Spatial Disorientation Induced by a Degraded Visual Environment

Training

Jill Browning
Tyson Phillips
Corey Boudreau
Agenda

• Approach
• Aeromedical
• Enroute Decision Triggers (EDT)
• Call to action!
Approach

• Compelling statistics
• Understanding spatial disorientation
• Not just an IMC issue
• EDT – an effective tools for preflight planning
Aeromedical
Spatial Disorientation

• A state characterized by an erroneous sense of one's position and motion relative to the plane of the earth's surface. (Benson, 1978)

• Physiologic factor that contributes most often to aircraft mishaps

Illusions

• Something that deceives or misleads intellectually. (Meriam-Webster, 2020)

• Visual
  • Vection
  • False Horizon
  • Confusion with Ground Lights

• Vestibular
  • Leans
  • Graveyard Spiral
  • Post Roll
Visual System

- 80% of orientation
- Capable to “tricking” vestibular system
Vestibular Illusions

No turning:
No sensation.

Start of turn:
Sensation of turning as moving fluid deflects hairs.

Constant rate turn:
No sensation after fluid accelerates to same speed as tube wall.

Turn stopped:
Sensation of turning in opposite direction as moving fluid deflects hairs in opposite direction.
Cognitive Function

• Prefrontal (Slow Brain) – Analytic and Reasoning
• Subcortical (Fast Brain) - Reactive
Calabasas, CA

Altitude: 1350 ft AMSL
Ground speed: 161 kts
Vertical speed: -4864 fpm
Enroute Decision Trigger

• Rebranding of NEMSPA’s Enroute Decision Point (EDP)
• IIMC/Spatial Disorientation?????? “problem” needs widely adopted procedure to assist in terminating flight prior to exceeding limitations
• Set of predetermined conditions that if met or exceeded “triggers” pilot action
• Scalable solution - conditions vary based on personal, organizational, experience, acft capabilities, etc.
• Pre-flight Planning Incorporation
• EDT = In Flight Emergency
Call to action

• Try it! Incorporate EDT into you daily preflight planning.

• Share your feedback on the technique.

• Check out our full paper and other resources on this topic and others on the USHST website.
Resources

Recommended Practices: Spatial DInduced by a Degraded Visual Environment

Aeromedical Training – FAA Visual and Vestibular Illusions
Videos –
• USHST 56 Seconds to Live
• Brazilian Wedding Flight
• Alaska Department of Public Safety
• Helicopter Flying Erratic Over New York
• The Light was the Moon

Risk Analysis Tools
• FAA Safety Team Flight Risk Assessment Tool (FAAST FRAT)
• CRM Briefing Card
• Using CRM on all Helicopter Flights

Personal Kneeboard Card

[Image]