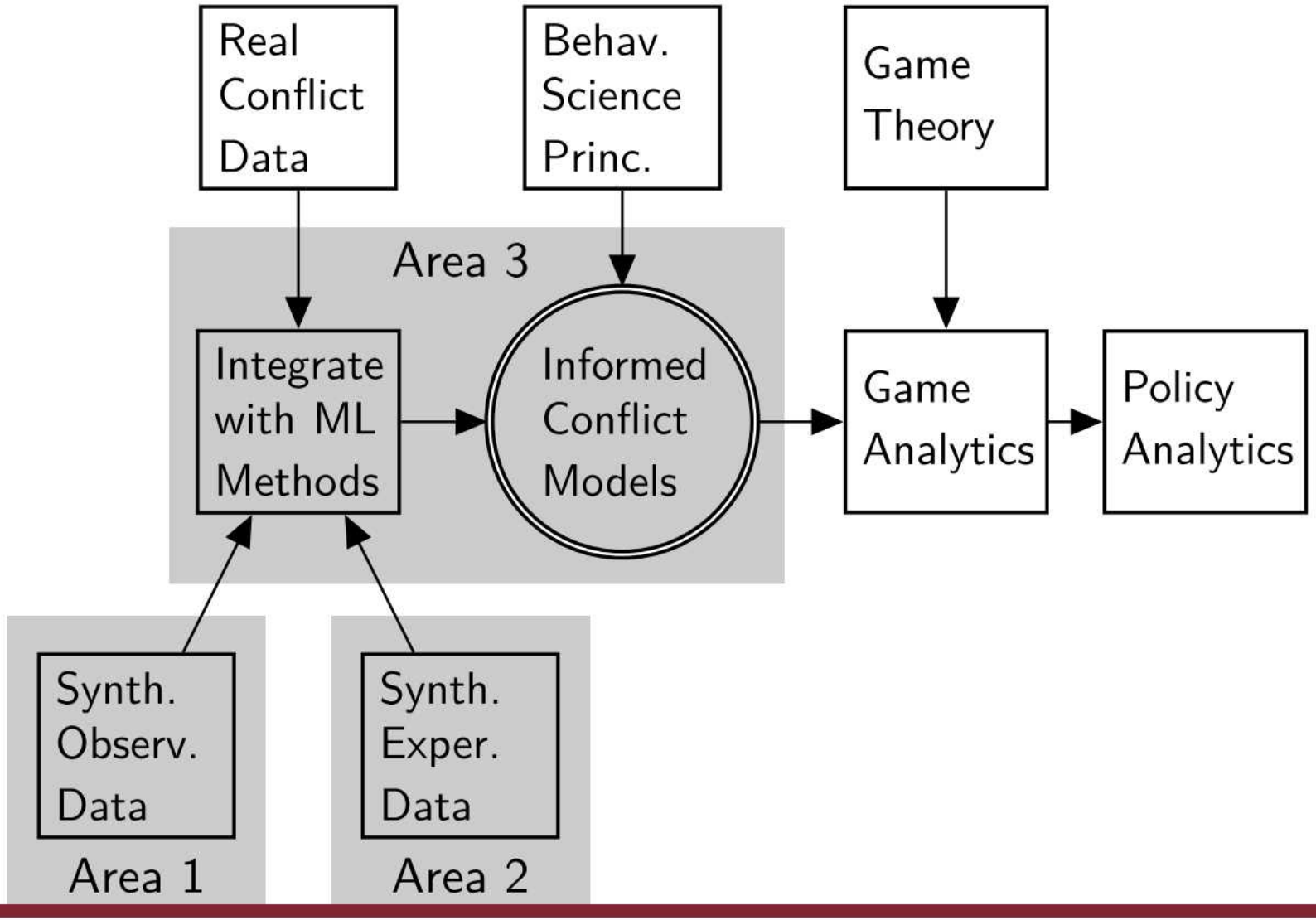
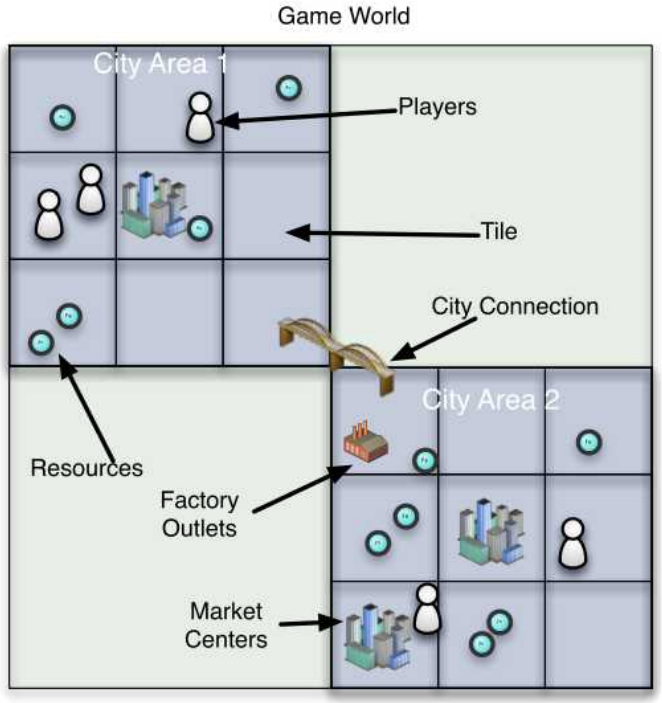
- Will there be patterns of behavior, or will aggregate player behavior be random?
  - Our game has a limited, but rich set of behaviors $\rightarrow$ we can aggregate outcomes into a higher level constructs.
- Will players behave similarly to the real world?
  - Studies show some similarity in biases between politicians and non-politician subject pools [SLS+18].
  - Focus on the differences in outcomes from capabilities – not as sensitive.
  - Some targeted data collection from representative sample.
- Can we get enough data?
  - Require only 3 people to play the game.
  - Deploying online to increase subject pool size (and diversity).

Sandia is focused on three areas to use serious online games to drive experiments that inform conflict.



SNL Focus Area 1: Operationalization of existing game data to address conflict problems

- Reference work: "A Path to Peace or a Source of Interstate Conflict" by K. Barbieri [Bar96, ELL+18]



MIDS Variable	Game X Variable
Dyadic Trade (Trade between two states)	Trade between guilds
Contiguity	Share a border
Alliance	Is Foe $\neq$ TRUE
Capabilities Ratio	Combat Strength, Economic Strength and Size Ratio

SNL Focus Area 2: Custom built serious online games as data collection systems

Working with partners to develop table-top and online experiment platforms:

- How can serious games be constructed and executed to place players in situations to model conflict escalation and stability challenges?
- Initial focus is on what impact might nuclear weapons that are tailored for specific military effects have on deterrence and strategic stability?
  - Enhanced radiation outputs
  - Electromagnetic pulse
  - High-precision, low-yield systems

Carnegie Corporation of New York

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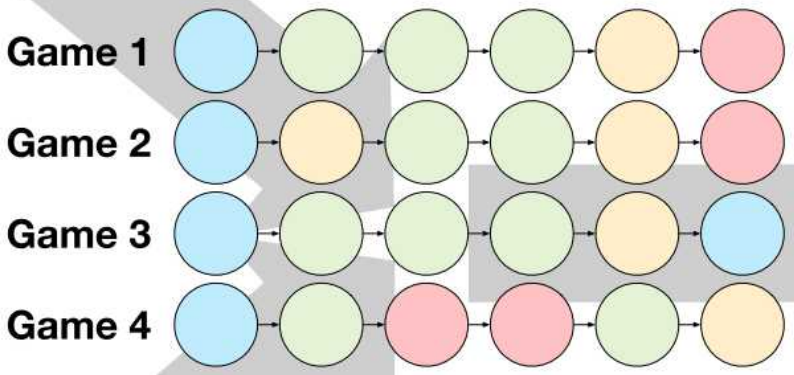
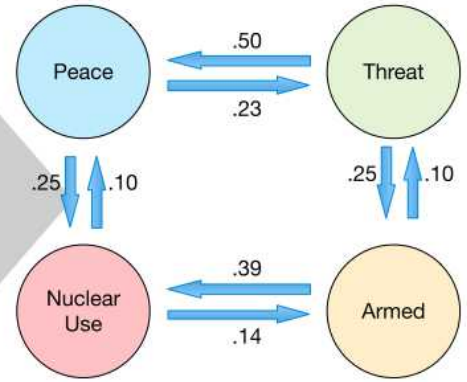
SNL Focus Area 2: Custom built serious online games as data collection systems

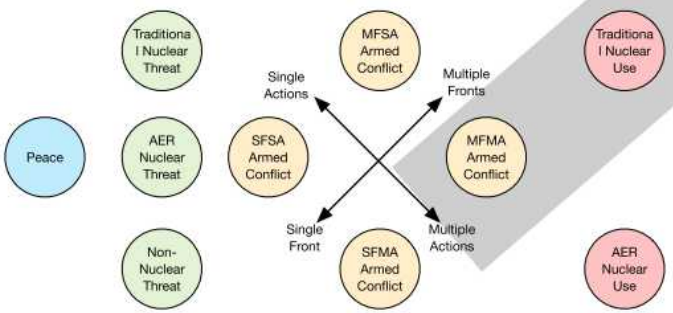
- Incorporates potential instruments and dynamics of deterrence, including bargaining, signaling, escalation, military action, economic interaction, uncertainty, etc.
- Collects data dynamically during game play, and data can be analyzed across multiple games

SNL Focus Area 3: Improved analytic methods for the data collected



Data Analysis





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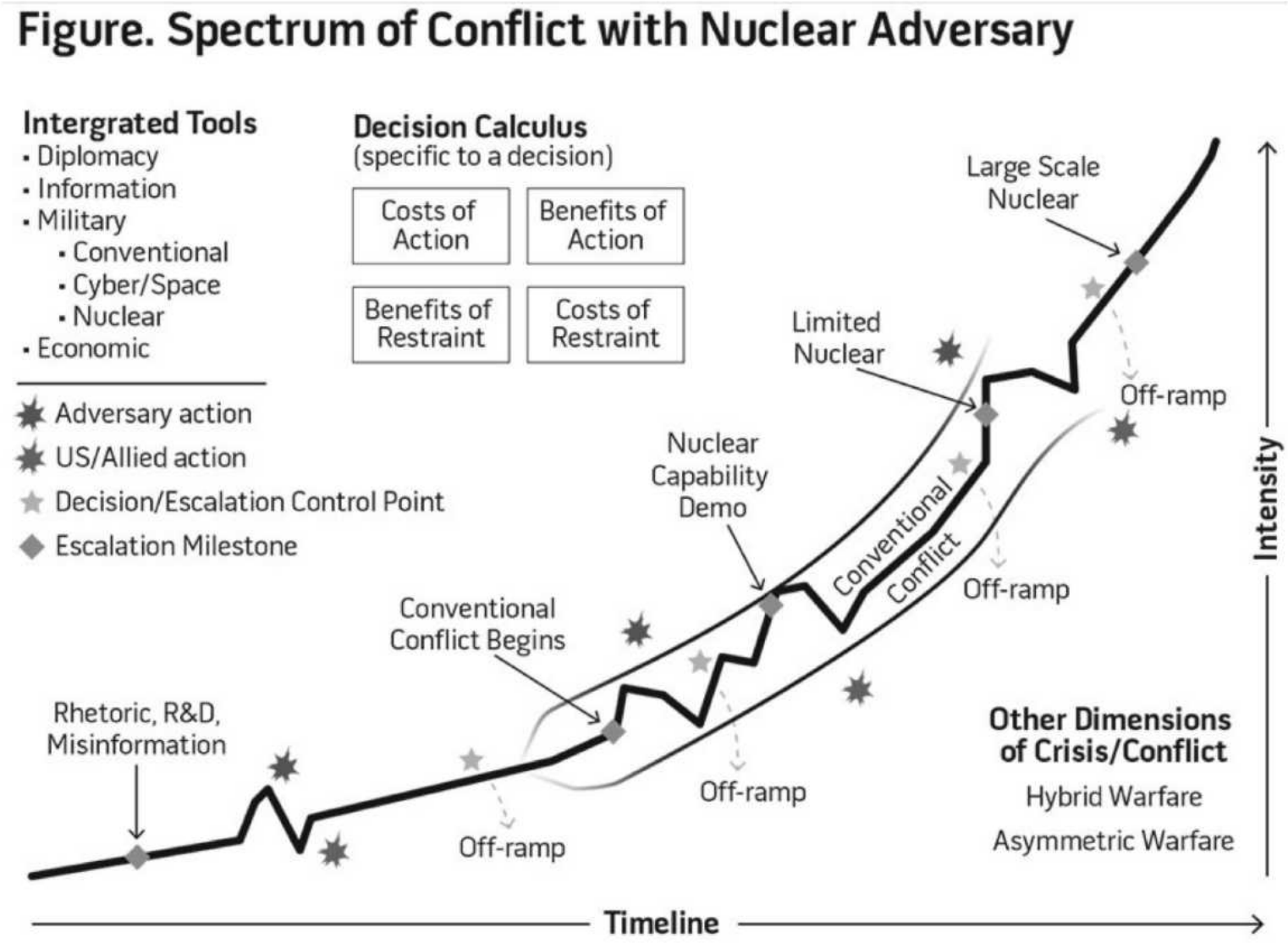
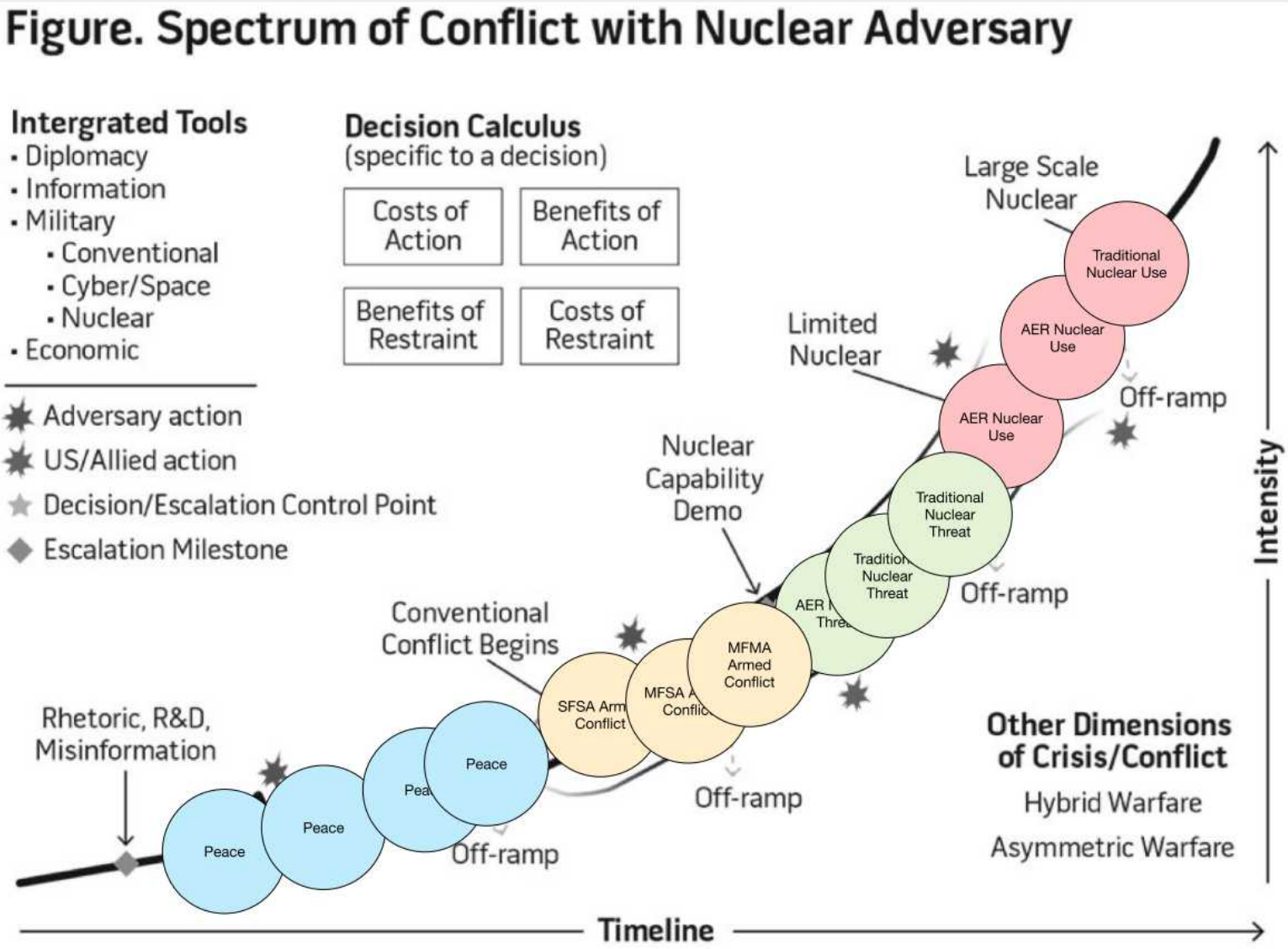
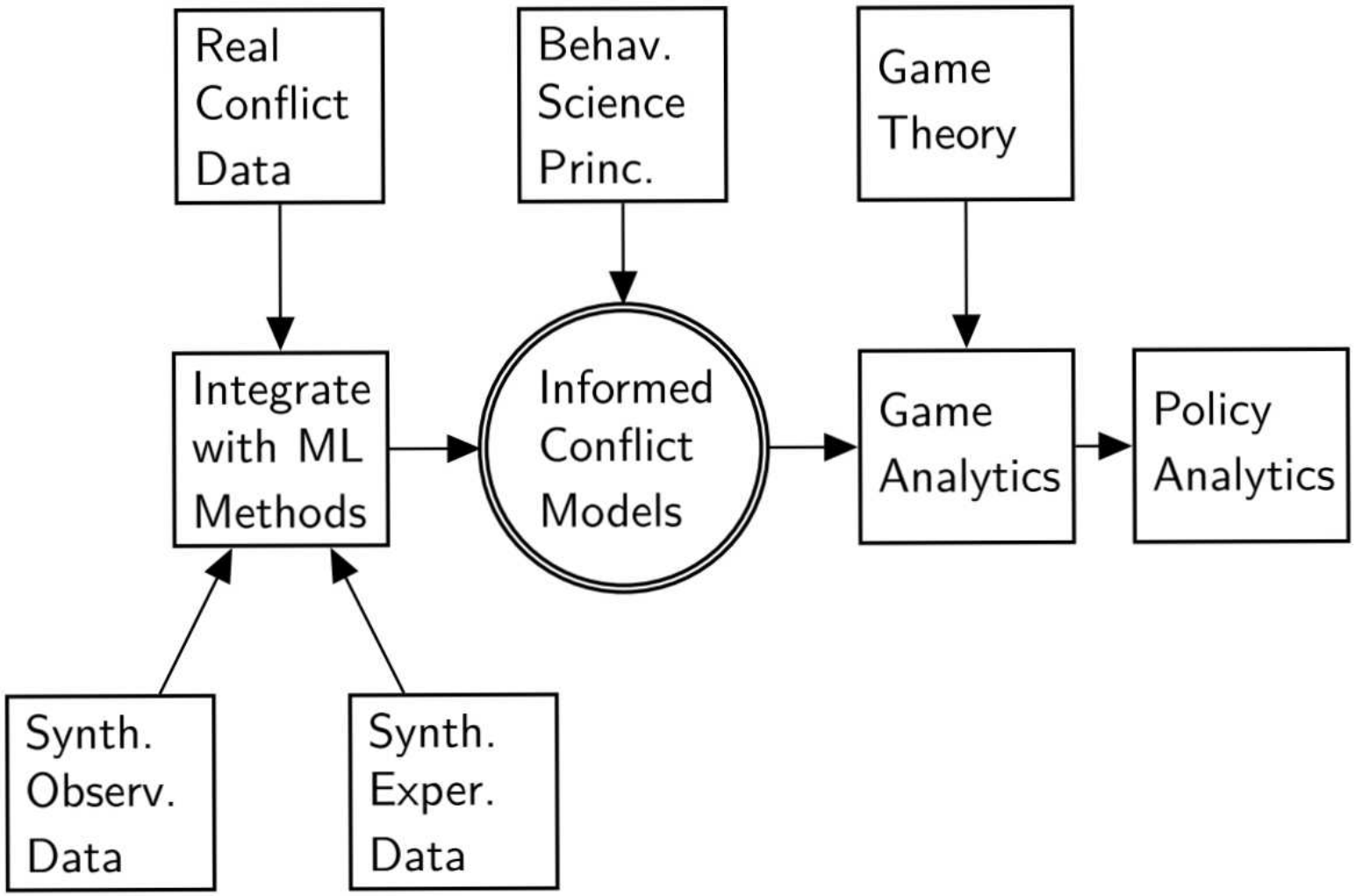


SNL Focus Area 3: Improved analytic methods for the data collected



The resulting capabilities create an new analytic framework and tool set for studying conflict



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