# Training Course on Human Factors in Aviation Systems Design

Professional Development Training Course Outline

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|---|---|---|---|
| **Category** | Aviation and Airport Management | **Duration** | 5 Days |
| **Base Fee** | $1,500 USD | **Delivery Mode** | Online / On-site Hybrid |

## Course Introduction

The **aviation industry** operates within an inherently complex and high-risk environment where human interaction with sophisticated **aviation systems** is paramount. Despite technological advancements, **human error** remains a significant contributing factor to incidents and accidents. Training Course on Human Factors in Aviation Systems Design is meticulously crafted to address this critical challenge by equipping aviation professionals with a deep understanding of how human capabilities and limitations influence **system performance, safety, and operational efficiency**. By integrating **human-centered design principles** from the outset, we aim to proactively mitigate risks, optimize **human-machine interface**, and foster a robust **safety culture** across all facets of **aerospace operations**.

This program delves into the intricate interplay between human cognition, perception, and behavior, and the design of **cockpit environments, air traffic control systems, maintenance procedures**, and **aviation training**. Participants will gain actionable insights into identifying potential **human factor risks**, implementing effective **error management strategies**, and applying **human factors engineering** to create more resilient and intuitive aviation systems. Our focus is on practical application, leveraging **real-world case studies** and **interactive simulations** to ensure participants can translate theoretical knowledge into tangible improvements in their respective roles, ultimately contributing to a safer and more efficient global aviation landscape.

## Programme Curriculum

**Training Course on Human Factors in Aviation Systems Design**

**Introduction**

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advancements, **human error** remains a significant contributing factor to incidents and accidents. Training Course on Human Factors in Aviation Systems Design is meticulously crafted to address this critical challenge by equipping aviation professionals with a deep understanding of how human capabilities and limitations influence **system performance, safety, and operational efficiency**. By integrating **human-centered design principles** from the outset, we aim to proactively mitigate risks, optimize **human-machine interface**, and foster a robust **safety culture** across all facets of **aerospace operations**.

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**Course Duration**

5 days

**Course Objectives**

1. Grasp foundational **human factors** concepts, **ergonomics**, and their critical role in **aviation safety management systems (SMS)**.
2. Learn to recognize various types of **human error**, differentiate between **latent and active failures**, and understand their causal pathways in **aviation incidents**.
3. Master the principles of **human-centered design (HCD)** and **user experience (UX)** in the development of **aviation systems** and **human-machine interfaces (HMI)**.
4. Develop strategies for improving **situational awareness** in complex **operational environments** and mitigating its degradation under stress.
5. Analyze cognitive biases and heuristics impacting **decision-making** in aviation, and apply models for effective **cognitive load management**.
6. Foster effective **communication, teamwork, and leadership** through advanced **Crew Resource Management (CRM)** techniques.
7. Identify the impact of **fatigue, stress**, and other **physiological factors** on human performance and implement **fatigue risk management systems**.
8. Understand the challenges and opportunities of **automation dependency** and the integration of **AI in aviation**, focusing on human supervision and control.
9. Acquire skills in conducting **human factors accident investigation** and **root cause analysis (RCA)** to prevent recurrence.
10. Design and evaluate **human factors training programs** that incorporate **simulation-based training** and **performance assessment**.
11. Analyze the influence of **organizational culture, safety culture**, and management practices on **human performance** and **system safety**.
12. Understand specific **human factors in aviation maintenance** and engineering, including the **Dirty Dozen** and **error trapping**.
13. Explore concepts of **resilience engineering** to build robust aviation systems capable of adapting to unexpected events and managing complexity.

**Organizational Benefits**

- Significant reduction in incidents, accidents, and **human error**, leading to a safer operational environment.
- Optimized **human-machine interaction** and streamlined procedures reduce delays, waste, and improve overall productivity.
- Decreased accident rates, lower insurance premiums, reduced legal liabilities, and efficient resource utilization contribute to substantial cost savings.
- Fosters a proactive, **just culture** where employees feel empowered to report hazards and contribute to continuous safety improvement.
- Ensures adherence to national and international **aviation safety regulations** and standards, including ICAO and FAA guidelines.
- Improved working conditions, reduced stress, and a focus on human well-being lead to higher job satisfaction and lower turnover.
- Demonstrates a commitment to **safety leadership** and innovation, enhancing reputation and market standing.
- Develops a systematic approach to identifying, assessing, and mitigating **human factor risks** across the organization.

**Target Audience**

1. Pilots & Flight Crew
2. Air Traffic Controllers
3. Aviation Maintenance Technicians (AMTs) & Engineers
4. Aviation System Designers & Developers.
5. Safety Managers & Quality Assurance Professionals.
6. Airline & Airport Operations Managers.
7. Regulators & Investigators
8. Aviation Training Instructors & Course Developers

**Course Outline**

**Module 1: Foundations of Human Factors in Aviation**

- Definition and Historical Evolution of Human Factors in Aviation.
- Key Human Factors Models: SHELL Model, Reason's Swiss Cheese Model.
- The Link between Human Factors, Safety, and Efficiency.
- Introduction to Aviation Safety Management Systems (SMS) and Human Factors Integration.
- Ethical Considerations and the "Just Culture" Concept.
- **Case Study:** Tenerife Airport Disaster (1977) - *Analysis of communication breakdowns, crew resource management failures, and organizational pressures.*

**Module 2: Human Performance and Limitations**

- Cognitive Processes: Perception, Attention, Memory, and Information Processing.
- Physiological Factors: Fatigue, Stress, Circadian Rhythms, and Environmental Stressors.
- Psychological Factors: Motivation, Personality, and Individual Differences.
- Workload Management and Human Information Processing Limitations.
- Human Error: Taxonomy of Errors (Slips, Lapses, Mistakes) and Error-Producing Conditions.
- **Case Study:** Air France Flight 447 (2009) - *Examination of pilot fatigue, startle effect, automation surprise, and degraded performance under stress.*

**Module 3: Human-Centered Design (HCD) & Ergonomics in Aviation**

- Principles of User-Centered Design and Human-Machine Interface (HMI) Design.
- Display and Control Design: Legibility, Usability, and Standardization.
- Anthropometry and Workspace Design for Cockpits and Control Towers.
- Automation and Autonomy: Levels of Automation, Trust, and Human Supervision.
- Usability Testing and Evaluation Methods for Aviation Systems.
- **Case Study:** Boeing 737 MAX Accidents (Lion Air & Ethiopian Airlines) - *Focus on MCAS design, human-automation interaction issues, and alarm management.*

**Module 4: Crew Resource Management (CRM) & Teamwork**

- Evolution of CRM: From Cockpit to Multi-Crew and Organizational CRM.
- Effective Communication: Active Listening, Assertiveness, and Cross-Cultural Communication.
- Leadership, Followership, and Decision-Making in Team Environments.
- Conflict Resolution and Error Trapping within Teams.
- Threat and Error Management (TEM) in Operational Contexts.
- **Case Study:** United Airlines Flight 232 (Sioux City) (1989) - *Illustrates exceptional CRM, improvisation, and teamwork in a critical engine failure scenario.*

**Module 5: Situational Awareness & Decision Making**

- Components of Situational Awareness (Perception, Comprehension, Projection).
- Factors Affecting Situational Awareness: Workload, Distraction, and Cognitive Biases.
- Naturalistic Decision Making (NDM) in High-Stakes Environments.
- Heuristics and Biases in Aviation Decision-Making (e.g., Confirmation Bias, Availability Heuristic).
- Strategies for Enhancing Decision Quality under Pressure.
- **Case Study:** American Airlines Flight 965 (1995) - *Analysis of breakdown in situational awareness, cognitive tunneling, and erroneous decision-making during approach.*

**Module 6: Human Factors in Aviation Maintenance & Ground Operations**

- The "Dirty Dozen" Human Factors in Maintenance Errors.
- Maintenance Resource Management (MRM) and Error Prevention Strategies.
- Tool Control, Housekeeping, and Environmental Factors in Maintenance.
- Documentation, Procedures, and Communication in Maintenance Operations.
- Impact of Organizational Factors on Maintenance Safety.
- **Case Study:** Aloha Airlines Flight 243 (1988) - *Focus on structural maintenance failures, inspection effectiveness, and organizational influences on safety.*

**Module 7: Accident Investigation & Risk Management**

- Principles of Human Factors Accident and Incident Investigation.
- Root Cause Analysis (RCA) Techniques: Bow-Tie Analysis, SHELL Model Application.
- Hazard Identification, Risk Assessment, and Mitigation Strategies.
- Proactive vs. Reactive Safety Management Approaches.
- Safety Culture Assessment and Improvement.
- **Case Study:** Colgan Air Flight 3407 (2009) - *Examination of pilot training deficiencies, fatigue, and stick shaker activation leading to a stall.*

**Module 8: Future Trends & Advanced Topics in Aviation Human Factors**

- Human Factors in Unmanned Aerial Systems (UAS) and Autonomous Operations.

- Integration of Artificial Intelligence (AI) and Machine Learning (ML) in Aviation.
- Cybersecurity and Human Factors in Aviation Systems.
- Human Factors in Space Exploration and Future Air Mobility (UAM/AAM).
- Continuous Learning, Resilience Engineering, and Future Challenges.
- **Case Study:** Development of Urban Air Mobility (UAM) Systems - *Discussion on human factors challenges in new operational concepts, remote piloting, and passenger experience.*

**Training Methodology**

Our training methodology for "Human Factors in Aviation Systems Design" is highly **interactive, experiential**, and designed for **maximum knowledge transfer and practical application**.

- **Instructor-Led Presentations:** Engaging sessions delivered by **aviation human factors experts** with extensive industry experience.
- **Interactive Discussions & Group Activities:** Fostering peer-to-peer learning and diverse perspectives.
- **Real-World Case Studies & Accident Scenarios:** In-depth analysis of actual aviation incidents and accidents to understand human factors contributions.
- **Simulation-Based Training (where applicable):** Utilizing **flight simulators**, **ATC simulators**, or **HMI prototypes** for hands-on experience and skill development in controlled environments.
- **Practical Exercises & Workshops:** Applying theoretical concepts to design challenges, risk assessments, and error management scenarios.
- **Video Analysis & Multimedia:** Incorporating visual aids to illustrate complex concepts and real-world examples.
- **Guest Speakers:** Industry professionals sharing their practical insights and experiences.
- **Question & Answer Sessions:** Dedicated time for addressing participant queries and fostering deeper understanding.
- **Personalized Feedback:** Constructive feedback on individual and group performance during practical sessions.

**Register as a group from 3 participants for a Discount**

**Send us an email: info@fineskilltrainingcenter.org or call** *+254769199797*

***Certification***

*Upon successful completion of this training, participants will be issued with a globally- recognized certificate.*

***Tailor-Made Course***

*We also offer tailor-made courses based on your needs.*

**Key Notes**

**a.** The participant must be conversant with English.

**b.** Upon completion of training the participant will be issued with an Authorized Training Certificate

**c.** Course duration is flexible and the contents can be modified to fit any number of days.

**d.** The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

**e.** One-year post-training support Consultation and Coaching provided after the course.

**f.** Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

## Upcoming Scheduled Sessions

| Start Date | End Date | Location | Price |
|---|---|---|---|
| **23 Nov 2026** | 27 Nov 2026 | Online | $1,000 |
| **23 Nov 2026** | 27 Nov 2026 | Physical | $1,500 |
| **23 Nov 2026** | 27 Nov 2026 | Physical | $3,000 |
| **23 Nov 2026** | 27 Nov 2026 | Physical | $3,000 |
| **23 Nov 2026** | 27 Nov 2026 | Physical | $6,000 |
| **23 Nov 2026** | 27 Nov 2026 | Physical | $4,500 |
| **23 Nov 2026** | 27 Nov 2026 | Physical | $6,000 |
| **23 Nov 2026** | 27 Nov 2026 | Physical | $6,000 |

Ready to enroll or request a customized program? Book online or contact us:

**Register Online Now**

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