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Midair Collision Involving US Army PAT25 and PSA Airlines Flight 5342 Washington, DC January 29, 2025

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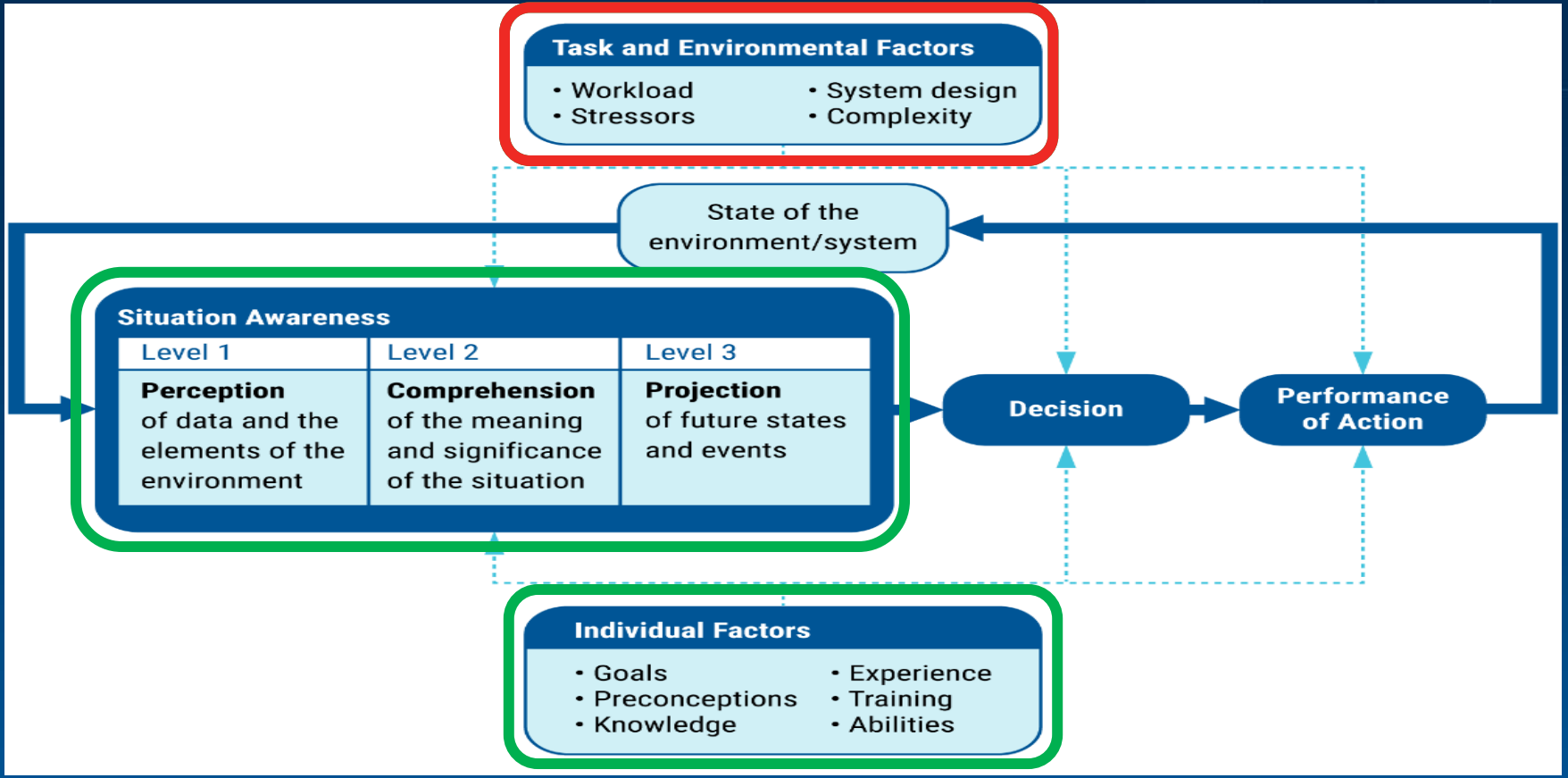
Overview

- DCA Air Traffic Control (ATC) tower use of visual separation
- Situation awareness concept
- Combining local control and helicopter control positions
- Recognition of impending collision and expectation driven process
- Conflict alert system
- Radio communications when positions combined
- Time on position limitations
- Threat and error management
- Risk management

DCA ATC Tower Use of Visual Separation

- Due to proximity of helicopter routes to approach and departure corridors, pilot-applied visual separation reduced controller workload and airspace congestion and complexity
- Controllers motivated to issue traffic advisory and authorize visual separation for transiting helicopters as early as possible
- Local controller's expectation that PAT25 crew would have specific aircraft (flight 5342) in sight was not valid
- Potential for controller to overestimate helicopter crew's traffic awareness and underestimate level of information and assistance needed to ensure collision avoidance

Situation Awareness Concept



Endsley (1995)

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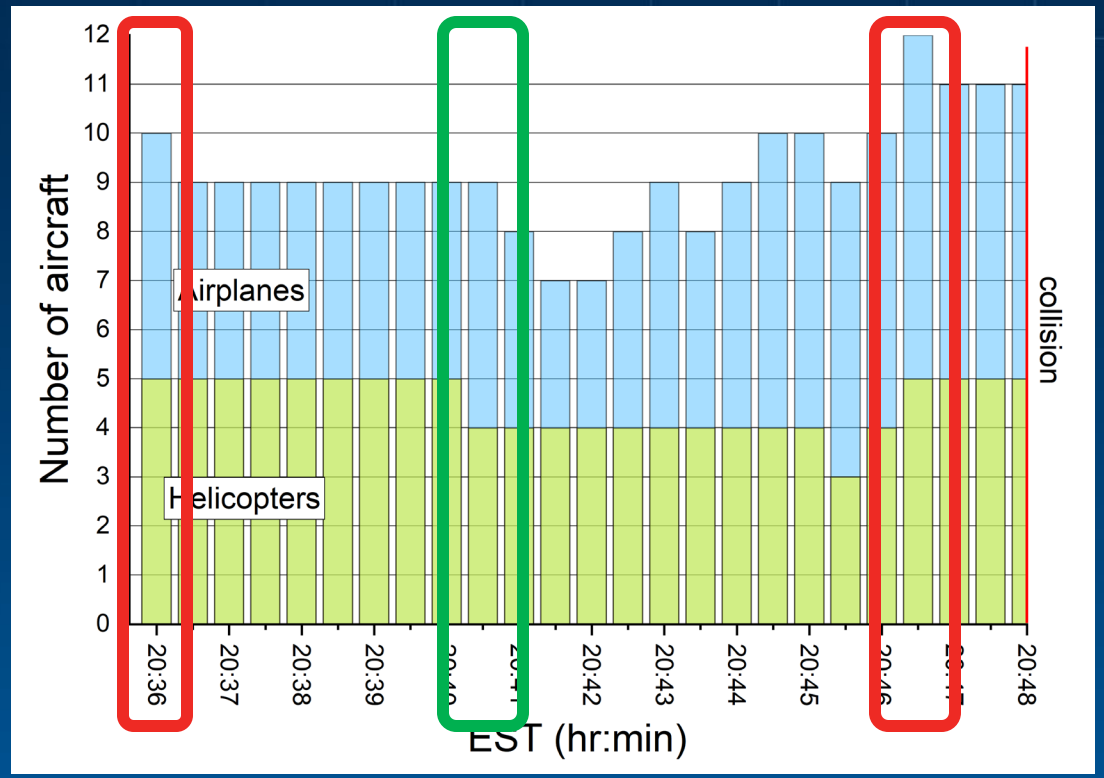
Combining Local Control and Helicopter Control (LC/HC) Positions

- Responsible for coordinating arrivals and departures and VFR helicopter traffic transiting airspace
- Local controller ”a little overwhelmed” about 10-15 minutes before accident
- Traffic volume manageable when one or two helicopters left airspace
- Traffic volume increased about 90 seconds before accident
- Controller shifting focus between airborne, ground, and transiting aircraft
- Combined positions increased controller workload, reduced situation awareness



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Recognition of Impending Collision

- Controllers monitor current state of aircraft and predict its future location
- Slowly developing conflicts, particularly at night, are difficult to recognize due to reduced visual cues
- Gradual change can reduce situation awareness and delay recognition

Expectation Driven Process

- Controller expected PAT25 to maintain visual separation
- Frequent use of pilot-applied visual separation reinforces expectation
  - Visual separation repeatedly worked as expected
  - More difficult to notice deviations, especially when high workload

What We Found: Conflict Alert System

- Draws controller's attention to potential conflict using aural and visual alerts
- Presentation not impacted by severity of conflict
- Conflict alert activation common at DCA; desensitization a concern
- Providing more salient cues regarding severity would reduce cognitive load and improve response time

What we propose:

- Two recommendations to FAA

What We Found: Radio Communications When LC/HC Combined

- DCA ATC tower utilized discrete frequency for helicopter communications
- Separate frequencies allowed for easier decombining positions
- All aircraft could hear controller communications, but helicopter transmissions not audible to airplanes and airplane transmissions not audible to helicopters
- Separate frequencies reduced frequency congestion but hearing all transmissions would improve pilots' situation awareness

What we propose:

- One recommendation to FAA

What We Found: Time-on-Position Limitations

- Operations supervisor (OS) working over 4 hours, on OS position over 2 hours
- Due to extended time on position, OS was likely experiencing reduced alertness and vigilance, which decreased ability to effectively assess operational risks
- Collective bargaining agreement between National Air Traffic Controllers Association (NATCA) and FAA specifies required relief; covers operational personnel not supervisory personnel
- No mandatory relief periods for supervisors

What we propose:

- One recommendation to FAA

Threat and Error Management (TEM)

- Process for identifying, analyzing and minimizing or mitigating risks; originated in flight deck human factors
- In November 2016 , NTSB issued Safety Recommendation A-16-51 asking FAA to provide initial and recurrent training for controllers on controller judgment, vigilance, and/or safety awareness (referencing two midair collisions in 2015)
- In July 2017, FAA responded that TEM was provided to controllers as part of instructor-led recurrent training and would be required training for future controllers

What We Found: Threat and Error Management (TEM)

- None of DCA ATC tower controllers received TEM training in 2017 or familiar with term “threat and error management”
- TEM training could improve controller situation awareness, promote communication, emphasize effective scanning patterns, help in recognizing patterns in developing adverse events, and enhance decision making under stress
- TEM training would also benefit supervisors in overseeing facility operations and making operational decisions

What we propose:

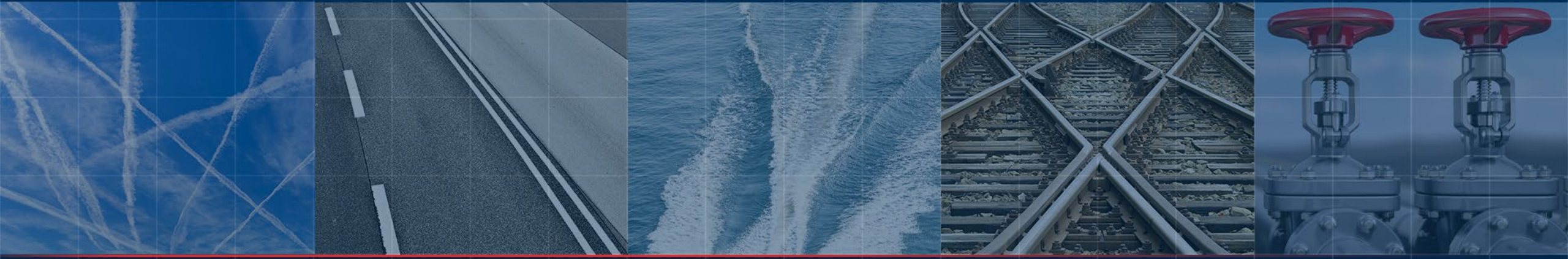
- One recommendation to FAA

What We Found: Risk Management

- Supervisor must balance safety and risk management with operational demands of facility
- DCA ATC Standard Operating Procedures had no guidance or tool available to support supervisors in identifying risks, analyzing impact of risks, prioritizing risks, or developing strategies to reduce or eliminate risks in real time
- Risk assessment or decision-making tool would have helped operations supervisor identify and mitigate operational risk factors

What we propose:

- One recommendation to FAA



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