Training Course on Human Factors in Air Traffic Control

Professional Development Training Course Outline

Category	Aviation and Airport Management	**Duration**	10 Days
Base Fee	$3,000 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

The complex and high-stakes environment of Air Traffic Control (ATC) demands exceptional human performance. Training Course on Human Factors in Air Traffic Control is meticulously designed to equip ATC professionals with the essential knowledge, skills, and proactive strategies to mitigate human error, enhance safety, and optimize operational efficiency. By delving into the intricate interplay between human capabilities, technology, and the operational environment, this course fosters a robust safety culture and empowers controllers to navigate challenging situations with greater confidence and competence.

In an era of increasing air traffic density and technological advancements, understanding and managing human factors is paramount for maintaining aviation safety and efficiency. This course goes beyond theoretical concepts, providing practical tools and real-world case studies to help participants identify, analyze, and address human-related risks within their daily operations. Through a blend of interactive learning and immersive simulations, attendees will develop critical non-technical skills, including decision-making under pressure, effective communication, and stress management, ultimately contributing to a more resilient and human-centered ATC system.

Programme Curriculum

Training Course on Human Factors in Air Traffic Control

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Course Objectives

1. Comprehend the foundational principles of human factors and their critical impact on Air Traffic Management (ATM) safety and performance.
2. Identify common types of human errors in ATC and implement proactive strategies for error prevention and recovery.
3. Develop advanced techniques for maintaining and improving situational awareness in dynamic and complex airspace environments.
4. Apply systematic decision-making models under pressure, considering cognitive biases and time constraints.
5. Improve verbal and non-verbal communication skills crucial for effective team coordination and clear instructions in ATC.
6. Implement strategies for managing cognitive and physical workload to prevent overload and maintain optimal performance.
7. Recognize the signs and symptoms of fatigue and stress, and apply effective coping mechanisms and fatigue risk management strategies.
8. Cultivate strong teamwork, leadership, and followership skills within the ATC operational environment.
9. Analyze the human-automation interface in ATC systems, identifying potential pitfalls and optimizing collaborative performance.
10. Integrate human factors principles into existing SMS frameworks for continuous safety improvement and incident investigation.
11. Utilize human factors methodologies to investigate incidents and accidents, identifying root causes and preventing recurrence.
12. Understand the principles of a just culture and its role in encouraging reporting and learning from human errors.
13. Prepare for the human factors implications of future ATM technologies, including AI and increased automation.

Organizational Benefits

- Proactive identification and mitigation of human error lead to a significant decrease in safety-related occurrences.
- Fosters an environment where reporting errors, learning from mistakes, and continuous improvement are actively encouraged.

- Optimized human performance translates to smoother traffic flow, reduced delays, and more efficient airspace utilization.
- Equips controllers with the mental and emotional tools to cope with high-pressure situations, reducing burnout and improving retention.
- Meets international standards and best practices for human factors training in aviation, ensuring regulatory adherence.
- Better teamwork and communication lead to more effective utilization of human and technological resources.
- Enhances collaboration and understanding among controllers, supervisors, and support staff.
- Develops a proactive approach to identifying and addressing human-related risks before they escalate into significant events.

Target Audience

1. Air Traffic Controllers (ATCOs)
2. ATC Supervisors and Managers
3. On-the-Job Training (OJT) Instructors.
4. ATC Training Developers.
5. Safety Managers and Analysts.
6. Human Factors Specialists.
7. Air Navigation Service Provider (ANSP) Personnel
8. Aviation Regulators.

Course Outline

Module 1: Introduction to Human Factors in Aviation

- Definition and Scope of Human Factors in ATC.
- Historical Overview: Major Accidents and Human Factors Contribution.
- The SHEL Model (Software, Hardware, Environment, Liveware) in ATC.
- Human-System Integration Principles.
- **Case Study:** Analysis of a historical ATC incident where human factors played a significant role (e.g., Tenerife Airport Disaster).

Module 2: Human Information Processing and Perception

- Sensory Systems and Their Limitations (Vision, Hearing).
- Attention, Memory, and Information Overload in ATC.
- Perception of Space, Time, and Movement in Airspace.
- The Role of Expectation and Confirmation Bias.
- **Case Study:** Misinterpretation of radar data or radio calls due to perceptual biases.

Module 3: Decision-Making and Problem Solving in ATC

- Models of Decision-Making (e.g., Recognition-Primed Decisions, Rational Choice).
- Cognitive Biases and Heuristics in ATC Decisions.
- Decision-Making Under Stress and Uncertainty.
- Error Traps and Strategies for Effective Problem Solving.
- **Case Study:** A near-miss incident where a critical decision was made under extreme time pressure.

Module 4: Communication and Teamwork (TRM)

- Principles of Effective Communication in ATC (Clarity, Conciseness, Accuracy).
- Barriers to Communication and Strategies for Overcoming Them.
- Team Resource Management (TRM) Principles for ATC Teams.
- Leadership, Followership, and Assertiveness in the Control Room.
- **Case Study:** Analysis of communication breakdowns contributing to an operational error or incident.

Module 5: Workload Management and Performance

- Understanding Cognitive and Physical Workload in ATC.
- Factors Influencing Workload (Traffic Density, Complexity, Emergencies).
- Strategies for Managing Workload and Prioritization.
- Impact of Automation on Workload Distribution.
- **Case Study:** Scenarios involving high traffic periods or multiple simultaneous events requiring effective workload distribution.

Module 6: Fatigue and Stress Management

- Physiology of Fatigue and Circadian Rhythms.
- Impact of Fatigue on Performance, Attention, and Decision-Making.
- Stressors in the ATC Environment and Their Physiological/Psychological Effects.
- Individual and Organizational Strategies for Fatigue and Stress Management.
- **Case Study:** An incident potentially linked to controller fatigue or prolonged periods of stress.

Module 7: Human Error and Error Management

- Models of Human Error (e.g., Reason's Swiss Cheese Model).
- Types of Errors (Slips, Lapses, Mistakes, Violations).
- Error Detection, Recovery, and Mitigation Strategies.
- The Concept of a "Just Culture" in ATC.
- **Case Study:** Analysis of a routine operational error and its underlying human factors.

Module 8: Automation and Human-Automation Interaction

- Levels of Automation in ATC Systems.
- Benefits and Risks of Automation (e.g., Automation Bias, Skill Degradation).
- Principles of Human-Centered Design for ATC Systems.
- Maintaining Manual Skills in Automated Environments.
- **Case Study:** An event where over-reliance on automation or a misinterpretation of automation status led to an issue.

Module 9: Individual Differences and Human Performance

- Impact of Personality, Experience, and Training on Performance.
- Factors Affecting Individual Vulnerability to Error.
- Importance of Self-Awareness and Self-Regulation.
- Ergonomics and Human Factors in Workstation Design.
- **Case Study:** Discussing how individual differences in cognitive style might influence responses to a given scenario.

Module 10: Human Factors in Incident and Accident Investigation

- Role of Human Factors in Safety Investigations.

- Techniques for Identifying Human Factors Contributions (e.g., SHEL, HFACS).
- Analyzing Causal Factors and Contributing Factors.
- Developing Effective Safety Recommendations.
- **Case Study:** A detailed post-incident analysis focusing on the human factors identified.

Module 11: Safety Culture and Organizational Factors

- Defining Safety Culture in ATC.
- The Influence of Organizational Climate and Leadership on Safety.
- Reporting Systems and Their Role in Safety Improvement.
- Promoting a Proactive and Learning Safety Culture.
- **Case Study:** Examining an organizational shift that either improved or negatively impacted safety culture within an ANSP.

Module 12: Human Factors in Procedures and Checklists

- Principles of Effective Procedure Design.
- Cognitive Aspects of Following Procedures and Checklists.
- Identifying and Mitigating Procedure-Related Errors.
- The Role of Checklists in Enhancing Safety and Efficiency.
- **Case Study:** A scenario where ambiguous or poorly designed procedures contributed to an operational error.

Module 13: Human Factors in Training and Simulation

- Integrating Human Factors Principles into ATC Training Programs.
- The Role of Simulation in Developing Human Factors Skills.
- Debriefing Techniques for Learning from Performance.
- Continuous Professional Development for Human Factors Competence.
- **Case Study:** Evaluating the effectiveness of a simulation exercise in addressing specific human factors challenges.

Module 14: Emerging Technologies and Future Human Factors Challenges

- The Human Factors of Artificial Intelligence (AI) in ATC.
- UAS Integration and Human-UAS Interaction.
- Cybersecurity and Human Factors Vulnerabilities.
- Future Trends in ATM and Their Human Factors Implications.
- **Case Study:** Exploring the human factors considerations for integrating AI-driven decision support tools into ATC operations.

Module 15: Practical Application and Action Planning

- Applying Human Factors Principles to Daily ATC Operations.
- Developing Personal Human Factors Improvement Plans.
- Contributing to a Human Factors-Focused Safety Management System.
- Group Exercises and Scenario-Based Problem Solving.
- **Case Study:** Participants work in groups to develop a human factors intervention plan for a hypothetical recurring operational issue.

Training Methodology

This training course will utilize a blended learning approach to maximize engagement and knowledge retention:

- **Interactive Lectures and Presentations:** Core concepts delivered with visual aids and real-world examples.
- **Group Discussions and Brainstorming:** Encouraging participants to share experiences and perspectives.
- **Case Studies Analysis:** In-depth examination of real or simulated incidents to apply theoretical knowledge.
- **Practical Exercises and Workshops:** Hands-on activities to reinforce learning and develop practical skills.
- **Role-Playing and Simulations:** Immersive scenarios to practice communication, decision-making, and teamwork in a controlled environment.
- **Video Analysis:** Review of aviation incidents to identify human factors at play.
- **Expert Guest Speakers:** Insights from experienced ATC professionals and human factors specialists.
- **Q&A Sessions:** Opportunities for participants to clarify doubts and deepen understanding.

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	04 Dec 2026	Online	$2,000
23 Nov 2026	04 Dec 2026	Physical	$3,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$9,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$12,000

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