Chapter II
Air Force Research Laboratory
Autonomy Science & Technology Strategy

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Integrity ★ Service ★ Excellence
AFRL Autonomy
Vision & Goals

Ensure operations in complex, contested environment

Demonstrate highly effective human-machine teaming

Intelligent machines seamlessly integrated with humans - maximizing mission performance in complex and contested environments

Create actively coordinated teams of multiple machines

Ensure safe and effective systems in unanticipated & dynamic environments
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**AFRL Autonomy**

**Human-Machine Teaming**

**ENDURING PROBLEMS**

- Enable & Calibrate trust between human and machines
- Develop common understanding and shared perception between humans and machines
- Create an environment for flexible and effective decision making

**Ensure operations in complex, contested environment**

**Demonstrate highly effective human-machine teaming**

Ensure safe and effective systems in unanticipated & dynamic environments.
HUMAN MACHINE TEAMING

ADVANCEMENT OF AUTONOMOUS SYSTEM THROUGH HUMAN-MACHINE TEAMING

VISION

2030 SEAMLESS HUMAN-MACHINE PARTNERSHIPS

TODAY

Machines as Tools
- Non-intuitive interfaces
- One-way information flow
- Uncertainty and limited trust

TECHNOLOGY CHALLENGES

HUMAN STATE SENSING & ASSESSMENT
- Objectively measure and assess human's state (physiological, performance, behavioral)

HUMAN-MACHINE INTERACTION
- Enable human and machines to communicate and share information

TASK & COGNITIVE MODELING
- Task and function allocation for workload and decision-making balance

HUMAN & MACHINE LEARNING
- Adaptive, learning, and extended mutual training between human and machine

DATA FUSION & UNDERSTANDING
- Integrate human and machine data (context, time, format) for a shared world model

FUTURE

Intelligent Machines as Team-Mates
- Natural user interfaces
- Mutual awareness of team-mate condition
- Shared situational understanding

MAXIMIZING PERFORMANCE IN COMPLEX AND CONTESTED ENVIRONMENTS

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Human-Machine Teaming Technology Challenges

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Inter-relationship