



# Human Systems COI

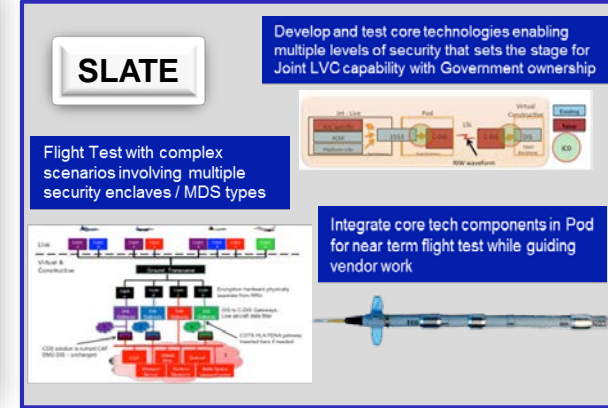
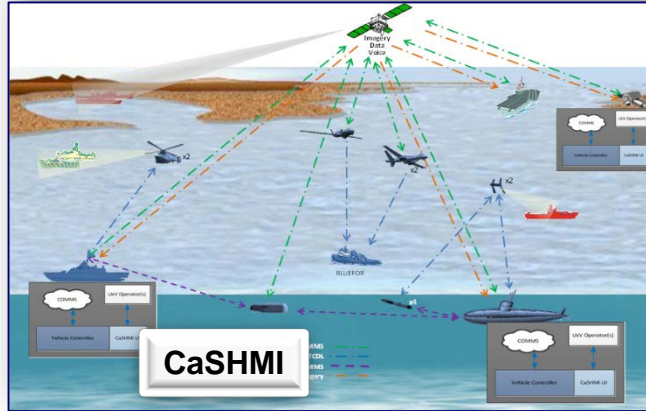
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# State of Technology: Accomplishments



- **IMPACT:** Realizing Autonomy via Intelligent Adaptive Hybrid Control: Refined tri-service “Base Defense” challenge scenario to include more unexpected, dynamic events; New rapid joint human-machine “Course of Action” tool; New Task Manager capability: system workload balancing
- **Control Station Human Machine Interface (CaSHMI):** Live demonstrations of AN/BYG-1 operators using CaSHMI to provide simultaneous supervisory control of a Blackwing UAS and multiple IVER UUVs concurrently
- **Secure LVC Advance Training Environment (SLATE):** New waveform for LVC data transmission; Enhanced range infrastructure; New standards, data specs, & interface control docs for 4<sup>th</sup> & 5<sup>th</sup> gen LVC
- Delivered PALMs (adaptive "flash cards") to Marines Awaiting Training for empirical testing



# State of Technology: Focus Areas



## Personalized Assessment, Education, and Training

### *Right Person, Right Job, Right Skills*

- First Principles for Training Design
- Personnel Selection and Assignment



## Protection, Sustainment, and Warfighter Performance

### *Ensuring Warfighter Safety and Survivability*

- Understanding and Quantifying the Effects of Critical Stressors
- Critical Stressor Mitigation Strategies



## System Interfaces and Cognitive Processes

### *Effective, Natural Human-Machine Teaming*

- Human-Machine Teaming
- Intelligent, Adaptive Aiding
- Human Information Interpretation & Influence





# State of Technology: Investments



## What gaps has the COI identified as risk areas that need further investment?

- Wearable Technology and Real-time Operator State Assessment
- Performance Optimization via Adaptive Wearable Robotics enabling Physical and Cognitive Overmatch: Advancing the 3rd Offset
- Trainable Undifferentiated Agents for Rapid Constructive Force Generation
- Context-Aware Communication for Human-Machine Teaming Performers

## Where is one Service relying on another Service to make an investment?

- 4th Gen Live, Virtual, Constructive (LVC) Advanced Training Environment: strategic partnership between Air Force and Navy on requirements and leveraging of funds for F15E OFP changes to reduce timeline/costs for similar OFP mods to F18 aircraft
- Directed Energy Bioeffects; Air Force is the DoD lead for Directed Energy Bioeffects



# Future Direction



## Initiatives or best practices to accelerate R&D process

- Subareas beginning monthly meetings with NDIA partners
- Continuation of Independent Research and Development (IR&D) Technology Interchange
- Participation in NATO, TTCP, and International Workshops (Singapore)
- Joint Exoskeleton Workshop

## Cross-COI, Industry, Academia Opportunities for Collaboration

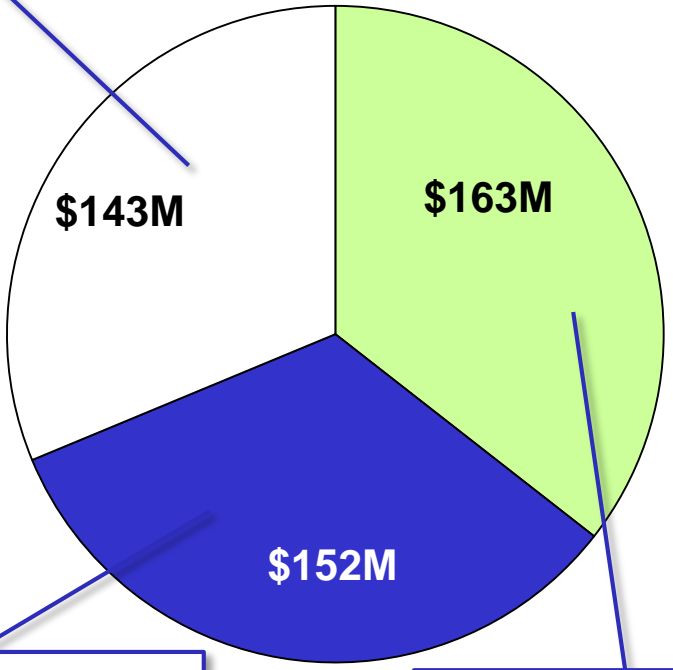
- ASBREM: MOMRP Wearables Meetings
- C4I: HCI for Decision Making Collaboration
- Autonomy: Machine Perception, Reasoning and Intel



# Future Direction: Lead, Leverage, Watch

*Leveraging: HMT*  
*Leveraging: Wearables*

**Total = \$458M**



■ Personalized Assessment, Education, and Training

■ Protection, Sustainment & Physical Performance

□ System Interfaces & Cognitive Processing

*Lead: OBOGS, DE Bioeffects*

*Lead: LVC*



# Take Aways for S&T ExCom



## Messages:

- HS COI well-positioned to support recent Services' strategic documents to leverage the human dimension in complex systems via using synthetic environment
  - Programs in Human Machine Teaming, Live Virtual Constructive, and Wearable Sensors address key capabilities
- Continuing to self-assess Sub Area S&T alignment, scope, and direction via roadmap refinement
- Steering Group will continue to strengthen awareness of Services' S&T capabilities through a series of laboratory site visits
- Exploring collaborations with other COIs (ASBREM, Autonomy, C4I, etc.), especially for ARAP proposals





# *Questions?*



*BACKUP*



# HI3 Overview

## Human



- ❖ Individuals, Social Groups, Organizations
- ❖ Analysts
- ❖ Decision Makers

## Information



- ❖ Computer-mediated messaging
- ❖ Text, images, videos, geo-locations, networks

## Interpretation



- ❖ Topic modeling, affect/SN/multi-perspectives, narratives, pattern of life, relationship linking
- ❖ Deception detection, fake news, disinformation, misinformation, bots, distortion, contagion, spread

## Influence



- ❖ Tailored truthful messaging with relevant platforms and emic perspectives
- ❖ TTPs for countering adversary messaging
- ❖ Metrics: Reach, Resonance, Response