Modeling Operational Design for Effective Learning and Training (MODEL-T)

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Agenda

- Mile Two: Who we are
- The Problem as we see it
- The M2A
- Our solution to similar problems
- MODEL-T
- Immediate benefits to Warfighters
- Full scale benefits
- Next Steps
- Summary

Mile 2: Who We Are and What We Do

- ~100 FTE: 35% SCI Cleared Staff, 100% Secret
- One of the Largest Cognitive Systems Engineering Cadre in Defense Contracting:
  - 25+ CSEs with 15+ PhDs
- World Recognized Team with hundreds of publications
- Established partnerships in DoD with Multiple On-Going Projects in JADC2
- Technical Skills skills (CSE, UI/UX, DevSecOps, AI/ML, M&S)
- **Focused on Human Machine Integration with an innovative and cutting-edge foundation: The Mile 2 Approach (M2A)**

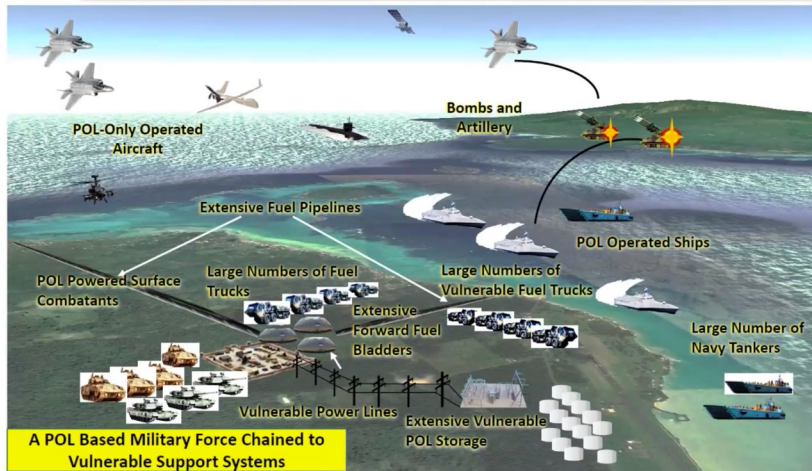Headquartered in the Manhattan Building in Downtown Dayton, Ohio
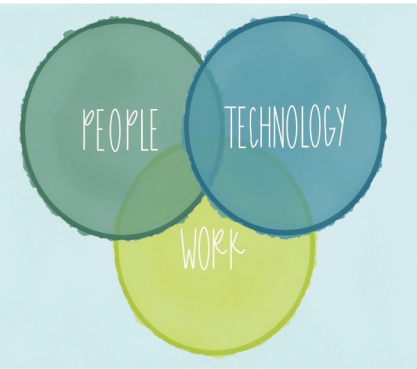
M2A: Helping people and organizations cope with complexity by understanding and innovating at the intersection of people, technology and work.

The Problem

Lack of broad understanding, effective training, and ability to make effective C2 decisions for Operational Energy across the Echelons (Strategic, Operational, and Tactical)

Current Energy Operations

POL-Only Operated Aircraft
Bombs and Artillery
POL Operated Ships
Extensive Fuel Pipelines
POL Powered Surface Combatants
Large Numbers of Fuel Trucks
Large Numbers of Vulnerable Fuel Trucks
Extensive Forward Fuel Bladders
Large Number of Navy Tankers
Vulnerable Power Lines
Extensive Vulnerable POL Storage
A POL Based Military Force Chained to Vulnerable Support Systems

https://www.dvidshub.net/video/861434/project-convergence-2022-scenario-alpha

Current State of OE:

1. Relies heavily on legacy concepts of logistics
2. Unclear OE C2 Tactics, Techniques, Procedures (TTP) and authorities
3. Lacks shared awareness, even within same echelon
4. Personnel don't understand *joint* energy capabilities and needs
5. Inconsistent or complete lack of training across echelons

Increasing complexity, austere conditions, contested logistics, and ever-expanding technology exacerbate these problems - even worse for each respective echelon given the different magnitudes and scales
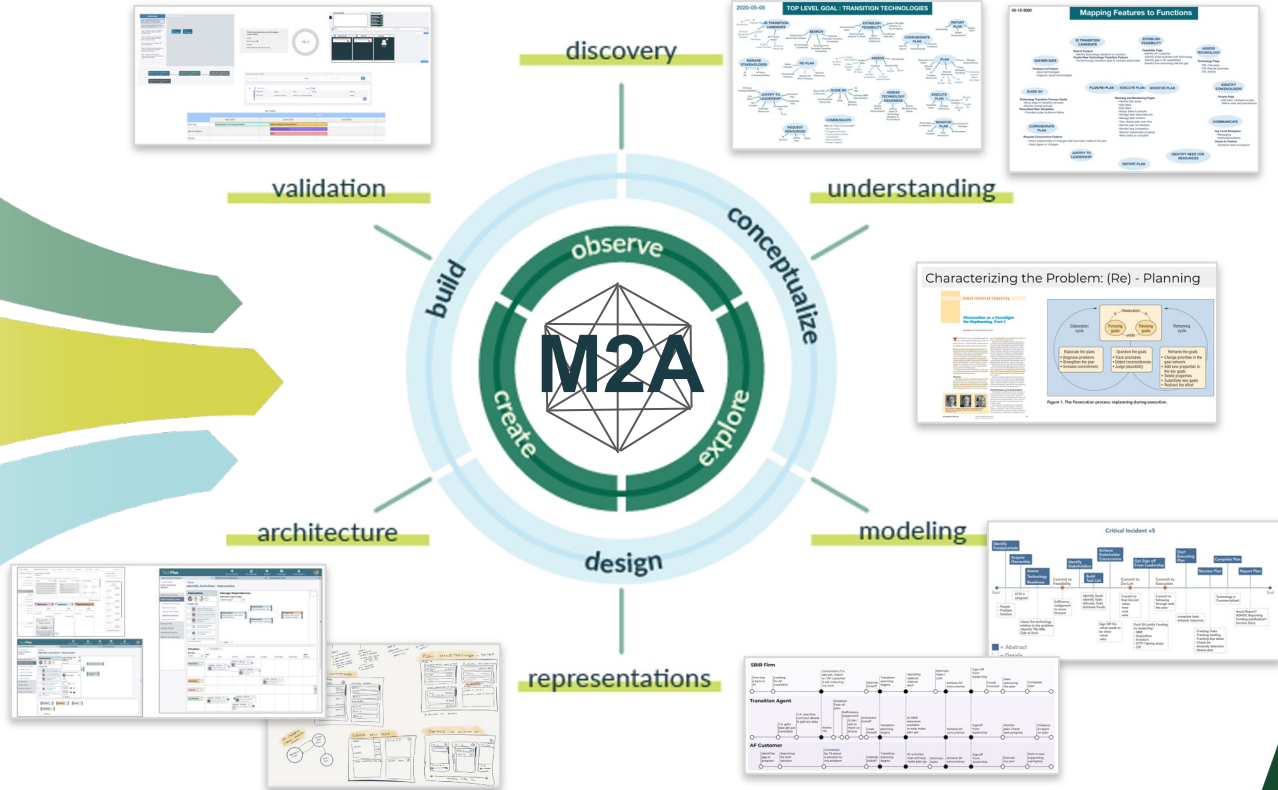
Mile Two Approach (M2A)

Cognitive Systems Engineering

User Experience/ User Interface

Development Security Operations

discovery

understanding

validation

modeling

architecture

representations

design

build — observe — conceptualize — explore — create

M2A

Our software development process focuses on the intersection of people, technology, and work; uncovering complexity and creating effective human-machine teams to address our client's most significant challenges.

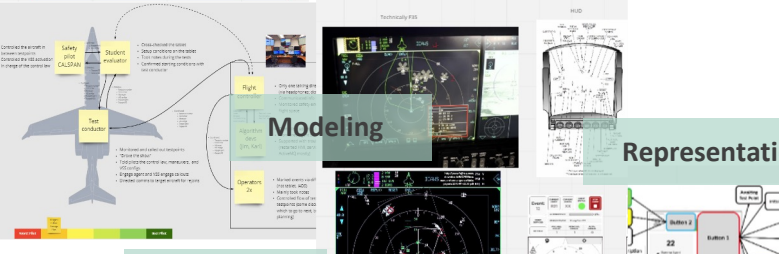# How did M2A solve Similar Complex JAD Problems?
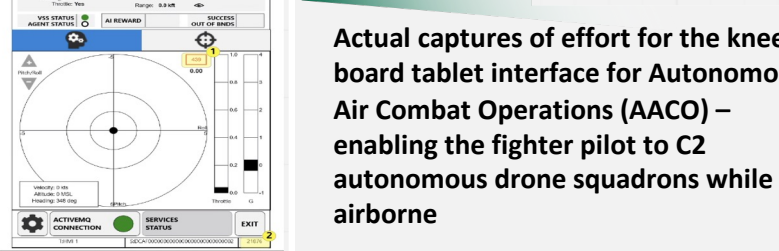
Autonmous Aircraft Command and Control
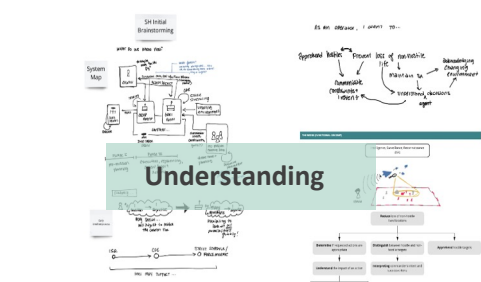

Understanding

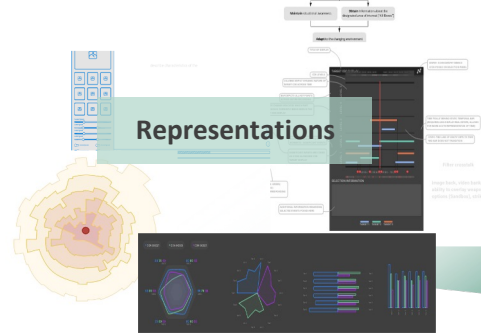Modeling

Representations

Software

Actual captures of effort for the knee-board tablet interface for Autonomous Air Combat Operations (AACO) – enabling the fighter pilot to C2 autonomous drone squadrons while airborne
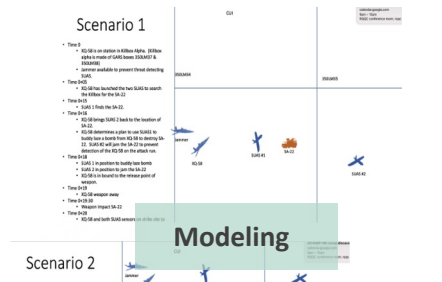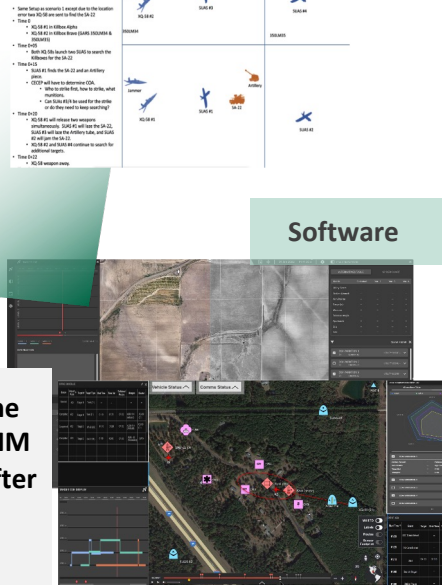
Base Defense and Counter-UAS

Understanding

Modeling

Representations

Software

Fully Deployed to AWS – Captures of the base defense COP which leverages AFSIM mission models to enhance operator after action reviews, training, and testing of different TTPs.

M2A MODEL-T Solution Concept

Frontend Application for the end user to engage with multi-modal scenarios powered by the simulation.
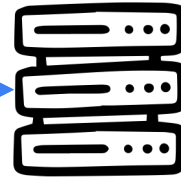
Scenario Frontend Web App

Administrative Application for creating and administering scenarios and modifying the OE models.

Scenario Creation Web App

Backend that powers the frontend applications and routes requests and info between the simulation engine, the databases and the applications.
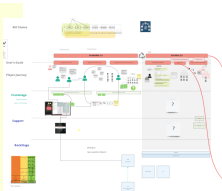
A standard **Simulation Engine** that powers the scenarios and integrates into existing training and simulation workflows.
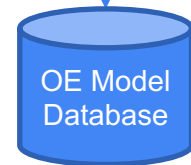
Application Backend

JTLS GO

Training Scenarios, interfaces, and models are based on information captured via our discovery process.

Scenario Database

**Databases** containing the training scenarios and OE models used by the simulation engine.

OE Model Database

MODEL-T: Immediate Benefits to the Joint Warfighter

Tailorable views based on needed information

- Introduce critical thinking about and planning for new forms of operational energy prior to conflict

- Forces a needed change in perspective; the implications of new energy forms on the battlefield and their consequences

- Creates a Joint focus on new forms of OE, the threats, benefits, and inter-relationships at the tactical through operational levels

- Exposes the force to OE during training to stimulate decision-making and analysis of OE capabilities
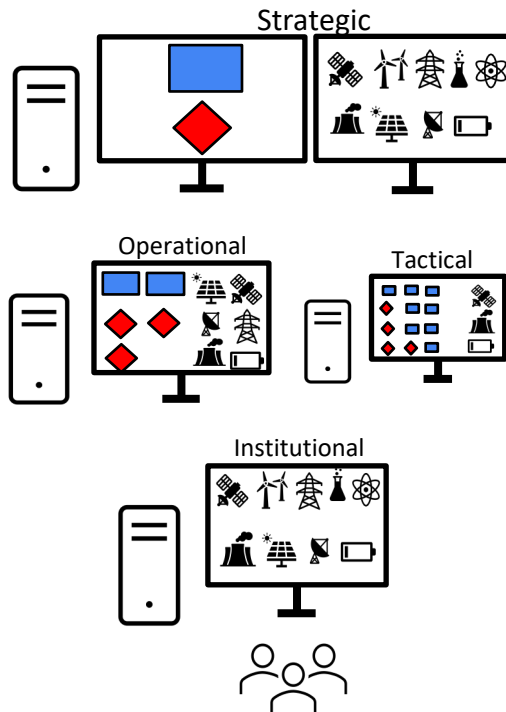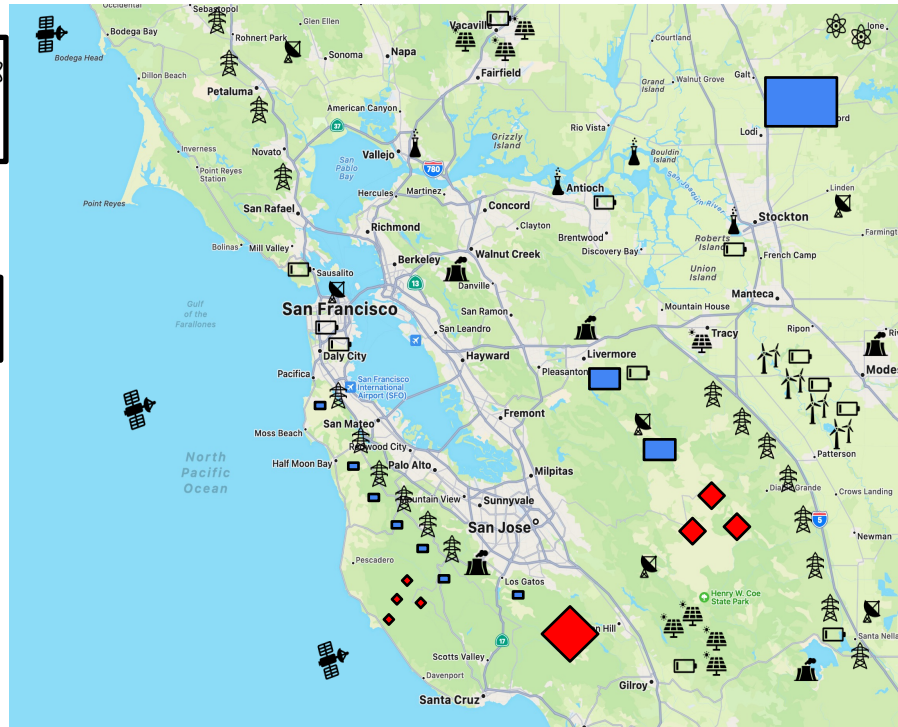
Integrated and interoperable backend systems and data

Strategic

Operational
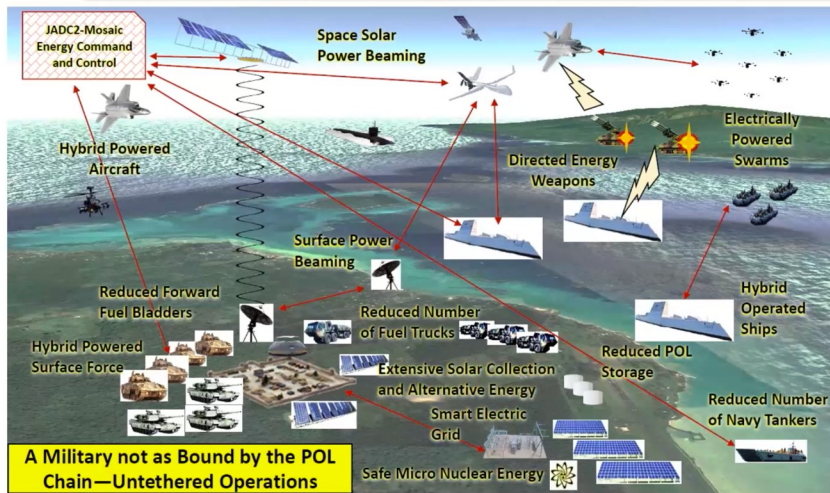
Tactical

Institutional

Ground Truth
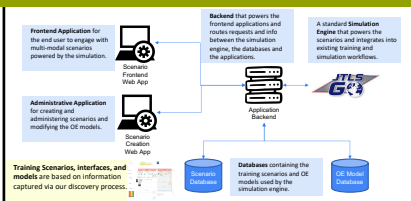
Changing the warfighter perspective of energy from a class of supply to weapon system

MODEL-T: Full Scale Benefits to Warfighter

Once fully implemented, MODEL-T will activate energy efforts across the institutional and operational force, creating a truly joint picture of Operational Energy for training, learning, and operations

1. Supports decision making practice of C2 of OE across the Joint force from the strategic to tactical levels
2. Enforces visibility and understanding of new forms of energy and their employment and use in the DoD
3. Enforces a new energy schema into training and learning activities
4. Supports development and continuous refinement of OE Tactics, Techniques and Procedures, Policy, and Standards
5. Improves comprehension of how energy functions as an underlying enabler or constraint to joint activities

Enabling the warfighter to rapidly make OE decisions thru collaboration, data, education, & training

Next Steps

- Discuss idea with possible stakeholders
- Secure funding
- Prototype base capability using Multi-Domain Operational (MDO) Scenario
- Work with stakeholders to refine MODEL-T
- Secure development funding
- Fully implement MODEL-T with multiple MDO scenarios
- Explore alternative technologies for visualization of OE (e.g., Augmented Reality, Mixed Reality)

Summary

- Current Learning and Training tools do not include new forms of Operational Energy

- Transitioning to a Non-POL based force requires unique training and learning environments

- MODEL-T: Modeling Operational Design for Effective Learning and Training is proposed as training and learning environment to support effective Command and Control of OE

- Thanks for your time and attention!

- Questions?