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NSI | **NATIONAL
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IARPA REASONS Proposer's Day

1-11-2023

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 University of Colorado
Boulder

University of Colorado Boulder

Mission

Address advanced capability needs of the Department of Defense and the Intelligence Community through leading-edge, high impact research and workforce development

Goals

Applied Research

Coordinate world-class capabilities of NSI and CU campus to mature concepts from basic ideas to products

Workforce Development

Train students to meet unique national security workforce requirements

Collaboration

Foster close relations with government and industry to develop effective partnerships for transition of capabilities

Core Capabilities

Multiple-faculty teams aligned with campus and regional strengths

Hypersonics



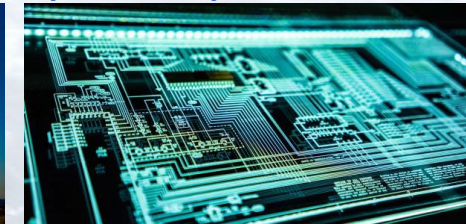
RF Engineering



Space Domain Awareness



Cybersecurity



Autonomous Systems





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CAMP II Project

**Collaborative Analyst-Machine Perception for
Robust Data Fusion**

PI: Nisar Ahmed (CU Boulder)

Co-PI: Danielle Szafir (UNC)

Subcontractor: UNC, Lockheed Martin Space

Sponsored by: United States Space Force (USSF)

BAA FA8810-17-C-0006



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CAMP Introduction

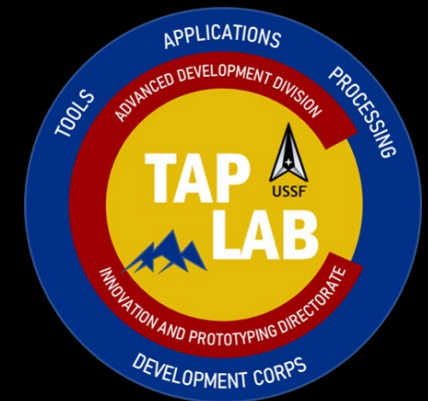
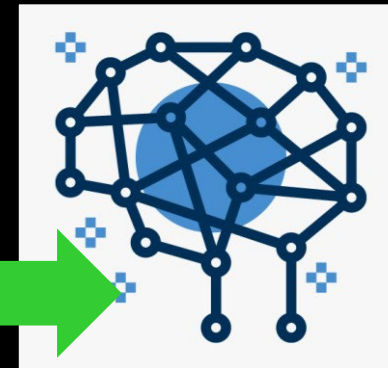
Concept: Direct operator interaction/collaboration with automation

Approach: Collaborative Analyst-Machine Perception (CAMP) tool

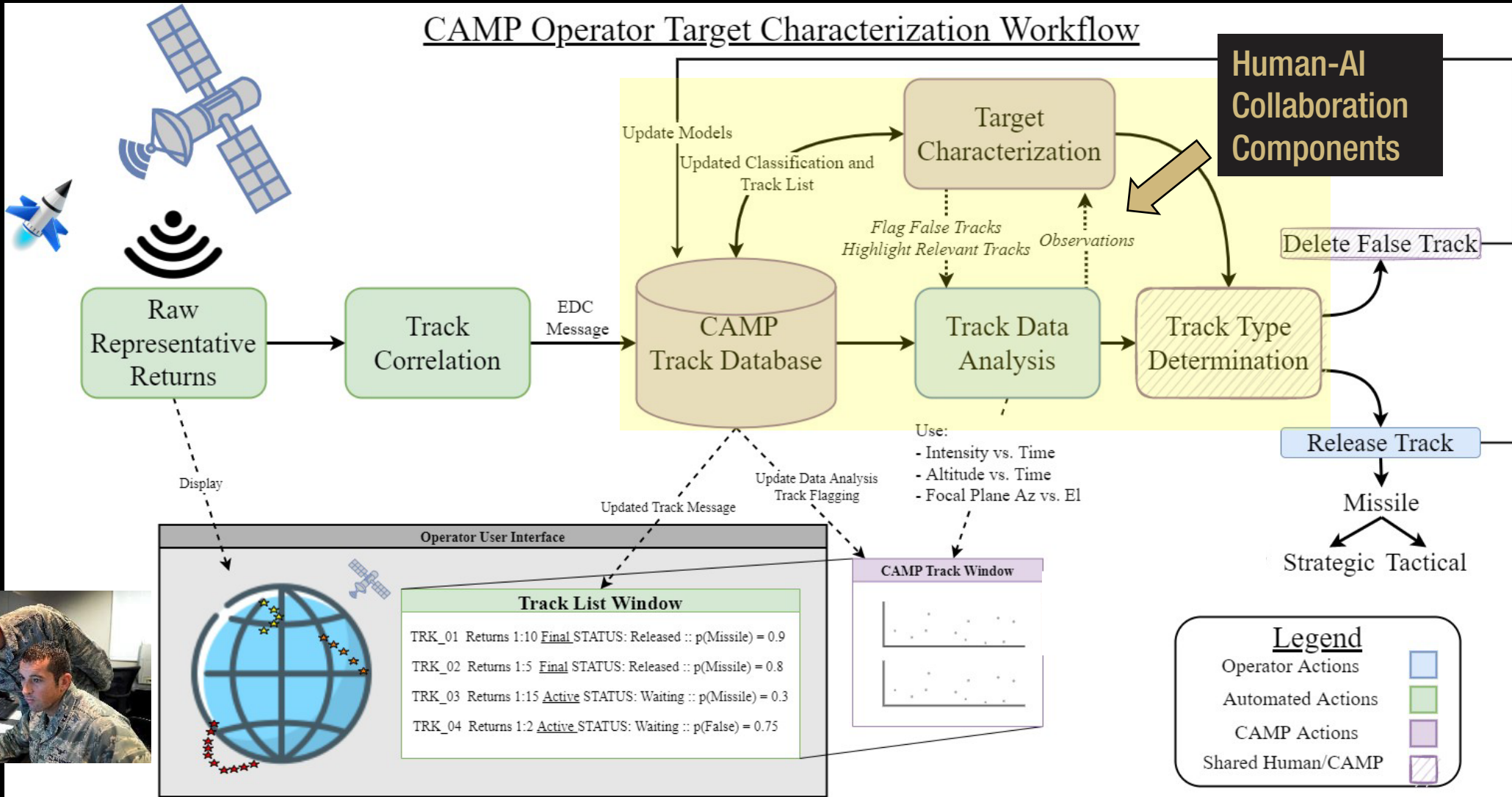
Targeted Mission Utility: Human-AI Collaboration for the OPIR mission

- Augment online capabilities for object characterization and data visualization/analysis in uncertain situations
- Boost operator performance, situational awareness, collaboration/training

Target End Users: Operators



CAMP Operator Workflow



Human-AI interaction concepts:

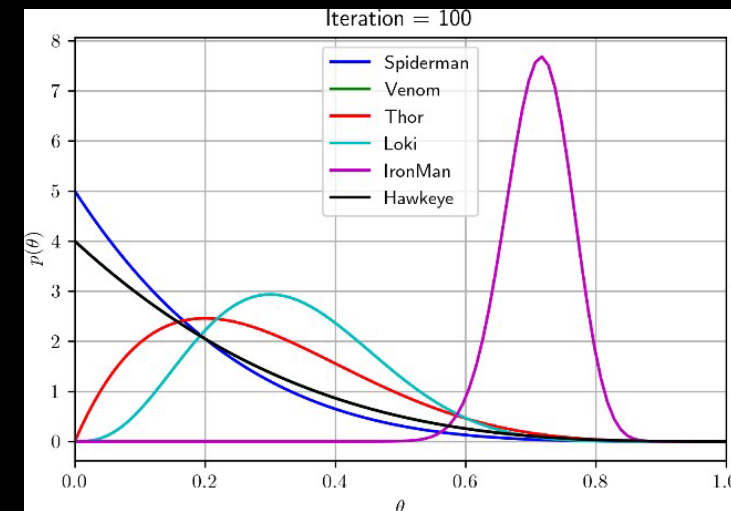
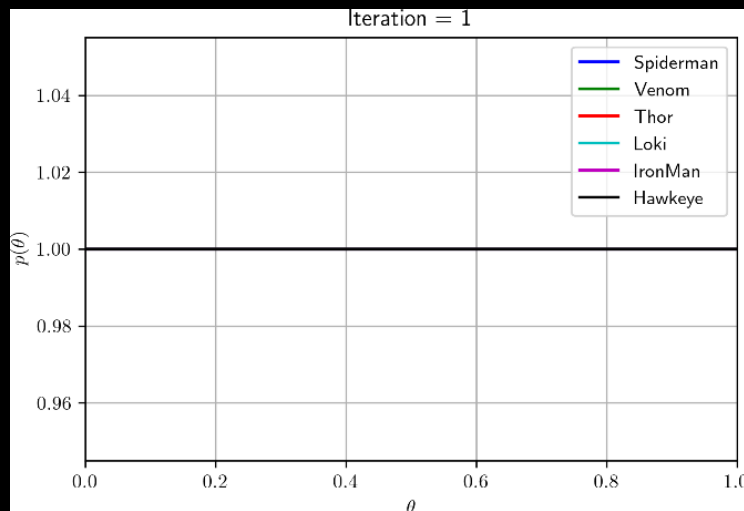
- Collaborative evidence characterization (optimized task support)
- Interactive data visualization/discovery (catch what's missing)
- Data-sparse evidence recommendation (show what's important)

AI Signal Characterization and Information Validation

- ML Classifier on synthetic and real data

AI Information Recommendation

- Learn individual operator preference to suggest evidence for operator interrogation



CAMP Operator User Interface Example

Operator Evidence Selection



Operator Expert Input to AI Model

Feedback from customers that the CAMP human AI collaboration tool should be extended and repurposed from operator use to analyst use

- CAMP is a stood-up human-AI collaboration system working online with real data in the OPIR mission space
 - **REASONS TA1:** CAMP relevant evidence discovery model based on human-AI collaborative characterization
 - **REASONS TA2:** CAMP reasoning model based on AI characterization uncertainty and human error
 - **REASONS TA3:** CAMP recommendation model
 - **REASONS General:** Human-AI collaborative user interface
- Repurpose CAMP human-AI collaboration components into a Natural Language Processing based system
 - **Interest in NLP expertise teaming**

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