

Aerospace Systems 2019 v1.2

IA1: Sample assessment instrument

Project — folio (25%)

This sample has been compiled by the QCAA to assist and support teachers in planning and developing assessment instruments for individual school settings.

Student name

Student number

Teacher

Issued

Due date

Marking summary

| Criterion | Marks allocated | Provisional marks |
|------------------------------|-----------------|-------------------|
| Retrieving and comprehending | 5 | |
| Analysing | 7 | |
| Synthesising and evaluating | 9 | |
| Communicating | 4 | |
| Overall | 25 | |

Conditions

| | |
|-------------------------|---|
| Technique | Project — folio |
| Unit | Unit 3: Aerospace operational systems |
| Topic/s | Topic 1: International and national operational and safety systems Topic 2: Airspace management Topic 3: Safety management systems Topic 4: Operational accident and incident investigation processes Topic 5: Airport and airline operation systems |
| Duration | 5–7 weeks |
| Mode/length | Part A — Documents the development of an operational systems problem solution <ul style="list-style-type: none">• Multimodal: 7–9 single-sided A3 pages or equivalent digital media Part B — Summary report <ul style="list-style-type: none">• Multimodal: 2–3 single-sided A4 pages or equivalent digital media |
| Individual/group | Individual |
| Other | The table of contents and reference list are not included in the page count. |

Context

A regional airline, Realway, is considering reducing its flights from a coastal town (CT) because of a 50 per cent drop to 62,300 passengers over the previous 12-month period. Realway found this route is not profitable, as many CT flights are well under capacity.

Use of a hub and spoke aviation transportation system at CT means that almost all of Realway's short-range jet aircraft (with single-class seating and a capacity for 100 passengers) fly on spokes between CT and a hub city airport, offering very few or no direct flights to other regional towns.

Regional airports near CT (flying distance)

- The closest regional airport is 235 kilometres away.
- There are six regional airports within 500 kilometres and another eight within 800 kilometres
- The hub city airport is 875 kilometres away.

Realway currently operates two flights to and from CT every weekday, with half as many flights on Saturdays and Sundays.

Passengers are often required to spend many hours travelling to and from the hub city airport enroute to their final destination. This has caused a lot of frustration and resulted in many customers choosing to find alternative transportation that is more convenient and cost-effective.

Realway requires an equitable solution to this operational problem. One that will meet the needs of the CT travelling public and enable Realway to operate at a net profit of \$4 per passenger per 100-kilometre flying distance.

Task

There are two parts to this assessment:

Part A

- Use a folio to document a solution to Realway's CT operational problem. In the folio, document the Aerospace Systems problem-solving process used to develop and propose a solution. Your folio should include:
 - aircraft types, range, passenger yield and load factor
 - recommendation regarding the minimum flight distance between towns to provide a revenue available seat kilometre (RASK) basis for making decisions about route viability, including cost of available seat kilometre (CASK)
 - analysis of Realway's current and proposed future service to customer model
 - consideration of an increase in profitability rather than a decrease in customer service.

Part B

- Provide Realway with a summary report of your recommended solution to its operational problem.

To complete this task, you must:

Part A

- recognise and describe the characteristics of the operational systems problem in relation to related aerospace systems, subsystems and system components

- symbolise and explain the incorporated aerospace systems, the development of ideas and the solution with visual frameworks, causal and feedback loops, flow charts, diagrams, sketches and/or pictures
- analyse aerospace systems, technology and research information, contributing factors, and areas of weakness, to identify the elements, components, and features, and their relationship to the structure of the aerospace operational systems problem
- determine solution success criteria considering the identified elements, components and features, and their relationship to the structure of the aerospace operational systems problem • synthesise aerospace systems, technology, and research information, and ideas to propose a possible solution to the aerospace operational systems problem
- generate the proposed solution for the aerospace operational systems problem, and test, simulate or hypothesise to provide data (e.g. pictures, tables, surveys, interview recordings, audio-visual recording) for evaluation including (if applicable) annotated photographs or screen captures of the solution prior to and after testing, simulating or hypothesising
- evaluate and refine ideas and a solution for the aerospace operational systems problem in relation to solution success criteria
- recommend and justify future modifications or enhancements to ideas and the solution to the aerospace operational systems problem
- communicate the development of ideas and the solution for the aerospace operational systems problem using written and visual features, e.g. PMI (plus, minus, interesting) charts, tables, pictures, bubble diagrams, feedback loops
- communicate data using diagrams, tables and/or spreadsheets.

Part B

Develop a summary report for the airline drawn from Part A documentation. The summary report includes key visual frameworks, feedback loops, flow charts, diagrams, sketches or pictures that provide a concise account of the preferred solution, including the key features of the solution and any recommendations made to inform future solution development.

Checkpoints

- Term 1 Week 6: Submit a draft during the allocated assessment time, which explores the operational systems problem, develops ideas and proposes a solution.

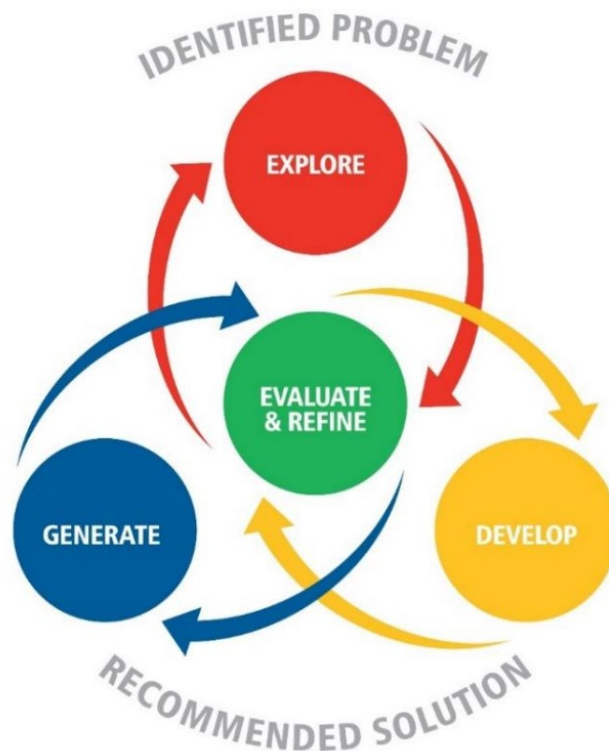
Authentication strategies

- The teacher will provide class time for task completion.
- Students will produce sections of the final response under supervised conditions.
- Students will each produce a unique response with the teacher monitoring how they identify the problem and problem solve.
- Students will provide documentation of their progress at indicated checkpoints.
- The teacher will conduct interviews or consultations with each student as they develop the response.
- Students must acknowledge all sources.
- Students must submit a declaration of authenticity.
- The teacher will ensure class cross-marking occurs.

Scaffolding

In Aerospace Systems, students are required to document in a folio how they apply a problem-solving process in response to an identified real-world aerospace problem.

The problem-solving process in Aerospace Systems



The response will include the following folio and referencing conventions:

- headings that organise and communicate the student's thinking through the iterative phases of the problem-solving process in Aerospace Systems
- a table of contents page
- a reference list and a recognised system of in-text referencing.

Instrument-specific marking guide (IA1): Project — folio (25%)

Criterion: Retrieving and comprehending

Assessment objectives

1. recognise and describe the operational systems problem, aerospace technology knowledge, concepts and principles, and systems thinking habits and systems thinking strategies in relation to aerospace management, safety, airline and/or airport operations
2. symbolise and explain ideas, a solution and relationships in relation to aerospace management, safety, airline and/or airport operations

| The student work has the following characteristics: | Marks |
|--|-------|
| <ul style="list-style-type: none"> • accurate and discriminating recognition and discerning description of the operational systems problem, aerospace technology knowledge, concepts and principles, and systems thinking habits and systems thinking strategies in relation to aerospace management, safety, airline and/or airport operations • adept symbolisation and discerning explanation of ideas, a solution and relationships in relation to aerospace management, safety, airline and/or airport operations with visual frameworks, causal and feedback loops, flow charts, diagrams, sketches and/or pictures. | 4–5 |
| <ul style="list-style-type: none"> • accurate recognition and appropriate description of the operational systems problem, aerospace technology knowledge, concepts and principles, and some systems thinking habits and systems thinking strategies in relation to aerospace management, safety, airline and/or airport operations • competent symbolisation and appropriate explanation of some ideas, a solution and relationships in relation to aerospace management, safety, airline and/or airport operations with visual frameworks, causal and feedback loops, flow charts, diagrams, sketches and/or pictures. | 2–3 |
| <ul style="list-style-type: none"> • variable recognition and superficial description of aspects of the operational systems problem, concepts or principles in relation to aerospace management, safety, airline and/or airport operations • variable symbolisation or superficial explanation of aspects of ideas, a solution, or relationships in relation to aerospace management, safety, airline and/or airport operations. | 1 |
| <ul style="list-style-type: none"> • does not satisfy any of the descriptors above. | 0 |

Criterion: Analysing

Assessment objectives

- analyse the operational systems problem and information in relation to aerospace management, safety, airline and/or airport operations
- determine solution success criteria for the operational systems problem

| The student work has the following characteristics: | Marks |
|---|-------|
| <ul style="list-style-type: none">insightful analysis of the operational systems problem, and relevant aerospace systems, technology, and research information in relation to aerospace management, safety, airline and/or airport operations to identify the relevant elements, components and features, and their relationship to the structure of the problemastute determination of essential solution success criteria for the operational systems problem. | 6–7 |
| <ul style="list-style-type: none">considered analysis of the operational systems problem, and relevant aerospace systems, technology, and research information in relation to aerospace management, safety, airline and/or airport operations to identify the relevant elements, components and features, and their relationship to the structure of the problemlogical determination of effective solution success criteria for the operational systems problem | 4–5 |
| <ul style="list-style-type: none">appropriate analysis of the operational systems problem and aerospace systems, technology, and research information in relation to aerospace management, safety, airline and/or airport operations to identify some of the elements, components and features of the problemreasonable determination of some solution success criteria for the operational systems problem. | 2–3 |
| <ul style="list-style-type: none">statements about the operational systems problem, or information in relation to aerospace management, safety, airline and/or airport operationsvague determination of some success criteria for the operational systems problem. | 1 |
| <ul style="list-style-type: none">does not satisfy any of the descriptors above. | 0 |

Criterion: Synthesising and evaluating

Assessment objectives

5. synthesise information and ideas to propose a possible aerospace management, safety, airline and/or airport operations solution
6. generate an aerospace management, safety, airline and/or airport operations solution to provide data to assess the feasibility of the proposal
7. evaluate and refine ideas and a solution to make justified recommendations

| The student work has the following characteristics: | Marks |
|--|-------|
| <ul style="list-style-type: none"> • coherent and logical synthesis of relevant aerospace systems, technology and research information, and ideas to propose a possible aerospace management, safety, airline and/or airport operations solution • purposeful generation of an aerospace management, safety, airline and/or airport operations solution to provide valid data to critically assess the feasibility of a proposal • critical evaluation and discerning refinement of ideas and a solution using success criteria to make astute recommendations justified by data and research evidence. | 8–9 |
| <ul style="list-style-type: none"> • logical synthesis of relevant aerospace systems, technology and research information, and ideas to propose a possible aerospace management, safety, airline and/or airport operations solution • effective generation of an aerospace management, safety, airline and/or airport operations solution to provide valid data to effectively assess the feasibility of a proposal • reasoned evaluation and effective refinement of ideas and a solution using success criteria to make considered recommendations justified by data and research evidence. | 6–7 |
| <ul style="list-style-type: none"> • simple synthesis of aerospace systems, technology, and research information and ideas to propose a possible aerospace management, safety, airline and/or airport operations solution • adequate generation of an aerospace management, safety, airline and/or airport operations solution to provide relevant data to assess the feasibility of a proposal • feasible evaluation and adequate refinement of ideas and a solution using some success criteria to make fundamental recommendations justified by data and research evidence. | 4–5 |
| <ul style="list-style-type: none"> • rudimentary synthesis of partial aerospace systems, technology, or research information and/or ideas to propose an aerospace management, safety, airline and/or airport operations solution • partial generation of an aerospace management, safety, airline and/or airport operations solution to provide elements of data to partially assess the feasibility of a proposal • superficial evaluation of ideas or a solution using some success criteria to make elementary recommendations. | 2–3 |
| <ul style="list-style-type: none"> • unclear combinations of information or ideas • generation of elements of an aerospace management, safety, airline and/or airport operations solution • identification of a change about an idea or the solution. | 1 |
| <ul style="list-style-type: none"> • does not satisfy any of the descriptors above. | 0 |

Criterion: Communicating

Assessment objectives

8. make decisions about and use mode-appropriate features, language and conventions to communicate development of the solution

| The student work has the following characteristics: | Marks |
|---|-------|
| <ul style="list-style-type: none">discerning decision-making about, and fluent use of,<ul style="list-style-type: none">written and visual features to communicate about a solutionlanguage for a technical audiencegrammatically accurate language structuresfolio and referencing conventions. | 3–4 |
| <ul style="list-style-type: none">variable decision-making about, and inconsistent use of,<ul style="list-style-type: none">written and visual featuressuitable languagegrammar and language structuresfolio or referencing conventions. | 1–2 |
| <ul style="list-style-type: none">does not satisfy any of the descriptors above. | 0 |



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