Aerospace Systems subject report

2025 cohort

January 2026

Queensland Government
QCAA Queensland Curriculum & Assessment Authority

260039

For all Queensland schools

Queensland Curriculum & Assessment Authority
PO Box 307 Spring Hill QLD 4004 Australia

Phone: (07) 3864 0299
Email: office@qcaa.qld.edu.au
Website: www.qcaa.qld.edu.au

Contents

Introduction

The annual subject reports seek to identify strengths and opportunities for improvement of internal and external assessment processes for all Queensland schools. The 2025 subject report is the culmination of the partnership between schools and the QCAA. It addresses school-based assessment design and judgments, and student responses to external assessment for General and General (Extension) subjects. In acknowledging effective practices and areas for refinement, it offers schools timely and evidence-based guidance to further develop student learning and assessment experiences for 2026.

The report also includes information about:

- how schools have applied syllabus objectives in the design and marking of internal assessments
- how syllabus objectives have been applied in the marking of external assessments
- patterns of student achievement
- important considerations to note related to the revised 2025 syllabus (where relevant).

The report promotes continuous improvement by:

- identifying effective practices in the design and marking of valid, accessible and reliable assessments
- recommending where and how to enhance the design and marking of valid, accessible and reliable assessment instruments
- providing examples that demonstrate best practice.

Schools are encouraged to reflect on the effective practices identified for each assessment, consider the recommendations to strengthen assessment design and explore the authentic student work samples provided.

Audience and use

This report should be read by school leaders, subject leaders, and teachers to:

- inform teaching and learning and assessment preparation
- assist in assessment design practice
- assist in making assessment decisions
- help prepare students for internal and external assessment.

The report is publicly available to promote transparency and accountability. Students, parents, community members and other education stakeholders can use it to learn about the assessment practices and outcomes for senior subjects.

Subject highlights

10
schools offered Aerospace Systems

70%
of IA3 endorsed at Application 1

100%
agreement with provisional marks for IA2

Subject data summary

Unit completion

The following data shows students who completed the General subject.

Note: All data is correct as at January 2026. Where percentages are provided, these are rounded to two decimal places and, therefore, may not add up to 100%.

Number of schools that offered Aerospace Systems: 10.

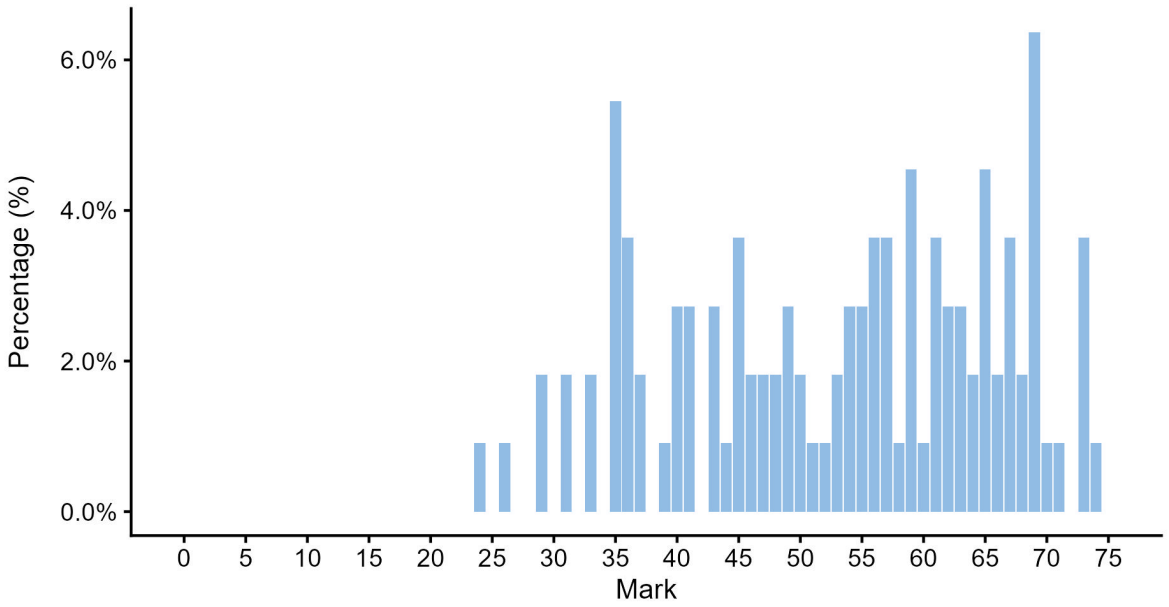
Completion of units	Unit 1	Unit 2	Units 3 and 4
Number of students completed	130	124	110

Units 1 and 2 results

Number of students	Unit 1	Unit 2
Satisfactory	118	114
Unsatisfactory	12	10

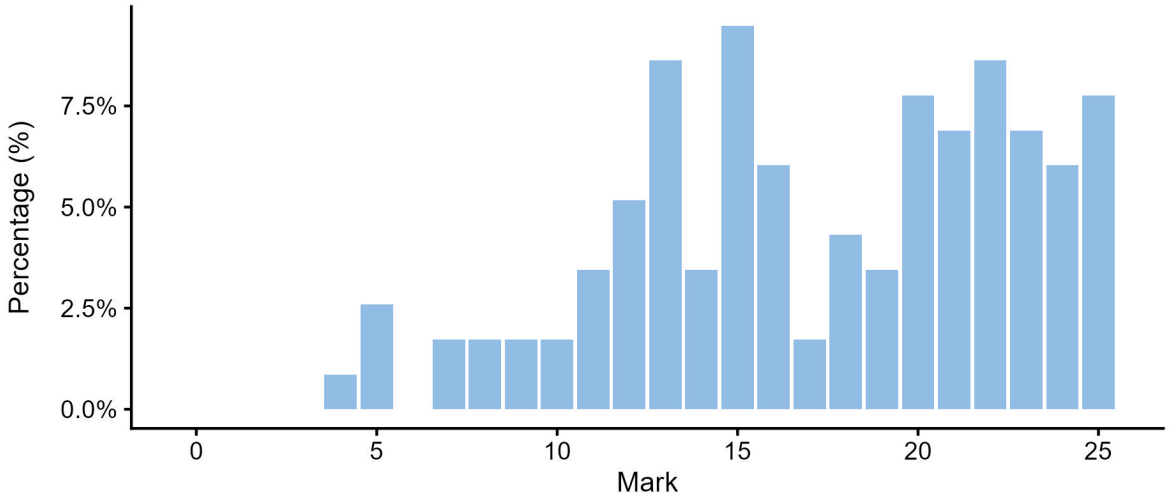
Units 3 and 4 internal assessment (IA) results

Total marks for IA

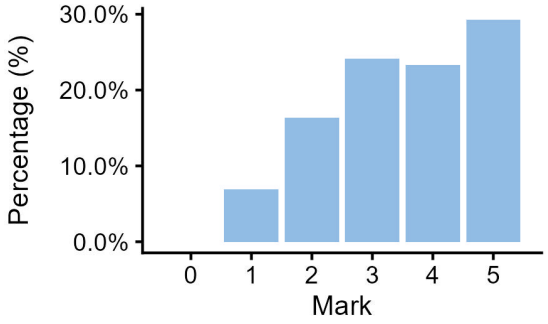


IA1 marks

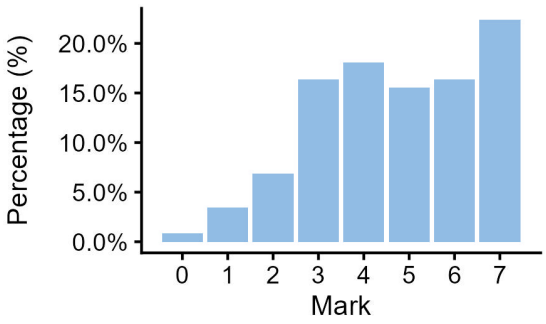
IA1 total



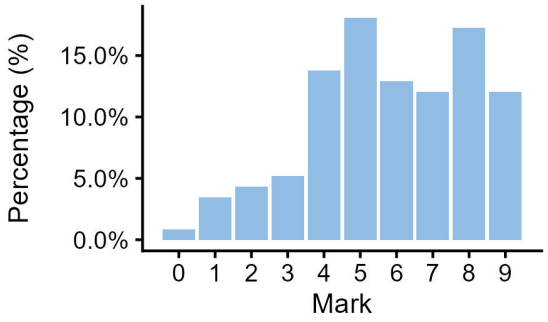
IA1 Criterion: Retrieving and comprehending



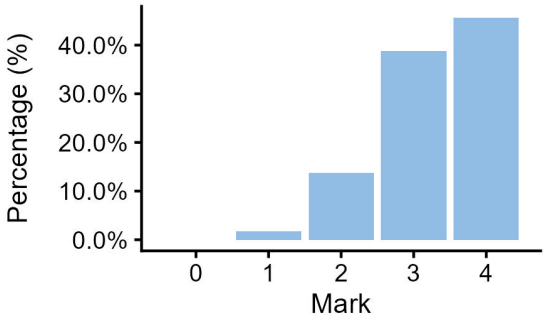
IA1 Criterion: Analysing



IA1 Criterion: Synthesising and evaluating

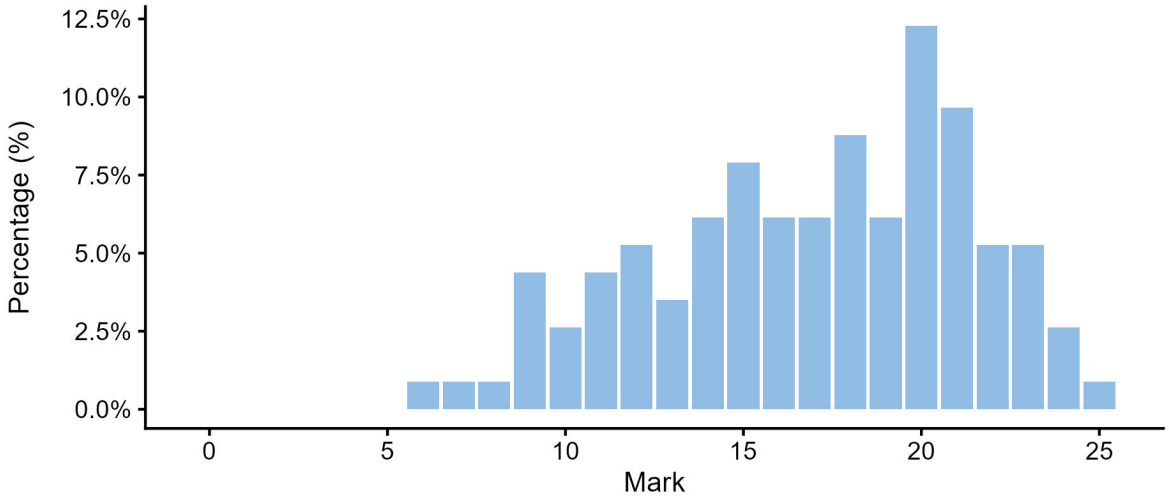


IA1 Criterion: Communicating

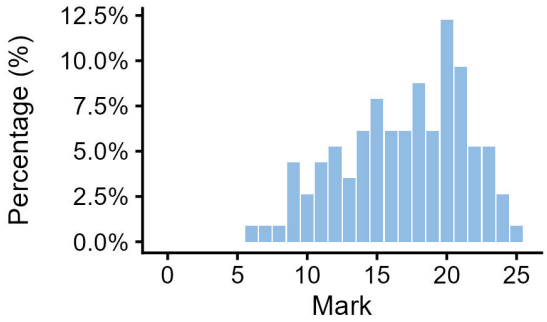


IA2 marks

IA2 total

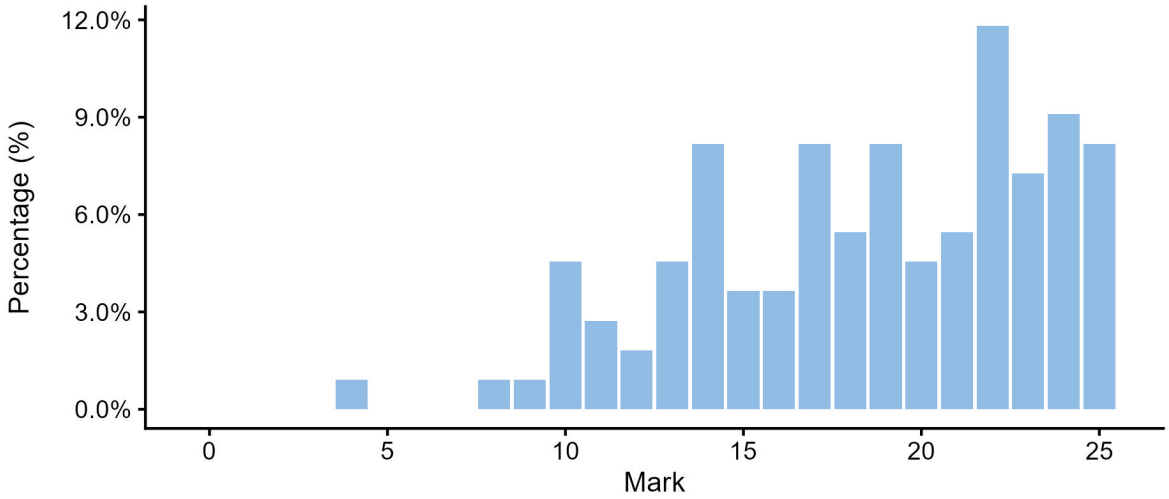


IA2 Criterion: Aerospace systems knowledge and problem-solving

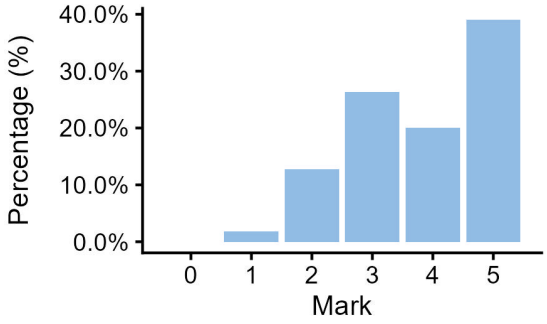


IA3 marks

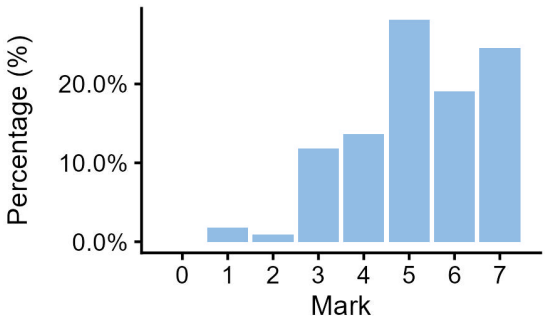
IA3 total



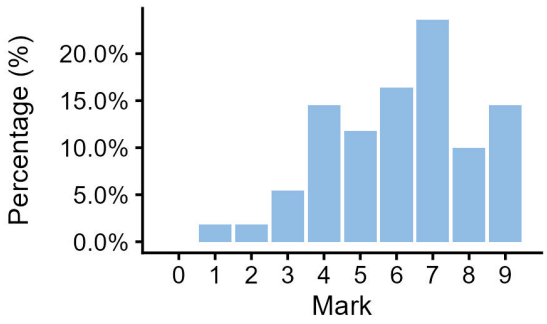
IA3 Criterion: Retrieving and comprehending



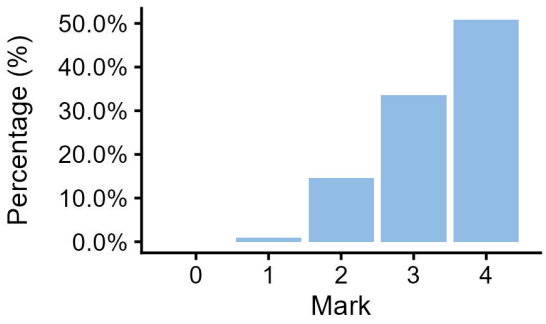
IA3 Criterion: Analysing



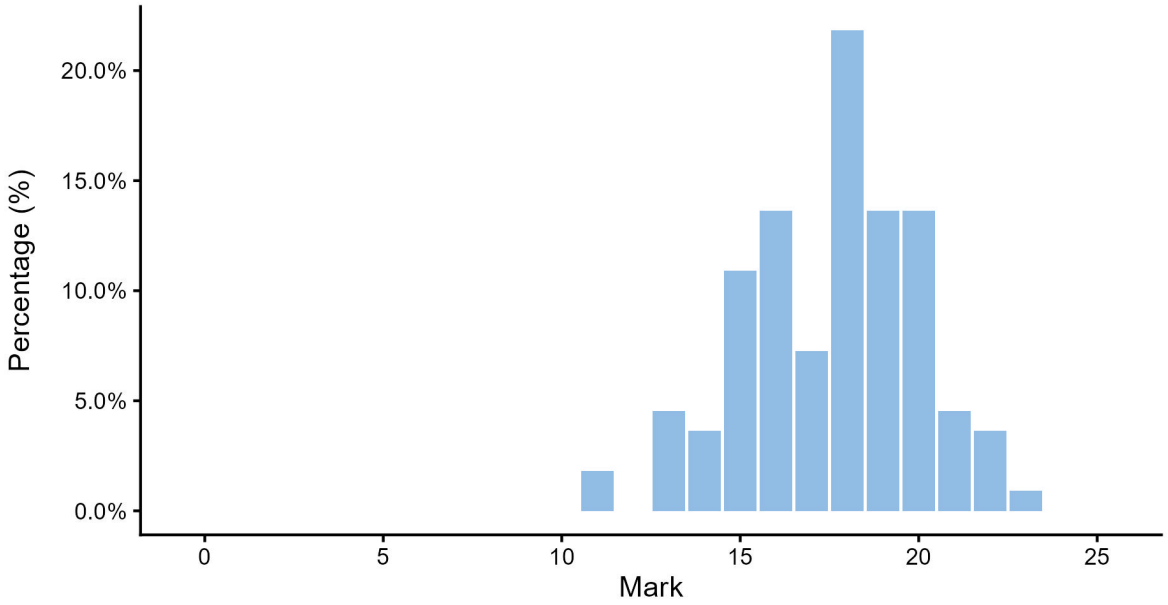
IA3 Criterion: Synthesising and evaluating



IA3 Criterion: Communicating

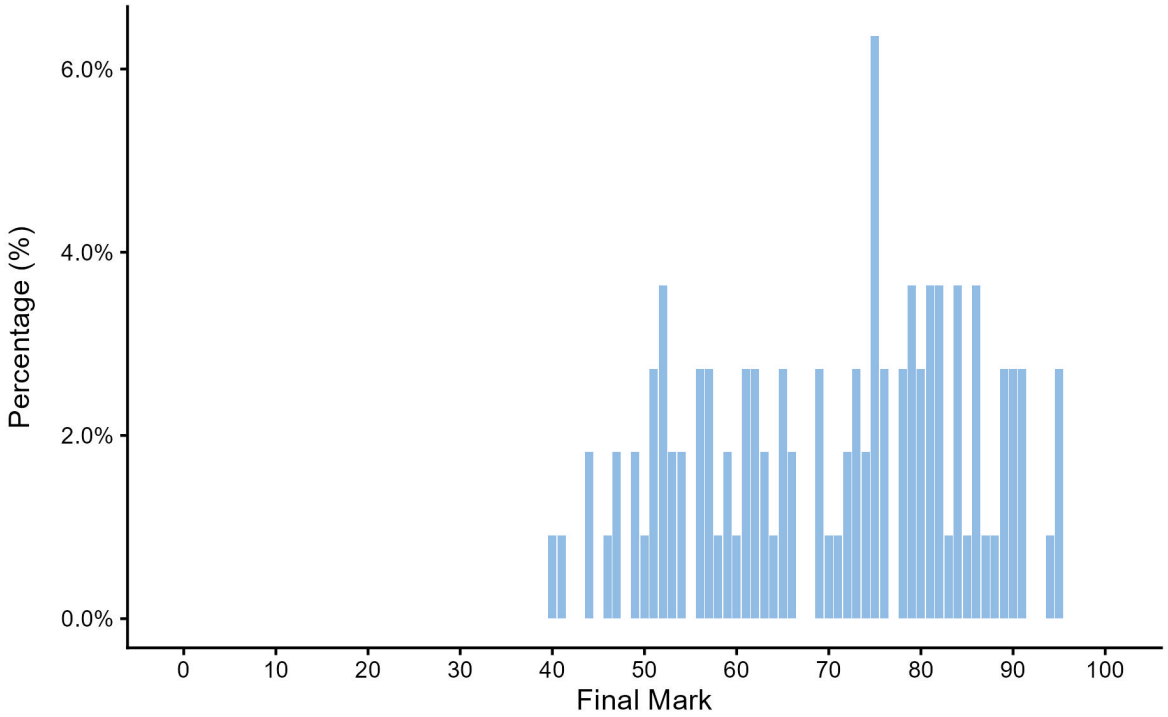


External assessment (EA) marks



Final subject results

Final marks for IA and EA



Grade boundaries

The grade boundaries are determined using a process to compare results on a numeric scale to the reporting standards.

Standard	A	B	C	D	E
Marks achieved	100–83	82–66	65–43	42–19	18–0

Distribution of standards

Number of students who achieved each standard across the state.

Standard	A	B	C	D	E
Number of students	25	42	41	2	0
Percentage of students	22.73	38.18	37.27	1.82	0.00

Internal assessment

This information and advice relate to the assessment design and assessment decisions for each IA in Units 3 and 4. These instruments have undergone quality assurance processes informed by the attributes of quality assessment (validity, accessibility and reliability).

Endorsement

Endorsement is the quality assurance process based on the attributes of validity and accessibility. These attributes are categorised further as priorities for assessment, and each priority can be further broken down into assessment practices.

Data presented in the Assessment design section identifies the reasons why IA instruments were not endorsed at Application 1, by the priority for assessment. An IA may have been identified more than once for a priority for assessment, e.g. it may have demonstrated a misalignment to both the subject matter and the assessment objective/s.

Refer to *QCE and QCIA policy and procedures handbook v7.0*, Section 9.5.

Percentage of instruments endorsed in Application 1

Internal assessment	IA1	IA2	IA3
Number of instruments	10	10	10
Percentage endorsed in Application 1	20	40	70

Confirmation

Confirmation is the quality assurance process based on the attribute of reliability. The QCAA uses provisional criterion marks determined by teachers to identify the samples of student responses that schools are required to submit for confirmation.

Confirmation samples are representative of the school's decisions about the quality of student work in relation to the instrument-specific marking guide (ISMG) and are used to make decisions about the cohort's results.

Refer to *QCE and QCIA policy and procedures handbook v7.0*, Section 9.6.

The following table includes the percentage agreement between the provisional marks and confirmed marks by assessment instrument. The Assessment decisions section for each assessment instrument identifies the agreement trends between provisional and confirmed marks by criterion.

Number of samples reviewed and percentage agreement

IA	Number of schools	Number of samples requested	Number of additional samples requested	Percentage agreement with provisional marks
1	10	68	0	90.00
2	10	68	0	100.00
3	10	66	0	70.00

Internal assessment 1 (IA1)

Project — folio (25%)

This assessment focuses on a problem-solving process that requires the application of a range of cognitive, technical and creative skills and theoretical understandings. Students document the iterative process undertaken to develop a solution to a problem. The response is a coherent work that includes written paragraphs and annotations, diagrams, sketches, drawings, photographs, tables, spreadsheets and prototypes.

This assessment occurs over an extended and defined period of time. Students may use class time and their own time to develop a response.

Assessment design

Validity

Validity in assessment design considers the extent to which an assessment item accurately measures what it is intended to measure and that the evidence of student learning collected from an assessment can be legitimately used for the purpose specified in the syllabus.

Reasons for non-endorsement by priority of assessment

Validity priority	Number of times priority was identified in decisions
Alignment	8
Authentication	1
Authenticity	1
Item construction	1
Scope and scale	0

Effective practices

Validity priorities were effectively demonstrated in assessment instruments that:

- provided appropriate scope and scale for students to develop unique responses within the syllabus conditions without compromising complexity
- contained authentication strategies that reflected the QCAA guidelines for assuring student authorship
- included scaffolding with clear instructions about the processes students should follow to complete the response.

Practices to strengthen

It is recommended that assessment instruments:

- indicate the appropriate topic selections in the conditions and describe aspects of the topics in the task. When submitting instruments for endorsement, schools should not tick non-compulsory topics in the Endorsement application (app), that have not been included in the task. Compulsory topics (e.g. Airspace Management or Safety Management Systems) must be covered in the task

- provide a context that relates to the task. If the task involves redesigning an airport, explain why the redevelopment is necessary, e.g. a quote from the airport's master plan
- reproduce Part A and B specifications directly from the syllabus without adaptations or alterations
- list checkpoints in sequential order and indicate the week when drafts and finals are due
- include the problem-solving process diagram and expectations from Syllabus section 1.2.4 at the end of the task section or in the scaffolding section.

Accessibility

Accessibility in assessment design ensures that no student or group of students is disadvantaged in their capacity to access an assessment.

Reasons for non-endorsement by priority of assessment

Accessibility priority	Number of times priority was identified in decisions
Bias avoidance	0
Language	1
Layout	0
Transparency	0

Effective practices

Accessibility priorities were effectively demonstrated in assessment instruments that:

- were less biased and contained appropriate content, e.g. used gender-neutral language and refrained from gender stereotyping
- used legible, clear, relevant, high-resolution images, diagrams or other visual elements.

Practices to strengthen

It is recommended that assessment instruments:

- use appropriate language and punctuation, and well-defined formatting, so students understand the elements of the assessment item, e.g. using dot points to make it easier to read and understand the required elements. For instance, for an airport design task, the folio should address airport design considerations, including
  - location
  - runway design
  - taxiway and apron design
  - terminal design
  - environmental impacts
  - accessibility
  - security
  - ground support services
  - infrastructure
  - an analysis of safety issues associated with your solution, including air traffic management requirements.

Additional advice

When developing an assessment instrument for this IA, it is essential to consider the following key differences between the 2019 and 2025 syllabuses:

- The Project folio technique has been replaced with an Aerospace solution technique.
- Response length has been reduced, e.g. written and visual (including images, graphs, calculations and diagrams) responses of up to 10 A4 pages or 2000 words (syllabus, p. 36).
- A word limit has been introduced.
- Assessment objectives 1 and 3 have been removed.
- Specifications have been updated to reflect removal of assessment objectives.
- Mark allocations in IA1 have been adjusted to
  - symbolising and communicating — 7 marks
  - determining and generating — 9 marks
  - synthesising and evaluating — 9 marks.

Schools should:

- add, unaltered, the specifications from p. 35 in the 2025 syllabus when creating the task in the Endorsement app
- add the problem-solving process diagram from p. 8 in the 2025 syllabus in the Scaffolding section of the Endorsement app.

Assessment decisions

Reliability

Reliability refers to the extent to which the results of assessments are consistent, replicable and free from error.

Agreement trends between provisional and confirmed marks

Criterion number	Criterion name	Percentage agreement with provisional	Percentage less than provisional	Percentage greater than provisional	Percentage both less and greater than provisional
1	Retrieving and comprehending	90.00	0.00	10.00	0.00
2	Analysing	90.00	0.00	10.00	0.00
3	Synthesising and evaluating	100.00	0.00	0.00	0.00
4	Communicating	100.00	0.00	0.00	0.00

Effective practices

Reliable judgments were made using the ISMG for this IA when:

- for the Synthesising and evaluating criterion
  - there was evidence of thoughtful, well-structured, and coherent combinations of ideas integrated with relevant information from the analysis of the problem. These ideas

incorporated aerospace systems, technology, and research data to propose a viable aerospace solution addressing aerospace management, safety, airline, and/or airport operations

  - marks were allocated where solution success criteria were effectively applied to evaluate the merit or value of ideas and the proposed solution
  - there was evidence of thoughtful and astute choices that were made to enhance or refine the solution based on evaluation outcomes, with recommendations supported and justified by robust data and research
- for the Communicating criterion
  - there was evidence of careful and deliberate decision-making in relation to the selection and fluent use of written features to communicate about a solution to a real-world-related problem with accurate spelling, grammar and appropriate technical language.

Practices to strengthen

To further ensure reliable judgments are made using the ISMG for this IA, it is recommended that:

- when matching evidence to the descriptors in the Symbolise and explain criterion at the upper performance level, attention should be given to representations of ideas and a solution using visual features, such as
  - visual frameworks, causal and feedback loops that demonstrate a high degree of skill and proficiency and have a sufficient level of detail to communicate how the ideas will respond to the problem, e.g. representing systems, safety and operations that address systems thinking and strategies
  - diagrams, graphs, tables and/or schemas that are selected for their value or worth in providing additional information about ideas and a solution, and demonstrate a high level of skill and accuracy in their use, e.g. accurate and clear labelling conventions for tables and graphs, economic comparisons, route selection and calculations
- when matching evidence to the descriptors in the Determine criterion at the upper performance level, attention should be given to
  - success criteria that have been determined from the problem's synthesised data/calculations and research that extends beyond the parameters stated in the assessment instrument. These include measurable attributes in relation to loading and dimensions, and can be used to establish the merit or worth of ideas and the success of the proposed real-world aerospace solution. The success criteria should be explicitly stated, not implied.

When making judgments for this IA for the 2025 syllabus, it is essential to consider the following key differences between the ISMGs in the 2019 and 2025 syllabuses:

- The Retrieving and comprehending criterion from the 2019 syllabus no longer exists. The criterion in the 2025 syllabus has been replaced by the Symbolising and communicating criterion, and the recognise and describe objective has not carried forward into this criterion.
- The 2025 syllabus does not assess the Analysing criterion and the analyse objective has been removed. The other objectives from the 2019 syllabus Analysing criterion have been carried forward and grouped differently into the Determining and generating criterion.

Additional advice

Schools should:

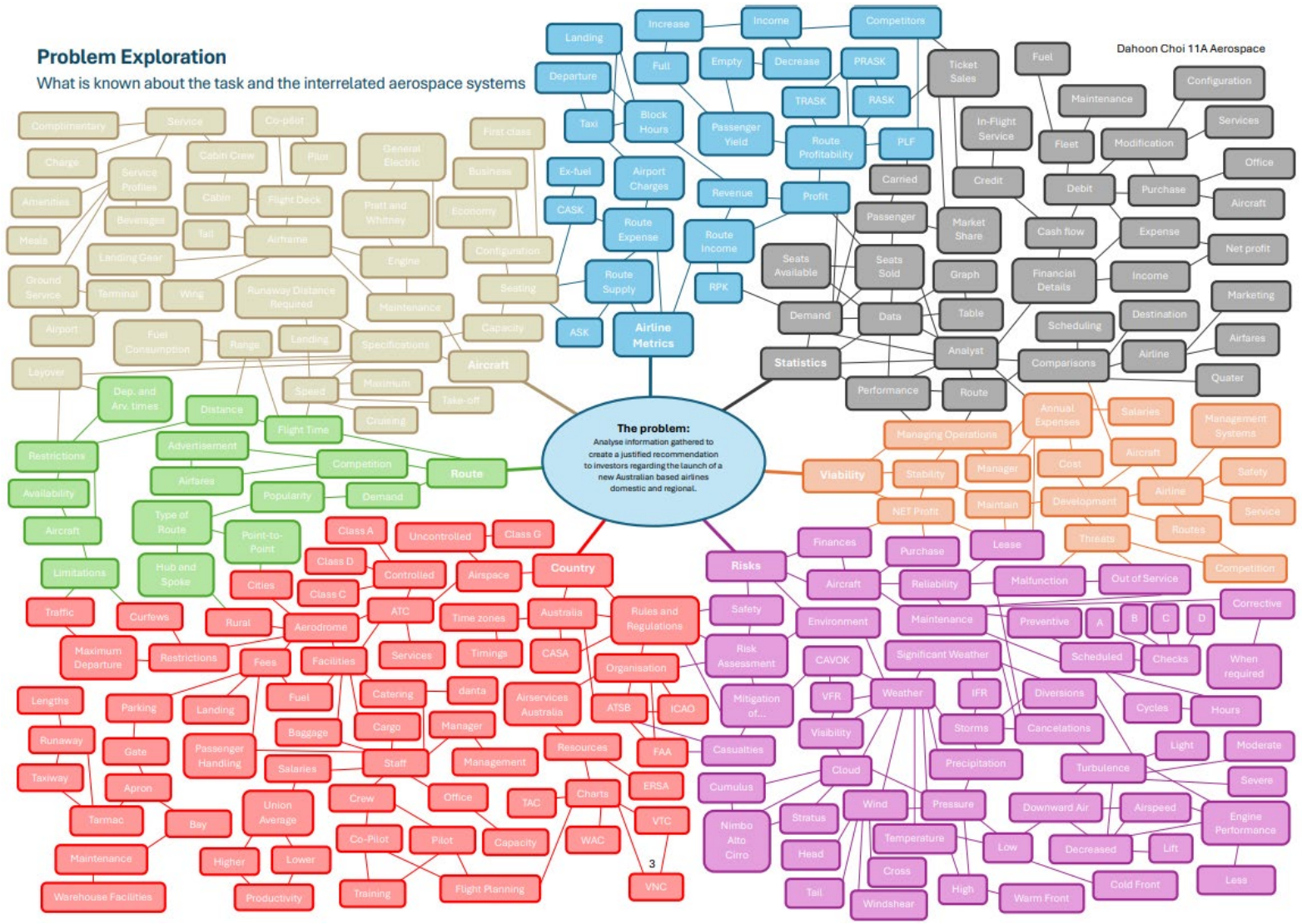
- ensure the strategy for managing response length found in the school's assessment policy is consistently implemented. Where a response exceeds the syllabus assessment conditions, the school should annotate relevant samples to indicate the marking strategy applied. Refer to the *QCE and QCIA policy and procedures handbook v7.0*, Section 9.6.1. For example
  - to use best-fit approach accurately, highlight on the ISMG the characteristics demonstrated in the response, then decide
    - which performance level matches the majority of evidence in the response
    - whether all evidence is matched at or above the performance level, to award the higher mark in the range
    - if some characteristics are not matched or matched at a lower performance level, to award the lower mark in the range
- ensure the quality, accuracy and accessibility of files before they are submitted for confirmation (*QCE and QCIA policy and procedures handbook v7.0*, Section 9.6.3). Schools should refer to the information contained in the *Confirmation submission information* document available on the QCAA website and in the Syllabuses app in the QCAA Portal to check the submission requirements and ensure all required documents are included.

Samples

The following excerpt illustrates visual frameworks or mind maps that use symbols to link problem recognition, success criteria, and systems, addressing the Retrieving and comprehending criterion. Mind mapping can also help identify key elements and their relationships within a problem's structure. The use of colour connects back to the success criteria, making this approach particularly useful for developing visual frameworks in the Aerospace solution assessment. Excerpt 2 demonstrates an adept causal loop that directly connects to the success criteria addressing airline income and viability.

Note: The characteristic/s identified may not be the only time the characteristic/s occurred throughout a response.

Excerpt 1


Problem Exploration
What is known about the task and the interrelated aerospace systems
Dahoon Choi 11A Aerospace
The problem:
Analyse information gathered to create a justified recommendation to investors regarding the launch of a new Australian based airlines domestic and regional.
Airline Metrics
Statistics
Viability
Risks
Route
Country
Aircraft
Increase
Income
Competitors
Landing
Departure
Full
Empty
Decrease
PRASK
TRASK
RASK
Taxi
Block Hours
Passenger Yield
Route Profitability
PLF
Ex-fuel
Airport Charges
CASK
Revenue
Profit
Route Expense
Route Income
Route Supply
RPK
ASK
Seats Available
Seats Sold
Demand
Data
Passenger
Carried
Ticket Sales
Fuel
In-Flight Service
Credit
Market Share
Graph
Table
Analyst
Performance
Route
Fleet
Maintenance
Configuration
Modification
Services
Debit
Purchase
Office
Aircraft
Cash flow
Expense
Net profit
Financial Details
Income
Marketing
Scheduling
Destination
Airfares
Comparisons
Airline
Quater
Managing Operations
Annual Expenses
Salaries
Management Systems
Stability
Manager
Cost
Aircraft
Safety
NET Profit
Maintain
Development
Airline
Service
Routes
Threats
Competition
Finances
Purchase
Lease
Aircraft
Reliability
Malfunction
Out of Service
Environment
Maintenance
Preventive
A
B
C
D
Corrective
Significant Weather
Scheduled
Checks
When required
CAVOK
VFR
Weather
IFR
Diversions
Cycles
Hours
Visibility
Storms
Cancelations
Light
Moderate
Cloud
Precipitation
Turbulence
Severe
Stratus
Wind
Pressure
Downward Air
Airspeed
Engine Performance
Temperature
Low
Decreased
Lift
Head
Cross
High
Cold Front
Less
Tail
Windshear
Warm Front
Nimbo
Atto
Cirro
Cumulus
Casualties
Risk Assessment
Mitigation of...
Safety
Rules and Regulations
Organisation
Australia
Time zones
CASA
Timings
Services
Facilities
Fees
Restrictions
Maximum Departure
Aerodrome
ATC
Rural
Curfews
Traffic
Class A
Uncontrolled
Class G
Class D
Controlled
Airspace
Cities
Class C
Lengths
Parking
Landing
Runaway
Gate
Taxiway
Apron
Tarmac
Bay
Maintenance
Warehouse Facilities
Fuel
Catering
danta
Baggage
Cargo
Manager
Passenger Handling
Salaries
Staff
Management
Airservices Australia
ATSB
ICAO
Resources
FAA
ERSA
Charts
VTC
WAC
VNC
TAC
Office
Crew
Co-Pilot
Pilot
Capacity
Training
Flight Planning
Union Average
Higher
Lower
Productivity
Hub and Spoke
Point-to-Point
Type of Route
Limitations
Availability
Restrictions
Aircraft
Leyover
Dep. and Arv. times
Distance
Flight Time
Advertisement
Airfares
Competition
Popularity
Demand
Route
Complimentary
Service
Co-pilot
Charge
Cabin Crew
Pilot
Service Profiles
Amenities
Cabin
Flight Deck
Beverages
Meals
tail
Airframe
Landing Gear
Ground Service
Terminal
Wing
Airport
Fuel Consumption
Range
Runaway Distance Required
Landing
Specifications
Maximum
Speed
Cruising
Take-off
General Electric
Pratt and Whitney
Engine
Maintenance
First class
Business
Economy
Configuration
Seating
Capacity
Aircraft

Excerpt 2

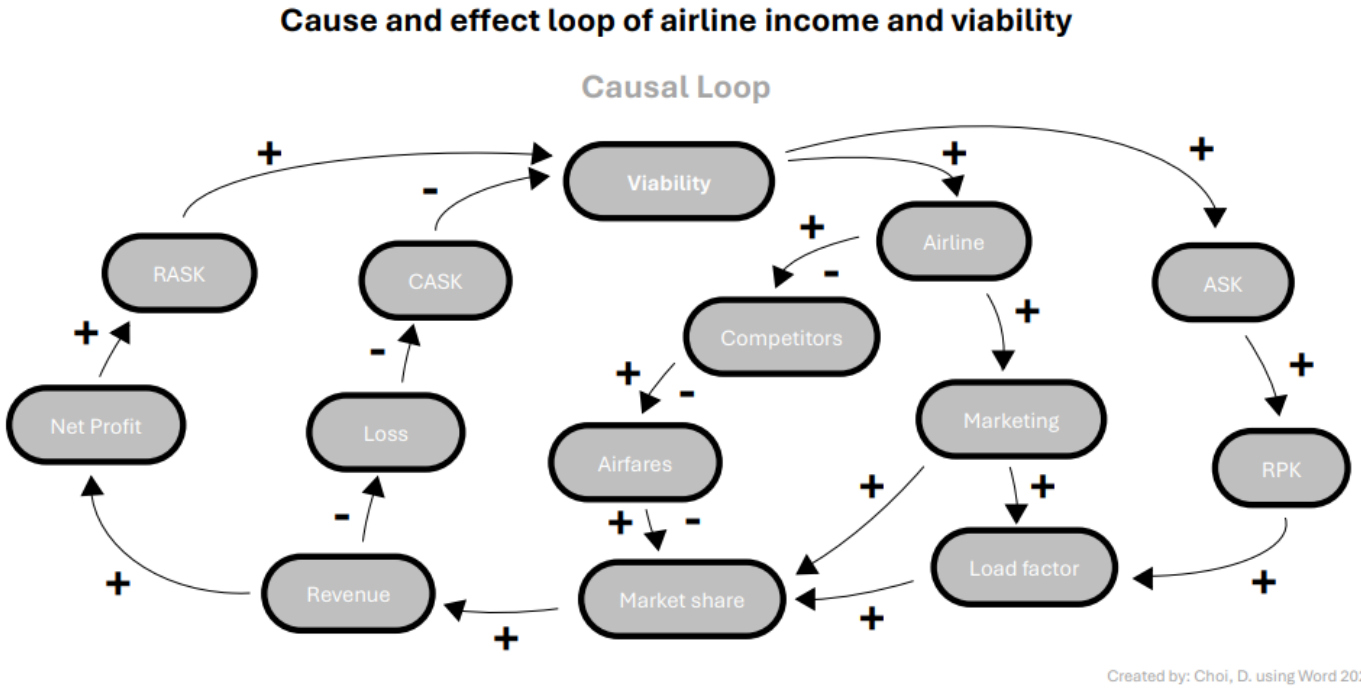
Success Criteria

In order for the airline to be deemed viable, the airline must:

- Consistently maintain at least 15% of the passenger market share for 2 years / 8 quarters.
- Hold and maintain an airline-wide load factor/RPK of at least 55% for 2 years / 8 quarters.
- Generate sufficient income to cover the operational costs with at least 10 million dollars in net profits for the further development of the airline.
- Produce a RASK-to-CASK profit of at least $0.01 with all transactions considered for 2 years / 8 quarters.
- Carry a minimum of 650,000 passengers for a consecutive duration of 2 years / 8 quarters with no exceptions of unsatisfactory performance.

Cause and Effect Systems Relationships

Figure 2: Cause and effect loop of airline income and viability.



The following excerpt illustrates a student highlighting the connection between the success criteria, problem and solution with clear determination of the criteria based on synthesised data/calculations and research.

Note: The characteristic/s identified may not be the only time the characteristic/s occurred throughout a response.

Cause and Effect Relationships for Consideration of Airport Design

The relationship between where the location of the airport is situated, its infrastructure and viability before and after the Olympics has both positive and negative effects. The key relationships are shown in the casual loop in Figure 3 below.

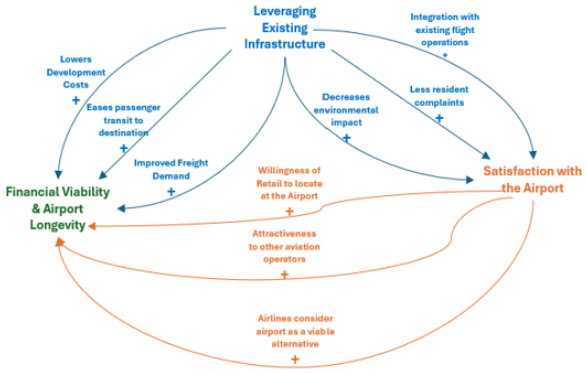


Figure 3: Casual loop of factors impacting the success of the new airport design

What the casual loop demonstrates is if careful planning is undertaken for the locating of the airport and its ability to integrating into existing infrastructure and without disrupting the operations of the current airport, the airport should be financially viable, cause less environmental impacts, have higher passenger and resident satisfaction and be a desirable location for aviation business to locate.

Success Criteria

Based on the research completed around the key factors for consideration for the new airport the following success criteria has been developed:

Table 6: Success criteria

Success Criteria	Purpose
Location: • Minimal impact on existing flight paths (Max 2 flight path modifications) • Minimal resumption of residential properties • <45 minutes of Brisbane CBD by car	• The new airport is designed to be used as a secondary airport to the main Brisbane Airport and should not disrupt existing airport operations. • Designed to enable spectators, competitors, officials, and VIPs to quickly get to/from Olympic venues
Runway/Taxiway: • Airport can handle international flights • Ability to operate ~30 flights per day • <5 concurrent aircraft movements per hour • Able to operate in all weather conditions	• Ability to manage the average smallest commercial aircraft that operate international flights. • Ability to avoid impact of high winds and severe storms on airline schedules. • Minimize tarmac and taxiway queuing for ease of flight movements/on-time arrivals
Terminal Design: • Able to manage concurrent international and domestic commercial flights. • Terminal designed to enable efficient passenger movements	• Ability to manage a variety of flight types as might be required for the Olympics. • Airport designed in a way that enables ease of passenger flow to maximize on-time aircraft arrivals and departures
Airport Accessibility: • Minimum of one public transport option • Has some private parking onsite • Passengers able to safely access taxi and/or rideshare services from the airport	• Passengers can quickly get to and from the Brisbane CBD for the Olympics • Minimise cost/increase attractiveness of use by leveraging existing transport networks. • Enable passenger choice as to method of transport
Environmental: • Limits noise impacts to residents to <75dBA. • Minimise environmental impact of constructing and operating the airport • No impact on designated environmental areas. • Minimise risk to airport operations from wildlife	• Airport needs to aim to limit disruption to existing residential areas and infrastructure. • Construction of new airport limits environment damage and 'fits' existing landscape without major earthworks • Mitigation of bird strikes or runway incursion risks
Security: • Maximize passenger safety. • Effective protection of terminals and aviation assets	• Ability to manage requirements for passenger screening and international arrival/departures. • Physical protection measures to prevent threats to aircraft and passengers of unintentional or intentional acts such as terrorism
Airport Facilities and Ground Support Services: • Airport has at least the minimum services needed to support international flights. • The airport has the service necessary to enable turnaround flights. • Supports basic aircraft maintenance	• The area is already a busy air corridor requiring localized air traffic management. • Aircraft refueling required at the airport. • Access to full spectrum of ground services from baggage handling through to cleaning and catering needed to enable turnaround departures
Lifecycle and Financial Viability: • Airport able to attract permanent scheduled passenger services. • Airport is not 100% reliant on commercial aviation for revenue	• Airport able to be used for multiple purposes both prior to and after the Olympics. • Range of commercial operators/retail businesses willing to operate from the airport

Internal assessment 2 (IA2)

Examination (25%)

This assessment is a supervised test that assesses the application of a range of cognitions to multiple provided items — questions, scenarios and problems.

Student responses must be completed individually, under supervised conditions, and in a set timeframe.

Assessment design

Validity

Validity in assessment design considers the extent to which an assessment item accurately measures what it is intended to measure and that the evidence of student learning collected from an assessment can be legitimately used for the purpose specified in the syllabus.

Reasons for non-endorsement by priority of assessment

Validity priority	Number of times priority was identified in decisions
Alignment	3
Authentication	0
Authenticity	0
Item construction	2
Scope and scale	0

Effective practices

Validity priorities were effectively demonstrated in assessment instruments that:

- enabled students to demonstrate their understanding of
  - a range of Unit 3 subject matter
  - assessment objectives and specifications required within the task
- featured a balance across the assessment objectives and Unit 3 subject matter
- used a range of item types, including multiple choice, single word, sentence, short paragraph and calculation responses that allowed for unique student responses, e.g. analysing an aircraft crash using the SHELL model or describing the function of the Australian Transport Safety Bureau (ATSB)
- provided appropriate scale for students to complete the task within syllabus conditions, e.g. the length of the examination and questions aligned with Syllabus section 4.8.2.

Practices to strengthen

It is recommended that assessment instruments:

- are written so that the difference between complex unfamiliar and complex familiar is clear. Syllabus section 4.8.2 explains each in detail

- provide a range of questions that assess a balance across the assessment objectives, with clearly labelled percentage mark allocations comprising ~ 20% complex unfamiliar, ~ 20% complex familiar and ~ 60% simple familiar
- include marking guides that have been reviewed and checked for mistakes, e.g. defining ATSB (Australian Transport Safety Bureau) as *Air Transport Safety Bureau* and calling a *heading indicator* a *compass*.

Accessibility

Accessibility in assessment design ensures that no student or group of students is disadvantaged in their capacity to access an assessment.

Reasons for non-endorsement by priority of assessment

Accessibility priority	Number of times priority was identified in decisions
Bias avoidance	0
Language	0
Layout	1
Transparency	0

Effective practices

Accessibility priorities were effectively demonstrated in assessment instruments that:

- were aligned to the assessment priorities and free from bias and inappropriate content, e.g. avoided gender stereotyping, used gender-neutral language
- used readable, understandable, pertinent, high-resolution pictures, diagrams or other visual components.

Practices to strengthen

It is recommended that assessment instruments:

- provide sufficient space for students to compose a concise yet comprehensive response, allowing marks to be awarded in accordance with the marking scheme
- are free from errors and model accurate spelling, grammar, punctuation and other textual features
- are presented so that the stimulus is clearly aligned to the question, i.e. students must use the stimulus to formulate a response. The stimulus is not required if it is possible to respond without referring to it
- feature legible, clear, relevant, accessible, high-resolution images, diagrams or other visual elements. In particular, charts, maps and airport diagram reproductions should be sufficiently large and clear.

Additional advice

Schools should:

- ensure compliance with examination specifications and facilitate the confirmation process. The marking scheme must
- indicate the mark allocations for all examination questions clearly within a single document (*QCE and QCIA policy and procedures handbook v7.0*, Section 9.6.1)
- indicate well-defined, clearly presented, expected responses and acceptable alternative responses
- be revised to address any errors identified and updated in the Endorsement app
- indicate explicitly where follow-through errors are permitted in calculation-based questions.

Assessment decisions

Reliability

Reliability refers to the extent to which the results of assessments are consistent, replicable and free from error.

Agreement trends between provisional and confirmed marks

Criterion number	Criterion name	Percentage agreement with provisional	Percentage less than provisional	Percentage greater than provisional	Percentage both less and greater than provisional
1	Aerospace systems knowledge and problem-solving	100.00	0.00	0.00	0.00

Effective practices

Reliable judgments were made using the ISMG for this IA when:

- consistency was shown in application of the marking guide
- marks were tallied without error
- credit was allocated for student work that was relevant to the question and clearly addressed stimulus material provided.

Practices to strengthen

To further ensure reliable judgments are made using the ISMG for this IA, it is recommended that:

- allocated marks per question are clearly identified
- total marks are used to correctly find the percent and percentage cut-offs are applied correctly
- the most recent complete marking guide, which matches the delivered paper, is uploaded separately from the student response
- close attention is paid to the correct use of the greater than symbol when applying the percentage cut-off score to accurately determine the mark out of 25.

Additional advice

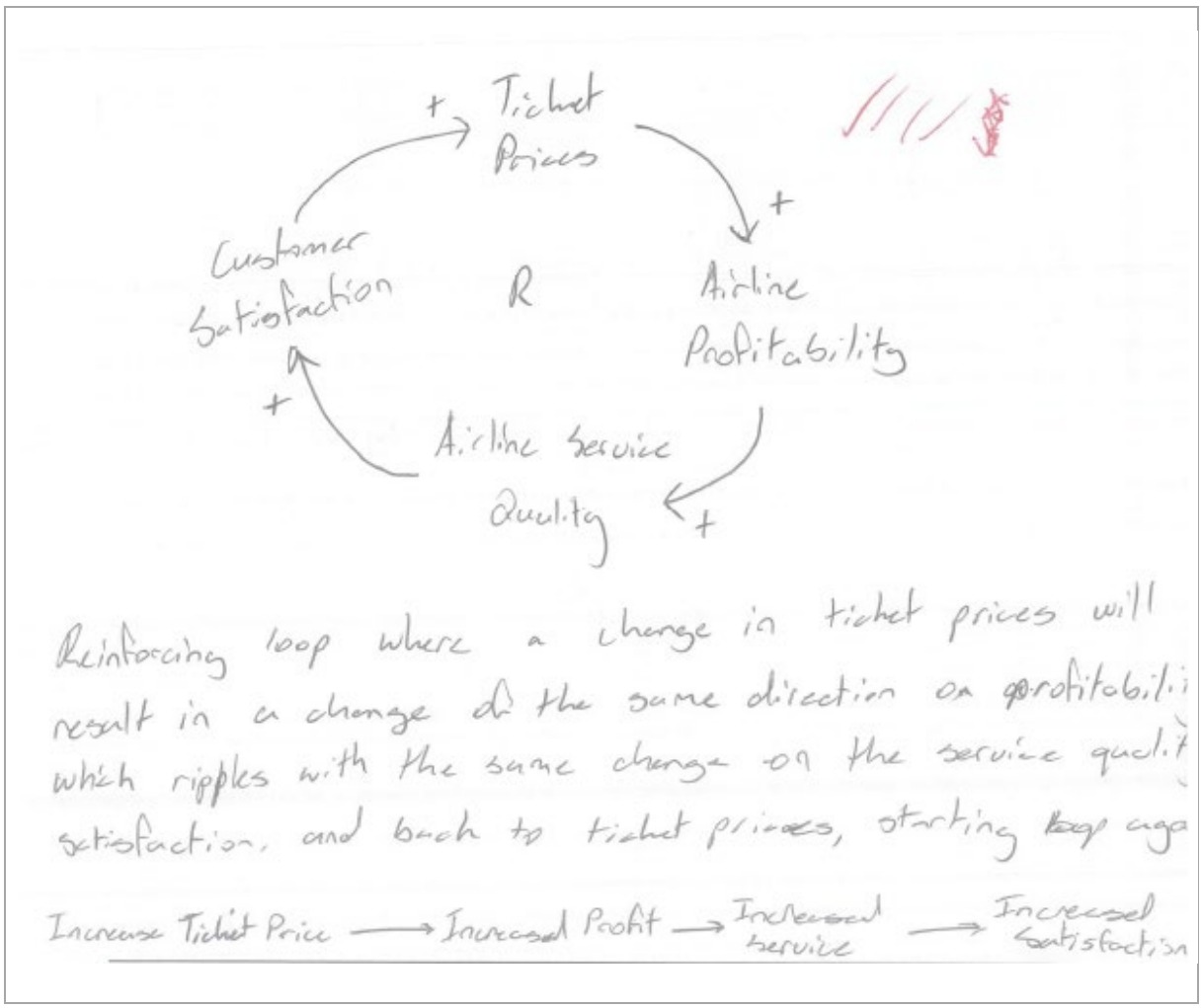
It is essential to consider the following key differences between the 2019 and 2025 syllabuses:

- The marking scheme used for the 2025 IA2 assessment
  - requires schools to update question content and sample responses from Unit 3 subject matter, especially Topics 2 and 5, as the subject matter involves questions that relate to human performance and calculations that use concepts and principles
  - should be capable of supporting the confirmation process by clearly indicating how marks have been awarded for each student response to each item in the assessment
  - must be complete at the time of confirmation. Incomplete or missing marking schemes result in confirmers not being able to support the school's assessment decisions, because there is no way to tell how they were determined. It is the school's responsibility to submit a complete and accurate marking scheme that can support assessment decisions at confirmation
  - should be amended, if necessary, to reflect unique student responses to the items and to correct any errors or omissions found during the marking process, e.g. if the school decides that a response is worth half marks when it does not align with the requirements of the marking scheme to fully obtain one mark, then the marking scheme should be updated to reflect the awarding of half marks. Similarly, if it is determined that a response should be awarded follow-through marks for errors in prior working and the marking scheme did not allow for this, then the marking scheme should be amended, and these decisions should be applied to all samples in the cohort to ensure the accurate and consistent allocation of marks. An amended marking scheme can be updated in the Endorsement app at any time or uploaded with the confirmation samples.

Samples

The following excerpt illustrates a sketched feedback loop that highlights the relationship between three of the following factors: airline profitability, ticket prices, risk management, customer satisfaction, airline service quality, airport profitability and maintenance schedules. The sketch provides adept symbolisation of the causal loop and clearly explains the chosen factors with marks that clearly match the available marks.

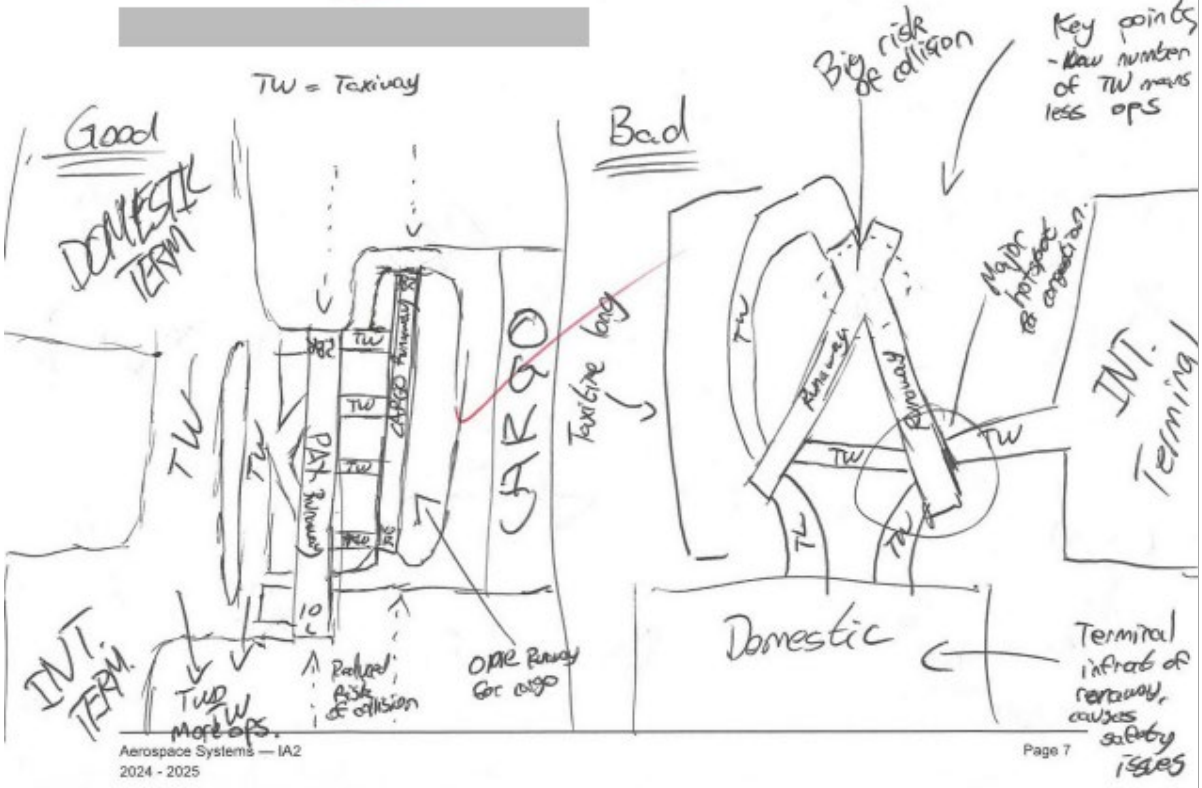
Note: The characteristic/s identified may not be the only time the characteristic/s occurred throughout a response.



The following excerpt demonstrates a response to a question requiring an explanation of the infrastructure involved in airport design, supported by a sketched diagram. The student accurately interprets the context but only partially addresses the infrastructure considerations, and the marks reflect this level of detail.

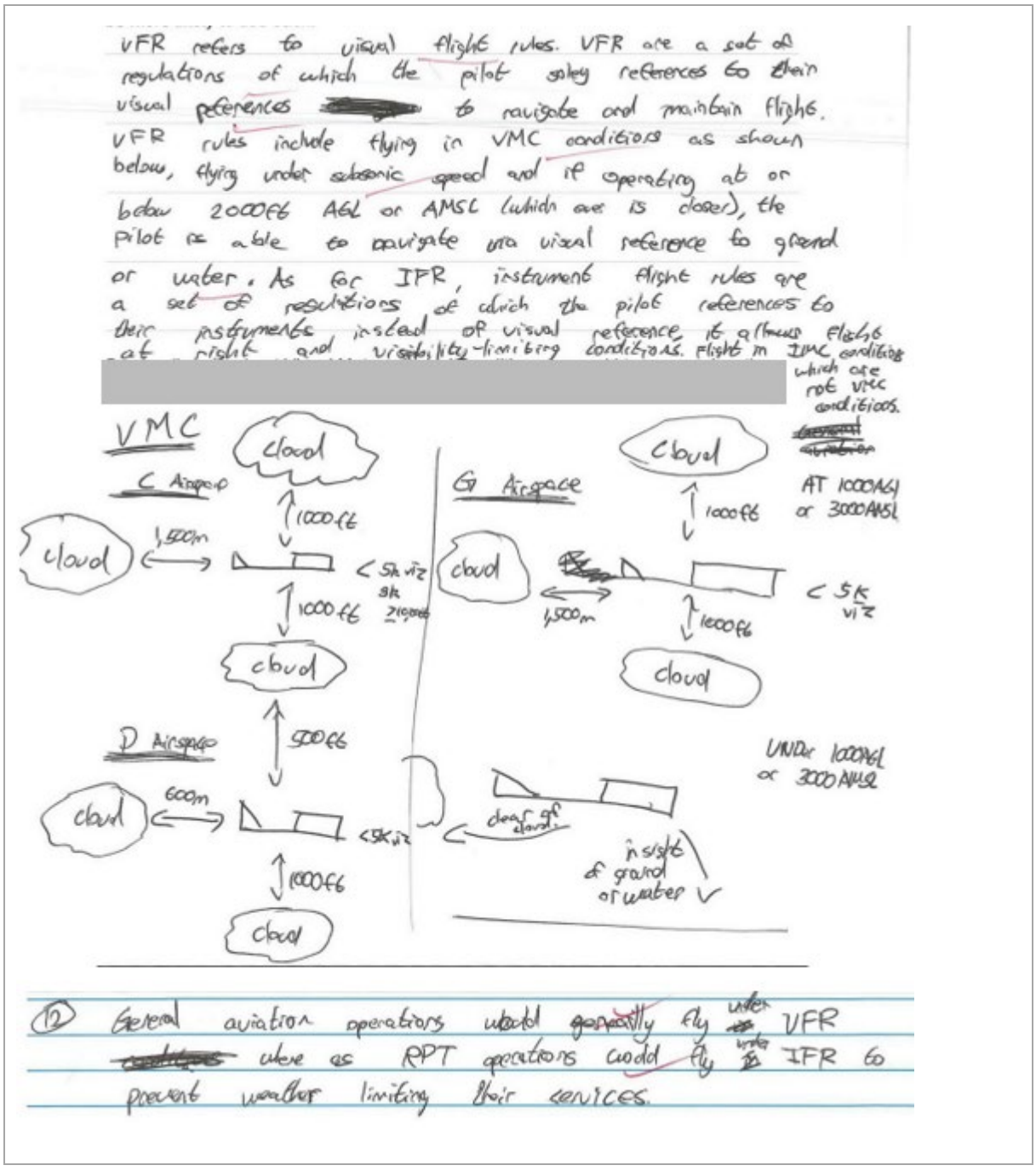
Note: The characteristic/s identified may not be the only time the characteristic/s occurred throughout a response.

1. Runaway designs - [redacted] The design of runaways must be considered to ensure air operations are conducted safely [redacted], and in convenience of pilots. How?
2. Taxiway designs - The design of taxiways must be considered, again to ensure air operations are conducted safely but also efficiently [redacted] (eg. low taxi times / shorter distances / less fuel consumption) while ensuring as many aircraft can [redacted] operate at the same time.
3. Terminal designs - The design of terminals must be considered to allow for efficient operations but also for passenger convenience, and comfort. (low travel times).



The following excerpt illustrates an explanation of the difference between VFR and IFR operations, supported by a sketched diagram of visual meteorological conditions. The student accurately interprets the context and identifies where each operation is most applicable. The sketch effectively symbolises the conditions, and the awarded marks appropriately reflect a 4-mark response.

Note: The characteristic/s identified may not be the only time the characteristic/s occurred throughout a response.



Internal assessment 3 (IA3)

Project — folio (25%)

This assessment focuses on a problem-solving process that requires the application of a range of cognitive, technical and creative skills and theoretical understandings. Students document the iterative process undertaken to develop a solution to a problem. The response is a coherent work that includes written paragraphs and annotations, diagrams, sketches, drawings, photographs, tables, spreadsheets and prototypes.

This assessment occurs over an extended and defined period of time. Students may use class time and their own time to develop a response.

Assessment design

Validity

Validity in assessment design considers the extent to which an assessment item accurately measures what it is intended to measure and that the evidence of student learning collected from an assessment can be legitimately used for the purpose specified in the syllabus.

Reasons for non-endorsement by priority of assessment

Validity priority	Number of times priority was identified in decisions
Alignment	1
Authentication	1
Authenticity	1
Item construction	0
Scope and scale	0

Effective practices

Validity priorities were effectively demonstrated in assessment instruments that:

- provided appropriate scope and scale for students to develop unique responses within the syllabus conditions without compromising complexity, e.g. requiring students to develop an aircraft performance system and/or human factors response with multiple elements to demonstrate a range of considerations
- contained authentication strategies that reflected QCAA guidelines for assuring student authorship of responses
- provided scaffolding, a clear overview and a framework for the assessment task, and context related to the subject matter that included subject matter language and headings.

Practices to strengthen

It is recommended that assessment instruments:

- indicate appropriate topic selection in the conditions section and describe aspects of the topics in the task. When submitting instruments for endorsement, schools should not tick topics in the Endorsement app if the topics are not included in the task

- are carefully checked before submission, particularly to ensure dates of checkpoints, draft and final dates are correct
- are sufficiently different from the QCAA sample, so students have greater opportunity to provide unique responses.

Accessibility

Accessibility in assessment design ensures that no student or group of students is disadvantaged in their capacity to access an assessment.

Reasons for non-endorsement by priority of assessment

Accessibility priority	Number of times priority was identified in decisions
Bias avoidance	0
Language	0
Layout	0
Transparency	0

Effective practices

Accessibility priorities were effectively demonstrated in assessment instruments that:

- used language from the unit and avoided jargon and technical language
- featured appropriate formatting, e.g. a clear, unambiguous layout with headings and subheadings, and carefully considered use of bold or italics
- included legible, clear, relevant, high-resolution and accessible images, diagrams or other visual elements.

Practices to strengthen

There were no significant issues identified for improvement.

Additional advice

When developing an assessment instrument for this IA, it is essential to consider the following key differences between the 2019 and 2025 syllabuses:

- The Project folio technique has been replaced with an Aerospace solution technique.
- Response length has been reduced, e.g. written and visual (including images, graphs, calculations and diagrams) responses of up to 10 A4 pages or 2000 words (syllabus, p. 36).
- A word limit has been introduced.
- Assessment objectives 1 and 3 have been removed.
- Specifications have been updated to reflect the removal of objectives.
- Mark allocations in IA3 have been adjusted and are now as follows
  - symbolising and communicating — 7 marks
  - determining and generating — 9 marks
  - synthesising and evaluating — 9 marks.

Schools should:

- add, unaltered, the specifications from p. 35 in the 2025 syllabus when creating the task in the Endorsement app
- add the problem-solving process diagram from p 8 in the 2025 syllabus in the scaffolding section of the Endorsement app.

Assessment decisions

Reliability

Reliability refers to the extent to which the results of assessments are consistent, replicable and free from error.

Agreement trends between provisional and confirmed marks

Criterion number	Criterion name	Percentage agreement with provisional	Percentage less than provisional	Percentage greater than provisional	Percentage both less and greater than provisional
1	Retrieving and comprehending	100.00	0.00	0.00	0.00
2	Analysing	90.00	10.00	0.00	0.00
3	Synthesising and evaluating	70.00	30.00	0.00	0.00
4	Communicating	90.00	10.00	0.00	0.00

Effective practices

Reliable judgments were made using the ISMG for this IA when:

- for the Retrieving and comprehending criterion
  - there was evidence of thoughtful and astute choices in the identification of relevant aerospace technology knowledge, systems thinking habits and strategies in relation to the problem. Additionally, responses that demonstrated good judgment when distinguishing between the known and unknown characteristics of the problem were awarded marks in the upper mark range for this criterion
  - there was evidence of the symbolisation of ideas and a solution identified relationships between aircraft performance systems and/or human factors in a highly skilled manner, which meant allocating marks in the 4–5 mark range could be supported
- for the Synthesising and evaluating criterion
  - evidence clearly aligned with the ISMG, showing critical evaluation and discerning refinement of ideas and a solution using success criteria to make astute recommendations justified by data and research.

Practices to strengthen

To further ensure reliable judgments are made using the ISMG for this IA, it is recommended that:

- when matching evidence to the characteristics in the Synthesising and evaluating criterion at the upper performance level, attention should be given to

  - thoughtful, well-structured and logical combinations of the most feasible attributes of ideas, integrated with the most relevant information from the analysis of the problem that includes aerospace systems, technology and research information to propose a possible aerospace solution that addresses aircraft performance systems and/or human factors
  - using the solution success criteria to judge the merit or worth of ideas and a solution
  - thoughtful and astute choices in relation to enhancements or improvements that could be made to the solution as a result of the evaluation with recommendations that are supported and justified by data and research evidence
- when matching evidence in responses to descriptors for the Communicating criterion at the upper performance level, attention should be given to
  - the use of folio and referencing conventions, e.g. referencing and labelling of images is required
  - whether student work that exceeds the specified page limits for both Parts A and B are unable to show discerning decision-making about folio and referencing conventions
  - the syllabus specifications as title pages are not part of the page requirements, and student responses may be formatted in a range of ways, provided the formatting falls within the syllabus conditions (syllabus section 5.7.1).

When making judgments for this IA for the 2025 syllabus, it is essential to consider the following key differences between the ISMGs in the 2019 and 2025 syllabuses:

- The 2025 Symbolising and communicating criteria requires significant visual content with highest performance including visual frameworks, causal and feedback loops, flow charts, diagrams, sketches and/or pictures.
- The Analysing criterion and the analyse objective have been removed. The Analysing criterion has been replaced by the Determining and generating criterion in the 2025 syllabus.
- In the 2025 syllabus, the Synthesising and evaluating criterion continues to focus on use of success criteria and justified data. However, reference to valid data is now included in the Determining and generating criterion.

Additional advice

Schools should:

- be aware that Unit 4 now includes Topic 3: Aircraft maintenance. Note that the task for the school may not include all topics but must include Topic 1: Airspace management, Topic 2: Aircraft performance and Topic 4: Aircraft navigation and radio communication technologies. This also means Topic 5: Human performance and limitations may not be assessed in the solution. Judgments will need to be made to find evidence within submissions that align with the topics allocated
- note that the 2025 syllabus assessment has changed from a Project — folio to an Aerospace solution. The solution requires a written and visual response that includes images, graphs, calculations and diagrams, with up to 10 A4 pages / 2000 words. The assessment criterion has also changed to three criterion rather than four criterion
- ensure the strategy for managing response length found in the school's assessment policy is consistently implemented. Where a response exceeds the syllabus assessment conditions, the school should annotate responses to indicate the marking strategy applied. (Refer to the *QCE and QCIA policy and procedures handbook v7.0*, Section 8.2.6.)

- ensure the best-fit approach is used when awarding marks across all criteria. Marked ISMGs should indicate the characteristics evident in the student response and the mark awarded for each criterion (see *QCE and QCIA policy and procedures handbook v7.0*, Section 9.6.1). Where there is a two-mark range within a performance level, evidence from the response should be used to determine whether on balance the higher or lower mark should be awarded.

Samples

The following excerpts illustrate a student response that shows considered analysis of the aircraft performance systems problem and relevant aerospace systems, technology, and research information in relation to aircraft performance systems to identify the relevant elements, components and features, and their relationship to the structure of the problem. This analysis is not assessed in the 2025 syllabus Aerospace solution. However, the structure/layout of the response is useful in preparation for the new Aerospace solution assessment. Excerpts 2 and 3 demonstrate a student response that used success criteria clearly to show synthesis and critical evaluation to make astute recommendations justified by data and research evidence.

Note: The characteristic/s identified may not be the only time the characteristic/s occurred throughout a response.

Excerpt 1

Weather

Before flying each day, the GAF and TAF should be checked to ensure VMC conditions are not violated during the flight. As can be seen in the TAF in Figure 15 and the GAF above, there was good visibility and little cloud scheduled during the flight. If there was bad weather on days flights were scheduled, the pilot could either delay the flight to another day or divert/ go around the weather but still make it to the destination.

TAF YROM 240701Z 2408/2420
VRB03KT CAVOK
RMK
T 21 16 13 11 Q 1018 1019 1019 1018

figure 15 – Roma TAF (Bureau of Meteorology, 2025)

Planning a Flight.

When it comes to planning the actual flight, there are four main things needed to make the plan: distance, track, true airspeed and wind. Once those things are found, most other variables can be calculated. To correctly plan the flight, all angles must be about magnetic north; the magnetic variation (found on WAC, blue circle) is 10E. The true airspeed of the PA28 is 111kts, which was found above.

Figure 16 – magnetic variation

To get the distance and tracks, an ATC navigational plotter was used on a WAC. Between all the waypoints, the distances were found to be: 39, 134, 154 and 117 Nautical miles. The track of the route was also found with a WAC and an ATC navigational plotter. Magnetic variation was also accounted for with tracks; the tracks between all the waypoints were found to be: 343, 337, 265, and 208°. The distance and track could also be found using an IFR chart, but generally, IFR charts only follow routes between major airports.

Figure 17 – calculating track

To get wind direction and speed, a GPWT was used. The grid in the far bottom right of Figure 18, GPWT, is where the route takes place. The closest altitude marked on the map to the 6500ft flight level is 7000ft, which is the 4th value from the bottom, or wind at 280°T 012kts. When accounting for magnetic variation, the wind direction is 270°.

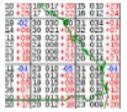


Figure 18 – GPWT for first day (Bureau of Meteorology, 2025)

To obtain the remaining information for the flight plan, an E6B flight computer was used. To get heading and ground speed, the wind side of the E6B was used as well as the information about wind, track and true air speed. To get ETI, the calculator side was used, needing information about distance and ground speed.

Using the information from above and the E6B calculations, the initial version of the first-day flight plan – back page was:

Table 1 – original first day flight plan(back)

day	flight	PSN	ALT	TAS	TR(M)	WIND(M)	HDG(M)	G/S	DIST	ETI	EET
1	1	YBCG	-	-	-	-	-	-	-	-	-
1	1	YDUN	6500	111	343	270/12	337	107	39	22	22
1	1	YHBA	6500	111	337	270/12	331	106	134	76	98
1	1	YTDR	6500	111	265	270/12	266	99	154	93	191
1	1	YROM	6500	111	208	270/12	213	105	117	67	258

After comparing this result with the success criteria, it was found to fall short of one major point. On that day, there will only be 4.3 hours of flying, which is 0.2 hours off the required time to be successful. When the route was originally planned, wind was not considered, which is why it was determined successful earlier. When wind impacts were considered, the flight fell just short of these criteria for success. For this reason, the route was altered so that instead of passing over Theodore, the route was planned to pass over Biloela airfield. This increased the time slightly, making the trip last just longer than 4.5 hrs.
The improved final flight plan for the first day of flying was:

The front page of the flight plan gives information about any changes in altitude or TAS made throughout the trip, as there were none.

Table 2 – improved first day flight plan(back)

day	flight	PSN	ALT	TAS	TR(M)	WIND(M)	HDG(M)	G/S	DIST	ETI	EET
1	1	YBCG	-	-	-	-	-	-	-	-	-
1	1	YDUN	6500	111	343	270/12	337	107	39	22	22
1	1	YHBA	6500	111	337	270/12	331	106	134	76	98
1	1	YBLE	6500	111	284	270/12	283	99	139	84	182
1	1	YROM	6500	111	202	270/12	208	106	163	92	274

This process of creating a flight plan was repeated for all the other legs of the trip.

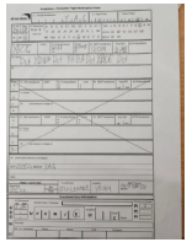


Figure 19 – flight plan (front)

Fuel Planning

For fuel planning, the calculator side of the E6B flight computer was used to convert between minutes and litres of fuel. For each flight, there must be 45 minutes of reserve fuel on top of the fuel needed for the trip. Using the E6B, it was found that 45 minutes of fuel was equal to 26 litres of fuel burned. As the initial trip was 274 minutes and the fuel burn of the aircraft was 35 litres per hour, the fuel required for the actual trip was 160 litres. These two values of fuel were added together with the taxi fuel (5L) to find the fuel required for the trip. The margin of extra fuel was found by subtracting the total (195L) from the needed amount. If there was a negative fuel margin, the flight would either have to be shortened or cut into two smaller flights, with the plane to get refuelled at the additional stop. This would ensure that the flight met the requirement of 45 minutes reserve fuel. This process of fuel planning was repeated for all the other flights.

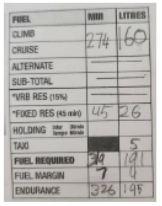


Figure 20 – fuel plan

Weight and Balance

It is important that when planning for a trip, the weight and balance of the aircraft are taken into account. If the plane is too heavy or is not balanced, the aircraft loses stability and becomes hard to control. For the example in Figure 21, it was assumed that there would be a total of 40kg of luggage for the two people, with each person weighing 80 kg, and the maximum amount of fuel used for the aircraft (136.5 kg). As can be seen in Figure 21, the loading chart for the aircraft was within the boundaries necessary to ensure the aircraft was balanced. This means it would be balanced for the duration of the trip and therefore produce no safety issues.

	mass	index unit
empty weight	687	19522
oil	7	86
baggage	40	1684
fuel	136.5	4026.75
people	160	4400
total	1030.5	29718.75
center of gravity		2883.916

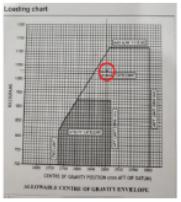
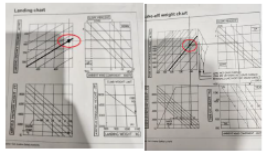


Table 3 and figure 21 – weight and balance

Excerpt 2

Take-off and Landing Charts

To ensure that the aircraft had the capability to take off and land at each aerodrome being visited, performance charts were used to check the plane had enough runway to take off and land. For the examples in Figures 22 and 23, conditions from the Roma TAF (Figure 15) were used. Roma aerodrome is at an altitude of 1027 feet and at that current time had an airfield pressure height of 847ft and a temperature of 16 degrees. The runway was a level runway made from asphalt, which would not affect the take-off/landing process. There would be a slight headwind, and the take-off weight/landing weight would be 1030.5 kgs (Table 3). These values were plotted into the take-off and landing chart, as the pressure height of the airfield was low and the weight below 1080kg was not climb-weight limited for landing.



Figures 22 and 23 takeoff and landing charts

The runway length at Roma aerodrome is 1504m. The take-off length required for this flight was around 650m, which was well below the available length, meaning that it was safe to take-off. The landing length required was around 475m, which was also well below the available length, meaning that it would be safe to land at Roma in these conditions. These considerations were made at all aerodromes visited on the route. If the plane's take-off distance was longer than the aerodrome runway, the route was rerouted to end at a different destination with the desired runway lengths.

Proposed solution

Route

The final route plan for the three-week trip can be seen in Figure 24 and Table 4.

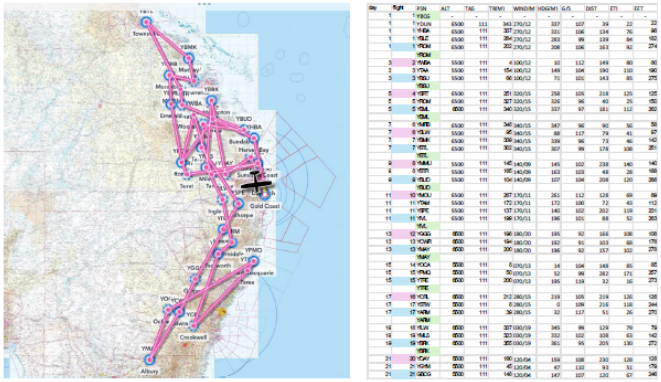


Figure 24 and table 4 – final flight plan

It was decided the trip would be flown day on, day off for three weeks. Doing this would ensure that the pilots were well-rested and not fatigued before each flight. All the routes were designed to fit the PA28's capabilities, ensuring that the flight did not exceed the maximum endurance of the aircraft (factoring in 45 minutes of reserve fuel).

Each day was planned so the pilot would always stay in VMC conditions, never flying into clouds but instead going above/below/around them. The pilot would check the appropriate weather forecasts for the day of flying ahead. If there was no reasonable altitude to fly without breaking VMC rules, the route would not be flown that day and would instead be delayed to another day.

In Table 4, squares highlighted blue (table 4) represent visits to a towered airport, while squares highlighted pink represent visits to non-towered airports. Landing at both kinds of airports multiple times provided excellent experience for the new pilot.

Costs

The cost of the trip was a very important factor to consider. The second-cheapest aircraft was used, which was beneficial in reducing costs. The aircraft was paid for by wet hire, meaning the costs of fuel and oil were included in the hourly costs. Accommodation was also included when creating a budget. The average cost of renting a two-room hotel for a night in Australia is $123 (*How Much Do Hotels Cost in Australia? Hotel Prices for Australia*, n.d.). The price for two people's meals each day would be approximately $80.

table 5 – budget

Reason	pricing	Cost
Aircraft hire	50 hours flown at $340 per hour	$17000
Accommodation	10 nights at $123 a night(average)	$1230
Food	21 days of food at $80 per day	$1680
Total		$19910

Evaluation

Evaluation of Success Criteria

Compared to the success criteria

Fly for 11 out of the 21 days (day on, day off)

- This criteria was successful; as seen in Table 4, where each flight was planned to take place on every odd-numbered day of the trip (or every second day).
- The plan never broke this pattern and was therefore successful throughout the entire trip.

Landing at least 8 or more of both towered and non-towered aerodromes

- This criteria was successful for non-towered airports, as seen in Table 4, where exactly 8 destinations are highlighted pink. This means 8 non-towered airports were visited, meeting the criteria.
- This criteria was also successful for towered airports. As seen in Table 4, there are 11 destinations highlighted blue. This means the trip visited 3 more than the minimum required, which can be considered highly successful.

Excerpt 3

Fly for at least 4.5 hours on days being flown.

- This criterion was not successful for three out of the 11 flying days. The days that failed to complete the criteria were days 3, 4 and 11 (Figure 25).
- This criterion was successful for days 1, 2, 5, 6, 7, 8, 9, and 10 (Figure 25).
- Even with these few failures, there was still a 73% success rate. This means the trip was reasonable in this aspect, but not good enough to be fully successful.

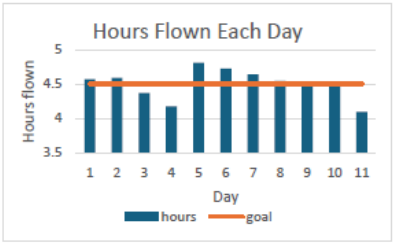


Figure 25 – determining which days were successful

Aim for more than 45 hours on the trip, overall, a three-week trip.

- This aspect of the success criteria was successful. As seen in Table 6, the total hours flown by the end of the trip was 49.54 hours, which was 4 hours over the minimum requirement, showing success with a significant margin.

day	total accumulation of hours flown on trip
1	4.57
3	9.16
5	13.53
7	17.71
9	22.51
11	27.23
13	31.88
15	36.42
17	40.92
19	45.45
21	49.54

Table 6 – total hours flown

Create a cost-effective trip with a budget of $20000

- This aspect was a success because the projected spending for the trip was $19 910 (Table 5). Although this left limited excess (for unexpected expenses) it was $90 under the $20 000 budget set for the trip. This shows that this aspect of the success criteria was successful.

Evaluation of the trip based on the success criteria

The solution created would be fairly successful, with all but one of the criteria met. The one that wasn't met was very close to meeting criteria. The failed success criteria would impact the experience gained for each pilot, as they would be flying less on some days. However, the reduced success of this one criteria was cancelled out by some days containing significantly over the minimum flying hours required for each day. This ensured that the total trip obtained the goal of 45 hours of flying time. For this reason, the plan could be seen as an overall success.

Future Considerations

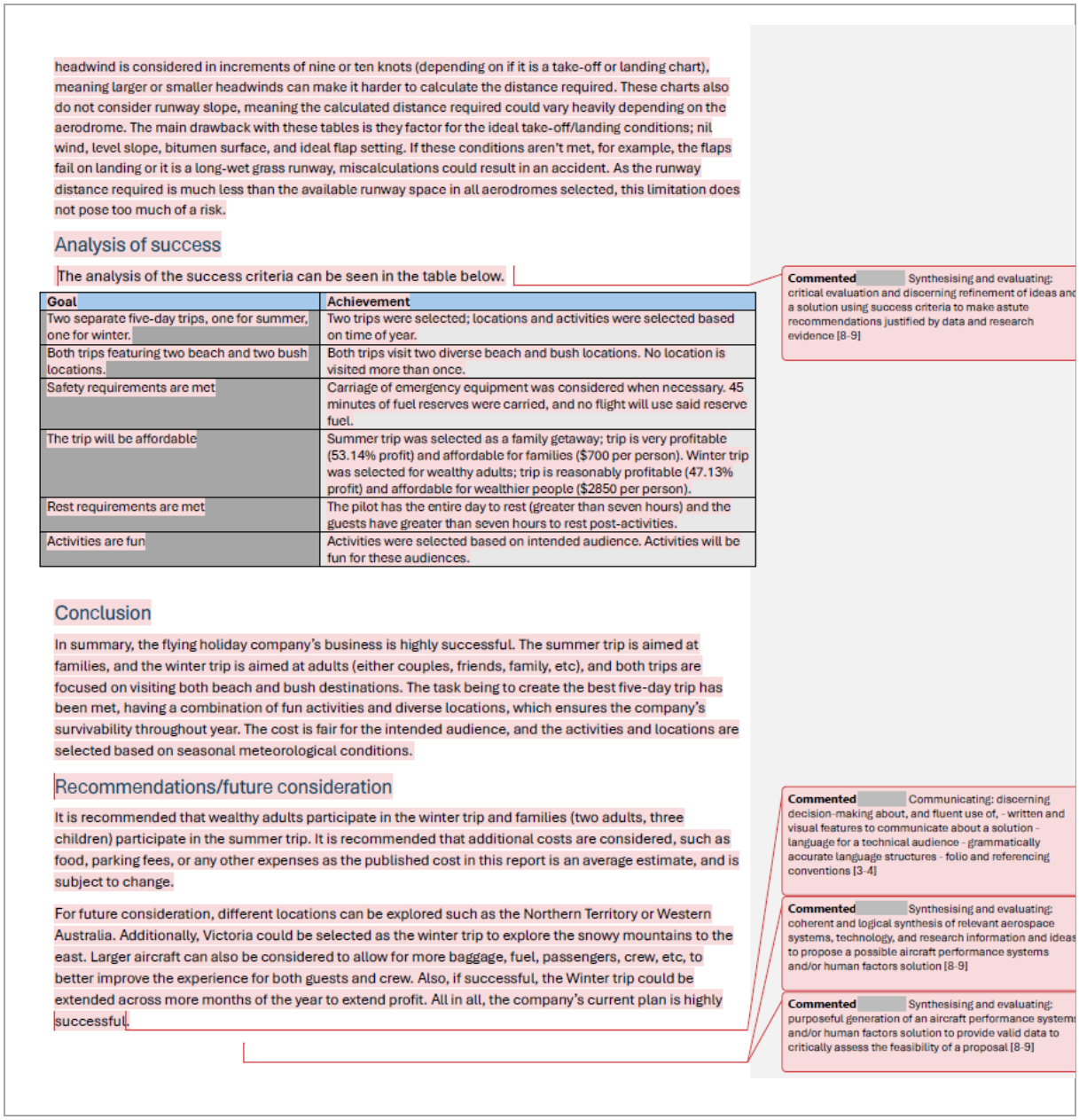
Multiple improvements can be made to the trip that would be beneficial for the pilots.

- Both pilots could get their instrument rating, which would allow them to fly in IMC conditions (into low visibility and clouds). The current trip was limited to flying in VMC conditions. This means that when there was poor visibility or bad weather conditions, the pilots could not fly that day. Being able to fly into these conditions would allow the pilots to fly at night, as well as not having to delay their flights in bad weather.
- A slightly larger aircraft could be used. This would increase the pilot's comfort levels when flying (lowering fatigue and increasing SA). The plane would also fly for longer periods of time without having to refuel. This would come with the limitation of now having to fly longer distances to fly the same number of hours completed in this trip. This could easily be achieved, though, as the trip could be planned to fly further around Australia or even internationally.

- The trip could be flown over more days. This would help the pilots to gain more experience throughout the trip as they would be flying more hours.
- The plan could consider the Gold Coast a hub in which the pilots would fly a day or two, then return to the Gold Coast to stay the night at their homes. This would reduce the costs of accommodations as they would be staying in their own homes.
- The plan could consider including extra non-flying days to allow for poor weather. This would ensure that, even if weather was poor, there would be sufficient days to allow for this without compromising the destinations or flight time requirements of the trip.

The following excerpt illustrates a student response that used success criteria clearly to show synthesis and critical evaluation to make astute recommendations justified by data and research evidence. The response includes a table to represent the student's goals and achievement and that information has been linked to the recommendations and future considerations.

Note: The characteristic/s identified may not be the only time the characteristic/s occurred throughout a response.



headwind is considered in increments of nine or ten knots (depending on if it is a take-off or landing chart), meaning larger or smaller headwinds can make it harder to calculate the distance required. These charts also do not consider runway slope, meaning the calculated distance required could vary heavily depending on the aerodrome. The main drawback with these tables is they factor for the ideal take-off/landing conditions; nil wind, level slope, bitumen surface, and ideal flap setting. If these conditions aren't met, for example, the flaps fail on landing or it is a long-wet grass runway, miscalculations could result in an accident. As the runway distance required is much less than the available runway space in all aerodromes selected, this limitation does not pose too much of a risk.

Analysis of success

The analysis of the success criteria can be seen in the table below.

Goal	Achievement
Two separate five-day trips, one for summer, one for winter.	Two trips were selected; locations and activities were selected based on time of year.
Both trips featuring two beach and two bush locations.	Both trips visit two diverse beach and bush locations. No location is visited more than once.
Safety requirements are met	Carriage of emergency equipment was considered when necessary. 45 minutes of fuel reserves were carried, and no flight will use said reserve fuel.
The trip will be affordable	Summer trip was selected as a family getaway; trip is very profitable (53.14% profit) and affordable for families ($700 per person). Winter trip was selected for wealthy adults; trip is reasonably profitable (47.13% profit) and affordable for wealthier people ($2850 per person).
Rest requirements are met	The pilot has the entire day to rest (greater than seven hours) and the guests have greater than seven hours to rest post-activities.
Activities are fun	Activities were selected based on intended audience. Activities will be fun for these audiences.

Conclusion

In summary, the flying holiday company's business is highly successful. The summer trip is aimed at families, and the winter trip is aimed at adults (either couples, friends, family, etc), and both trips are focused on visiting both beach and bush destinations. The task being to create the best five-day trip has been met, having a combination of fun activities and diverse locations, which ensures the company's survivability throughout year. The cost is fair for the intended audience, and the activities and locations are selected based on seasonal meteorological conditions.

Recommendations/future consideration

It is recommended that wealthy adults participate in the winter trip and families (two adults, three children) participate in the summer trip. It is recommended that additional costs are considered, such as food, parking fees, or any other expenses as the published cost in this report is an average estimate, and is subject to change.

For future consideration, different locations can be explored such as the Northern Territory or Western Australia. Additionally, Victoria could be selected as the winter trip to explore the snowy mountains to the east. Larger aircraft can also be considered to allow for more baggage, fuel, passengers, crew, etc, to better improve the experience for both guests and crew. Also, if successful, the Winter trip could be extended across more months of the year to extend profit. All in all, the company's current plan is highly successful.

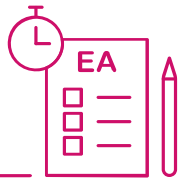
Commented Synthesising and evaluating: critical evaluation and discerning refinement of ideas and a solution using success criteria to make astute recommendations justified by data and research evidence [8-9]

Commented Communicating: discerning decision-making about, and fluent use of, - written and visual features to communicate about a solution - language for a technical audience - grammatically accurate language structures - folio and referencing conventions [3-4]

Commented Synthesising and evaluating: coherent and logical synthesis of relevant aerospace systems, technology, and research information and ideas to propose a possible aircraft performance systems and/or human factors solution [8-9]

Commented Synthesising and evaluating: purposeful generation of an aircraft performance system and/or human factors solution to provide valid data to critically assess the feasibility of a proposal [8-9]

External assessment



External assessment (EA) is developed and marked by the QCAA. The external assessment for a subject is common to all schools and administered under the same conditions, at the same time, on the same day. The external assessment papers and the EAMG are published in the year after they are administered.

Examination (25%)

Assessment design

The assessment instrument was designed using the specifications, conditions and assessment objectives described in the summative external assessment section of the syllabus.
The examination consisted of one paper with 22 questions (80 marks):

- Paper 1, Section 1 consisted of multiple choice questions (10 marks)
- Paper 1, Section 2 consisted of short response questions (70 marks).

The assessment instrument was designed using the specifications, conditions and assessment objectives described in the summative external assessment section of the syllabus. The examination consisted of questions that were derived from the context of Unit 4 subject matter:

- Topic 1: Aircraft performance
- Topic 2: Aircraft navigation
- Topic 3: Advanced navigation and radio communication technologies
- Topic 4: Human performance and limitations.

The assessment required students to respond in various ways, including:

- sketching, drawing and creating graphs, tables and diagrams
- writing multiple choice, single word, sentence or short paragraph responses
- calculating using formulas
- responding to unseen stimulus materials.

The stimulus was purposefully chosen to elicit a range of unique responses linked to the syllabus objectives and to Unit 4: Topic 1 — Aircraft performance and Topic 2 — Aircraft navigation subject matter. The stimulus provided real-world contexts for students to demonstrate their knowledge of aeronautical charts and information.

The stimulus included:

- a CASA flight planning notepad SP107 and fuel log
- a CASA landing chart
- En Route Supplement Australia (ERSA)
- grid point wind and temperature forecasts (GPWT)
- six-pack flight instruments
- a visual terminal chart (VTC).

Assessment decisions

Assessment decisions are made by markers by matching student responses to the external assessment marking guide (EAMG).

Multiple choice question responses

There were 10 multiple choice questions in Paper 1.

Percentage of student responses to each option

Note:

- The correct answer is **bold** and in a blue shaded table cell.
- Some students may not have responded to every question.

Question	A	B	C	D
1	6.74	4.49	35.96	**49.44**
2	13.48	56.18	5.62	**21.35**
3	**95.51**	1.12	1.12	0.00
4	1.12	6.74	3.37	**86.52**
5	3.37	**66.29**	0.00	28.09
6	**50.56**	28.09	11.24	7.87
7	2.25	13.48	**80.90**	1.12
8	6.74	**6.74**	46.07	37.08
9	**43.82**	2.25	13.48	37.08
10	25.84	1.12	**55.06**	15.73

Effective practices

Overall, students responded well to:

- questions that assessed the recognition and description of aerospace technology knowledge, concepts, and principles, covering simple and some more complex scenarios
- questions that involved explaining ideas, solutions and relationships related to aircraft performance systems and human factors
- analysis of aerospace problem scenarios and information that focused on aircraft performance systems and human factors across simple familiar and some complex familiar questions
- questions requiring solutions to problems supported by calculations where relationships and interactions were obvious and had few elements, and all the information to solve the problem was clearly provided in the question.

Practices to strengthen

When preparing students for external assessment, it is recommended that teachers consider:

- strengthening students' understanding of systems thinking habits and strategies, e.g. understanding the habits of a systems thinker helps students grasp how systems function and how actions can influence outcomes over time. Additionally, it provides a variety of strategies that promote problem-solving and encourage critical questioning

- providing more opportunities for students to engage with complex unfamiliar situations that require an in-depth analysis of problems and information (Assessment objective 3) and expect students to refine ideas and solutions to make justified recommendations (Assessment objective 7). Emphasis should be placed on selecting and prioritising relevant criteria that are used to assess an aerospace systems issue or circumstance, using knowledge drawn from Unit 4 subject matter
- increasing students' knowledge and use of different aeronautical charts and stimulus information from Unit 4, e.g. GPWTs, WACs, VNCs, VTCs, ERSA, TAFs and CASA flight plan format (SP107), landing and take-off charts
- providing further learning experiences that require students to use the aerospace systems formula sheet, flight performance parameter charts, flight computers and plotters to enable them to work more efficiently under examination conditions.

Additional advice

- Inform students of the importance of responding to examination questions in clear and legible handwriting.
- Provide exposure to the subject matter prescribed in the syllabus, making specific reference to the terminology, areas of study, cognitive requirements and specified examples.
- Support students to develop positive multiple choice practices that involve
  - breaking down the elements of the question stem
  - reading all the answer options carefully
  - considering the validity of the options and having a decision-making process to determine the most correct one
  - attempting every question by filling out the answer bubbles in the question and response book.
- Support students to develop positive practices when responding to short response questions that involve
  - breaking down the question
  - identifying the relevant subject matter from the syllabus (and associated terminology)
  - understanding and responding to the cognition/s and separate or connected elements within the question
  - planning and completing a logical and well-sequenced response
  - checking their responses, ensuring that all elements of the question have been completed, should they have time.
- Support students to not cancel out or cross out responses to questions if they do not follow with another attempt, as this will result in a mark of zero being awarded.

Samples

Short response

Question 11a and 11b

This question required students to define aircraft ergonomics and explain how cockpit design in aviation assists pilots during periods of high stress with two examples.

Effective student responses:

- correctly defined aircraft ergonomics [1 mark]
- correctly provided a cockpit design example [1 mark]
- correctly explained how the example assists pilots during high-stress periods [1 mark]
- correctly provided a second cockpit design example [1 mark]
- correctly explained how the second example assists pilots during high-stress periods [1 mark].

This excerpt has been included:

- to demonstrate a clear and concise aircraft ergonomics definition and explanation with examples that illustrates how cockpit design in aviation assists pilots during periods of high stress.

Excerpt 1

Designing an aircraft with the needs of the pilot in mind

Excerpt 2

- Switches and instruments are arranged in a standardised and orderly fashion
- This decreases cognitive load on the pilot

2 Examples:

- A pilot might be looking for their circuit breakers, and if they are in clear view, it will not take their focus off the instrument panel
- Carburettor heat is placed close to the throttle so a pilot does not have to move their hand, lessening distraction

Question 12

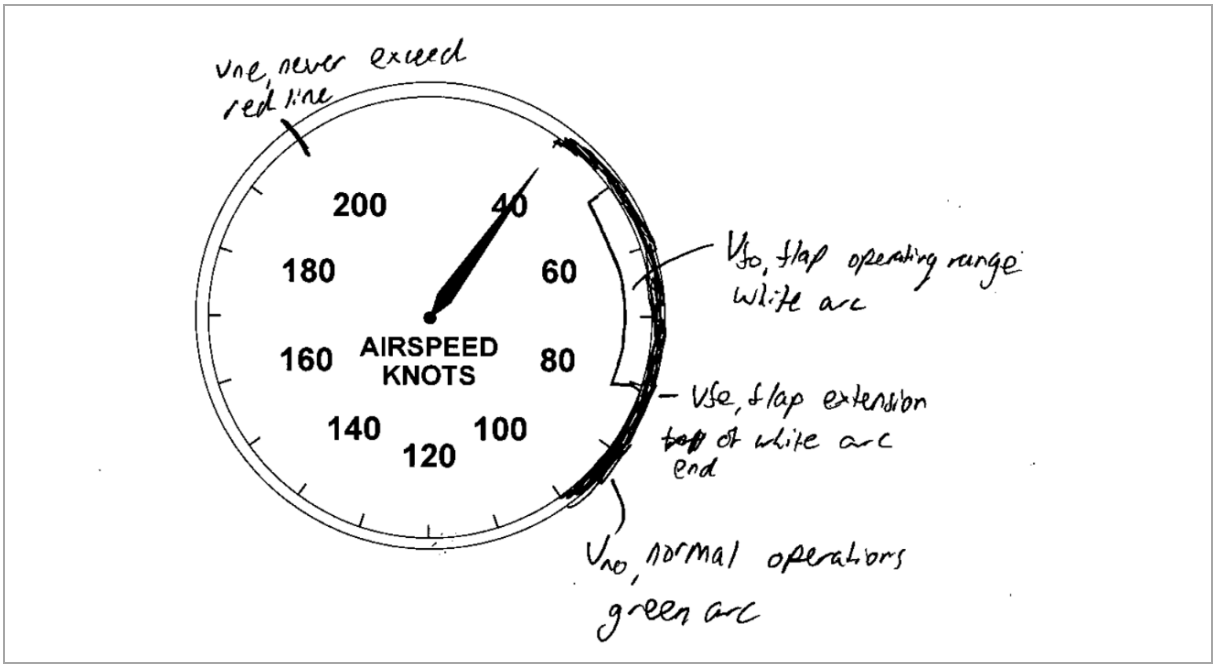
This question required students to complete airspeed indicator diagram provided and complete the diagram identifying Vne, Vno, Vfe and Vfo.

Effective student responses:

- correctly annotated and labelled the airspeed indicator diagram, including clearly identified positions of:
  - Vne [1 mark]
  - Vno [1 mark]
  - Vfe [1 mark]
  - Vfo [1 mark].

This excerpt has been included:

- to demonstrate a correctly completed airspeed indicator diagram.



Question 16a, 16b and 16c

This question required students to describe the operation of a head-up display in an aerospace context, then define Vs, Vs1 and Vs0. Question 16c required an explanation describing a benefit of using a HUD in relation to Vs with a justification of how the HUD improves safety.

Effective student responses:

- correctly described a HUD an aerospace context [2 marks]
- correctly defined Vs, Vs1 and Vs0 [3 marks]
- correctly explained one HUD benefit with relation to Vs [1 mark]
- correctly justified how the HUD improves safety [1 mark].

This excerpt has been included:

- to demonstrate a correctly described a HUD an aerospace context with correctly defined Vs, Vs1 and Vs0 definitions
- to illustrate an explanation and justification of how the HUD benefits pilots with relation to improves safety.

Excerpt 1

Digital screen which provides primary flight data to a pilot without them having to focus away from the windscreen

Excerpt 2

Vs: Stall speed

Vs1: Stall speed in a clean configuration

Vs0: Stall speed in landing configuration

Excerpt 3

- A pilot can easily see their airspeed without looking inside
- Enables a better scan, meaning a pilot is more likely to notice if their airspeed is critically low

Question 19

This question required students to analyse a context where an operator was looking to expand their aircraft fleet. Students were provided a table of two aircraft and their specifications. After synthesising data from the context and aircraft specifications, students were required to provide four reasons for their aircraft selection with supporting justification using data from the table.

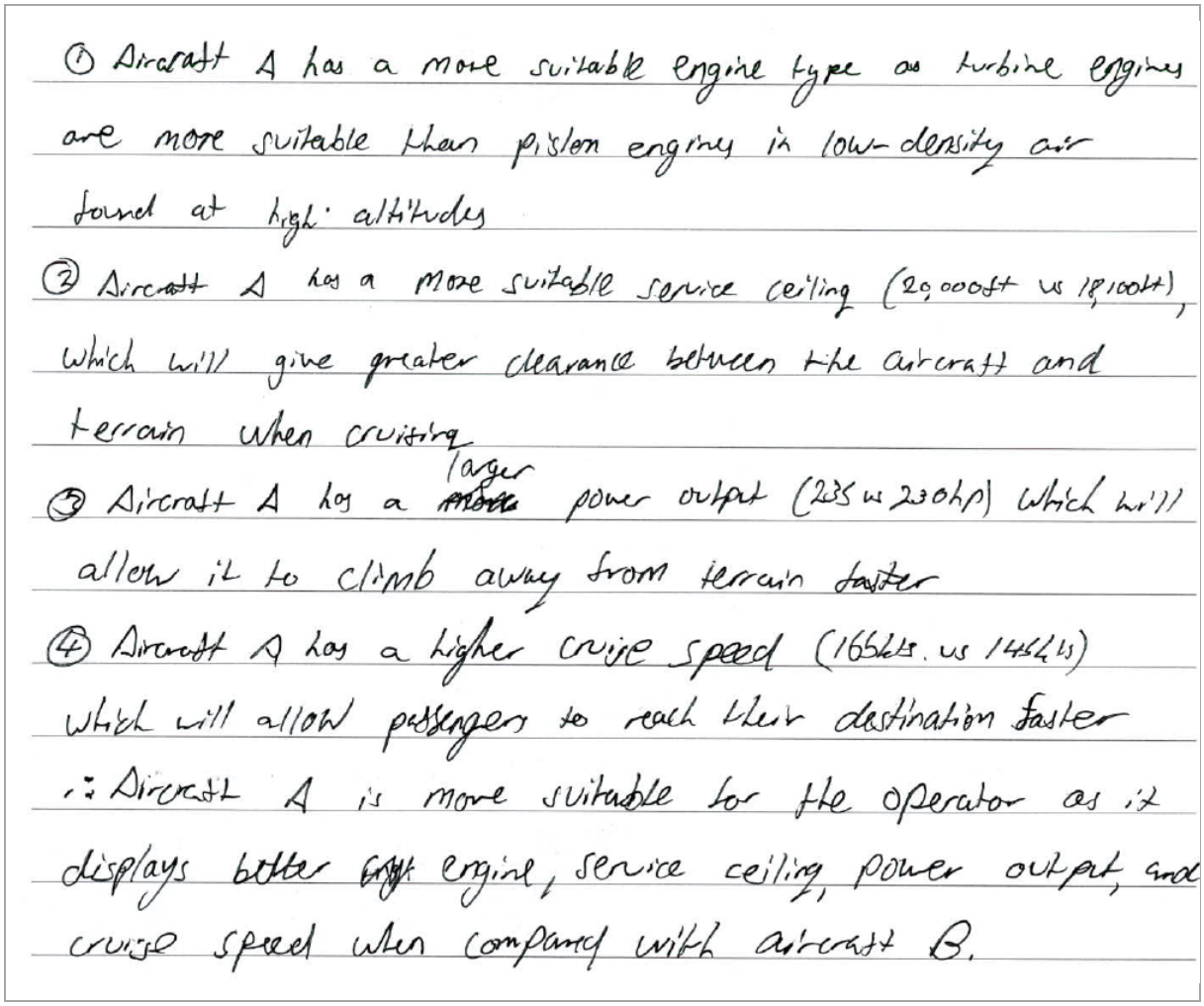
Effective student responses:

- correctly identified aircraft A as the most suitable aircraft [1 mark]
- correctly provided one valid reason for the aircraft selection [1 mark]
- correctly provided a second valid reason for the aircraft selection [1 mark]

- correctly provided a third valid reason for the aircraft selection [1 mark]
- correctly provided a fourth valid reason for the aircraft selection [1 mark]
- correctly justified aircraft choice with reference to the flying conditions [1 mark]
- correctly justified aircraft choice using data from the table [1 mark].

This excerpt has been included:

- to demonstrate that Aircraft A was the most suitable aircraft
- to illustrate the four valid reasons, e.g.
  - more suitable engine type (turbine engines are more suitable in low-density air found at high altitude)
  - more suitable service ceiling, (20,000 ft vs 18,100 ft)
  - larger power output (235 hp vs 230 hp)
  - higher cruise speed (165 kts vs 145 kts)
- to demonstrate a coherent justification that references to the flying conditions and flight specification data.



① Aircraft A has a more suitable engine type as turbine engines are more suitable than piston engines in low-density air found at high altitudes

② Aircraft A has a more suitable service ceiling (20,000ft vs 18,100ft), which will give greater clearance between the aircraft and terrain when cruising

③ Aircraft A has a larger power output (235 vs 230hp) which will allow it to climb away from terrain faster

④ Aircraft A has a higher cruise speed (165kts vs 145kts) which will allow passengers to reach their destination faster

∴ Aircraft A is more suitable for the operator as it displays better engine, service ceiling, power output, and cruise speed when compared with aircraft B.