



Brussels, 17/01/2025

Position Paper

Understanding the distinction between "Acclimatised" and "Synchronised" in Aviation Regulation FTL

The European aviation regulatory framework, specifically the ORO.FTL.105 definition provided by COMMISSION REGULATION (EU) No 83/2014, introduces critical terminology concerning crew fatigue management and circadian rhythm alignment. The terms "acclimatised" and "synchronised" are often used interchangeably, but their implications differ significantly, leading to potential misinterpretations and safety concerns.

Scientific Basis: Circadian Rhythm Synchronisation

Circadian rhythm synchronisation refers to a crew member's biological clock being aligned with the local time zone. Scientifically, a human's circadian rhythm can synchronise to only **one time zone at a time**. This biological alignment is essential to ensure the crew member's mental alertness and physical well-being, particularly in a high-stakes environment such as aviation.

When a crew member's circadian rhythm is synchronised to the local time, they are considered to be at their optimal functioning capacity. This synchronisation process is grounded in established chronobiology research, which highlights the adverse effects of circadian misalignment, including fatigue, decreased cognitive performance, and impaired decision-making.

Regulatory Interpretation: Acclimatised vs Synchronised

The regulation defines "acclimatised" as a state in which a crew member is considered adjusted to a **two-hour wide time zone band** surrounding the local time at the point of departure. This definition deviates from the scientific understanding of circadian rhythm synchronisation and raises concerns about its practical application in ensuring crew safety.

Key Differences:

1. **Synchronised:** A crew member's circadian rhythm is fully aligned with the local time zone where they are operating. This alignment is necessary to maintain alertness and reduce fatigue.
2. **Acclimatised:** A regulatory construct allowing a crew member to be deemed adjusted to a broader time zone range (up to 5 time zones). This definition does not require actual circadian rhythm synchronisation and introduces a level of flexibility that may compromise safety.

Implications of the Definition Shift

In the first part of the definition (ORO.FTL.105), the regulation appears to acknowledge the need for synchronisation with a single time zone. However, in the subsequent paragraph, the term "acclimatised" is introduced, creating a broader interpretation that allows for a less stringent requirement.

This shift from **scientific synchronisation** to **regulatory acclimatisation** has serious implications:

- **Scientific Inconsistency:** The notion that a crew member can be acclimatised to multiple time zones simultaneously contradicts chronobiological principles.
- **Operational Risks:** By considering crew members acclimatised across a two-hour wide time zone band, the regulation potentially underestimates fatigue risks and cognitive impairments.

The Problem with "Considered Acclimatised"

The phrase "considered to be acclimatised" indicates a regulatory assumption rather than a scientifically verified state. This regulatory flexibility prioritises operational convenience over the biological realities of human circadian rhythms.

In the initial definition, a crew member would need to meet two essential criteria to be considered acclimatised:

1. The crew member must be in the time zone they are synchronised to.
2. Their circadian rhythm must be synchronised with the local time zone.

The second part of the definition, however, removes the requirement for circadian synchronisation and introduces a **five-time-zone range** in which a crew member is considered acclimatised, irrespective of their actual biological state.

Conclusion: Prioritising Scientific Accuracy

The distinction between "acclimatised" and "synchronised" must be clarified to align regulatory practices with scientific research on circadian rhythms. The current regulatory approach risks prioritising operational flexibility over crew well-being and safety.

Regulators and operators should consider revising the definition to ensure that the concept of acclimatisation reflects the need for **true circadian rhythm synchronisation**. This adjustment would improve fatigue management policies, enhance crew performance, and ultimately ensure safer flight operation.

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