



# **HUMAN FACTORS IN AVIATION SAFETY**

**PRESENTED TO**

**THE NATIONAL AVIATION SAFETY SEMINAR (NASS-23)  
“SAFETY CULTURE-IT STARTS FROM THE GROUND UP”  
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## OUTLINE OF PRESENTATION

- ▶ **DEFINING HUMAN FACTORS IN AVIATION**
- ▶ **THE IMPORTANCE OF HUMAN FACTORS TO AVIATION SAFETY**
- ▶ **THE HUMAN PERFORMANCE PRINCIPLES**
- ▶ **HUMAN CONDITIONS WHICH AFFECT HUMAN DECISIONS AND IMPACT SAFETY**
- ▶ **APPROACH TO SYSTEM SAFETY DESIGN**

## DEFINING HUMAN FACTORS IN AVIATION

- ▶ Human Factors is the understanding of human behavior and performance under operational conditions.
- ▶ When applied to aviation operations, Human Factors knowledge is used to optimize the **fit between people and the systems in which they work** in order to improve safety and performance.



## THE IMPORTANCE OF HUMAN FACTORS TO AVIATION SAFETY

▶ Human factors is inherently involved in all incidents and accidents. Whether related to crews, air traffic control, maintenance, organization or design, each link in the safety chain involves human beings and therefore the potential for fallible human decisions and human errors.



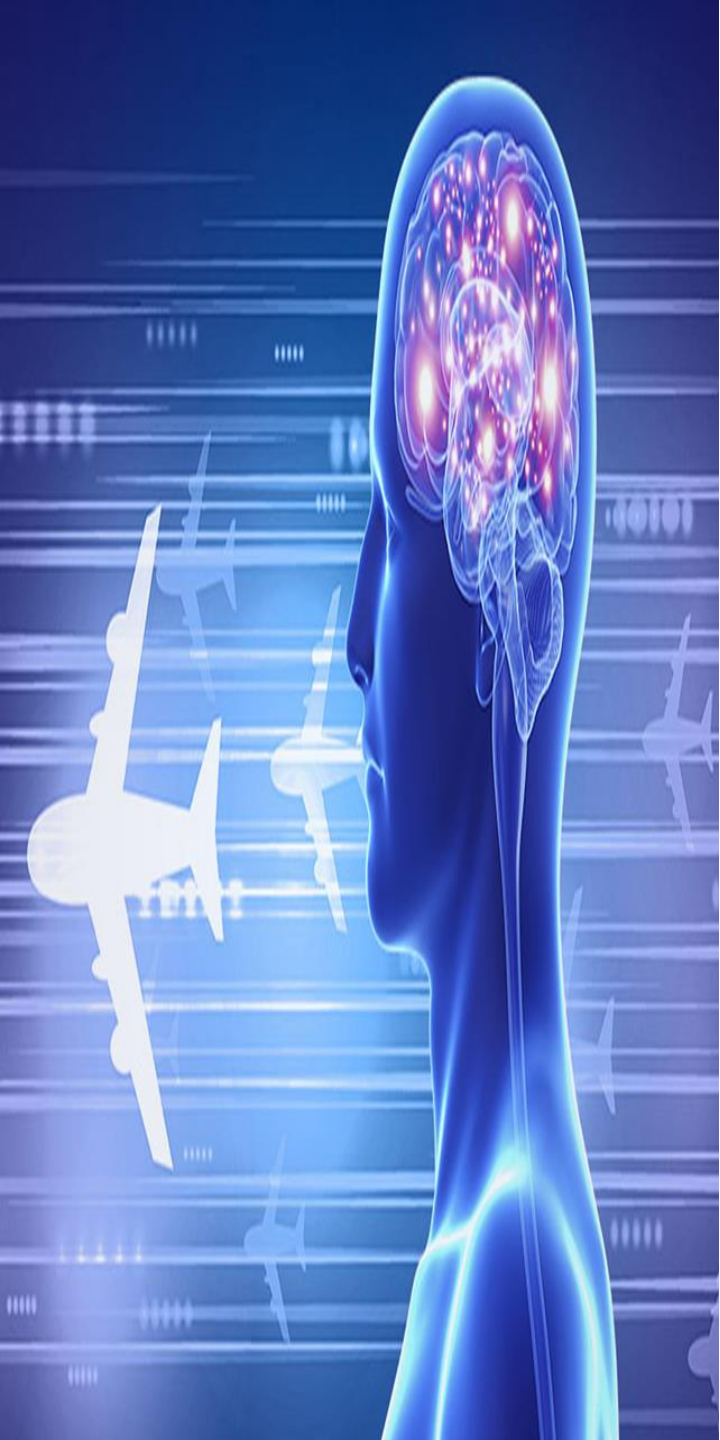


## THE HUMAN PERFORMANCE PRINCIPLES

► There are **five (5)** Human Performance principles, none of which operate in isolation:

1. Capability and limitation which influence performance.
2. Interpretation and sense-making..
3. Adaption to changing demand.
4. Risk assessment and trade off
5. Interaction with people, technology and environment

► Understanding and applying these principles result in **regulatory** and **operational approaches** that aim to support human performance and make it easy for them to do the right thing for system safety.





## HUMAN CONDITIONS WHICH AFFECT HUMAN DECISIONS AND IMPACT SAFETY

▶ There are **eight (8)** human conditions

1. **FATIGUE**: Decreases concentration and slow reaction times, increasing the risk of errors and accidents.

**Cause** - Long work hours, lack of rest or sleep, physically demanding tasks, or high-stress environments.

2. **STRESS**: High-stress levels reduce cognitive function and decision-making abilities.

**Cause** – A heavy workloads, time pressure, job insecurity, conflicts, or lack of control over one's work.



## HUMAN CONDITIONS WHICH AFFECT HUMAN DECISIONS AND IMPACT SAFETY (CONT'D)

### 3. COMMUNICATION:

communication can lead to misunderstandings and mistakes, affecting safety. Poor

Cause - Language barriers, lack of clear instructions, inadequate reporting systems for incidents or hazards, or a workplace culture discouraging open communication.

### 4. TRAINING: Insufficient or inadequate training can result in workers not knowing how to perform tasks safely or respond to emergencies. This can increase the risk of accidents.



## HUMAN CONDITIONS WHICH AFFECT HUMAN DECISIONS AND IMPACT SAFETY (CONT'D)

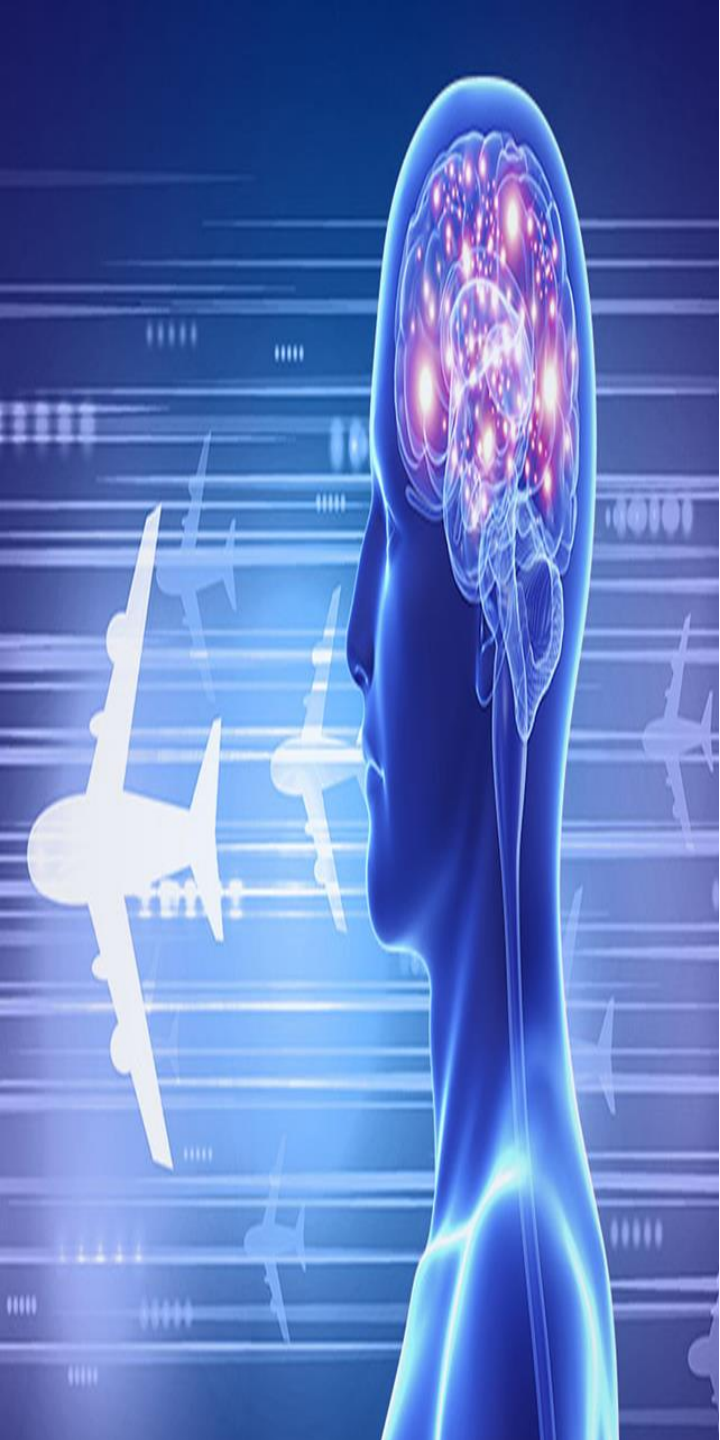
5. **PHYSICAL ABILITY**: The physical demands of a job must align with the worker's capabilities.
6. **JOB DESIGN AND ERGONOMICS**: Poorly designed tasks can lead to accidents and health issues.
7. **ORGANIZATIONAL CULTURE**: A workplace culture that doesn't prioritize safety can increase the risk of accidents.
8. **EQUIPMENT AND ENVIRONMENT**: The design and state of the physical environment and tools can greatly impact safety.





## APPROACH TO SYSTEM SAFETY DESIGN

- Hardware reliability, redundancy, and increased dependency on software functionality have shifted emphasis from the earlier hardware (still critical for ATC systems) towards both software and the human element.
  
- ▶ A general approach to system safety design should include:
  1. Gross hazard analysis
  2. Identification of hazard.
  3. Classification of hazards (negligible; marginal; critical and catastrophic).
  4. Anticipated possibility of hazards
  5. Corrective actions or preventative measures.



*You shall make a parapet for your roof, that you may not bring the guilt of blood upon your house, if anyone fall from it.*

Deuteronomy 22.8

# QUESTIONS

# Thank You

