Human Systems Integration: Issues and Challenges

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Attributes

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Demands on Human Operators are Increasing and Changing

- Increased demands on operators
  - New missions, CONOPS, tactics
  - Network-Centric Warfare
  - Increased volume/rate of information
  - Manpower Reductions

- Changing human roles
  - Increased vehicle autonomy → human supervisory control
  - Control of multiple platforms
  - Multi-mission tasking
8 Central HSC Issues for Operator Performance in NCW:

- Information Overload
- Attention Allocation
- Distributed Decision-Making and Team Coordination
- Appropriate Level of Automation
- Adaptive Automation
- Supervisory Monitoring of Operators
- Complexity Measures
- Decision Biases

Human Role in Systems/Systems Engineering
(adaptive capabilities of humans; cognitive systems engineering; support for decision making; impacts of increasing automation)

- Status – The planned role of the human in the system may be viewed in terms of the user/operator, the decision maker (e.g., command and control), or support processes that are human-intensive. Designing for these roles in tandem with the hardware and software development requires an integrated, disciplined systems approach that leverages both systems engineering and human systems integration best practices. The need to consider human roles within systems drives the need for new methods to address the cognitive and self-adaptive nature of humans.
HSI System Engineering
Methods and Tools

- **AF Scientific Advisory Board** identified need for improvement in
  - Data Mining of Operational Experience
  - Cognitive Engineering
    - Mixed Initiative Teams
    - Situation Awareness
    - Behavioral Modeling
  - Feedback Mechanisms to Design Principles
  - Requirements Allocation
  - Performance Metrics