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A Human-Systems Approach to Proactively Managing Risk through Training in an Evolving Aviation Industry

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Fort Hill Group
National Training Aircraft Symposium
Embry-Riddle Aeronautical University
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NextGen will introduce new procedures & operational conditions

Changes Impact Performance

- New human-system and human-human interactions
- New off-nominal conditions
- Gaps in existing checklists & SOPs
- Gaps in existing training programs
Human Organizational Safety Technique

- Human-centered method for proactively bridging the gap between current & future operations
- Identifies task impacts, sources of resiliency, emerging risks, and performance metrics
- Data-driven outputs that are repeatable and scalable to evolve training platforms
HOST Approach

Baseline

1. Review Change vs Current Operations
2. Identify Actors, Tasks, KSAs, & Systems
3. Strategic Impact Analysis

Model

4. Human-System Interaction Models
5. Key Interaction Analysis
6. Assess, Quantify, Prioritize Impacts

Implement

7. Develop Mitigation/Implementation Strategies
8. Implement Mitigations Into Training Platform
Interval Management

PBN Route

Assigned Spacing Objective: 6 NM

Current Operations
- ATC utilizes speed instructions & vectors to maintain spacing
- Vectoring and speed instructions may create system inefficiencies
- Flight crews may not be aware of controllers purpose or plan

Future Operations
- ATC assigns eligible aircraft pairs an interval management clearance
- Trailing flight crew will maintain an assigned interval behind lead aircraft
- Capability utilizes ADS-B in/out capabilities & advanced avionics

Source: Pilot and Air Traffic Controller use of Interval Management during Terminal Metering Operations. MITRE – January 2018
Interval Management

Assigned Spacing Objective: 6 NM

**En Route Controller**
- Input IM Pair
- Monitor Conformance
- Traffic & Aircraft Info
- Aircraft Pair

**En Route Automation**

**Flight Crew**
- IM Clearance – Interval, Target, Termination Point
- IM Clearance Acknowledgement

**Flight Crew Automation**
- Check clearance viability
- IM Interval & Target AC
- Monitor Interval Conformance
- Terminate Interval Pair
- Other Aircraft Traffic
- Current Interval Status

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Interval Management

En Route Controller

ID Pairing Opportunity

En Route Automation

IM Clearance – Interval, Target, Termination Point

IM Clearance Acknowledgement / Readback

Flight Crew

Check clearance viability

Flight Crew Automation

IM Interval & Target AC

Monitor Interval Conformance

Terminate Interval Pair
Interval Management

- Task-specific KSA impacts
- Sources of human-system resiliency
- Emerging risks
- Post-implementation performance measures

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Key Takeaways

HOST identifies key intersection points between task impacts, risks, and training opportunities

HOST may be used to revalidate and/or evolve an existing training platform

Guides the use of safety performance indicators & post-implementation alerting thresholds
Fort Hill Group provides strategic guidance, analysis, and training to empower organizations to improve human performance and reduce operational risks.

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