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CRADA PROPOSAL FOR DIA

"HARNESSING THE POWER OF AI AND DYNAMIC SIMULATIONS FOR DEFENSE INTELLIGENCE"

SIMWELL
Your Simulation Technology Partner

anylogic®

PROVIDED BY ZOLONTECH, SIMWELL CONSULTING & TECHNOLOGIES, AND THE ANYLOGIC COMPANY

DATE: 2023-09-05

Up-Front DISCLAIMER

This presentation is “UNCLASSIFIED!”

All data was obtained from open-sources or by an internal process of reasonable estimation

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INTRODUCTION

- Teaming up of Zolontech, SimWell Consulting & Technologies, and AnyLogic.
- Pursuit of a Cooperative Research and Development Agreement (CRADA) with the Defense Intelligence Agency (DIA).
- **Objective:** Elevate DIA's intelligence prowess and business methodologies through AI, ML, and dynamic simulations.

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COOPERATIVE RESEARCH AND DEVELOPMENT AGREEMENT (CRADA) WHITE PAPER HIGHLIGHTS

- Intriguing confluence of AI and dynamic simulations.
- Exploration of challenges and potential reward
- Successful integration to serve the mission of DI

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DIA'S MISSION

Provide military intelligence to:

- Warfighters;
- Defense policymakers;
- Force planners in the Department of Defense and Intelligence Community; and

Support U.S. military planning, operations, and weapon systems acquisition.

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VALUE OF HIGH-FIDELITY DYNAMIC SIMULATIONS

- Accurate representation of problem scenarios.
- Analysis of risk mitigation options.
- Understanding of complex scenarios, course of action analysis, forecasting, prediction, etc.
- Historically limited to large-budget weapons programs due to high costs.

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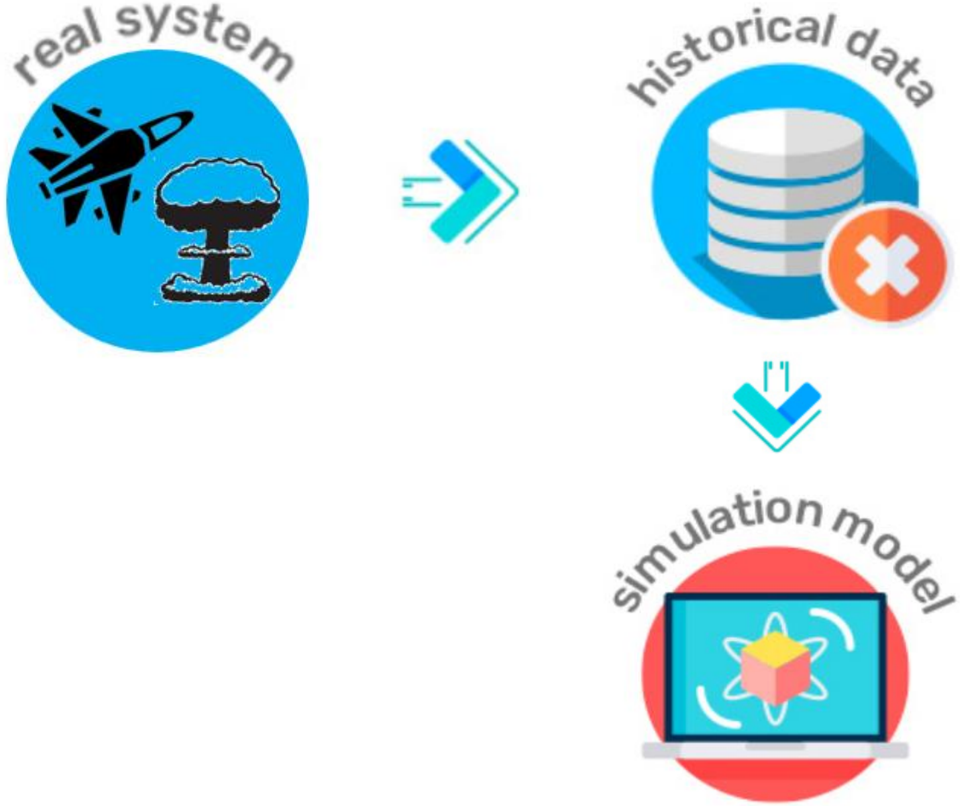
TRADITIONAL CHALLENGES TO SIMULATION INPUT DATA



Expensive data collection: e.g., nuclear tests, extended aircraft flight hours.

Usage of supercomputers and custom modeling programs.

Requirement for several SMEs, high-tech professionals, and software engineers.

Cost-prohibitive for routine applications.

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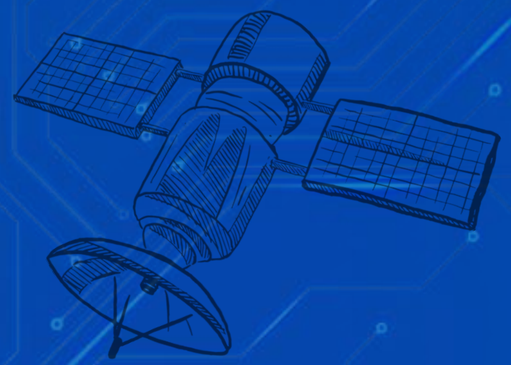

THE GAME CHANGER

Integration of AI-produced data sets with dynamic simulations.

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Utilization of commercially available simulation software or open sources.

Fast-tracking analysis of intricate, dynamic systems for both military applicatrions and business-oriented processes.

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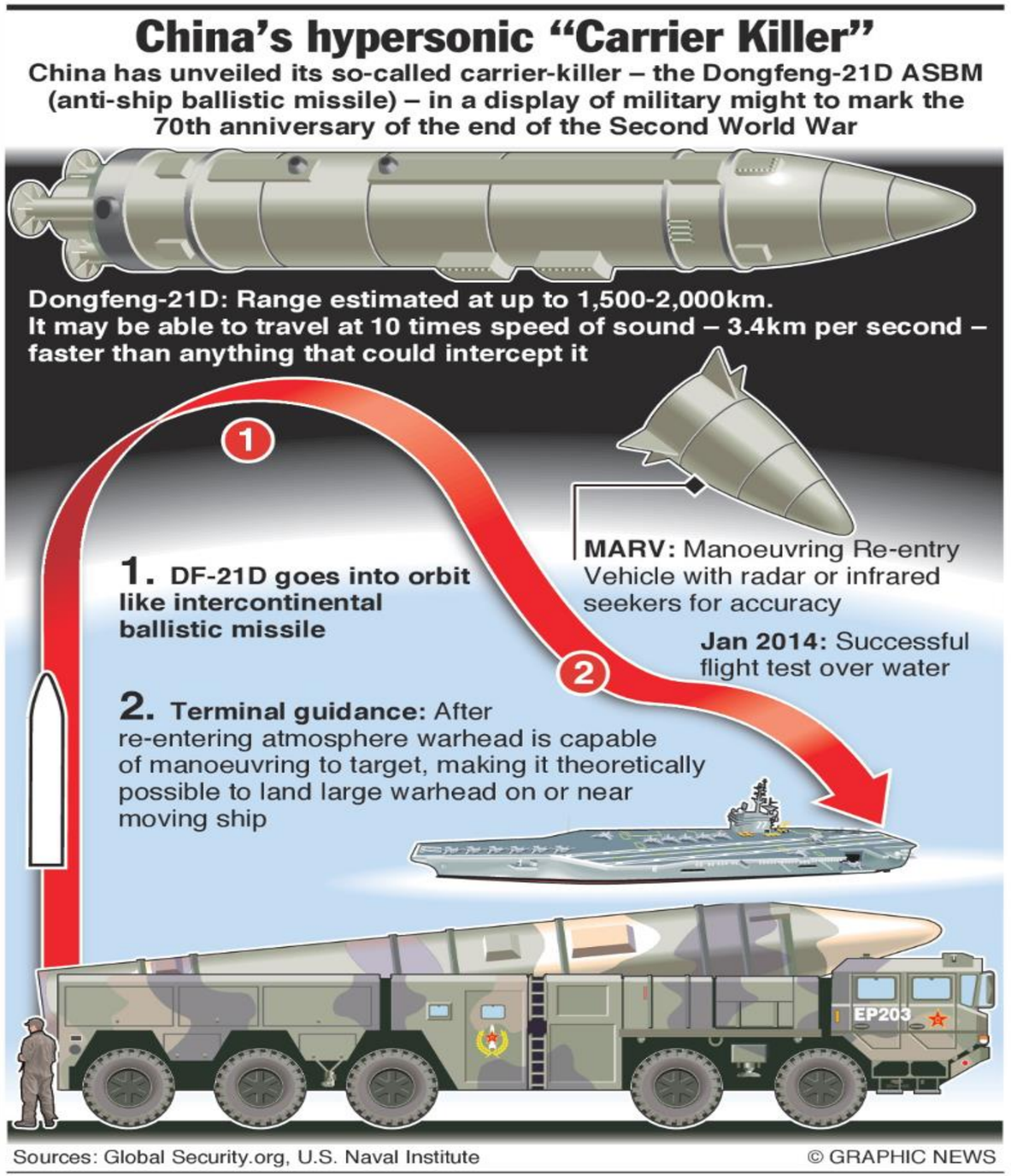
PROOF OF CONCEPT SCENARIO

- If DIA doesn't provide a specific CRADA scenario, the team has selected one.
- Scenario: Simulate interdiction strategies against the Chinese PLA's DF-21D Hypersonic Missile – referred to by the PLA as the "carrier killer."



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PROOF OF CONCEPT SCENARIO

300KW
Continuous Wave (CW) Laser
2-3 seconds

- Our weapons system for interdicting the DF-21D is the T-USPL (Tactical-Ultra Short Pulse Laser

- Where other lasers spread out in the atmosphere and take seconds of engagement time to interdict a target, the USPL is more focused, and its pulse length is 200 femtoseconds (or 0.0002 nanoseconds (ns).

A femtosecond (fs) is a unit of time equivalent to 10^{-15} seconds or one quadrillionth of a second).

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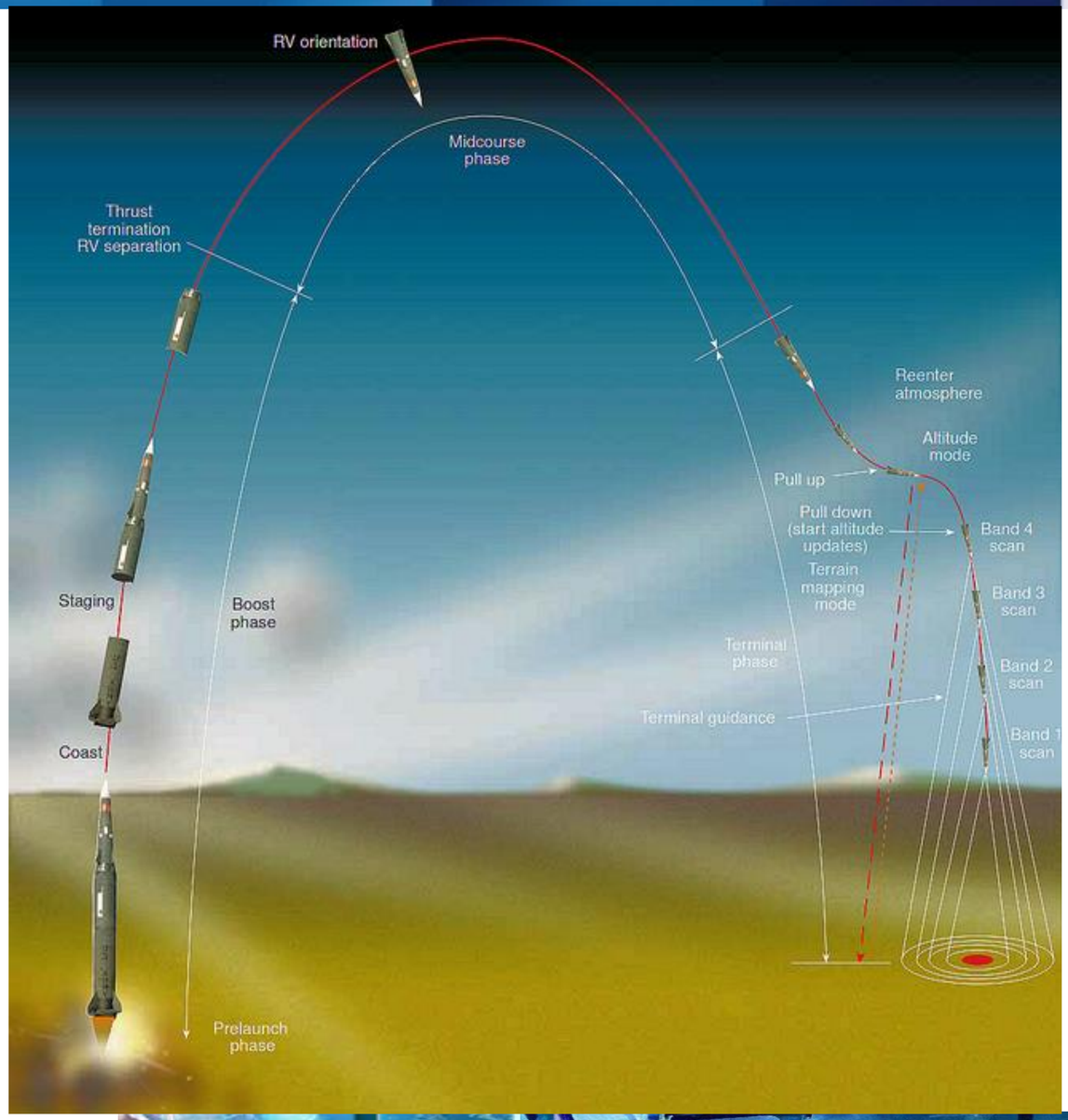
How the Simulation Model was Constructed

- Starting with the missile:
  - Range: 1035 mi
  - Speed: Mach 5 to 10 (3835 – 7670 mph)

Mach 1 = 767 mph



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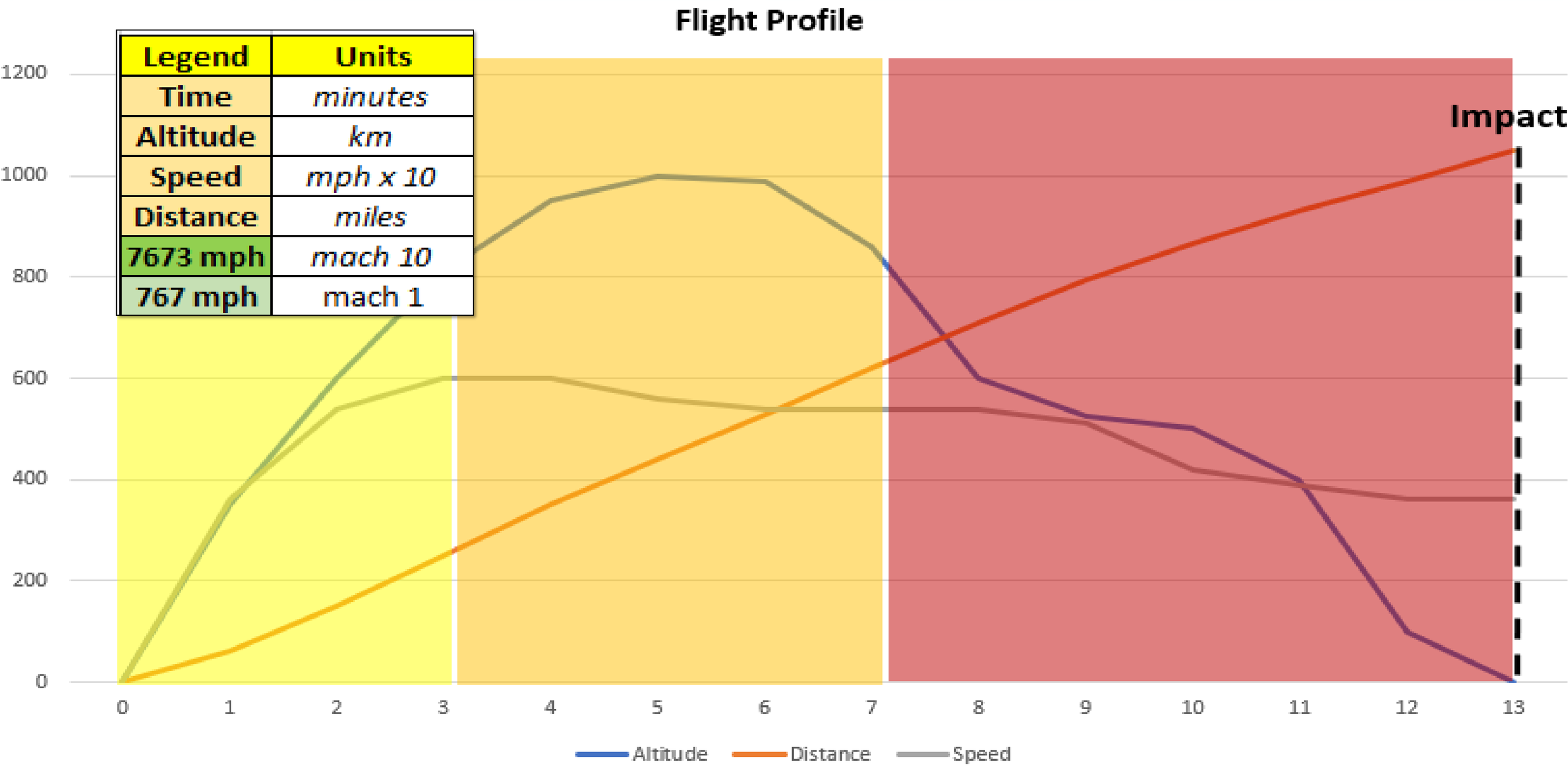
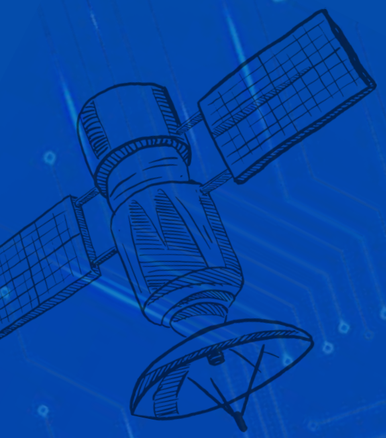
We began with the Missile's Flight Profile



Targeting Specs



- Range in the atmosphere: 1 mile (tested), 5 miles expected soon
- Range in Space: 100 miles (notional)
- Strength: Petawatts (>1000 terawatts)
- Length of engagement to interdict target: <.0000001 second (one pulse = 200 Femtoseconds)
- Can be mounted in a fighter jet, ship, or satellite

Notes:

- Angle of attack affects changes effectiveness, 30^0 degrees in the direction of flight is somewhat resistant to attack because nosecone materials are designed to handle extreme heat and physical stress
- Assume multiple engagement angle and time lengths

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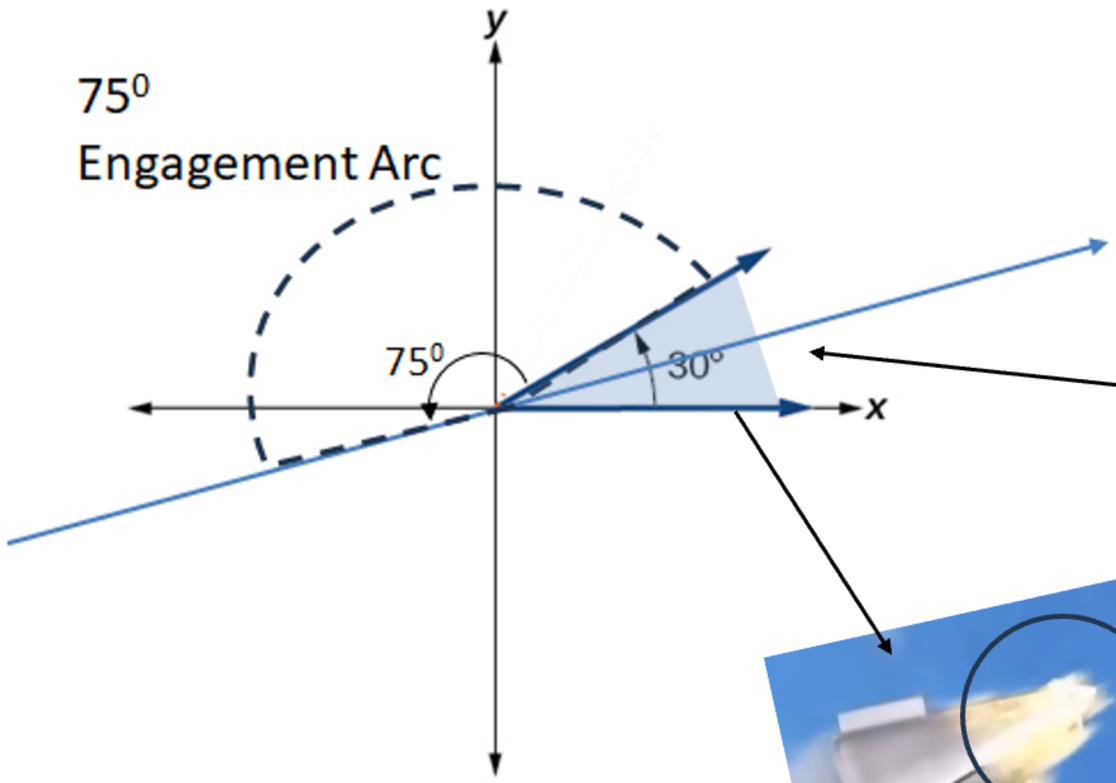
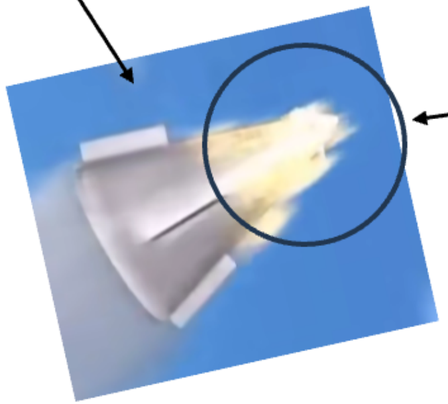
NOTIONAL TARGETING CHARACTERISTICS



Target Flight Path

Assume five (5) times as many pulses to get same effect as in the Engagement Arc



Target nosecone is somewhat resistant to attack

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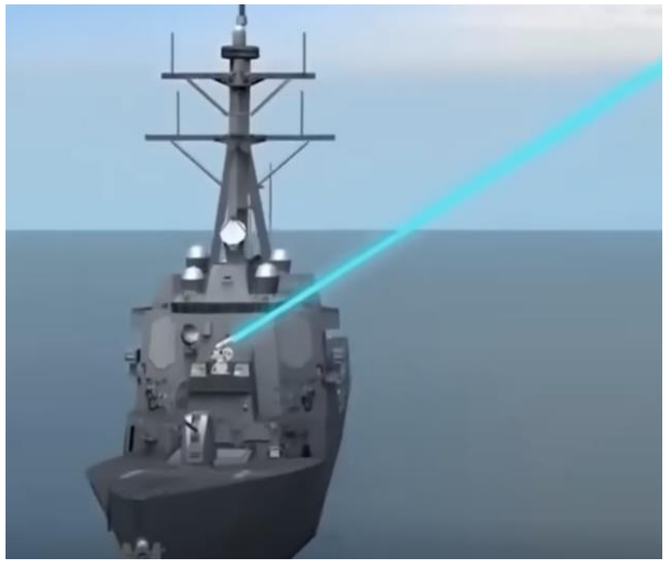
3 Proposed Basing Configurations

- Air Platform
- Ship-based
- Space Based



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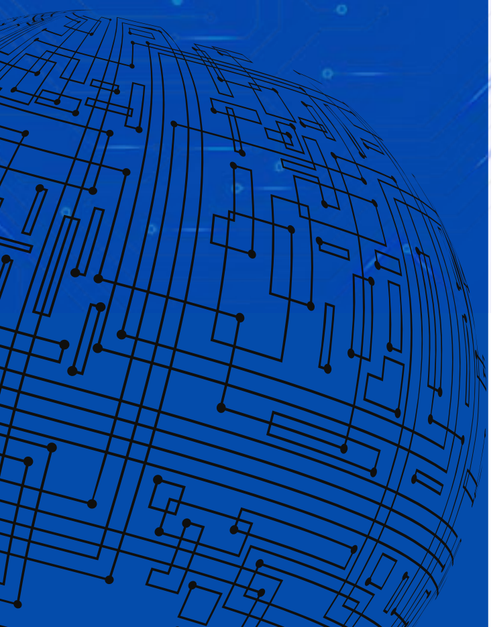

Potential AI/Simulation Paradigm in Defense??

DoD's AI Projects Focus:

- Faster recognition of targets using existing sensor nets
- Enhanced Battlefield insights
- Increasing autonomy of uncrewed systems

Challenges faced:

- Need for labeled data.
- Integrating AI into existing weapons/sensor platforms and IC processes.

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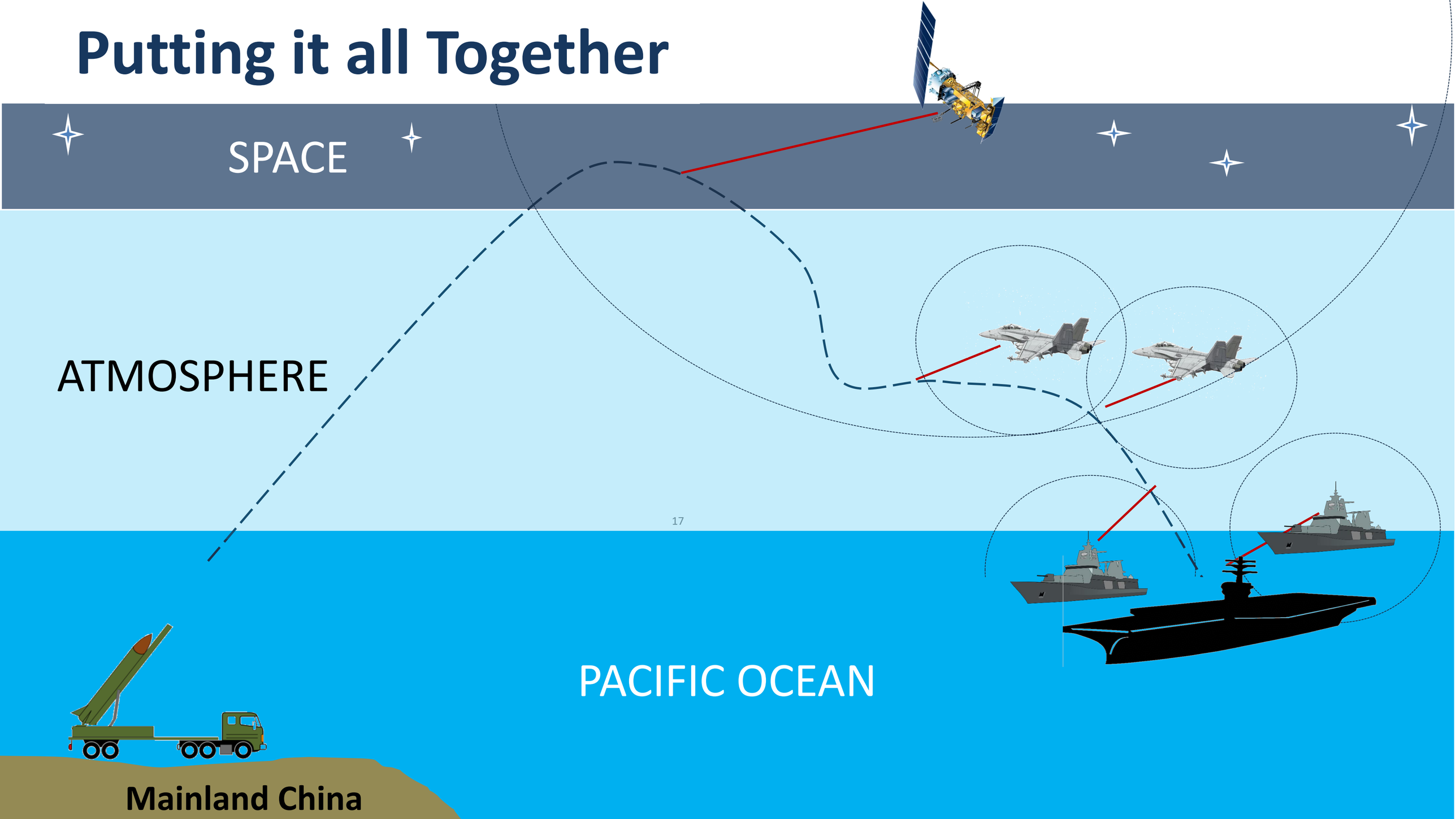
Putting it all Together



SIMULATION VIDEO

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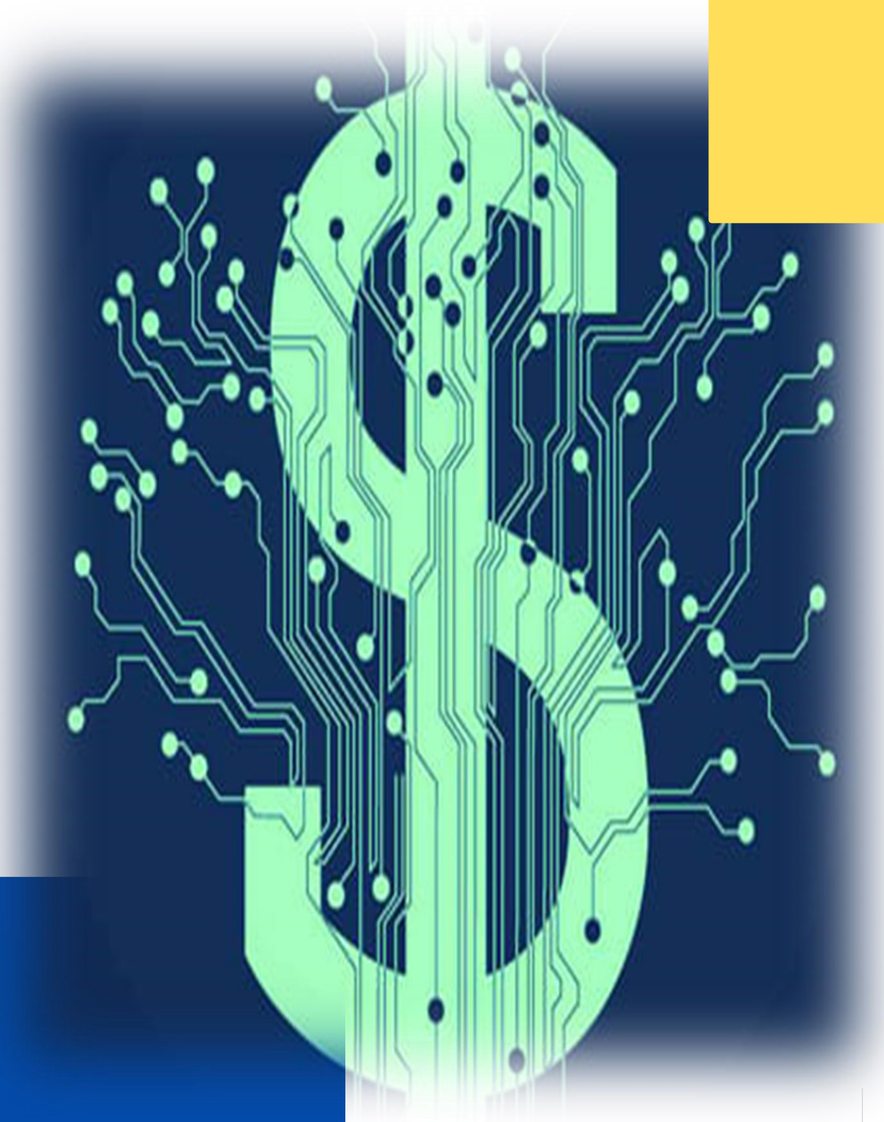
CRADA Cost to Date$



- Less than $35K to date
- Less than $ 600K CRADA to fully explore opportunities
- ROE - *What does one super carrier cost?*

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CONCLUSION

- The CRADA represents an evolutionary leap for DIA's intelligence gathering and analysis capabilities.
- Through the integration of AI and dynamic simulations, the possibilities are vast.
- Looking forward to the potential of transforming the landscape of military intelligence.

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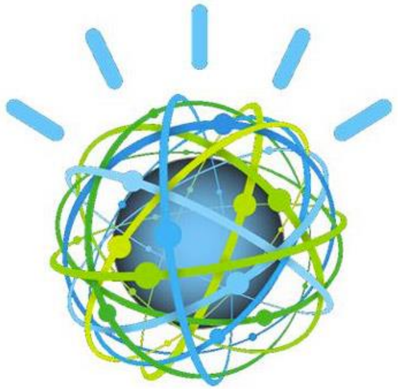
AIs Queried for this Project



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THANK YOU & Q&A

- THANK YOU FOR YOUR ATTENTION!
- OPEN TO QUESTIONS AND DISCUSSIONS.

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