Unmanned Low Profile Vessels (ULPVs):

"Narco Subs" for Contested Logistics

SPONSORED BY:

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PRESENTATION OF ONGOING THESIS RESEARCH

21ST ANNUAL ACQUISITION RESEARCH SYMPOSIUM

9 MAY 2024

NAVAL POSTGRADUATE SCHOOL

MAJ SERGIO A. SIERRA, USAF

WHAT'S THE PROBLEM?

WANTED: INDUSTRY PARTNERS TO 'SCOUT' FOR SOLUTIONS TO U.S. PACIFIC FLEET CHALLENGES

For Immediate Release: Mar 29, 2023

By Warren Duffie Jr., Office of Naval Research

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Michael Hugos, Edward Salo, Ryan Kuhns and Ben Hazen | 08.09.22

(Hugos et al., 2022)

PACFLEET CO Paparo Talks Combat Logistics, Chinese Coercion

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MEANWHILE…

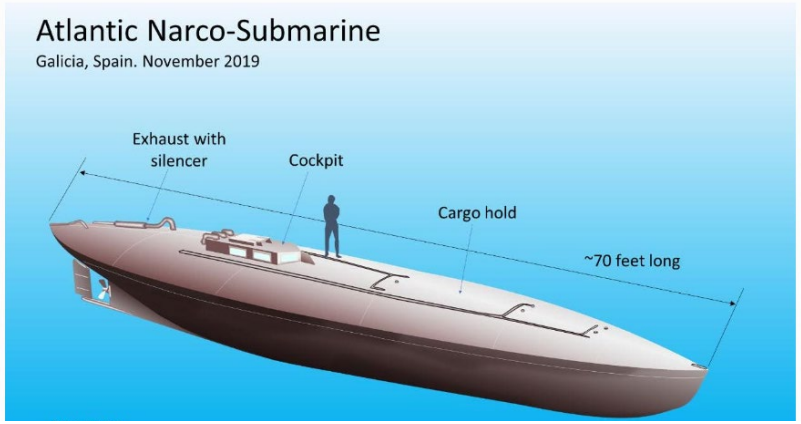
Photos Of First Trans-Pacific Narco Submarine Caught Heading To Australia

Thu 22 February 2024
By H I Sutton

(Sutton, 2024)

FORBES > BUSINESS > AEROSPACE & DEFENSE

Not Unexpected: First Trans-Atlantic Drug Submarine

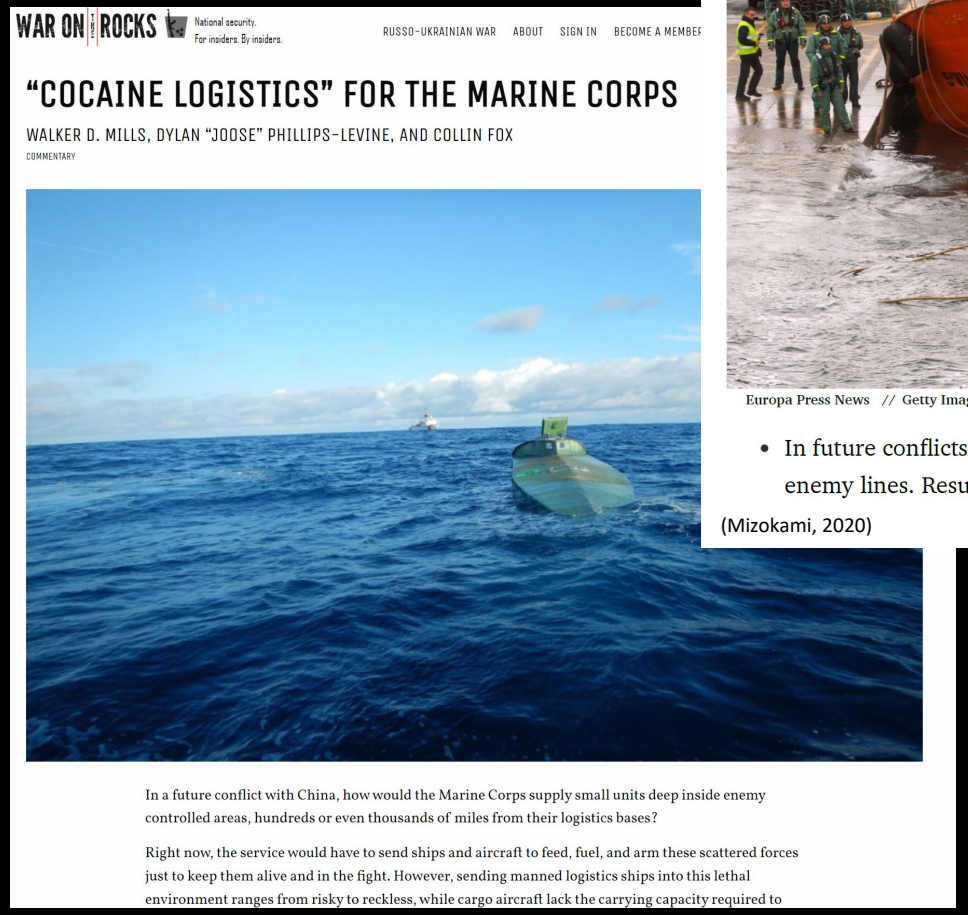


(Sutton, 2019)

View of Low-Profile Vessel Operating (Sutton, 2021)

RESEARCH QUESTION

…How might an unmanned version of a "narco-sub" support military logistics operations in a contested environment?



WAR ON THE ROCKS — National security. For insiders. By insiders.

RUSSO-UKRAINIAN WAR ABOUT SIGN IN BECOME A MEMBER

"COCAINE LOGISTICS" FOR THE MARINE CORPS

WALKER D. MILLS, DYLAN "JOOSE" PHILLIPS-LEVINE, AND COLLIN FOX

COMMENTARY

In a future conflict with China, how would the Marine Corps supply small units deep inside enemy controlled areas, hundreds or even thousands of miles from their logistics bases?

Right now, the service would have to send ships and aircraft to feed, fuel, and arm these scattered forces just to keep them alive and in the fight. However, sending manned logistics ships into this lethal environment ranges from risky to reckless, while cargo aircraft lack the carrying capacity required to

(Mills et al., 2020)

Military

The Marines Could Steal a Page From Cocaine Smugglers

Resupplying forces behind enemy lines is risky. Enter the narcosubs.

BY KYLE MIZOKAMI PUBLISHED: JUL 22, 2020

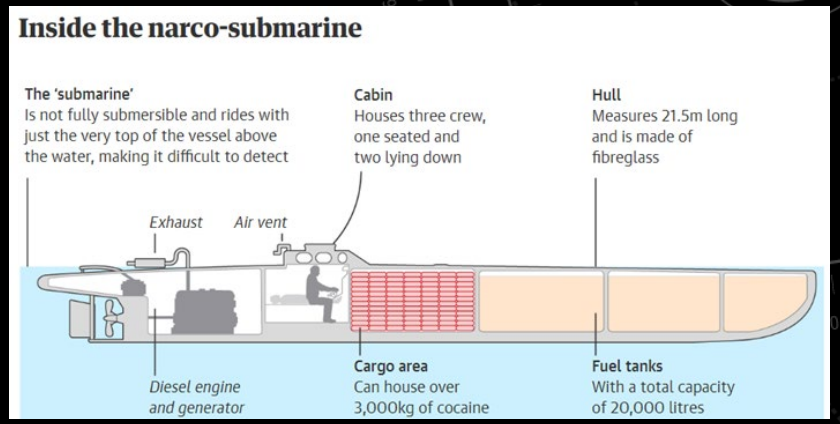
Europa Press News // Getty Images

- In future conflicts, U.S. forces could become isolated behind enemy lines. Resupplying them could be risky.

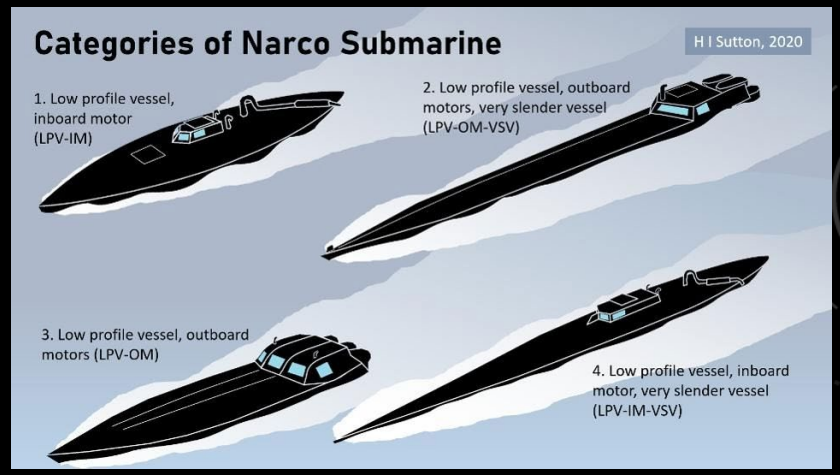
(Mizokami, 2020)

BACKGROUND: WHAT IS A NARCO SUB? LPV?

- Narco Submarine: Self-propelled semi-submersible vessels for smuggling
- Low Profile Vessel (LPV): Surface vessel with minimal freeboard, often designed to run awash
- Nearly-fully submersible to reduce visual, radar, or infrared detection
- High success rates (estimated only 20% found or interdicted)
- Usually made of fiberglass and wood; sometimes with steel
- Powered by inboard or outboard motors
- Built in the jungles of South America for ~$500k - $2M each
- 30 – 45 day build time with unskilled labor



Cutaway of LPV Highlighting Crew, Cargo, Engine, and Fuel Spaces (Jones, 2022)



Low Profile Vessels (LPVs) are a relatively unexplored model in the DoD

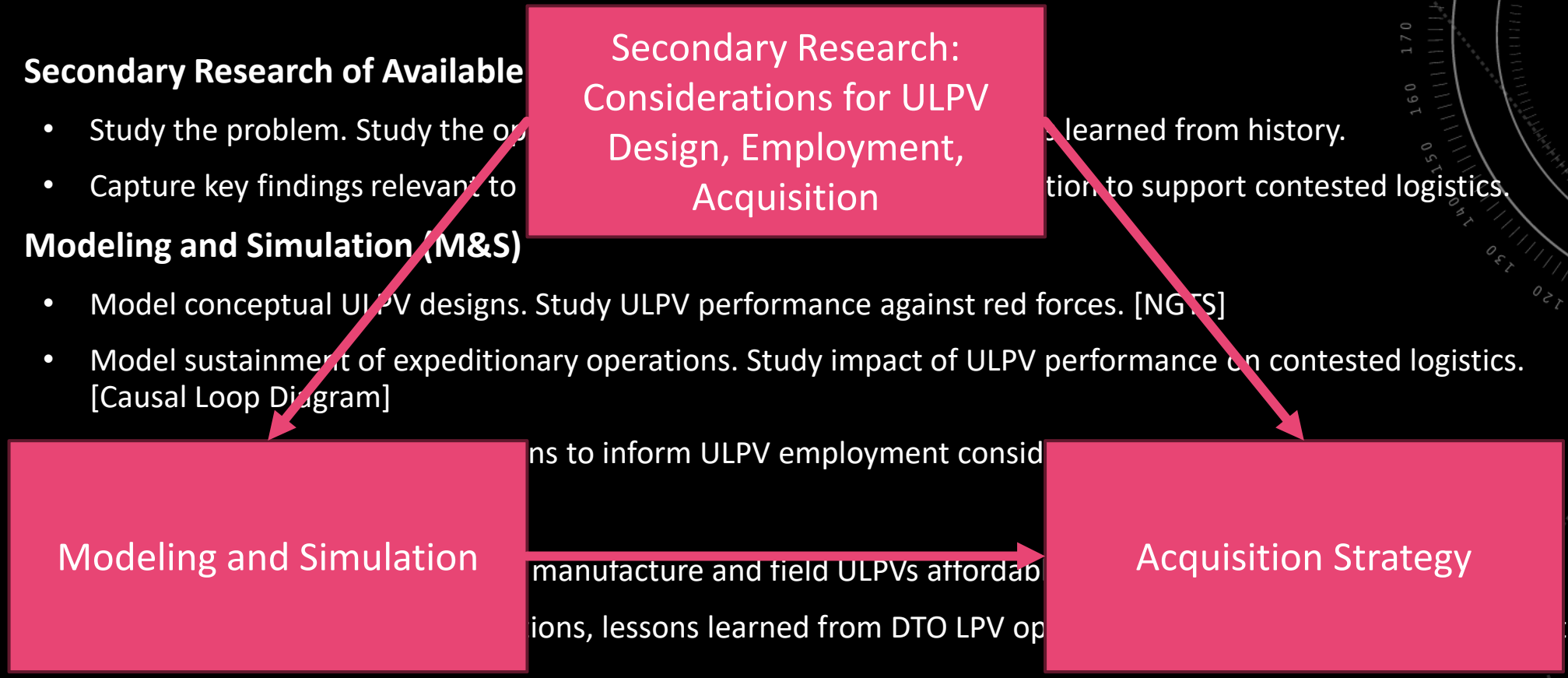
NARCO SUBS ARE THE CURRENT GLOBAL LPV MODEL

DRUG TRAFFICKING ORGANIZATIONS (DTO) RUN HISTORY'S MOST SUCCESSFUL LPV OPERATION

RESEARCH APPROACH

Three Main Research Components

1. **Secondary Research of Available**
   - Study the problem. Study the op… learned from history.
   - Capture key findings relevant to … tion to support contested logistics.
2. **Modeling and Simulation (M&S)**
   - Model conceptual ULPV designs. Study ULPV performance against red forces. [NG TS]
   - Model sustainment of expeditionary operations. Study impact of ULPV performance on contested logistics. [Causal Loop Diagram]
3. … ns to inform ULPV employment consid…



… manufacture and field ULPVs affordab…

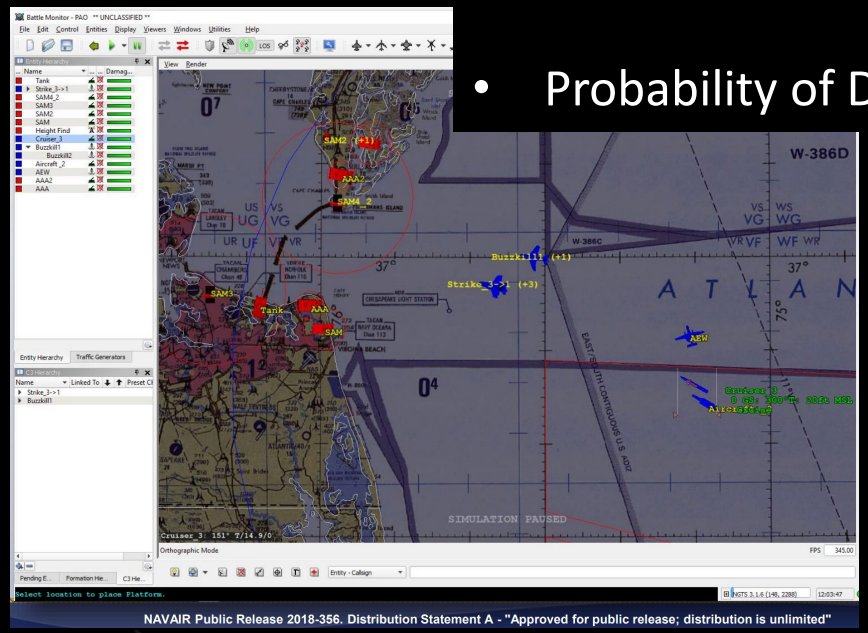
… ions, lessons learned from DTO LPV op… s.

DETAILS: *MODELING & SIMULATION*

Step 1.

Run Concept ULPV Vessels in NGTS
Simulations to Learn:

- Probability of Detection **-->** Success Rate



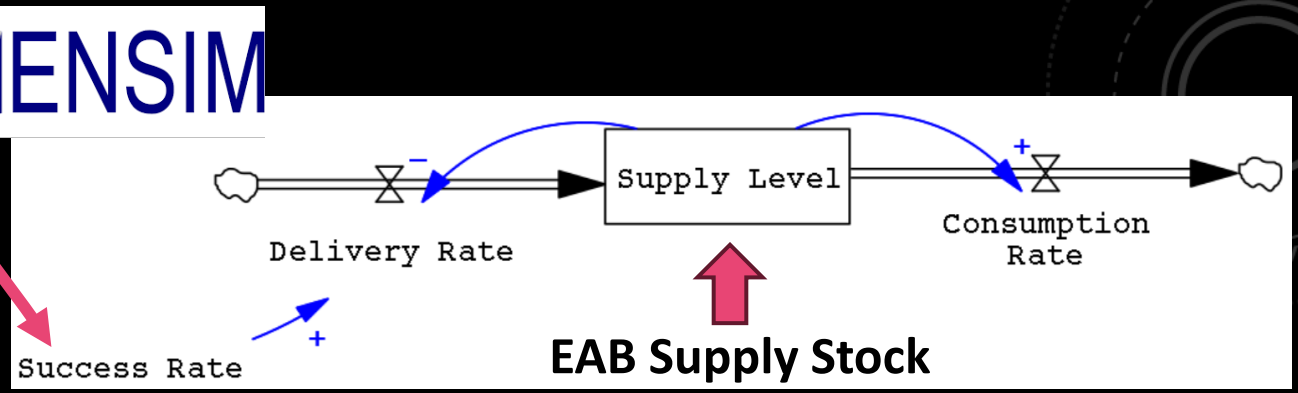
Next Generation Threat System (NGTS)

Step 2.

Simulate interaction of variables to maintain a supply level at an expeditionary base

Will inform:

- Number of Vessels Necessary
- Tradeoffs Between Vessel Types



Simplified Contested Logistics "Causal Loop Diagram"

DETAILS: *ULPV CONSIDERATIONS & ACQUISITION STRATEGY*

ULPV Considerations

- Vessel Design: Seaworthiness, Cargo Capacity, Susceptibility, Range
- Vessel Materials
- Level of Autonomy
- Comms & PNT in DDIL Environment
- Commercial Off-the-Shelf (COTS) Technologies
- Material Handling Equipment (MHE)
  - Loading & Unloading
- Vessel Beachability

Acquisition Strategy

- How ULPV Design Considerations Impact:
  - Vessel Cost
  - Vessel Build Time
  - Design Materials & Complexity
    - Could impact labor needs or specialized equipment for production
  - Where Vessels are Produced; Vendor Viability
- Integration Strategy
- Cost vs Capability: Enable Attritability (if desired)

QUESTIONS

BACKUP SLIDES

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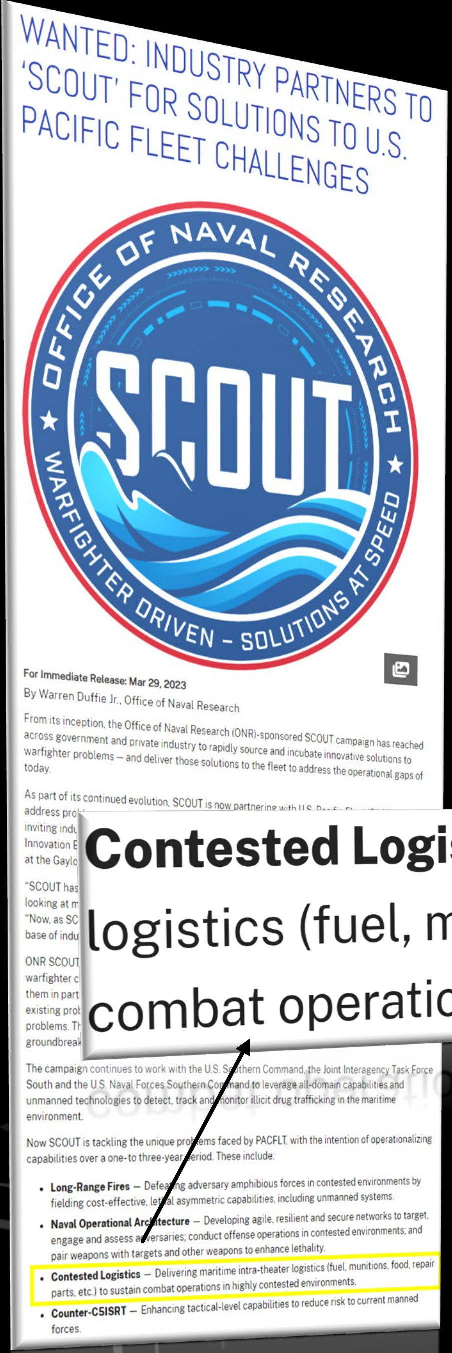

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3. Acquisition
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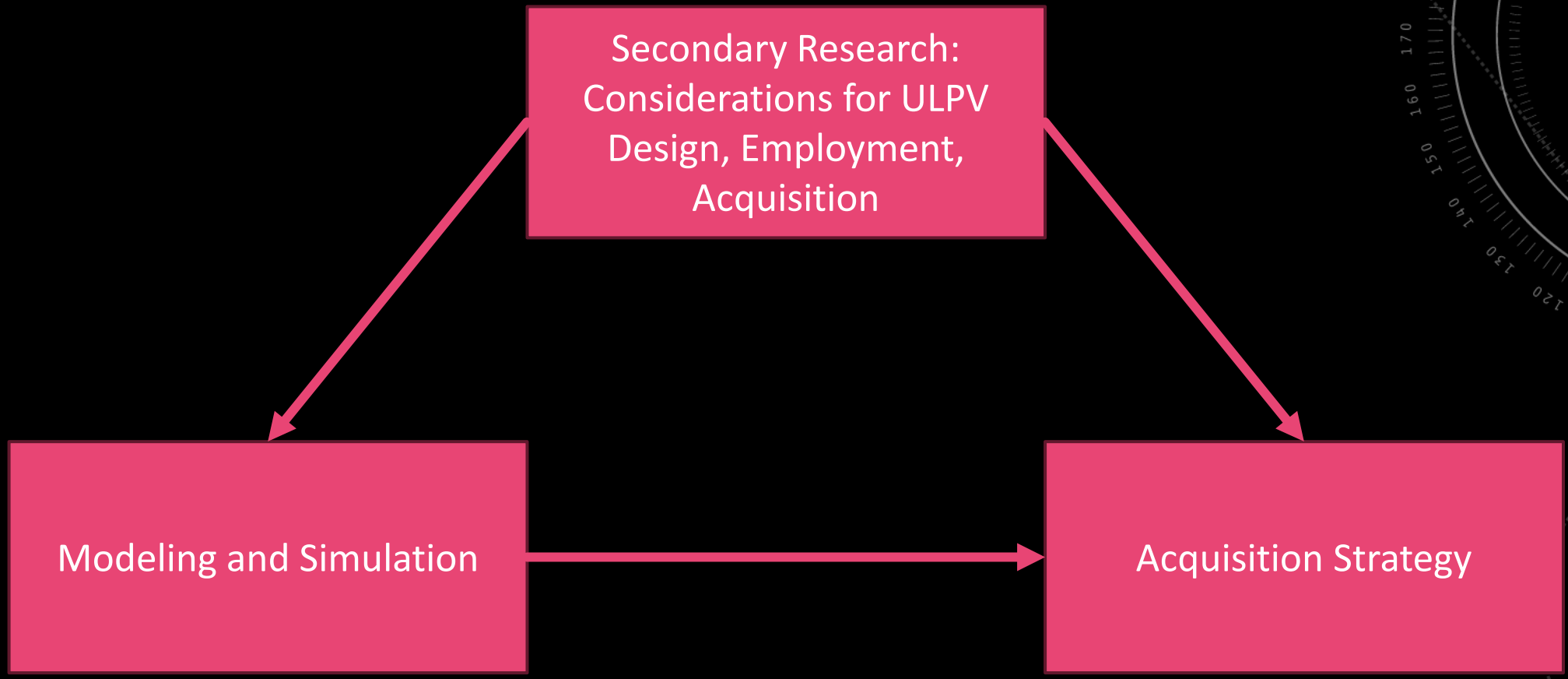

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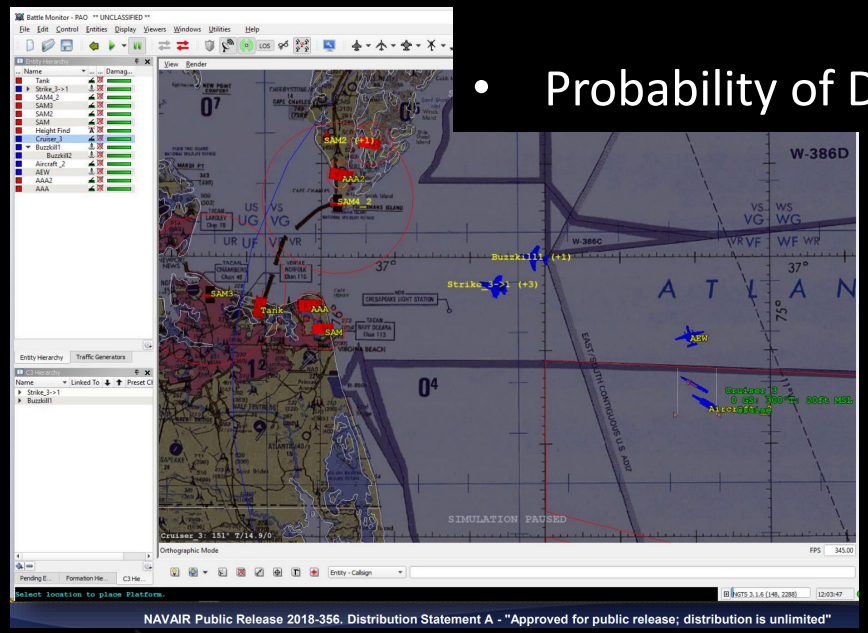

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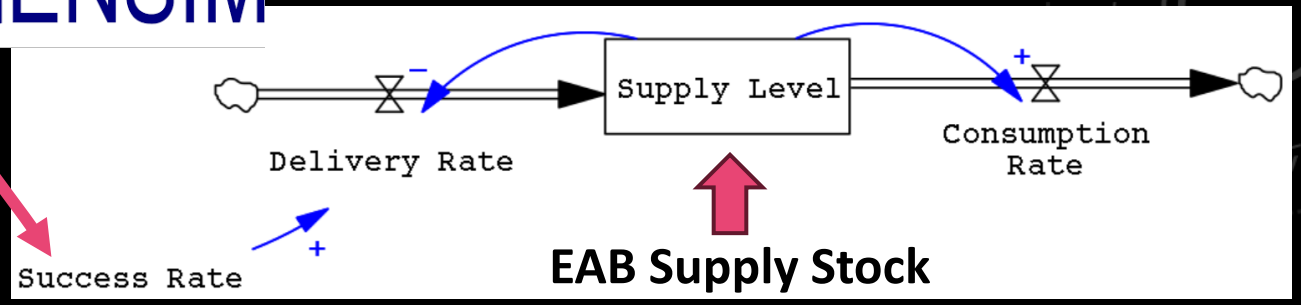

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UNCLASS: sergio.sierra@nps.edu

SIPR: sergio.a.sierra2.mil@mail.smil.mil

JWICS: sergio.sierra@nrnic.ic.gov