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| **1XXXXX** | **Interpret Crew Resource Management, Threat Management, and Human Factors for the aviation industry** |

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| **Kaupae |** Level | 4 |
| **Whiwhinga |** Credit | 8 |
| **Whāinga |** Purpose | People credited with this skill standard are able to identify and minimise the risk of human error within aviation systems by applying knowledge of Crew Resource Management, Threat and Error Management, and Human Factors in an aviation environment.  This skill standard can be used in programmes leading to a range of aviation qualifications and micro-credentials that include minimising the risk of human error within aviation systems. |

**Hua o te ako me Paearu aromatawai |** Learning outcomes and assessment criteria

| **Hua o te ako |** Learning outcomes | **Paearu aromatawai |** Assessment criteria |
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| 1. Identify and minimise the risk of human error within aviation systems by applying accepted industry models. | 1. Define ‘multicrew’ and explain the safety benefits and risks of multicrew operations. |
| 1. Explain the development of Human Factors and apply the model to accidents, incidents and accident reports. |
| 1. Explain Crew Resource Management and its application to managing threats and errors. |
| 1. Explain the concept of an ultra safe industry and its application to the aviation industry. |
| 1. Explain the effects and countermeasures of stress on the Liveware component of the SHELL model. |
| 1. Explain the principles of Threat and Error Management and the application of countermeasures. |
| 1. Identify and apply knowledge of effective teamwork in an aviation environment. | 1. Explain the concepts of effective teamwork and risks to it. |
| 1. Demonstrate effective teamwork. |

**Pārongo aromatawai me te taumata paearu |** Assessment information and grade criteria

*Assessment specifications:*

All descriptions, analysis and demonstrations of knowledge are to be made in accordance with accepted industry standards and texts.

Assessment must include the applications of the stated models when analysing incident and accident reports.

This skill standard can be undertaken by those working in multicrew or single pilot environments, with crew in these contexts referring to not only to pilots and cabin crew but also those involved in providing the services and support required to sustain an aviation enterprise.

*Definitions:*

*Accepted industry standards* refers to the recommended practices set by the International Civil Aviation Organization (ICAO) and the Civil Aviation Authority of New Zealand (CAA).

*SHELL* refers to the Software/Hardware/Environment/Liveware/(Liveware) model.

*Ultra safe industry* refers to the concept formulated and discussed by Prof. James Reason.

***Ngā momo whiwhinga |*** *Grades available*

Achieved

**Ihirangi waitohu |** Indicative content

Human Factors and Crew Resource Management

* The development of Human Factors, including ergonomics (anthropology, engineering, physiology, psychology).
* The role of Human Factors in accidents.
* The emergence of Crew Resource Management and its application.
* The role and content of ICAO Annexes 13 and 19
* Incident and accidents reports.

Ultra safe industry

* Information processing, including perception processes, basic physiology of sensors, attention, memory, and pattern recognition.
* Threats to decision-making.
* Systematic problem-solving models
* Countermeasures to barriers preventing good Crew Resource Management.
* Examples of other ultra safe industries.

The SHELL model

* How human factors are defined within the SHELL model.
* The effects of stress on the individual Liveware component of the SHELL model.
* Management of stress as a countermeasure, including defence mechanisms, coping strategies, and stress management processes.
* Incident and accidents reports.

Threat and Error Management

* The principle theories behind Threat and Error Management.
* The definitions of threats, errors, serious injury, incidents and accidents.
* The definitions of safety data, safety information and safety risk.
* Skill-based tools used as countermeasures.
* Decision-making models.
* The role of Crew Resource Management in managing actual and potential threats and errors.
* Avoidance trapping and mitigating error.
* How cognitive processes influence information processing.
* Incident and accidents reports.

Teamwork

* Concepts of effective teamwork.
* Examples of poor teamwork.
* Accident events and limitations of the individual Liveware component when affected by concepts of conformance, lack of authority or leadership skills.
* Risky shift.

**Rauemi |** Resources

* [www.aviation.govt.nz/safety/safety-education-and-advice/human-factors/](http://www.aviation.govt.nz/safety/safety-education-and-advice/human-factors/)
* [www.aviation.govt.nz/assets/publications/pilot-syllabus-assistance-archive/Subject\_34\_Human\_factors.pdf](http://www.aviation.govt.nz/assets/publications/pilot-syllabus-assistance-archive/Subject_34_Human_factors.pdf)
* Prof James Reason, *Human Error* (Cambridge: Cambridge University Press, 1990)
* Frank H Hawkins, and Harry W Orlady, *Human Factors in Flight*, 2nd ed (Hampshire: Ashgate Publishing, 1993)
* David O’Hare and Stanley Roscoe, *Flightdeck Performance – The Human Factor (*Ames, Iowa: Iowa State University Press, 1990)
* Roger G Green, Helen Muir, Melanie James, David Gradwell, and Roger L Green, *Human Factors for Pilots*, 2nd ed (Hampshire: Ashgate Publishing, 1996)
* ICAO Annexes 13 and 19.

**Pārongo Whakaū Kounga |** Quality assurance information

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| **Ngā rōpū whakatau-paerewa |** Standard Setting Body | Ringa Hora Services Workforce Development Council |
| **Whakaritenga Rārangi Paetae Aromatawai |** DASS classification | Service Sector > Aviation > Aviation - Core |
| **Ko te tohutoro ki ngā Whakaritenga i te Whakamanatanga me te Whakaōritenga |** CMR | 0112 |

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| **Hātepe |** Process | **Putanga |** Version | **Rā whakaputa |** ReviewDate | **Rā whakamutunga mō te aromatawai |** Last date for assessment |
| **Rēhitatanga |** Registration | 1 | [dd mm yyyy] | N/A |
| **Kōrero whakakapinga |** Replacement information | This skill standard replaced unit standard 21836. | | |
| **Rā arotake |** Planned review date | 30 December 2030 | | |

Please contact Ringa Hora Services Workforce Development Council at [qualifications@ringahora.nz](mailto:qualifications@ringahora.nz) to suggest changes to the content of this skill standard.