ST0855/V1.2

Draft end-point assessment plan for the Space engineering technician apprenticeship

Apprenticeship reference number	Level of this end-point assessment (EPA)	Integration
ST0855	4	None

Contents

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Introduction and overview

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This document explains the requirements for end-point assessment (EPA) for the space engineering technician apprenticeship. End-point assessment organisations (EPAOs) must follow this when designing and delivering the EPA.

Space engineering technician apprentices, their employers and training providers should read this document.

A full-time space engineering technician apprentice typically spends 48 months on-programme. The apprentice must spend at least 12 months on-programme and complete the required amount of off-the-job training in line with the apprenticeship funding rules.

The EPA should be completed within an EPA period lasting typically 3 months.

The apprentice must complete their training and meet the gateway requirements before starting their EPA. The EPA will assess occupational competence.

An approved EPAO must conduct the EPA for this apprenticeship. Employers must work with the training provider to select an approved EPAO from the apprenticeship providers and assessment register (APAR).

This EPA has 2 assessment methods.

The grades available for each assessment method are below.

Assessment method 1 - practical assessment with questioning:

- fail
- pass

Assessment method 2 - interview underpinned by a portfolio of evidence:

- fail
- pass
- distinction

The result from each assessment method is combined to decide the overall apprenticeship grade. The following grades are available for the apprenticeship:

- fail
- pass
- distinction

EPA summary table

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On-programme - typically 48 months	The apprentice must: • complete training to develop the knowledge, skills and behaviours (KSBs) outlined in this apprenticeship's standard • complete training towards English and mathematics qualifications in line with the apprenticeship funding rules • compile a portfolio of evidence
End-point assessment gateway	The apprentice's employer must be content that the apprentice is occupationally competent. The apprentice must: • confirm they are ready to take the EPA • have achieved English and mathematics qualifications in line with the apprenticeship funding rules For the interview underpinned by a portfolio of evidence, the apprentice must submit a portfolio of evidence. Gateway evidence must be submitted to the EPAO, along with any organisation specific policies and procedures requested by the EPAO.
End-point assessment - typically 3 months	**The grades available for each assessment method are below** Practical assessment with questioning: • fail • pass Interview underpinned by a portfolio of evidence: • fail • pass • distinction **Overall EPA and apprenticeship can be graded:**

	○ fail ○ pass ○ distinction
Professional recognition	This apprenticeship aligns with: • IET for Engineering Technician This apprenticeship aligns with: • IMechE for Engineering Technician This apprenticeship aligns with: • Royal Aeronautical Society for Engineering Technician
Re-sits and re-takes	The details for re-sits and re-takes are below: • re-take and re-sit grade cap: pass • re-sit timeframe: typically 3 months • re-take timeframe: typically 6 months

Duration of end-point assessment period

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The EPA is taken in the EPA period. The EPA period starts when the EPAO confirms the gateway requirements have been met and is typically 3 months.

The EPAO should confirm the gateway requirements have been met and start the EPA as quickly as possible.

EPA gateway

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The apprentice's employer must be content that the apprentice is occupationally competent. That is, they are deemed to be working at or above the level set out in the apprenticeship standard and ready to undertake the EPA. The employer may take advice from the apprentice's training provider, but the employer must make the decision. The apprentice will then enter the gateway.

The apprentice must meet the gateway requirements before starting their EPA.

They must:

- confirm they are ready to take the EPA

- have achieved English and mathematics qualifications in line with the apprenticeship funding rules
- submit a portfolio of evidence for the interview underpinned by a portfolio of evidence

Portfolio of evidence requirements:

The apprentice must compile a portfolio of evidence during the on-programme period of the apprenticeship. It should only contain evidence related to the KSBs that will be assessed by the interview. It will typically contain 10 discrete pieces of evidence. Evidence must be mapped against the KSBs. Evidence may be used to demonstrate more than one KSB; a qualitative as opposed to quantitative approach is suggested.

Evidence sources may include workplace documentation and records, for example:

- workplace policies and procedures
- witness statements
- annotated photographs
- video clips with a maximum total duration of 10 minutes; the apprentice must be in view and identifiable

This is not a definitive list; other evidence sources can be included.

The portfolio of evidence should not include reflective accounts or any methods of self-assessment. Any employer contributions should focus on direct observation of performance, for example, witness statements, rather than opinions. The evidence provided should be valid and attributable to the apprentice; the portfolio of evidence should contain a statement from the employer and apprentice confirming this.

The EPAO should not assess the portfolio of evidence directly as it underpins the interview. The independent assessor should review the portfolio of evidence to prepare questions for the interview. They are not required to provide feedback after this review.

Gateway evidence must be submitted to the EPAO, along with any organisation specific policies and procedures requested by the EPAO.

Order of assessment methods

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The assessment methods can be delivered in any order. The result of one assessment method does not need to be known before starting the next.

Practical assessment with questioning

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Overview

In a practical assessment with questions, an independent assessor observes the apprentice completing a task or series of tasks set by the EPAO. The EPAO decides in which of the simulated environments it takes place. The assessment environment must closely relate to the apprentice's natural working environment. It gives the apprentice the opportunity to demonstrate the KSBs mapped to this assessment method.

Rationale

This assessment method is being used because:

- this is a practical role, which can be demonstrated through completing tasks
- it allows for consistency of opportunity for apprentices to demonstrate their competence against the mapped KSBs
- it assesses KSBs holistically and objectively
- it is a valid assessment because it involves direct testing under controlled conditions

Delivery

The practical assessment with questioning must be structured to give the apprentice the opportunity to demonstrate the KSBs mapped to this assessment method to the highest available grade.

An independent assessor must conduct and assess the practical assessment with questioning.

The independent assessor must only observe one apprentice at a time to ensure quality and rigour. They must be as unobtrusive as possible.

The EPAO must give an apprentice 2 weeks' notice of the practical assessment with questioning.

The practical assessment with questioning must take 3 hours.

The independent assessor can increase the time of the practical assessment with questioning by up to 10%. This time is to allow the apprentice to complete a task or respond to a question if necessary.

The practical assessment with questioning cannot be split, other than for comfort breaks or to allow apprentices to move from one location to another. Where breaks occur, they will not count towards the total EPA time.

The EPAO must manage invigilation of the apprentice during the assessment, to maintain security of the EPA, in line with their malpractice policy. This includes breaks and moving between locations.

The independent assessor must explain to the apprentice the format and timescales of the practical assessment with questioning before it starts. This does not count towards the assessment time.

The independent assessor must observe the following during the practical assessment:

- assembly, integration and inspection of a mechanical or electronic subsystem for use either in the space or ground segment
- completion of a joining process (for example bonding, plating)
- testing of the completed subsystem using optical, mechanical or electronic test and measurement equipment and techniques
- compliance with health and safety requirements in the working environment
- compliance with standards and regulations relating to quality management
- accessing and following organisational procedures for production, assembly or testing
- recording of data and results in paper or electronic form as required by the organisation

These activities provide the apprentice with the opportunity to demonstrate the KSBs mapped to this assessment method.

The independent assessor must ask questions.

The purpose of the questions is:

- to seek clarification where required
- to assess the level of competence against the grading descriptors

Questions must be asked after the practical. The total duration of the practical is 3 hours and the time for questioning is included in the overall assessment time. The total time for the practical element is 2 hours 15 minutes. The time allocated for questioning is 45 minutes.

The independent assessor must ask at least 6 questions. The independent assessor must use the questions from their EPAO's question bank or create their own questions in line with the EPAO's training.

The independent assessor can ask follow-up questions to clarify answers given by the apprentice. These questions are in addition to the above set number of questions for the practical assessment with questioning.

The independent assessor must make the grading decision. The independent assessor must assess the practical assessment and responses to questions holistically when deciding the grade.

The independent assessor must keep accurate records of the assessment. They must record:

- the KSBs observed
- the apprentice's answers to questions
- KSBs demonstrated in answers to questions
- the grade achieved

Assessment location

The practical assessment with questioning must take place in a simulated environment selected by the EPAO for example, the EPAO's premises, a training provider's premises, a training facility in the employer's premises, a test centre or a similar simulated environment. This simulated environment must relate to the apprentice's natural work environment. Equipment and resources needed for the practical assessment with questioning must be confirmed to be available by the EPAO, who can liaise with the employer to provide these. They must be in good and safe working condition.

Questioning that occurs after the practical assessment with questioning should take place in a suitable environment for example a quiet room, free from distractions and influence.

Additional venue requirements that must be in place include:

- The practical assessment with questioning can take place in a venue provided by the EPAO or training provider. It can also take place in the employers premises.

Question and resource development

The EPAO must develop a purpose-built assessment specification and question bank. It is recommended this is done in consultation with employers of this occupation. The EPAO must maintain the security and confidentiality of EPA materials when consulting with employers. The assessment specification and question bank must be reviewed at least once a year to ensure they remain fit-for-purpose.

The assessment specification must be relevant to the occupation and demonstrate how to assess the KSBs mapped to this assessment method. The EPAO must ensure that

questions are refined and developed to a high standard. The questions must be unpredictable. A question bank of sufficient size will support this.

The EPAO must ensure that the apprentice has a different set of tasks and questions in the case of re-sits and retakes, to minimise predictability.

The EPAO must produce the following materials to support the practical assessment with questioning:

- independent assessor assessment materials which include:
    - training materials
    - administration materials
    - moderation and standardisation materials
    - guidance materials
    - grading guidance
    - question bank
- EPA guidance for the apprentice and the employer

The EPAO must ensure that the EPA materials are subject to quality assurance procedures including standardisation and moderation.

Interview underpinned by a portfolio of evidence

Edit interview underpinned by a portfolio of evidence form

Overview

In the interview, an independent assessor asks the apprentice questions. It gives the apprentice the opportunity to demonstrate the KSBs mapped to this assessment method.

Rationale

This assessment method is being used because:

- it assesses KSBs holistically and objectively
- it allows for the assessment of KSBs that do not occur on a predictable or regular basis
- it allows for assessment of responses where there are a range of potential answers
- it can be conducted remotely, potentially reducing cost

Delivery

The interview must be structured to give the apprentice the opportunity to demonstrate the KSBs mapped to this assessment method to the highest available grade.

An independent assessor must conduct and assess the interview.

The purpose of the independent assessor's questions will be to assess the apprentice's competence against the following themes:

- quality, documentation and problem-solving
- work environment
- analysis and design
- professional behaviours

The EPAO must give an apprentice 2 weeks' notice of the interview.

The independent assessor must have at least 2 weeks to review the supporting documentation.

The apprentice must have access to their portfolio of evidence during the interview.

The apprentice can refer to and illustrate their answers with evidence from their portfolio of evidence however, the portfolio of evidence is not directly assessed.

The interview must last for 60 minutes. The independent assessor can increase the time of the interview by up to 10%. This time is to allow the apprentice to respond to a question if necessary.

The independent assessor must ask at least 6 questions. The independent assessor must use the questions from the EPAO's question bank or create their own questions in line with the EPAO's training. Follow-up questions are allowed where clarification is required.

The apprentice may choose to end the assessment method early. The apprentice must be confident they have demonstrated competence against the assessment requirements for the assessment method. The independent assessor or EPAO must ensure the apprentice is fully aware of all assessment requirements. The independent assessor or EPAO cannot suggest or choose to end the assessment methods early, unless in an emergency. The EPAO is responsible for ensuring the apprentice understands the implications of ending an assessment early if they choose to do so. The independent assessor may suggest the assessment continues. The independent assessor must document the apprentice's request to end the assessment early.

The independent assessor must make the grading decision.

The independent assessor must keep accurate records of the assessment. They must record:

- the apprentice's answers to questions
- the KSBs demonstrated in answers to questions
- the grade achieved

Assessment location

The interview must take place in a suitable venue selected by the EPAO for example, the EPAO's or employer's premises.

The interview can be conducted by video conferencing. The EPAO must have processes in place to verify the identity of the apprentice and ensure the apprentice is not being aided.

The interview should take place in a quiet room, free from distractions and influence.

Question and resource development

The EPAO must develop a purpose-built assessment specification and question bank. It is recommended this is done in consultation with employers of this occupation. The EPAO must maintain the security and confidentiality of EPA materials when consulting with employers. The assessment specification and question bank must be reviewed at least once a year to ensure they remain fit-for-purpose.

The assessment specification must be relevant to the occupation and demonstrate how to assess the KSBs mapped to this assessment method. The EPAO must ensure that questions are refined and developed to a high standard. The questions must be unpredictable. A question bank of sufficient size will support this.

The EPAO must ensure that the apprentice has a different set of questions in the case of re-sits or re-takes.

The EPAO must produce the following materials to support the interview underpinned by a portfolio of evidence:

- independent assessor assessment materials which include:
    - training materials
    - administration materials
    - moderation and standardisation materials
    - guidance materials
    - grading guidance

- question bank

- EPA guidance for the apprentice and the employer

The EPAO must ensure that the EPA materials are subject to quality assurance procedures including standardisation and moderation.

Grading

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Practical assessment with questioning

Fail - does not meet pass criteria

Theme **KSBs**	**Pass** **Apprentices must demonstrate all of the pass descriptors**
Measurement equipment K8 K13 S9 S14	Selects and uses electrical or electronic measurement and testing equipment in compliance with industry standards, procedures, techniques and task requirements (K8, S9) Measures, tests and analyses results in line with the requirements for the task and limitations of the measurement systems, using instruments such as pressure gauges, micrometers, balances and non-contact approaches in line with industry standards, procedures and techniques. (K13, S14)
Assembly, integration and testing K4 K5 K11 S3 S4 S10	Assembles and integrates components, products and equipment to design specifications and space industry standards. (K4, S3) Performs joining techniques such as using adhesives, bonding, soldering and fastening techniques that meet space qualification standards to assemble, integrate and test at equipment, subsystem and system level, relevant to published standards for processes and quality. (K11, S10) Uses and maintains ground support equipment, including Mechanical (MGSE) electrical and electronic systems (EGSE) for spacecraft or subsystems in line with space

Theme KSBs	Pass Apprentices must demonstrate all of the pass descriptors
	industry standards, procedures, techniques and task requirements. (K5, S4)
Quality, HSE and documentation K2 K7 K10 K16 K17 K20 K24 S1 S7 S8 S11 S19 B1 B4 B7	Applies and promotes a safety-first approach for themselves and colleagues. Complies with workplace health, safety, environmental and sustainability legislation, practices and regulations in line with task requirements. . (K17, K24, S19, B1, B7) Prepares and completes paper or digital documentation for example work instructions, build and change records and risk assessments, in compliance with the business configuration management, document management control processes and space industry processes and standards in line with the task requirements (K10, K16, K20, S1) Uses quality management systems and procedures in compliance with the published standards adopted by the business. (K7, S7) Takes responsibility for the quality of work and enables others to work to high standards through inspecting electrical, mechanical or electronic equipment for quality assurance purposes such as maintenance and calibration, in line with the task requirements (S11, B4) Interprets and uses mathematical and scientific principles, techniques and methods, and technical information such as assembly instructions and requirements, production data, drawings and workplans, schedules test plans, specifications and quality reports. to draw conclusions and make evidence based decisions relating to the task to be undertaken. (K2, S8)

Theme KSBs	Pass Apprentices must demonstrate all of the pass descriptors
Work environment K9 K14 K15 S13 B6	Applies a professional approach to the space industry procedures for handling materials in controlled work areas including the monitoring of particle contaminations, which comply with legislative and company health, safety and environment requirements. (K9, K14, K15, S13, B6)

Interview underpinned by a portfolio of evidence

Fail - does not meet pass criteria

Theme KSBs	Pass Apprentices must demonstrate all of the pass descriptors	Distinction Apprentices must demonstrate all of the pass descriptors and all of the distinction descriptors
Quality, documentation and problem-solving K22 S2 S5 S6	Describes how they have solved problems using procedures and methodologies such as Failure Mode and Effects Analysis (FMEA), Plan-Do-Check-Act (PDCA) Cycle, 8-Disciplines (8D), Ishikawa fishbone diagrams and how they have provided ideas and inputs into process improvement plans. (K22, S5, S6)	Critically evaluates the problem-solving procedures and methodologies they have used to solve problems in space engineering applications. (K22, S5) Evaluates the impact to the organisation of the implementation of the outputs of technical reviews. (S2)

Theme KSBs	Pass Apprentices must demonstrate all of the pass descriptors	Distinction Apprentices must demonstrate all of the pass descriptors and all of the distinction descriptors
	Explains how they implemented outputs of technical reviews in line with organisational requirements. (S2)	
Work environment K1 K6 K12	Describes the different spacecraft systems and their purpose, features and function (for example, types of attitude sensor and actuator, and use of feedback control loops in attitude control), including power, attitude control, thermal, communications, data handling, propulsion and structures (K1) Describes the properties, handling and application of space qualified materials including Electrostatic Discharge (ESD) precautions. (K6)	None.

Theme KSBs	Pass Apprentices must demonstrate all of the pass descriptors	Distinction Apprentices must demonstrate all of the pass descriptors and all of the distinction descriptors
	Describes the space environment including thermal, vacuum and radiation, and how this environment impacts on the design and verification of spacecraft (for example, materials choices, thermal control and types of testing). (K12)	
Analysis and design K23 S12	Explains how they interpret and apply outputs from computer aided design CAD software to create 3-D models and parts drawings to enable the manufacture of components in their role. (K23, S12)	Critically evaluates the use of computer aided design (CAD) in their role. (K23, S12)
Professional behaviours K3 K18 K19 K21 S15 S16 S17 S18 B2 B3 B5	Explains how they follow equality, diversity, and inclusion procedures to support a diverse and inclusive workplace culture, (K21, S17, B2) Explains how they carry out and record planned and	Evaluates the benefits to the organisation of supporting a diverse and inclusive workplace culture. (K21, S17) Outlines the impact and benefits of collaboration and teamwork within the organisation and the wider team. (K3, K18, S18)

Theme KSBs	Pass Apprentices must demonstrate all of the pass descriptors	Distinction Apprentices must demonstrate all of the pass descriptors and all of the distinction descriptors
	unplanned learning and development activity and complete continual professional development to maintain and enhance competence in own area of practice in line with organisational and professional requirements. (S16, B3) Explains how they use verbal and written communication techniques suitable for the context, adapting style and use of industry terminology to suit the audience. (K19, S15) Describes the roles and relationships they hold in their role with customers, partners and suppliers in the national and international space engineering and manufacturing sector, (K3) Explains how they promote and apply teamworking principles, collaborating across disciplines including to meet organisation goals. (K18, S18, B5)	

Overall EPA grading

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Performance in the EPA determines the overall grade of:

- fail
- pass
- distinction

An independent assessor must individually grade the practical assessment with questioning and interview underpinned by a portfolio of evidence in line with this EPA plan.

The EPAO must combine the individual assessment method grades to determine the overall EPA grade.

If the apprentice fails one assessment method or more, they will be awarded an overall fail.

To achieve an overall pass, the apprentice must achieve at least a pass in all the assessment methods. To achieve an overall distinction, the apprentice must achieve a pass in the practical assessment and a distinction in the interview.

Grades from individual assessment methods must be combined in the following way to determine the grade of the EPA overall.

Practical assessment with questioning	Interview underpinned by a portfolio of evidence	Overall Grading
Fail	Any grade	Fail
Any grade	Fail	Fail
Pass	Pass	Fail
Pass	Distinction	Distinction

Re-sits and re-takes

Edit re-sits and re-takes form

If the apprentice fails one assessment method or more, they can take a re-sit or a re-take at their employer's discretion. The apprentice's employer needs to agree that a re-sit or re-take is appropriate. A re-sit does not need further learning, whereas a re-take does. The apprentice should have a supportive action plan to prepare for a re-sit or a re-take.

The employer and the EPAO should agree the timescale for a re-sit or re-take. A re-sit is typically taken within 3 months of the EPA outcome notification. The timescale for a re-take is dependent on how much re-training is required and is typically taken within 6 months of the EPA outcome notification.

Failed assessment methods must be re-sat or re-taken within a 6-month period from the EPA outcome notification, otherwise the entire EPA will need to be re-sat or re-taken in full.

Re-sits and re-takes are not offered to an apprentice wishing to move from pass to a higher grade.

The apprentice will get a maximum EPA grade of pass if they need to re-sit or re-take one or more assessment methods, unless the EPAO determines there are exceptional circumstances.

Roles and responsibilities

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Roles	Responsibilities
Apprentice	As a minimum, the apprentice should: • complete on-programme training to meet the KSBs as outlined in the apprenticeship standard for a minimum of 12 months • complete the required amount of off-the-job training specified by the apprenticeship funding rules and as arranged by the employer and training provider • understand the purpose and importance of EPA • prepare for and undertake the EPA including meeting all gateway requirements
Employer	As a minimum, the apprentice's employer must: • select the training provider • work with the training provider to select the EPAO • work with the training provider, where applicable, to support the apprentice in the workplace and to provide the opportunities for the apprentice to develop the KSBs

Roles	Responsibilities
	• arrange and support off-the-job training to be undertaken by the apprentice • decide when the apprentice is working at or above the apprenticeship standard and is ready for EPA • ensure the apprentice is prepared for the EPA • ensure that all supporting evidence required at the gateway is submitted in line with this EPA plan • confirm arrangements with the EPAO for the EPA in a timely manner, including who, when, where • provide the EPAO with access to any employer-specific documentation as required for example, company policies • ensure that the EPA is scheduled with the EPAO for a date and time which allows appropriate opportunity for the apprentice to meet the KSBs • ensure the apprentice is given sufficient time away from regular duties to prepare for, and complete the EPA • ensure that any required supervision during the EPA period, as stated within this EPA plan, is in place • ensure the apprentice has access to the resources used to fulfil their role and carry out the EPA for workplace based assessments • remain independent from the delivery of the EPA • pass the certificate to the apprentice upon receipt
EPAO	As a minimum, the EPAO must: • conform to the requirements of this EPA plan and deliver its requirements in a timely manner • conform to the requirements of the apprenticeship provider and assessment register • conform to the requirements of the external quality assurance provider (EQAP)

Roles	Responsibilities

	• understand the apprenticeship including the occupational standard and EPA plan
	• make all necessary contractual arrangements including agreeing the price of the EPA
	• develop and produce assessment materials including specifications and marking materials, for example mark schemes, practice materials, training material
	• maintain and apply a policy for the declaration and management of conflict of interests and independence. This must ensure, as a minimum, there is no personal benefit or detriment for those delivering the EPA or from the result of an assessment. It must cover:
	  ○ apprentices
	  ○ employers
	  ○ independent assessors
	  ○ any other roles involved in delivery or grading of the EPA
	• have quality assurance systems and procedures that ensure fair, reliable and consistent assessment and maintain records of internal quality assurance (IQA) activity for external quality assurance (EQA) purposes
	• appoint independent, competent, and suitably qualified assessors in line with the requirements of this EPA plan
	• appoint administrators, invigilators and any other roles where required to facilitate the EPA
	• deliver induction, initial and on-going training for all their independent assessors and any other roles involved in the delivery or grading of the EPA as specified within this EPA plan. This should include how to record the rationale and evidence for grading decisions where required

Roles	Responsibilities
	• conduct standardisation with all their independent assessors before allowing them to deliver an EPA, when the EPA is updated, and at least once a year • conduct moderation across all of their independent assessors' decisions once EPAs have started according to a sampling plan, with associated risk rating of independent assessors • monitor the performance of all their independent assessors and provide additional training where necessary • develop and provide assessment recording documentation to ensure a clear and auditable process is in place for providing assessment decisions and feedback to all relevant stakeholders • use language in the development and delivery of the EPA that is appropriate to the level of the apprenticeship • arrange for the EPA to take place in a timely manner, in consultation with the employer • provide information, advice, and guidance documentation to enable apprentices, employers and training providers to prepare for the EPA • confirm the gateway requirements have been met before they start the EPA for an apprentice • arrange a suitable venue for the EPA • maintain the security of the EPA including, but not limited to, verifying the identity of the apprentice, invigilation and security of materials • where the EPA plan permits assessment away from the workplace, ensure that the apprentice has access to the required resources and liaise with the employer to agree this if necessary

Roles	Responsibilities
	• confirm the overall grade awarded • maintain and apply a policy for conducting appeals
Independent assessor	As a minimum, an independent assessor must: • be independent, with no conflict of interest with the apprentice, their employer or training provider, specifically, they must not receive a personal benefit or detriment from the result of the assessment • have, maintain and be able to evidence up-to-date knowledge and expertise of the occupation • have the competence to assess the EPA and meet the requirements of the IQA section of this EPA plan • understand the apprenticeship's occupational standard and EPA plan • attend induction and standardisation events before they conduct an EPA for the first time, when the EPA is updated, and at least once a year • use language in the delivery of the EPA that is appropriate to the level of the apprenticeship • work with other personnel, where used, in the preparation and delivery of assessment methods • conduct the EPA to assess the apprentice against the KSBs and in line with the EPA plan • make final grading decisions in line with this EPA plan • record and report assessment outcome decisions • comply with the IQA requirements of the EPAO • comply with external quality assurance (EQA) requirements
Training provider	As a minimum, the training provider must: • conform to the requirements of the apprenticeship provider and assessment register

Roles	Responsibilities
	• ensure procedures are in place to mitigate against any conflict of interest • work with the employer and support the apprentice during the off-the-job training to provide the opportunities to develop the KSBs as outlined in the occupational standard • deliver training to the apprentice as outlined in their apprenticeship agreement • monitor the apprentice's progress during any training provider led on-programme learning • ensure the apprentice is prepared for the EPA • work with the employer to select the EPAO • advise the employer, upon request, on the apprentice's readiness for EPA • ensure that all supporting evidence required at the gateway is submitted in line with this EPA plan • remain independent from the delivery of the EPA

Reasonable adjustments

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Reasonable adjustments

The EPAO must have reasonable adjustments arrangements for the EPA.

This should include:

- how an apprentice qualifies for a reasonable adjustment
- what reasonable adjustments may be made

Adjustments must maintain the validity, reliability and integrity of the EPA as outlined in this EPA plan.

Special considerations

The EPAO must have special consideration arrangements for the EPA.

This should include:

- how an apprentice qualifies for a special consideration
- what special considerations will be given

Special considerations must maintain the validity, reliability and integrity of the EPA as outlined in this EPA plan.

Internal quality assurance

Edit internal quality assurance form

Internal quality assurance refers to the strategies, policies and procedures that an EPAO must have in place to ensure valid, consistent and reliable EPA decisions.

EPAOs for this EPA must adhere to the requirements within the roles and responsibilities table.

They must also appoint independent assessors who:

- have recent relevant experience of the occupation or sector to at least occupational level 4 gained in the last 3 years or significant experience of the occupation or sector
- meet the following minimum requirements:
    - knowledge and competence in space manufacturing engineering
    - evidence of continued professional development

Value for money

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Affordability of the EPA will be aided by using at least some of the following:

- completing applicable assessment methods online, for example computer-based assessment
- using the employer's premises
- conducting assessment methods on the same day

Professional recognition

Edit professional recognition form

This apprenticeship aligns with:

- IET for Engineering Technician

This apprenticeship aligns with:

- IMechE for Engineering Technician

This apprenticeship aligns with:

- Royal Aeronautical Society for Engineering Technician

Mapping of KSBs to assessment methods

Edit mapping of ksbs to assessment methods form

Knowledge	Assessment methods
K1 Spacecraft systems including power, attitude control, thermal, communications, data handling, propulsion and structures – the purpose, features and function of these systems (for example, types of attitude sensor and actuator, and use of feedback control loops in attitude control).	Interview underpinned by a portfolio of evidence
K2 Engineering mathematical techniques and scientific principles and methods such as graphical expressions, symbols, formulae and calculations.	Practical assessment with questioning
K3 Customers, partners and suppliers in the national and international space engineering and manufacturing sector; roles and relationships.	Interview underpinned by a portfolio of evidence
K4 Space system assembly products and equipment; subsystem and system, integration and test procedures, processes, techniques.	Practical assessment with questioning
K5 The role and use of Mechanical (MGSE) electrical and electronic systems (EGSE).	Practical assessment with questioning
K6 Properties, handling and application of space qualified materials including Electrostatic Discharge (ESD) precautions.	Interview underpinned by a portfolio of evidence

Knowledge	Assessment methods
K7 Quality and product assurance principles in space projects, including the purpose of approved processes, verification and control documents for components, parts, materials and processes for space projects and ground support, and relevance of standards including EN9100 and ISO9001.	Practical assessment with questioning
K8 Principles, processes and techniques for space environment and mechanical testing such as thermal vacuum, electromagnetic compatibility, shock, vibration and acoustic testing, and radio frequency range testing.	Practical assessment with questioning
K9 The principles of additive manufacturing and applications in space components.	Practical assessment with questioning
K10 Configuration management and document management control processes including issue control, incorporation of change and end item data pack.	Practical assessment with questioning
K11 Adhesives, bonding, soldering and fastening techniques.	Practical assessment with questioning
K12 The space environment including thermal, vacuum and radiation, and how this environment impacts on the design and verification of spacecraft (for example, materials choices, thermal control and types of testing).	Interview underpinned by a portfolio of evidence
K13 Precision and uncertainty in measurement systems, including limitations and appropriate use.	Practical assessment with questioning

Knowledge	Assessment methods
K14 Vacuum and pressurised systems and pressure measurement.	Practical assessment with questioning
K15 Disciplines and handling of materials in cleanliness and contamination controlled environments.	Practical assessment with questioning
K16 Principles of risk assessment at point of work.	Practical assessment with questioning
K17 Environmental Impacts of space manufacturing and operations, approaches to improved sustainability, and associated regulations such as REACH.	Practical assessment with questioning
K18 Team working principles.	Interview underpinned by a portfolio of evidence
K19 Verbal communication techniques. Giving and receiving information. Matching style to audience. Barriers in communication and how to overcome them. Space engineering terminology.	Interview underpinned by a portfolio of evidence
K20 Written and digital communication techniques. Plain English principles. Report writing.	Practical assessment with questioning
K21 Equality Act. Equality, diversity, and inclusion in the workplace. Unconscious bias.	Interview underpinned by a portfolio of evidence
K22	Interview underpinned by a portfolio of evidence

Knowledge	Assessment methods
Problem-solving techniques such as Failure Mode and Effects Analysis (FMEA), Plan-Do-Check-Act (PDCA) Cycle, 8-Disciplines (8D), Ishikawa fishbone diagrams.	
K23 Principles of computer aided design (CAD) and its use in the space sector.	Interview underpinned by a portfolio of evidence
K24 Health, safety, environmental and sustainability legislation and company policies.	Practical assessment with questioning
Skill	**Assessment methods**
S1 Prepare and complete paper or digital documentation such as work instructions, build and change records, risk assessments and non-conformance reports in compliance with applicable space industry processes and standards.	Practical assessment with questioning
S2 Implement outputs of technical reviews such as assembly, integration and test readiness, and non-conformance reviews.	Interview underpinned by a portfolio of evidence
S3 Carry out assembly and integration of products, components or equipment, at subsystem or system level.	Practical assessment with questioning
S4 Use and maintain ground support systems for spacecraft and subsystems.	Practical assessment with questioning
S5 Solve problems using lean and agile methodologies commonly applied in the space engineering sector, such as Failure Mode	Interview underpinned by a portfolio of evidence

Knowledge	Assessment methods
and Effects Analysis (FMEA), Plan-Do-Check-Act (PDCA) Cycle, 8-Disciplines (8D), Ishikawa fishbone diagrams.	
S6 Provide ideas and inputs to space engineering process improvement plans.	Interview underpinned by a portfolio of evidence
S7 Use internal and external quality management systems for example Non-Conformance Reports (NCRs), production documentation, and published standards including EN9100, ISO9001.	Practical assessment with questioning
S8 Interpret and use technical information such as assembly instructions and requirements, production data, drawings and workplans, schedules test plans, specifications and quality reports.	Practical assessment with questioning
S9 Selects and uses electrical and electronic measurement and testing equipment, for example voltmeters, spectrum analysers, oscilloscopes.	Practical assessment with questioning
S10 Perform appropriate joining techniques for example using adhesives, bonding, plating, soldering and fastening.	Practical assessment with questioning
S11 Inspect electrical, mechanical or electronic equipment for quality assurance purposes such as maintenance and calibration.	Practical assessment with questioning
S12	Interview underpinned by a portfolio of evidence

Knowledge	Assessment methods
Use CAD software to create 3D models and part drawings to enable manufacture of components for spacecraft systems or ground support equipment.	
S13 Apply space industry procedures and standards in controlled work areas such as cleanrooms, workshops and testing facilities for example, ECSS-Q-ST-70-50C: Particles contamination monitoring for spacecraft systems and cleanrooms.	Practical assessment with questioning
S14 Measure, test and analyse, using instruments such as pressure gauges, micrometers, balances and non-contact approaches.	Practical assessment with questioning
S15 Communicate using verbal and written methods such as for formal and informal presentations, written reports and electronic dissemination.	Interview underpinned by a portfolio of evidence
S16 Carry out and record planned and unplanned learning and development activities and continual professional development (CPD).	Interview underpinned by a portfolio of evidence
S17 Follow equality, diversity and inclusion procedures.	Interview underpinned by a portfolio of evidence
S18 Apply team working principles.	Interview underpinned by a portfolio of evidence
S19 Comply with legislative and company health, safety, environmental and sustainability policies and regulations.	Practical assessment with questioning

Behaviour	Assessment methods
B1 Take personal responsibility for their own sustainable working practices.	Practical assessment with questioning
B2 Support an inclusive culture.	Interview underpinned by a portfolio of evidence
B3 Committed to continued professional development (CPD) to maintain and enhance competence in their own area of practice.	Interview underpinned by a portfolio of evidence
B4 Take responsibility for the quality of work and enable others to work to high standards.	Practical assessment with questioning
B5 Collaborate and promote teamwork across disciplines.	Interview underpinned by a portfolio of evidence
B6 Apply a professional approach.	Practical assessment with questioning
B7 Take personal responsibility for and promote health and safety.	Practical assessment with questioning

Mapping of KSBs to grade themes

Edit add grade themes formEdit mapping of ksbs to grade themes form

Practical assessment with questioning

KSBS GROUPED BY THEME	Knowledge	Skills	Behaviour
Measurement equipment K8 K13	Principles, processes and techniques for space environment and	Selects and uses electrical and electronic measurement and	None

KSBS GROUPED BY THEME	Knowledge	Skills	Behaviour
S9 S14	mechanical testing such as thermal vacuum, electromagnetic compatibility, shock, vibration and acoustic testing, and radio frequency range testing. (K8) Precision and uncertainty in measurement systems, including limitations and appropriate use. (K13)	testing equipment, for example voltmeters, spectrum analysers, oscilloscopes. (S9) Measure, test and analyse, using instruments such as pressure gauges, micrometers, balances and non-contact approaches. (S14)	
Assembly, integration and testing K4 K5 K11 S3 S4 S10	Space system assembly products and equipment; subsystem and system, integration and test procedures, processes, techniques. (K4) The role and use of Mechanical (MGSE) electrical and electronic systems (EGSE). (K5) Adhesives, bonding, soldering and fastening techniques. (K11)	Carry out assembly and integration of products, components or equipment, at subsystem or system level. (S3) Use and maintain ground support systems for spacecraft and subsystems. (S4) Perform appropriate joining techniques for example using adhesives, bonding, plating, soldering and fastening. (S10)	None
Quality, HSE and documentation K2 K7 K10 K16 K17 K20 K24	Engineering mathematical techniques and scientific principles and methods such as graphical expressions, symbols,	Prepare and complete paper or digital documentation such as work instructions, build and change records, risk	Take personal responsibility for their own sustainable

KSBS GROUPED BY THEME	Knowledge	Skills	Behaviour
S1 S7 S8 S11 S19 B1 B4 B7	formulae and calculations. (K2) Quality and product assurance principles in space projects, including the purpose of approved processes, verification and control documents for components, parts, materials and processes for space projects and ground support, and relevance of standards including EN9100 and ISO9001. (K7) Configuration management and document management control processes including issue control, incorporation of change and end item data pack. (K10) Principles of risk assessment at point of work. (K16) Environmental Impacts of space manufacturing and operations, approaches to improved sustainability, and associated regulations such as REACH. (K17) Written and digital communication	assessments and non-conformance reports in compliance with applicable space industry processes and standards. (S1) Use internal and external quality management systems for example Non-Conformance Reports (NCRs), production documentation, and published standards including EN9100, ISO9001. (S7) Interpret and use technical information such as assembly instructions and requirements, production data, drawings and workplans, schedules test plans, specifications and quality reports. (S8) Inspect electrical, mechanical or electronic equipment for quality assurance purposes such as maintenance and calibration. (S11)	working practices. (B1) Take responsibility for the quality of work and enable others to work to high standards. (B4) Take personal responsibility for and promote health and safety. (B7)

KSBS GROUPED BY THEME	Knowledge	Skills	Behaviour
	techniques. Plain English principles. Report writing. (K20) Health, safety, environmental and sustainability legislation and company policies. (K24)	Comply with legislative and company health, safety, environmental and sustainability policies and regulations. (S19)	
Work environment K9 K14 K15 S13 B6	The principles of additive manufacturing and applications in space components. (K9) Vacuum and pressurised systems and pressure measurement. (K14) Disciplines and handling of materials in cleanliness and contamination controlled environments. (K15)	Apply space industry procedures and standards in controlled work areas such as cleanrooms, workshops and testing facilities for example, ECSS-Q-ST-70-50C: Particles contamination monitoring for spacecraft systems and cleanrooms. (S13)	Apply a professional approach. (B6)

Interview underpinned by a portfolio of evidence

KSBS GROUPED BY THEME	Knowledge	Skills	Behaviour
Quality, documentation and problem-solving K22 S2 S5 S6	Problem-solving techniques such as Failure Mode and Effects Analysis (FMEA), Plan-Do-Check-Act (PDCA) Cycle, 8-Disciplines (8D), Ishikawa fishbone diagrams. (K22)	Implement outputs of technical reviews such as assembly, integration and test readiness, and non-conformance reviews. (S2) Solve problems using lean and agile	None

KSBS GROUPED BY THEME	Knowledge	Skills	Behaviour
		methodologies commonly applied in the space engineering sector, such as Failure Mode and Effects Analysis (FMEA), Plan-Do-Check-Act (PDCA) Cycle, 8-Disciplines (8D), Ishikawa fishbone diagrams. (S5) Provide ideas and inputs to space engineering process improvement plans. (S6)	
Work environment K1 K6 K12	Spacecraft systems including power, attitude control, thermal, communications, data handling, propulsion and structures – the purpose, features and function of these systems (for example, types of attitude sensor and actuator, and use of feedback control loops in attitude control). (K1) Properties, handling and application of space qualified materials including Electrostatic Discharge (ESD) precautions. (K6)	None	None

KSBS GROUPED BY THEME	Knowledge	Skills	Behaviour
	The space environment including thermal, vacuum and radiation, and how this environment impacts on the design and verification of spacecraft (for example, materials choices, thermal control and types of testing). (K12)		
Analysis and design K23 S12	Principles of computer aided design (CAD) and its use in the space sector. (K23)	Use CAD software to create 3D models and part drawings to enable manufacture of components for spacecraft systems or ground support equipment. (S12)	None
Professional behaviours K3 K18 K19 K21 S15 S16 S17 S18 B2 B3 B5	Customers, partners and suppliers in the national and international space engineering and manufacturing sector; roles and relationships. (K3) Team working principles. (K18) Verbal communication techniques. Giving and receiving information. Matching style to audience. Barriers in communication and how	Communicate using verbal and written methods such as for formal and informal presentations, written reports and electronic dissemination. (S15) Carry out and record planned and unplanned learning and development activities and continual professional development (CPD). (S16)	Support an inclusive culture. (B2) Committed to continued professional development (CPD) to maintain and enhance competence in their own area of practice. (B3) Collaborate and promote

KSBS GROUPED BY THEME	Knowledge	Skills	Behaviour
	to overcome them. Space engineering terminology. (K19) Equality Act. Equality, diversity, and inclusion in the workplace. Unconscious bias. (K21)	Follow equality, diversity and inclusion procedures. (S17) Apply team working principles. (S18)	teamwork across disciplines. (B5)

Supporting information

External quality assurance

Edit external quality assurance - eqa form

Option selected: Ofqual

Involved employers

Airbus Defence & Space Ltd, University of Leicester, BAE Systems PLC, Thales Alenia Space UK, Nammo Westcott Ltd, Reaction Engines Ltd, Oxford Space Systems

EPA menu