Risk Mitigation

Captain Kent Lewis
USMC (Ret)
Delta Air Lines

Operational Safety

"The use of good judgement, common sense and adherence to sound prescribed procedures is key to the preservation of our war fighting assets (asses). Doing it right is what counts."

Big Picture
Safety Management System 4 Pillars

I. Policy

Culture - Informed, open, reporting, just, learning.

Everyone is responsible for safety and mission.

II. Risk Management

Focus safety efforts on those hazards posing the greatest risks.

III. Assurance

Feedback on system performance, audit and evaluation

IV. Promotion

Training, literature, courses, briefs

Threat and Error Risk Management (TEM)

ID hazards

- Threats
- Errors

Assess risk

- Consequence - Negligible to catastrophic
- Frequency - Improbable to frequent

Mitigate risk

- **Reduce severity or exposure to hazards**
- **Implement controls - Sticker, Train, Procedure**
- **System design change**

Monitor effect

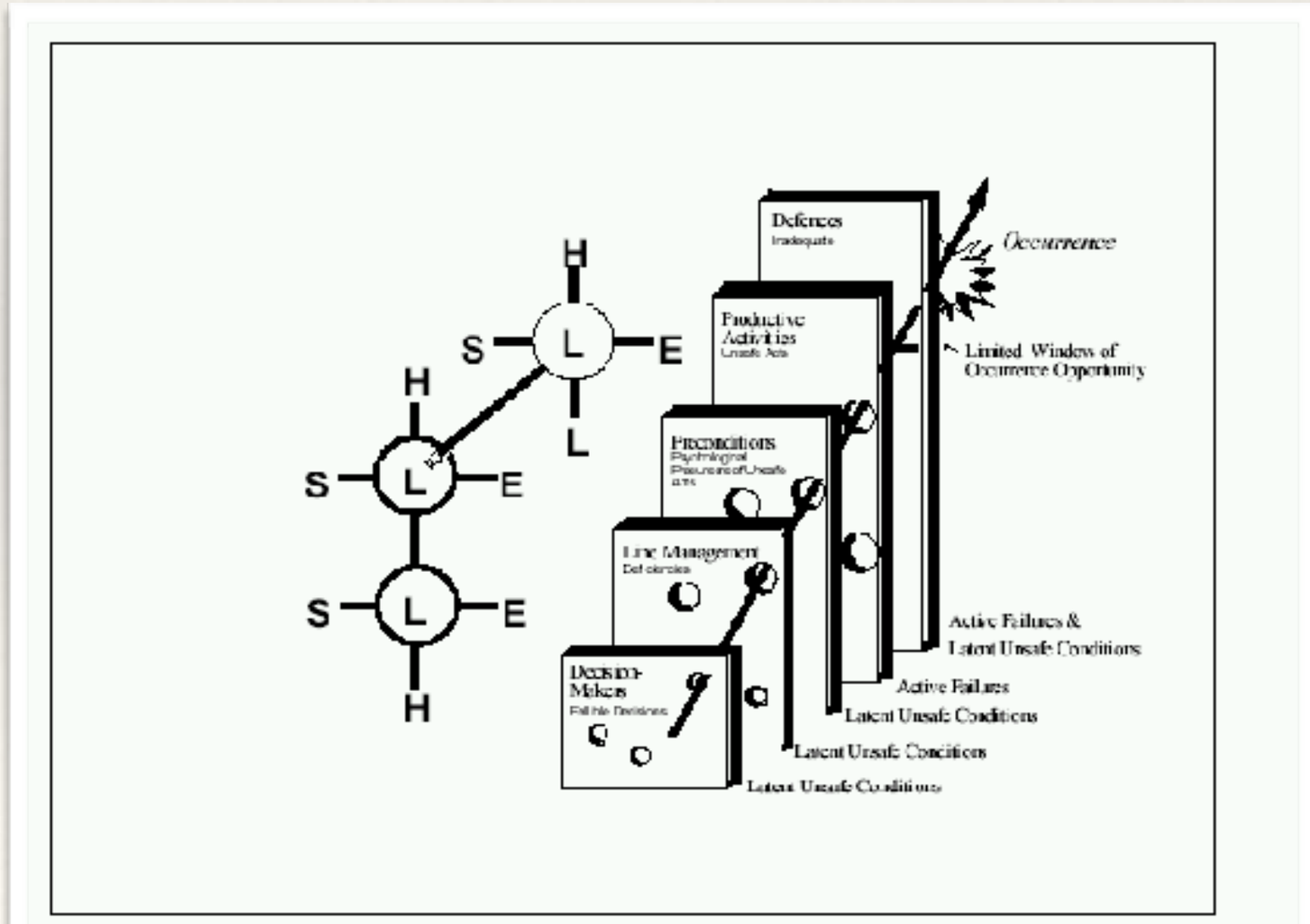
Repeat

Risk Assessment Focus (PAVE)

- Personnel
  - Fatigue Awareness Scheduling Tool
- Aircraft
  - Maintenance items, minimum equipment
- enVironment
  - Weather
- External Pressures
  - Perceived or actual

Risk Assessment of Systems (SHELL)

- Assessment of system risk and the "Liveware" interface
- When swiss cheese model turns to fondue
  - Software
  - Hardware
  - Environment
  - Liveware



Risk Mitigation (TEAM)

- Goal - Reduce risk to as low as reasonable (ALAR)
- Negotiation with Mother Nature, your airplane is constantly trying to return to its natural state
- TEAM approach to risk
  - Transfer
  - Eliminate
  - Accept
  - Mitigate

Defense In Depth

Philosophy

Commander's Intent

Policies

Written and understood

Procedures

Do what we say we are going to do

Technology

Appropriate to the mission

Levels of Control

- Manage risk at the appropriate level
  - Regulatory
    - Flag level
  - Supervisory
    - Squadron
  - Operational
    - Crew
  - Unsafe acts
    - Individual

When Mitigations Fail, We Lose

- Threat: Night, Low Altitude
- Mitigation: Low Altitude Warning System (RadAlt)
- Error: Lack of funding = LAWS not installed
- + Error: Spatial Disorientation
- = Loss of crew and aircraft

Mitigations - Threat and Error

- Fatigue and Stress
  - Schedule
  - Diet, exercise, sleep
- Interruptions and Distractions
  - Checklist and procedure discipline
  - Triggers and cues
- Prospective Memory
  - Task shift vs multi tasking new and interleaved tasks

Mitigations - Threat and Error

- Dispel the myth of multitasking
- Realize the limits of ability to task shift
- Recognize vulnerability to unintentional omissions
- Be more deliberate about
  - Performing checklists (slow down, point, touch
  - Monitoring - essential vs secondary task
  - Crosschecking
  - Triggers - Anchor checklist initiation and floating tasks to salient cues and events
  - Recognizing when interrupted
  - Creating reminders when activities are deferred

Mitigations - Organizational Training

- Recognize realistic vs idealistic human performance in generating errors as they work
- Explain why even expert teams are vulnerable to error
- Explain advantages and disadvantages of timing, triggers and expectations
- Educate on bias - pattern and optimistic - 5H1T HA99EN5
- Expand Team Resource Management training for Workload Management
  - Address multitasking threat and avoid when able
  - Teach safeguards
  - Create reminders
  - Anticipate interruptions and distractions
  - Resist rushing

Mitigations - Procedure Design

- Align procedures with realities of operating conditions and human information processing
  - Review design of Normal/Non Normal procedures
- Analyze SOPs for conflicts and hidden traps
  - Solicit and provide team feedback
  - Analyze incident reports
  - Consult with human factors experts
- Look for threats that
  - require critical activities during periods of anticipated interruptions
  - allow critical items to float in time - not anchored
  - force crew to go heads down during critical periods - ex crossing a runway, taxi at night…

Mitigations - Policy

- Ensure policy and practice does not reward rushing and create risky decision making - ex “On Time.”
- Train like you fight.
- Decide what to measure and measure it.

Threat and Error Management (TEM)

- Time
  - Wind the clock
- No Time
  - Fire
  - Medical Emergency

ART of Information Management

- Most mishaps can be prevented if commanders and crews are given information that is
  - Accurate
  - Relevant
  - Timely

Questions?

"You can't go on liberty if you're dead."

LtCol Mike "Spot" Kurth

HMLA-369 Gunfighters

Desert Shield/Desert Storm

Navy Cross recipient

Resources

- *The Limits of Expertise: Rethinking Pilot Error and the Causes of Airline Accidents*. Dismukes, Berman and Loukopolous. 2007
- *The Multitasking Myth: Handling Complexity in Real-World Operations*. Loukopolous, Dismukes and Barshi. 2009
- International Civil Aviation Organization (ICAO) Safety Management Manual
- Federal Aviation Administration Safety Management Systems for Air Operators

Thank You For Your Service!
For More Information

- Kent B. Lewis, MLS
- (850) 449-4841
- lewis.kent@gmail.com
- www.signalcharlie.net