# **HUMAN SYSTEMS**



## HUMAN-CENTERED RESEARCH FOR AI AND AUTONOMY

Our Industrial/Organizational and Human Factors Specialists specialize in cognitive systems, personality, and personnel assessment and psychometrics. We use empirical research to develop, assess, and improve human-machine interaction interfaces and human performance capabilities.

## Human-machine teaming research and cognitive systems engineering

- Human-AI coordination
- Human-machine interface design, prototypes, implementation & evaluation
- · Decision support systems
- UX/UI Design

#### **Performance Optimization**

- · Personnel selection and assessment
- Training

#### Knowledge elicitation & field research

- · Cognitive task analysis
- Scenario & use case definition and creation

#### Human-centered AI development

- Natural language
  processing
- AI explainability
- Machine Learning



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DCS has been conducting human systems research for the DoD since the early 1990s. Each day, we develop, design, conduct, and report on human systems research. Our research addresses the areas of human-machine teaming, knowledge elicitation, performance optimization, warfighter readiness, human-centered AI development, software engineering, data visualization, cognitive neuroscience, biodynamics and oxygen systems. Using industry-leading interdisciplinary R&D capabilities and methodologies, we deliver innovative solutions to meet the challenges of this ever-evolving field.

## AEROSPACE PHYSIOLOGY RESEARCH FOR AIRCREW SAFETY AND AIRMAN READINESS OPTIMIZATION

#### **Cognitive Neuroscience**

- Non-invasive neuromodulation
- · Brain machine interfaces research
- · Cognitive state assessment

#### **Biodynamics Research**

- · Impact/acceleration studies
- · Vibration, head/neck injury criteria, mass properties studies

#### **Oxygen Systems**

- On-board oxygen generation systems (OBOGS)
- Incident investigation

#### Warfighter Optimization

- · Wearable monitoring devices
- · Fitness and performance analysis tools









## **MANNED-UNMANNED SYSTEMS**

DCS software engineers develop and test autonomy solutions, operator interfaces, and visualization capabilities. Our autonomy solutions provide operator decision support, allocation and teaming, and route and task management. They have been validated in simulation and live flight, at scales from single to dozens of vehicles. Operator interface work includes software engineering to produce agile, intuitive operator interfaces that support transparency, directability, observability, predictability, explainability, calibrated trust, and shared awareness.

#### **Software Engineering**

- · Small- and large-scale suites
- · Deployment, integration, and use
- Agile and DevOps
- · AI and ML Development

#### **Integrated Teaming Applications**

- Manned-Unmanned Teaming (MUM-T)
- Command & Control
- Autonomy development and integration
- · Flight test support
- Biometric data collection

#### **Visualization Systems**

- Virtual environments, Image generation software suites
- · Geospatial visualization, data integration, management and delivery

#### **Operator Systems Integration**

- · Fighter pilot interfaces
- · Supervisory control interfaces

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### **MAJOR CUSTOMERS**

- USAF/AFRL (Human Effectiveness, Aerospace Vehicles, Space Vehicles)
- USSF
- USAF/AFA1
- Army DEVCOM AvMC
- USAF/AFLCMC (Human Systems)



