Achieving Decision Making Superiority Based on EMS Superiority

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Defense Planning & Policy Dep.
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The views expressed in this presentation are my own and do not necessarily reflect the official position of my organization.

Understanding the Concept of EMS SUPERIORITY

Freedom of action in the electromagnetic spectrum, **at the time, place, and parameters of our choosing**, is a required precursor to the successful conduct of operations in all domains.

【DoD Electromagnetic Spectrum Superiority Strategy】

The joint force should place a high priority on achieving the degree of EMS control required to ensure the freedom of action necessary to compete and win. **The required degree of EMS control should be determined by the level required to enable successful execution of EMSO** and may range from parity, superiority, or supremacy, depending on the situation and the JFC's CONOPS.

【ELECTROMAGNETIC SPECTRUM OPERATIONS　AFDP3-85】

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Defining the required degree of EMS SUPERIORITY

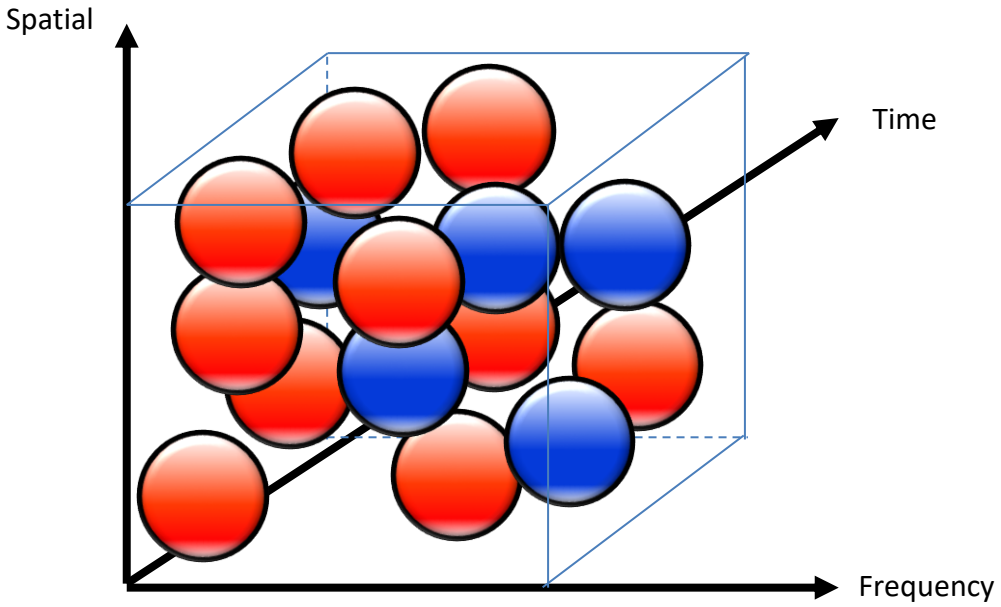
- To increase our SUPERIORITY over adversary

$$\frac{①quantity\ of\ EMS\ resource}{②utilization\ for\ successful\ conduct\ of\ operations} > \frac{③quantity\ of\ EMS\ resource}{④utilization\ for\ successful\ conduct\ of\ operations}$$

Increase①
Decrease②

Decrease③
Increase④

Defining the required degree of EMS SUPERIORITY



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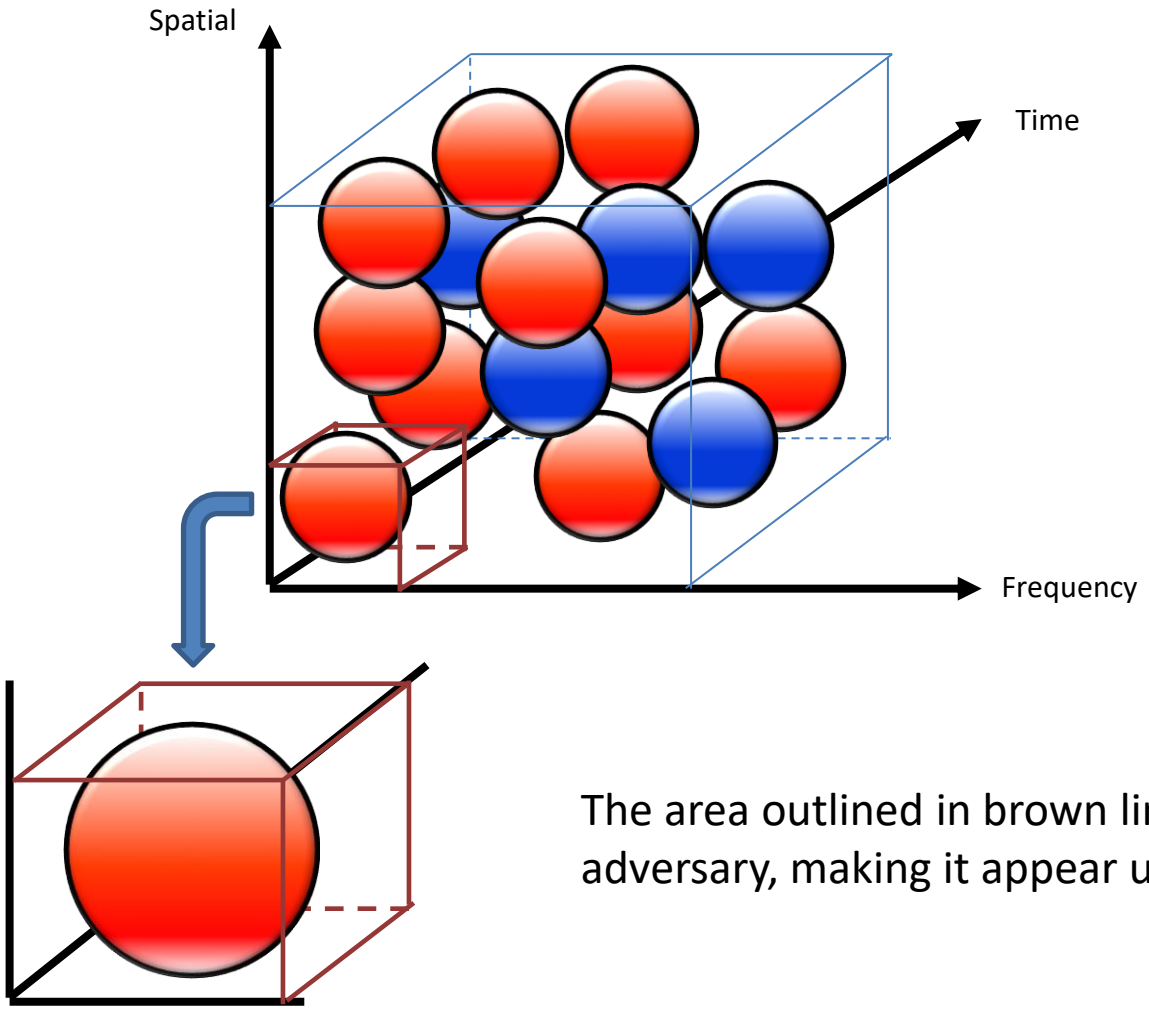

The area outlined in brown lines is occupied by the adversary, making it appear unusable to us...

Defining the required degree of EMS SUPERIORITY

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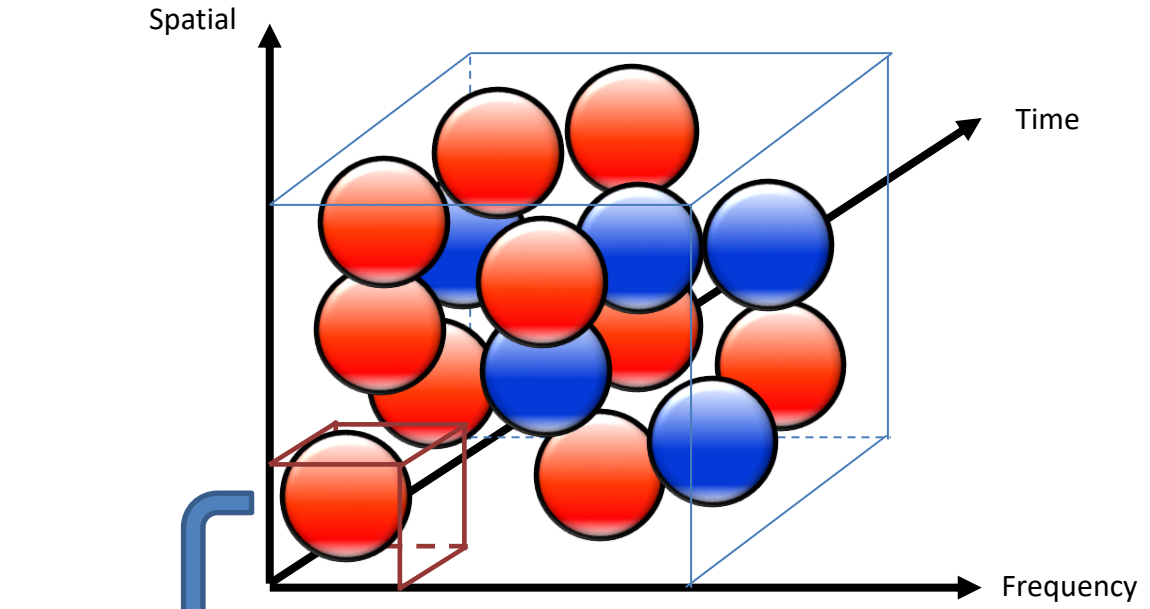
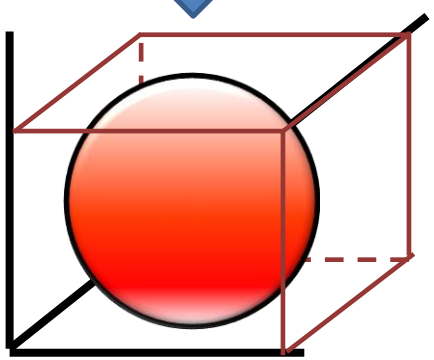
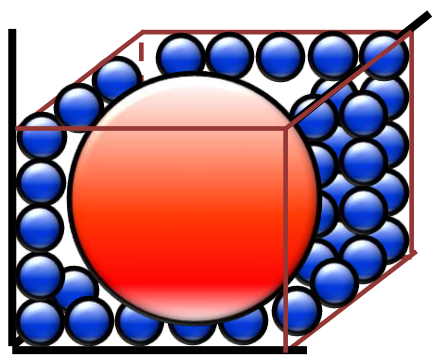




By reducing the minimum unit size,



available resources are generated.

Defining the required degree of EMS SUPERIORITY

- Defining the required degree

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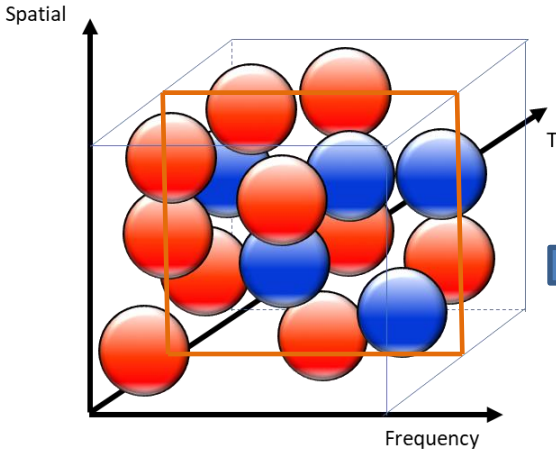
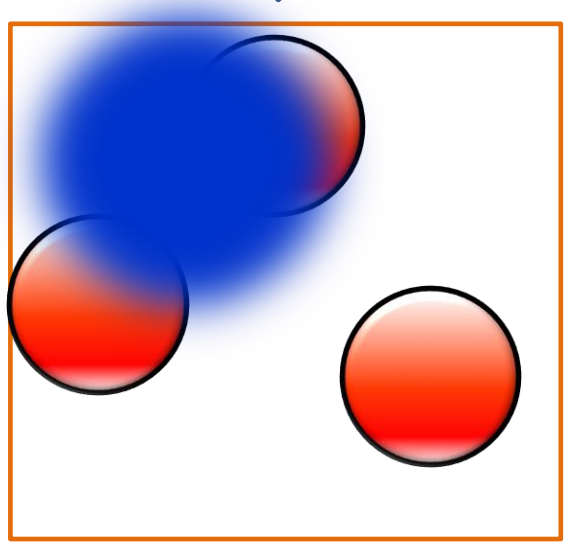


Fix the axis and compress the dimensions



Do we have to completely suppress both enemy usage areas?

Defining the required degree of EMS SUPERIORITY

- Defining the required degree

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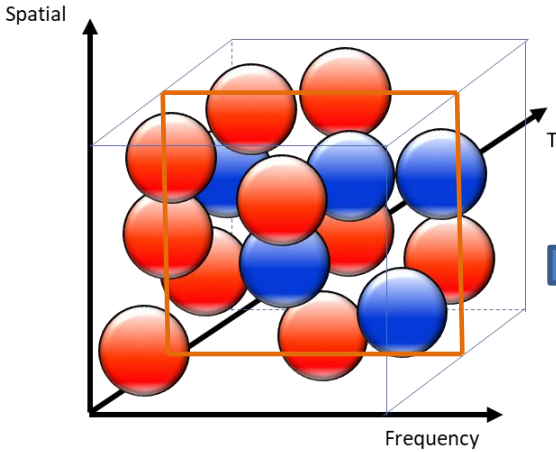

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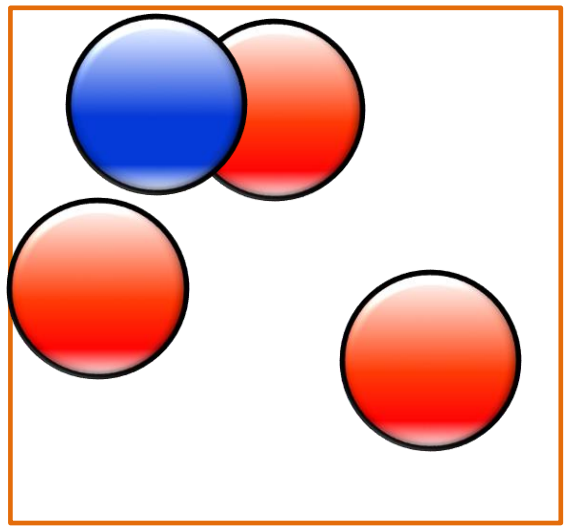

We have to control **only one** of the enemy's areas of operation.

Defining the required degree of EMS SUPERIORITY

- Target Determination Based on EOB Analysis

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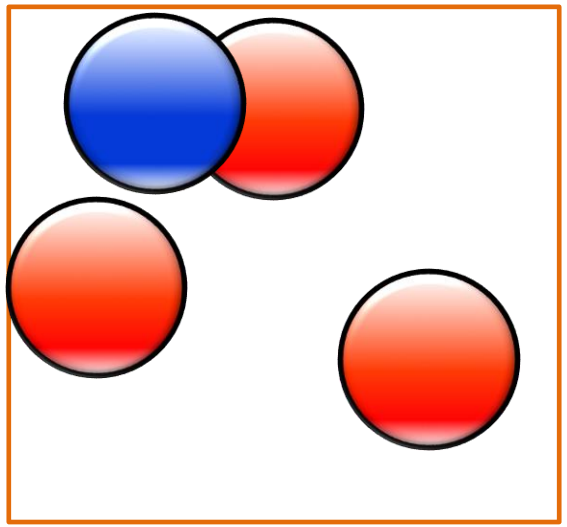

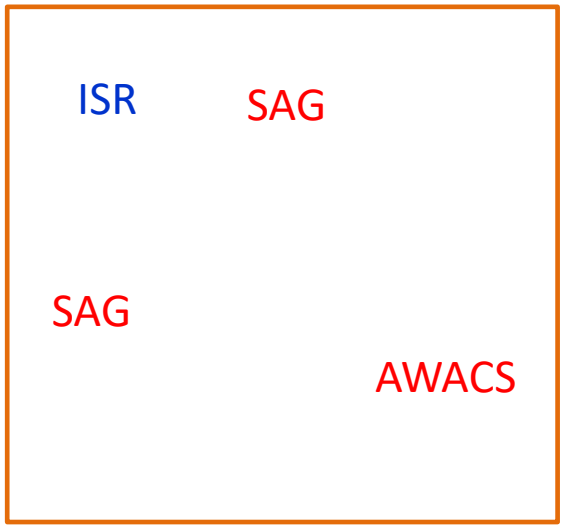

In many cases, the resources we want to use are also highly valued by the adversary and are robustly defended.

Defining the required degree of EMS SUPERIORITY

◆ Target Determination Based on EOB Analysis

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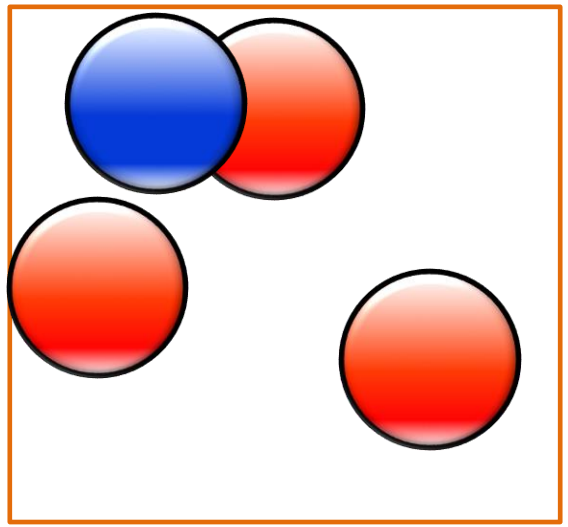
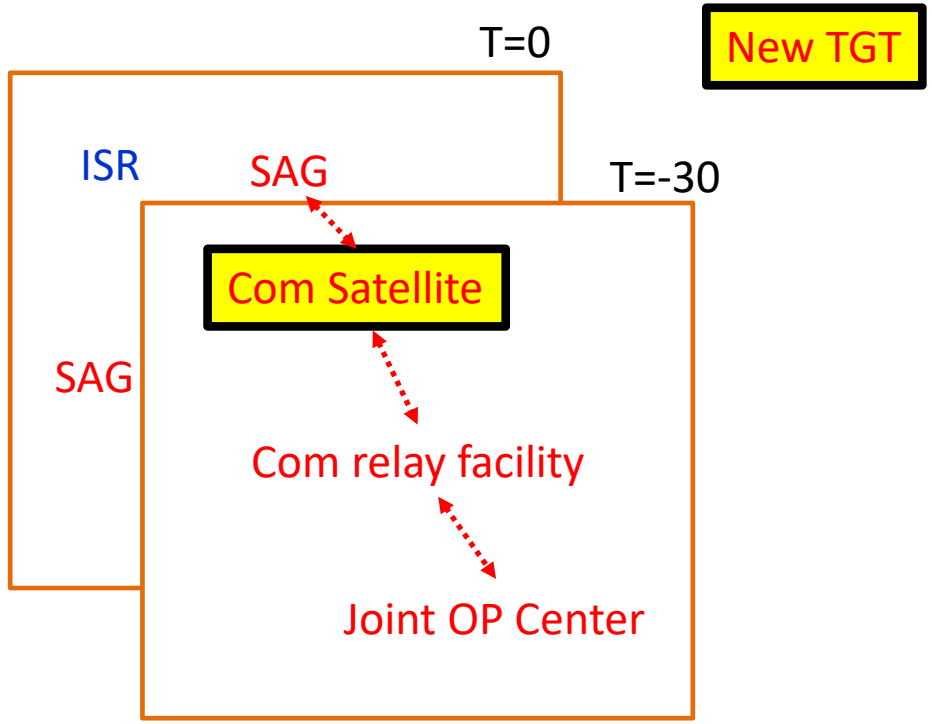
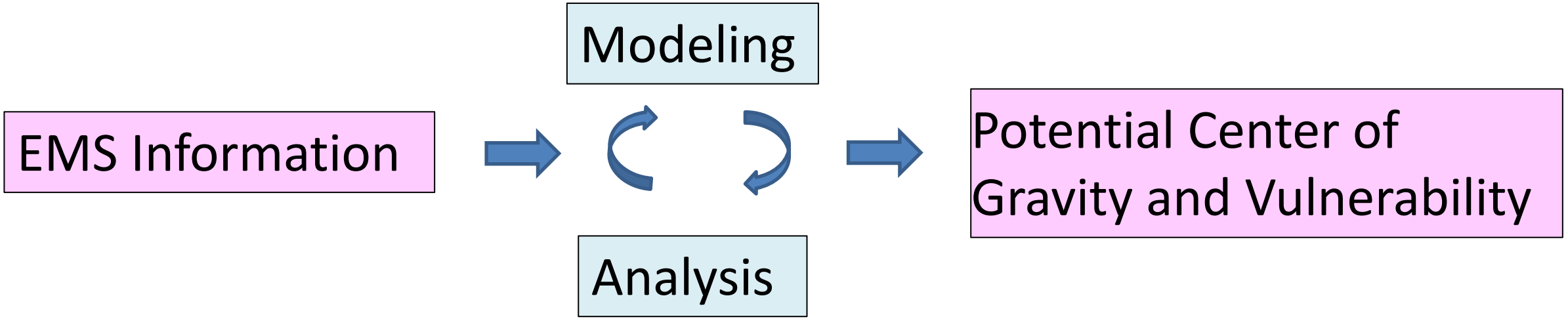




By analyzing EMS information and clarifying the correlations between each element, we identify the enabling systems that the enemy has not robustly defended and wishes to disable, and attack them.

Defining the required degree of EMS SUPERIORITY

- Target Determination Based on EOB Analysis



Defining the required degree of EMS SUPERIORITY

◆ Predicting adversary actions

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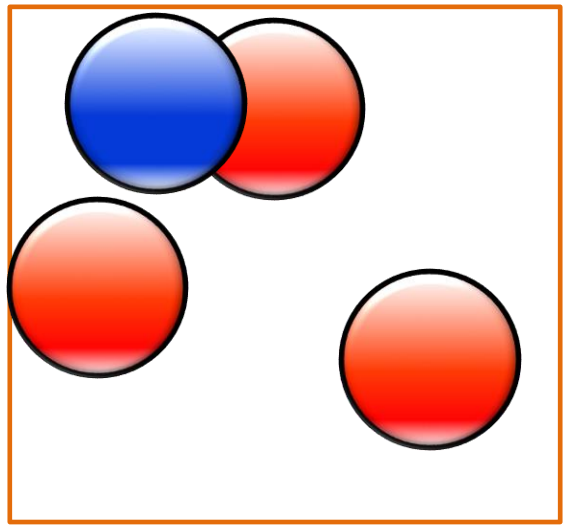
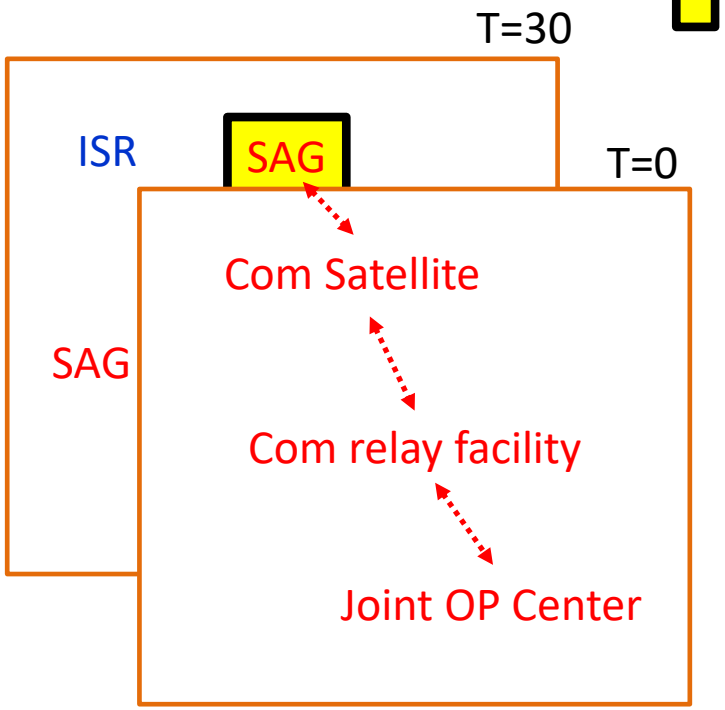


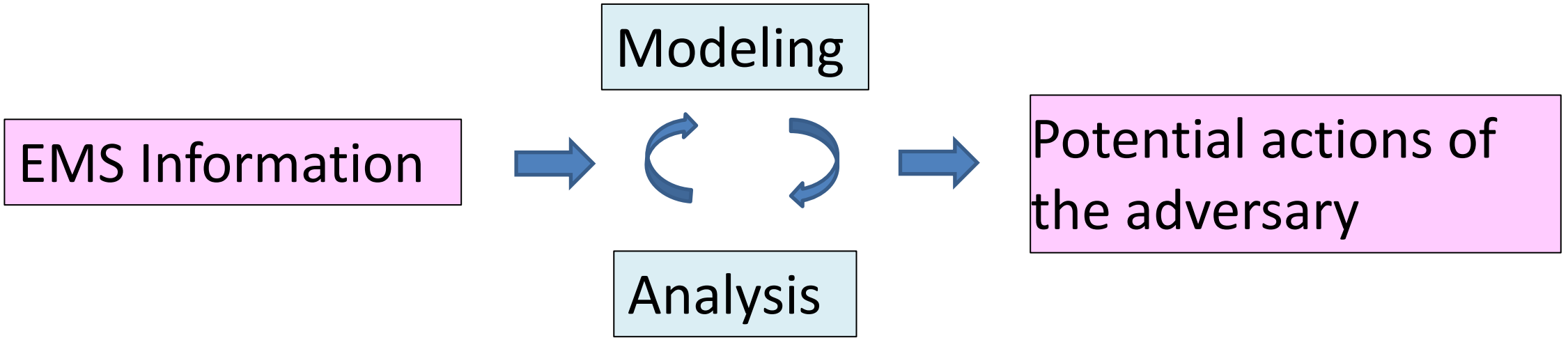
: Subject of behavioral prediction



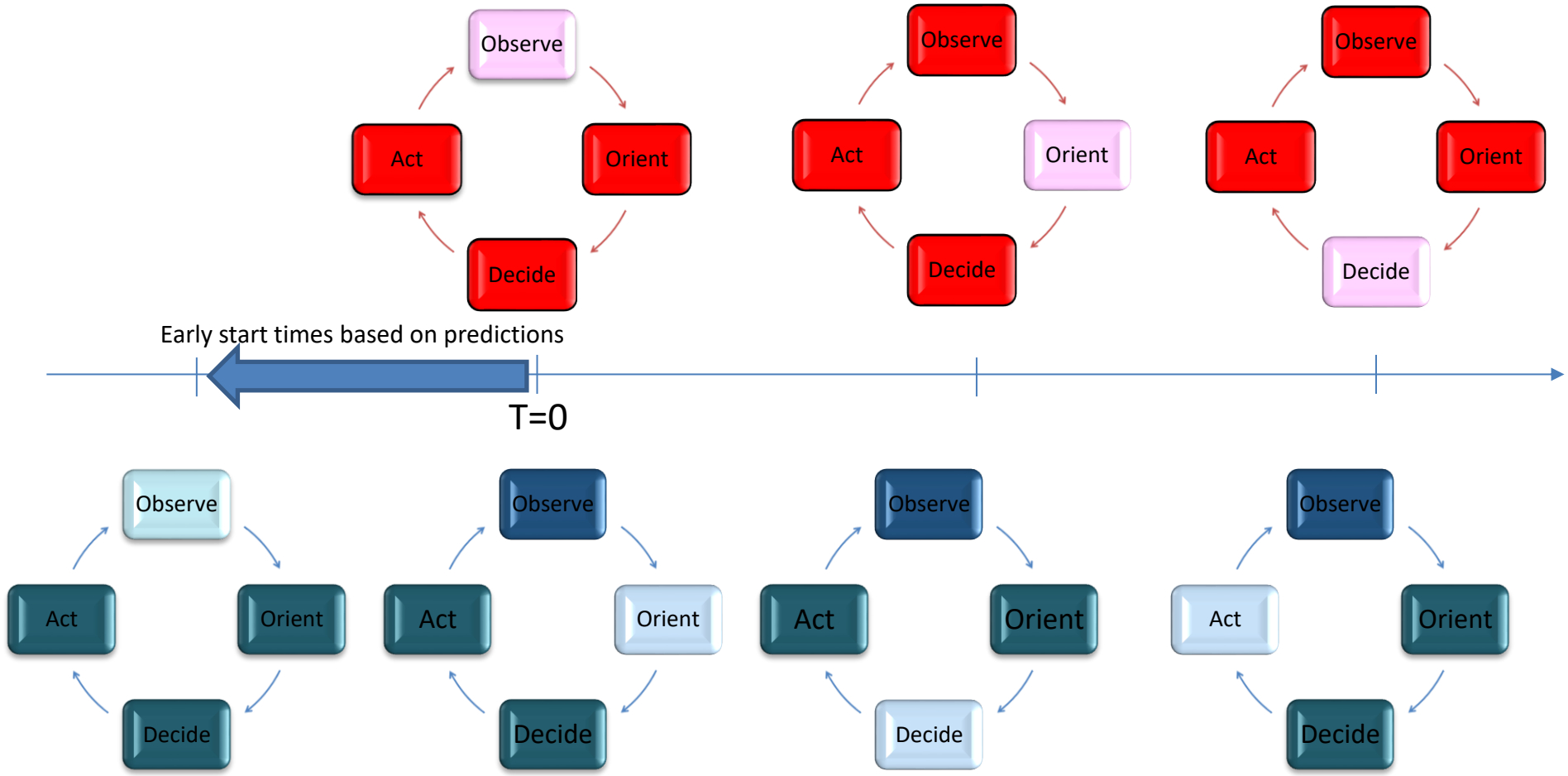
By analyzing the configuration between subsystems when viewing the adversary as a system, we predict the behavior of high-value systems.

Defining the required degree of EMS SUPERIORITY

- Predicting adversary actions



Achieving Decision Superiority



Summary

- Function-based EMS superiority
- Approaches to Enhancing EMS superiority
- Approaches to Enhancing Decision Making Superiority

Supplement

To increase our SUPERIORITY over adversary

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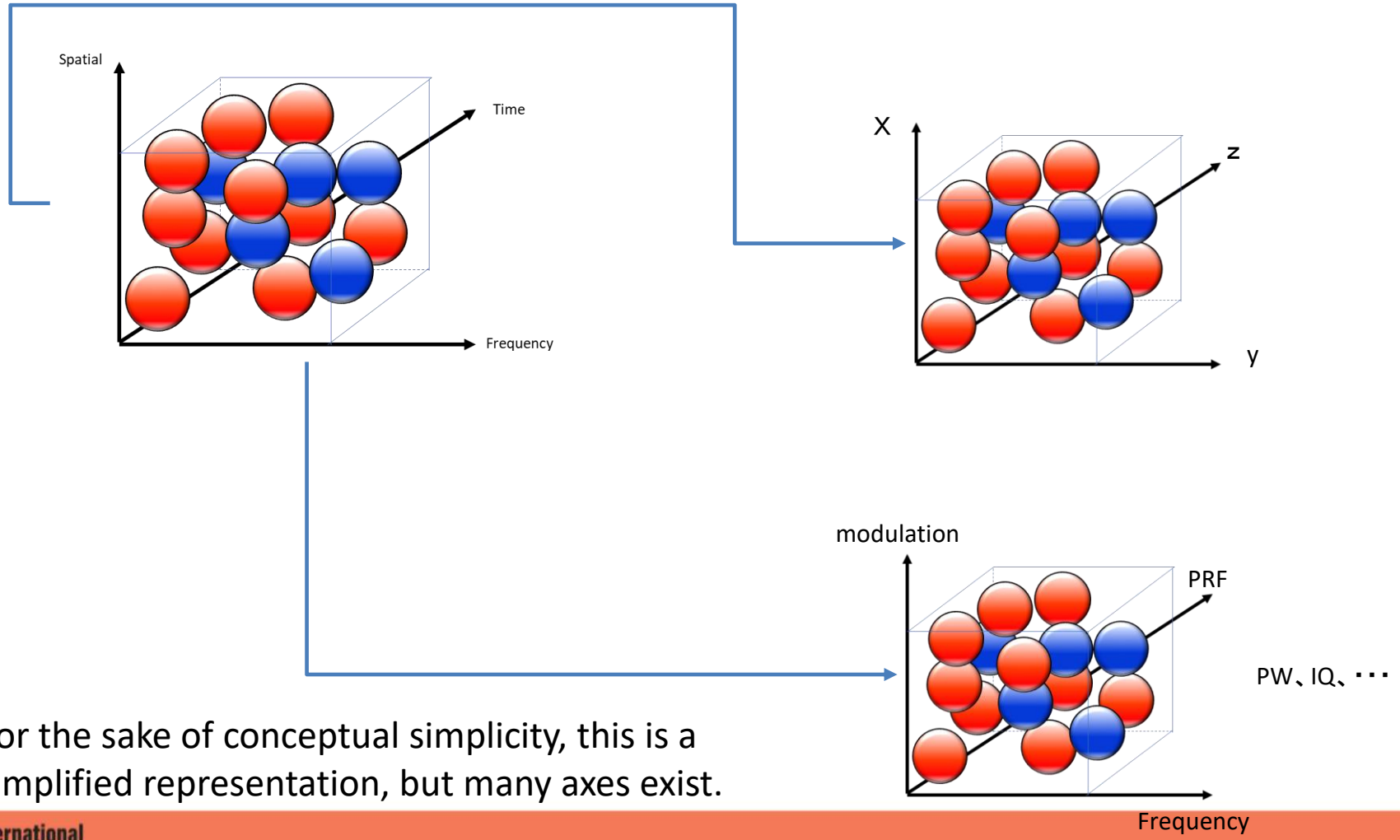
①Increase our resource ⇒Effective EMS management	**③Decrease enemy's resource** ⇒Jamming
②Decrease our utilization ⇒ frequency hopping LPI Radar	**④Increase enemy's utilization** ⇒Input fake information

Defining the required degree of EMS SUPERIORITY



For the sake of conceptual simplicity, this is a simplified representation, but many axes exist.

Challenges

- How to collect the data required for analysis
- How to conduct learning assessments
- How to incorporate into decision-making
- （The realization of predicting the enemy‘s possible actions is difficult on a large scale.）Where should I start?

Adapting to Ultra-Dynamic Spectrum Environments

- Spectrum conditions evolve within milliseconds
- Static planning cycles rapidly become obsolete
- Real-time EMS provides earliest indicators of adversary intent
- Requirements must evolve at operational tempo

Why Triple-Loop Learning Is Essential for Future EW

- Single-Loop: Improving immediate actions and techniques
- Double-Loop: Challenging underlying assumptions
- Triple-Loop: Redesigning how learning and requirements occur
- Enables continuous adaptation to a dynamic EMS battlespace

Moving Beyond JCIDS for EW in 2035

- Traditional JCIDS cannot match the speed of threat evolution
- Validation timelines lag behind spectrum dynamics
- Threat-informed EMS enables continuously refreshed requirements
- Agile cycles: feedback → iteration → rapid fielding

Allied Approaches to Agile EW Modernization

- United Kingdom: Spiral upgrade model for high-tempo EW updates
- Australia: Persistent ISR–EMS integration for threat-driven modernization
- NATO: System-of-Systems targeting accelerating decision advantage
- Shared EMS architectures enhance multinational capability alignment

Triple-Loop Learning Framework

- Single-Loop: Are we executing correctly?
- Double-Loop: Are we pursuing the correct goals?
- Triple-Loop: How do we decide what ‘correct’ should be?
- Transforms doctrine, acquisition, and learning into adaptive systems