aerofuse project

Evaluation, Transparency and Recognition Tools Guidelines

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List of abbreviations

CRA - Cyber Resilience Act

EASA – European Union Aviation Safety Agency

ECTS - European Credit Transfer and Accumulation System

ECVET - European credit system for vocational education and training

EDC - European Digital Credentials for Learning

ELM - European Learning Model

EQAVET - European Quality Assurance Reference Framework for VET

EQF - European Qualifications Framework

ESCO - European Skills, Competences, Qualifications and Occupations

ICAO - International Civil Aviation Organisation

MRO - Maintenance, Repair and Overhaul

QA - Quality assurance

SLP – Short learning programme

WBL - Work-based learning

1. Introduction, purpose and context of the deliverable

As part of the AEROFUSE project's aims to develop a reactive and proactive response to skills mismatches and gaps in the aerospace sector, work package 4 foresees the design of roadmaps for training development (VET and HEI curricula) to be implemented in the satellite manufacturing, aircraft production and airports subsectors. Such trainings will ensure alignment with skills needs and EU competence frameworks, integrating aspects of validation and recognition through microcredentials and AI-driven methodologies. Pilot training courses will validate methodologies, before scaling to fully-fledged courses in VET and HEI to respond to the needs of the aerospace industry, through a blended e-learning platform and microcredential tools.

In order to develop the tools and materials above, specific guidelines are foreseen, defining how to evaluate skills gained through work experience, training or non-traditional education pathways. Such guidelines – i.e. deliverable (D4.7) of task 4.5 in the project – will ensure:

1. **Standardisation and transparency** of the assessment methods and criteria, to better align with academic standards and a transparent credit transfer processes;

2. **Evaluation and recognition** of the acquired skills from industries and institutions like universities in terms of ECTS credits or equivalent, establishing a collaborative framework involving industry stakeholders, educational institutions, and accreditation bodies. Through micro-credentials, validation will be transparent in terms of descriptions and references. Microcredentials will also be available in various digital formats, making them portable and stackable.

The following chapters present the guidelines by covering different dimensions of the validation and recognition process, first by addressing current trends in the subsectors of the AEROFUSE project, second by defining frameworks, criteria and principles to respect when issuing courses, training and validating them, and finally by elaborating on the features of microcredentials as last step in the validation pathway.

2. State of play: summary of the competences required by the aerospace sector

This chapter sets the context for the evaluation, transparency and recognition tools developed under Task 4.5, drawing on the preliminary findings of Task 2.1 and 2.2. It presents the main external forces affecting the aerospace skills ecosystem and the competence demands and workforce gaps identified through desk research and surveys with key industry stakeholders, including representatives of enterprises, industry organisations, digital and green transformation experts and market analysts. By examining the subsectors of the AEROFUSE project, i.e. aircraft, satellite, airports and defence, the chapter also ensures a contextualisation not only for task 4.5, but also to T4.4 and the whole work package 4, aligning the content and deliverables of these tasks with the greater structure of the project.

2.1 External drivers of skills change – results from desk research

According to the desk research carried out in Task 2.1 and the aerospace, defence and space sectors have been affected by four main external forces that are reshaping workforce needs:

- *COVID-19 and post-pandemic recovery*

The pandemic disrupted production, supply chains, and workforce continuity across the sector. Recovery efforts accelerated the uptake of digital tools and exposed weaknesses in talent planning and knowledge transfer, adding pressure on upskilling and retention.

- *Digital and deep-tech transformation*

AI, automation, advanced analytics and digital engineering are changing the skills required across the sector. Proficiency in software development, machine learning, cybersecurity and digital systems is increasingly expected in roles where these were not previously core requirements.

- *Green transition*

Regulatory requirements and environmental objectives are creating demand for competences in sustainable engineering, environmental compliance, and green

manufacturing. These are areas where current training provision still lags behind industry needs.

- *Geopolitical developments*

Greater attention to defence, supply-chain resilience and European strategic autonomy has increased the relevance of competences in space security, resilience planning and risk management.

When taken together, these factors are generating skills needs that existing education and training systems are not fully equipped to meet, which is the core reason for the tools developed under Task 4.5.

2.2 Skills demands and workforce gaps - results from stakeholders' surveys

Desk research and survey findings point consistently to strong demand for technical, engineering, and digital competences. Advanced manufacturing, systems integration and interdisciplinary profiles are also increasingly needed. Table 1 summarises the competence categories ranked as most important by survey respondents.

Competence Category	Survey Responses
Technical and engineering competences	36
Digital, data and AI competences	23
Advanced manufacturing and industrial competences	23
Analytical and problem-solving competences	20
Supply-chain and logistics competences	17
Systems integration competences	16
Collaboration, teamwork and interdisciplinary competences	14
Sustainability and environmental competences	9

Table 1. Most important competence categories identified by survey respondents (Task 2.1, 2026).

On the supply side, organisations report considerable difficulty filling positions. Engineers and technicians are the hardest roles to recruit (24 and 22 responses respectively), followed by skilled trades workers (19), digital and IT specialists (18), production workers (16), and R&D specialists (12). Shortages are spread across occupational categories, not concentrated in one area.

The desk research also points to structural issues behind these gaps. Workforce ageing and retirements are leading to the loss of accumulated expertise. The speed at which new technologies are adopted is outpacing current training capacity. Moreover, emerging fields such as space security, cybersecurity and sustainable manufacturing are not yet properly covered by available education and training programmes.

These findings set out the main challenge that Task 4.5 aims to address: the need for recognition mechanisms that go beyond formal qualifications and can capture competences gained through work experience, professional training and other learning pathways. Micro-credentials, competence descriptors, and ECTS-aligned frameworks are the main tools proposed in the chapters that follow.

2.3 Results from the industrial report analysis of the skills needs in the aerospace sector

Following up on the analysis of current skills needs based on existing literature and survey related to the effects of external drivers for skills change, this chapter aims to introduce an overview of the preliminary findings of the industrial report analysis.

The preliminary results, as part of T2.2, highlights specific skills and job roles, grouping them into categories:

- Digital & Data Technologies
- Cyber, Communications & Digital Infrastructure Technologies
- Autonomous, Robotic & System Technologies
- Space & Aviation Technologies
- Advanced Industrial & Materials Technologies
- Deep-Tech & Emerging Technologies

These categories were used to shape questions mainly to industrial players in the aerospace ecosystem, in majority large ones from 12 EU and Member States and Erasmus+ partner countries. Results based on 39 responses informed the following two overviews:

Overview of current jobs, skills and technologies

As highlighted by the preliminary findings, technologies currently implemented in businesses linked to aerospace are, for instance, related to cybersecurity and cyber-resilience, secure communication and encryption, network and connectivity, and digital engineering and simulation. The use of such technologies impacts and defines the roles that businesses in aerospace are looking for to maintain and expand their activities. Currently, organisations claim to need technicians and technical specialists (e.g. avionics, electronics, laboratory or testing technicians), engineers, skilled trades workers (e.g. mechanics, welders, electricians), digital/IT specialists and production workers.

Against this backdrop, digital hard-skills such as human-machine interaction design and quantum-secure communication technologies are said to be difficult to recruit, as well as analytical and critical thinking and complex and creative problem-solving competences, which are constantly needed in the industrial landscape. Such requests and demands from the industrial sector go hand in hand with the current technological transformations shaping aerospace in Europe mentioned above.

Jobs, skills and technologies of the future

From the preliminary findings, skills considered important in the next five years make are mainly related to technological advancements in data analysis and AI. Interviewees point out to the following skills growing in importance over the next 5 years: 1) spatial and mobility data analytics, 2) threat detection and risk analytics skills, 3) autonomous and unmanned systems engineering, 4) human machine interaction design and 6) data and AI-driven service personalisation. In a convergent way, new job roles seem to be emerging, especially in relation to the digital and green transformation: cloud engineers, sustainability and environmental systems specialist, or AI/Machine Learning specialist are becoming more prominent in the positions demanded by industries in the aerospace sector. Such roles integrate the analysis on the technologies planned within the next 5 years, which mainly related to artificial intelligence and machine learning, internet of things, edge computing, data analytics and robotics.

2.4 General considerations

The previous sections addressing the preliminary findings of the analysis, convey the following messages to the following chapters:

- **Technological advancements, geopolitical instability and external disruptions** (e.g. pandemics) are affecting and will still affect the labour market in the aerospace sector, driving the demand of skills linked to digitalisation and, to a lesser extent, sustainability;

- In the subsectors defined in AEROFUSE, **employers still demand greater numbers of technicians, engineers and traders**, i.e. professions that require not only a diploma from higher education, but also from the VET sector. For the future, it can be assumed that a greater emphasis of VET providers and HEI should be put on AI and new technologies implemented in the subsectors;

- **Transversal competences and skills** (e.g. creative problem-solving, critical thinking, etc.) are paramount to industry today, while they tend to be disregarded in the future planning. However, they might be an assumption for employers, since such competences are tightly connected to the skills said to be important in the next 5 years (e.g. the need for critical thinking in data and risk analytics or the need for problem-solving in data service personalisation).

A final consideration from the industrial report must be made, as it concerns training formats. In this context, employers stress that short training courses (1-2 days) are preferred (66.7% of respondents), followed by industry-academia training programmes, micro training sessions, modular training programmes and intensive training courses. Such data calls for a more widely acknowledged recognition of previous training and professional experience, as well as the validation of credentials of learners and workers, as the guidelines intend to provide for the AEROFUSE project.

3. EU frameworks for the recognition of competences, qualifications and occupations

The main EU frameworks for the recognition of competences, qualifications and occupations are presented below, to clarify the main context in which AEROFUSE guidelines have to be inscribed.

European Qualifications Framework (EQF)[1]	The EQF is the main EU tool for comparing qualifications across countries and systems, based on 8 learning-outcome levels. In aerospace, it can help position VET, higher education and professional qualifications for aircraft maintenance, avionics, aerospace engineering, space data, manufacturing or drone operations. National frameworks translate national qualifications into EQF levels, allowing for the transposability of certain qualifications, including in the aerospace sector, among EU Member States.
European Skills, Competences, Qualifications and Occupations classification (ESCO)[2]	ESCO classifies occupations, skills and competences relevant to the EU labour market and education systems. For aerospace, it can support the mapping of job profiles such as aircraft mechanic, aerospace engineer, avionics technician, drone pilot, satellite data analyst or CNC/aerostructures technician. It is useful for skills intelligence, curriculum design, job matching and micro-credential descriptions.
Directive 2005/36/EC on recognition of professional qualifications[3]	The Directive 2005/36/EC on recognition of professional qualifications is an EU legal framework to recognise professional qualifications for access to regulated professions. In aerospace, it may apply indirectly to regulated engineering professions in some countries, but it does not replace EASA licensing rules for aviation safety-critical roles. It is relevant when aerospace professionals move across Member States and need recognition for a regulated national profession.
European Credit Transfer and Accumulation System (ECTS)[4]	ECTS supports credit transfer and accumulation in higher education. In aerospace, it is essential for joint Bachelor's and Master's programmes in aerospace engineering, aeronautics, space systems, satellite applications or aviation management. It helps make learning workload and achievements transparent across universities.
European Quality Assurance Reference Framework for VET (EQAVET)[5]	EQAVET supports quality assurance in initial and continuing vocational education and training (VET). For aerospace, it can help guarantee that training in safety-critical and high-precision areas meets transparent quality standards. It is

[1] Retrieved from: https://europass.europa.eu/en/european-qualifications-framework-eqf
[2] Retrieved from: https://esco.ec.europa.eu/en
[3] Retrieved from: https://eur-lex.europa.eu/eli/dir/2005/36/oj/eng
[4] Retrieved from: https://education.ec.europa.eu/education-levels/higher-education/inclusive-and-connected-higher-education/european-credit-transfer-and-accumulation-system
[5] Retrieved from: https://employment-social-affairs.ec.europa.eu/policies-and-activities/skills-and-qualifications/working-together/eqavet-european-quality-assurance-vocational-education-and-training_en

	useful when building trust between VET providers, employers, aviation companies and regulatory bodies.
European Quality Assurance and Recognition System in Higher Education proposal[6]	This initiative aims to strengthen quality assurance and recognition in higher education, including automatic recognition. Aerospace universities and alliances could use it to support joint degrees, transnational programmes and more trusted recognition of engineering qualifications. It is especially relevant for European University alliances or joint aerospace/space programmes.
European Union Aviation Safety Agency (EASA) core competencies training[7]	EASA, in close collaboration with industry, introduced the core competencies in training with the introduction of knowledge, skills and attitudes (KSA) 100 for the theoretical knowledge training (published in February 2018). EASA has also introduced airline pilot standard multi-crew coordination (APS MCC, published in December 2017), which is an alternative to the conventional MCC course and provides a stronger bridge between initial licences and airline operations. The course evaluates and assesses the student pilot's ability using the core competencies. **Disclaimer:** EASA's guidelines for skills recognition vary depending on the professional domain (e.g., flight crew vs. maintenance technicians). EASA does not offer automatic recognition, as foreign credentials must be converted under specific regulatory frameworks via an EU National Aviation Authority.
International Civil Aviation Organisation (ICAO) frameworks[8]	ICAO establishes global Standards and Recommended Practices (SARPs) to ensure the safety, interoperability and development of civil aviation. In the area of competences, it provides frameworks for training, licensing and competency-based approaches (CBTA), defining the knowledge, skills and attitudes required by aviation professionals.

[6] Retrieved from: https://education.ec.europa.eu/sites/default/files/2024-03/Proposal%20for%20a%20Council%20Recommendation%20on%20a%20European%20Quality%20Assurance%20and%20Recognition%20System%20in%20Higher%20Education.pdf
[7] Retrieved from: https://www.easa.europa.eu/en
[8] Retrieved from: https://www.icao.int/competency-based-training

Besides EU frameworks, other instruments facilitate skills recognition and a shared language on skills and competences, such as:

Europass[9]	Europass supports individuals in documenting skills, qualifications, work experience and credentials in a common European format. Aerospace learners and professionals can use it to present technical competences, mobility periods, EASA-related training, language skills and project experience. For employers, it improves the readability of cross-border aerospace profiles.
European Digital Credentials for Learning (EDC)[10]	EDCs are verifiable digital credentials for diplomas, certificates, micro-credentials and other learning achievements. In aerospace, they could be used to issue tamper-evident certificates for modules such as composite materials, CAD/CAM, avionics, satellite data, UAV operations, safety procedures or green aviation skills. They support cross-border trust and recognition.
European Learning Model (ELM)[11]	The ELM provides a common data model and vocabulary for describing learning achievements and credentials. Aerospace training providers can use it to describe learning outcomes, assessments, workload, issuing bodies and qualification links in a standard digital format.
European approach to micro-credentials[12]	The EU approach supports the development, implementation and recognition of short learning experiences across institutions, sectors and borders. Aerospace can use micro-credentials for rapid upskilling in areas such as sustainable aviation fuels, hydrogen propulsion, drone operations, cybersecurity, AI for predictive maintenance, geospatial data or

[9] Retrieved from: https://europass.europa.eu/it

[10] Retrieved from: https://europass.europa.eu/en/european-digital-credentials

[11] Retrieved from: https://esco.ec.europa.eu/en/about-esco/escopedia/escopedia/european-learning-model

[12] Retrieved from: https://education.ec.europa.eu/education-levels/higher-education/micro-credentials

	advanced manufacturing. This is highly relevant because aerospace skills evolve quickly.
Council Recommendation on validation of non-formal and informal learning[13]	This framework encourages Member States to validate knowledge, skills and competences acquired outside formal education. In aerospace, it can support experienced workers, technicians, military personnel or manufacturing staff who have gained skills on the job but need formal recognition. It can help convert workplace experience into credits, partial qualifications or full qualifications, where national systems allow it.
European credit system for vocational education and training (ECVET)[14]	ECVET as a standalone system has been discontinued by the 2020 EU Council Recommendation on VET (see above), but some of its principles remain useful: units of learning outcomes, assessment, validation and transfer. Aerospace VET providers can use these principles to modularise training in aircraft maintenance, composites, avionics, CNC, quality control or drone systems. It is useful for Erasmus+ mobility and joint VET curricula.

Examples of skills needed in the aerospace sector according to EU frameworks

According to ESCO, the following skills are needed for the following professions in the area of the AEROFUSE project:

Example 1: Aerospace engineer (code 2144.1.1)
Aerospace engineers develop, test and oversee the manufacture of flight vehicles such as aircrafts, missiles, and spacecrafts. The field of engineering they are active in, can be divided into two branches: aeronautical engineering and astronautical engineering.

Essential skills and competences	Optional skills and competences

[13] Retrieved from: https://www.cedefop.europa.eu/files/Council_Recommendation_on_the_validation_20_December_2012.pdf
[14] Retrieved from: https://www.cedefop.europa.eu/en/projects/european-credit-system-vocational-education-and-training-ecvet

• adjust engineering designs • approve engineering design • assess financial viability • ensure aircraft compliance with regulation • execute feasibility study • perform scientific research • troubleshoot • use technical drawing software	• analyse production processes for improvement • apply advanced manufacturing • build a product's physical model • conduct performance tests control production • create a product's virtual model • design prototypes • develop test procedures • draft design specifications • manage product testing • oversee assembly operations • plan test flights • record test data • use CAD software • use CAM software
Essential knowledge	**Optional knowledge**
• aerospace engineering • aircraft mechanics • computer simulation • engineering principles • engineering processes • industrial engineering • manufacturing processes • production processes • quality standards • safety engineering • technical drawings	• CAE software • aerodynamics • defence system • design principles • fluid mechanics • guidance, navigation and control • material mechanics • mathematical modelling • mechanical engineering • state estimation • stealth technology • synthetic natural environment • unmanned air systems
Related occupations	
• aircraft engine tester • aircraft maintenance engineer • avionics inspector • aircraft engine inspector • aerospace engineering drafter • aircraft gas turbine engine overhaul technician • aircraft engine assembler • aircraft de-icer installer • aircraft assembler • aircraft engine specialist	

• aerospace engineering technician • aircraft maintenance technician • aircraft assembly inspector • aircraft assembly supervisor

Example 2: Aircraft maintenance technician (code 7232.5)

Aircraft maintenance technicians perform preventive maintenance to aircrafts, aircraft components, engines and assemblies, such as airframes and hydraulic and pneumatic systems. They perform inspections following strict protocols and aviation laws.

Essential skills and competences	Optional skills and competences
• apply technical communication skills • assemble electrical components • disassemble engines • ensure compliance with airport security measures • evaluate engine performance • follow manufacturer guidelines in use of airport equipment • install electrical and electronic equipment • manage health and safety standards • operate soldering equipment • read engineering drawings and standard blueprints • repair engines • use power tools and technical documentation • wear appropriate protective gear	• conduct performance tests • inspect aircraft for airworthiness • operate precision measuring equipment • test electronic units • use computerised maintenance management systems • use testing equipment

• Essential knowledge	Optional knowledge
• aircraft mechanics • airport safety regulations • common aviation safety regulations • electrical engineering • electrical wiring plans • electricity • electromechanics • electronics • engine components • engineering principles • engineering processes • mechanical engineering • mechanics • technical drawings	• aircraft flight control systems • electrical systems used in transportation

As visible from the examples above, these skills, competences, knowledge and jobs position are related mainly to specific roles and levels of Education and Training, but they can be applicable to more occupations in the AEROFUSE sectors.

4. Criteria and principles for the validation and recognition of skills in the AEROFUSE sectors

The sections below are highlighting the main principles and criteria to take into account for and apply to the evaluation and recognition of competences acquired in the aerospace sector. They define the general terms under which learning outcomes will have to be evaluated, as well further dimensions related to the validation and recognition of competences in the AEROFUSE sector, based on the European frameworks illustrated above.

4.1 Learning outcomes

Competences must be described in terms of knowledge, skills and attitudes, according to the 2018 Council Recommendation on Key Competences for Life-long Learning. Accordingly, **knowledge** "is composed of the facts and figures, concepts, ideas and theories which are already established and support the understanding of a certain area or subject";

skills are defined as the "ability and capacity to carry out processes and use the existing knowledge to achieve results"; **attitudes** consist of the "disposition and mind-sets to act or react to ideas, persons or situations".[15] As shown by frameworks such as EQF, ECTS and ESCO, learning outcomes should be measurable, observable, assessable and sector-specific, reflecting both the theoretical understanding of learners and workers and their practical and operational capabilities.

4.2 Alignment with the European Qualifications Framework (EQF)

In training and education, competences must correspond to a clearly identified EQF level. Evaluation should verify the complexity of the tasks performed, the degree of autonomy of the learner, their problem-solving capacity, as well as their propension to innovation and the degree of responsibility in the work/learning ecosystem. Within EQF, responsibility and autonomy are described as the "ability of the learner to apply knowledge and skills autonomously and with responsibility".[16] In initial vocational education and training (IVET), learners obtain qualifications along EQF levels 3 to 5, with level 5 representing Higher VET. EQF levels 6 to 8 pertain instead to tertiary education (Bachelor's, Master's and PhD qualifications). Below is an example of the EQF levels applied to some of the aerospace occupations:

EQF Level	Aerospace occupation
Level 4	Aircraft maintenance technician
Level 5	Drone systems supervisor
Level 6	Aerospace systems engineer
Level 7	Space mission operations specialist

In the VET sector, EQF level 4 competences are specifically important for technician profiles. They also relate to work-based learning (WBL) validation, safety practices, compliance and quality assurance. Since VET providers in these areas foresee in-company training in airports facilities, provided by companies in the sector, the role of aviation authorities in

[15] COUNCIL RECOMMENDATION of 22 May 2018 on key competences for lifelong learning (Text with EEA relevance) (2018/C 189/01), retrieved from: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018H0604(01)
[16] Description of the eight EQF levels, retrieved from: https://europass.europa.eu/en/description-eight-eqf-levels

recognition processes is paramount to define the skills and competences needed by the industry.

4.3 Sector relevance and labour market alignment

Once the EQF level has been determined, the competences to be achieved by the end of the learning or training experience must be outlined. In this context, both ESCO and EQAVET point to certain dimensions of the occupations, highlighting that outcomes must be framed with an eye on:

- (aerospace) occupations
- current labour market needs
- emerging technologies (as referred to in point 2.2)
- industrial standards

Alongside ESCO and other European transparency tools, relevant European Union Aviation Safety Agency (EASA) domains should also be considered when defining, assessing and recognising competences within the AEROFUSE sectors. The four subsectors identified through the AEROFUSE analysis, namely satellite manufacturing, aircraft production, Maintenance, Repair and Overhaul (MRO) and airports, are closely linked to several EASA domains that provide an important reference for sector-specific skills requirements, safety standards and technological developments.

For satellite manufacturing, relevant EASA domains include Research and Innovation and Cybersecurity, reflecting the growing importance of digital engineering, systems integration, satellite operations and secure aerospace infrastructures. For aircraft production, the most relevant domains are Aircraft and Products, Environment, Research and Innovation, and Cybersecurity, particularly regarding advanced manufacturing, new materials, sustainable aviation technologies and digitalised production processes. For the MRO subsector, Aircraft and Products, Continuing Airworthiness, Safety Management and Promotion, and Cybersecurity are particularly relevant, given their focus on maintenance activities, airworthiness requirements, operational safety and digital maintenance systems. For airports, the domains of Aerodromes, Air Operations, Air Traffic Management (ATM/ANS), Safety Management and Promotion, Environment, and Cybersecurity are directly relevant to airport operations, safety and security management, logistics, digital infrastructure and sustainability objectives.

Against this backdrop, evaluation of the competences acquired should include a certain degree of employer validation, targets agreed on by sectoral consultations with relevant stakeholders and alignment with aerospace clusters and alliances, e.g. those within the network of the European Aerospace Cluster Partnership or the Aerospace & Defence ecosystem and Large-Scale Partnerships within the EU Pact for Skills. It is paramount that sector relevance is the result of thorough sectoral consultations with all partners: industry, education, research and civil society (when applicable), with involvement of public employment services and national and regional observatories focusing on skills evolution and analysis.

In the sectors of AEROFUSE project, some occupations related to aircraft production and space manufacturing, also considering MRO, as well as infrastructures for green and digital priorities (e.g. airports) could be the following:

- Aviation maintenance
- Space technologies
- Satellite data operations
- Advanced manufacturing
- AI and automation in aerospace
- Cybersecurity for aviation systems
- Green aviation technologies

4.4 ESCO mapping

In the framework of ESCO, competences for the evaluation and recognition should be mapped according to the main occupations related to the aerospace sector, as well as the skills and the knowledge of concepts, theories and practices related to the field. Moreover, assessment of training and upskilling should be always framed in light of:

Ensuring that competences across different sectors are semantically consistent and vocabulary is used homogeneously.

Making competences align with interoperability across different EU (national) systems, to apply the same competences in different yet interlinked domains

Ensuring competences' compatibility with Europass and other European Digital Credentials for Learning (EDC).[17] EDCs are checked and verified to ensure trust, security and authenticity of the qualification, maintaining a high degree of details and guaranteeing recognition.

Example

<table>
<tr><th>Competence</th><td rowspan="4">Mapped to</td><th>ESCO occupation</th></tr>
<tr><td rowspan="3">"Interpret satellite imagery for environmental monitoring"</td><td>Geospatial analyst</td></tr>
<tr><th>ESCO skill</th></tr>
<tr><td>Analyse geospatial information</td></tr>
</table>

4.5 Work-Based Learning (WBL) integration

Especially in the context of initial VET and continuous VET, competences are often evaluated and practically expressed in work-based learning (WBL) setting and through WBL activities. Such activities take place in workplace contexts, often guided by enterprises' employees who play a double role of worker and mentor for learners. Against this backdrop, evaluation should also include authentic workplace scenarios, where competences can be assessed in laboratories, simulators, hangars, production facilities and operational environments. The degree of inclusion of WBL evaluation depends on the occupation concerned, the type of training offered and the set of skills, knowledge and attitudes to be learnt. Such environments also support testing of:

- Ability to apply procedures safely and within security standards
- Team collaboration and (management) responsibilities vis-à-vis other colleagues
- Compliance with operational protocols
- Decision-making under pressure, critical thinking and ethical reasoning

4.6 Safety and regulatory compliance

Given the strategic and high-risk nature of aerospace, evaluation of competences must include:

[17] European Digital Credentials, retrieved from https://europass.europa.eu/en/european-digital-credentials

- European Union Aviation Safety Agency (EASA) standards
- International Civil Aviation Organisation (ICAO) regulations
- Other aviation safety protocols
- Cybersecurity requirements (e.g. the NIS2 Directive for critical infrastructure and enterprises, the Cyber Resilience Act (CRA) for digital products, and the EU Cybersecurity Act for ICT certification)

These frameworks are defining elements to integrate in the evaluation and verification of competences gained through work experience, training, or non-traditional education pathways, especially to favour a better understanding of the competences required to master risk management, incident reporting, quality control and ethical principles.

4.7 Quality Assurance, assessment methods, recognition and transferability

Especially in the context of EQAVET (see above), quality assurance must be a part of the evaluation systems issued by AEROFUSE.

4.7.1 Evaluation

Evaluation systems should demonstrate:

- clear assessment procedures
- assessor qualification standards
- feedback mechanisms
- learner support processes
- traceability of evidence
- periodic review with industry (in line with sector relevance and labour market alignment)

Some of the most common indicators, to be selected as to their significance for the specific case of AEROFUSE could be:

- graduate employability
- employer satisfaction
- learner progression
- certification completion rates
- mobility outcomes

4.7.2 Recognition and transferability

According to EQF and ECTS, competences achieved through education and training must respect some criteria ensuring their recognition and transferability across systems at EU level. For instance, competences should be:

- modular
- stackable
- transferable between institutions and countries
- recognisable across education and training sectors

In the area of VET, the former system of ECVET (credit transfer system applied to VET qualifications and diplomas) was repealed by the Recommendation on vocational education and training for sustainable competitiveness, social fairness and resilience, adopted in 2020 by the Council of the EU. The Recommendation defines key principles for ensuring that vocational education and training is agile and adapts swiftly to labour market needs, providing quality learning opportunities for young people and adults alike. Some aspects to take into account are:

- clear workload estimation
- transparent assessment systems
- documents proving evidence of achievements during training
- compatibility with microcredentials and digital certificates

Recognition could be weak in certain cases, if no specific regulations are in place. We can support it by including consistent information, i.e. defining clearly the information we need in the final certification (e.g. awarding body, references, etc.). Accessibility is key. It is important to create meaningful objects (i.e. microcredentials, badges, etc.) that are relevant for industry.

4.7.3 Assessment

Assessment methods are also a paramount dimension of recognition and validation of competences, as they indicate learners' degree of mastery and proficiency for skills, knowledge and attitudes learnt in education and training.

Some examples include:

- test-based assessment
- challenge-based assessment
- project-based assessment
- simulations
- interdisciplinary case studies

5. Validation process

The validation process constitutes the quality-assurance gateway of the AEROFUSE framework. It ensures that Short Learning Programs (SLPs) designed for rapid upskilling and reskilling are rigorously assessed for safety, pedagogical integrity and labour market relevance before being issued as microcredentials.

To bridge the gap between agile educational offerings and the strict safety-critical demands of the aerospace sector, AEROFUSE implements a multi-tiered validation mechanism structured across three pillars: **Peer Review**, **Expert Evaluation** and **Stakeholder Feedback**, fully supported by an integrated digital ecosystem: **Moodle (LMS) → Drillster (Adaptive Learning) → MICOO (Credentialing Platform)**.

Within the context of microcredentials, the term **validation** may refer to two distinct yet complementary processes, each serving a different purpose and involving different stakeholders.

5.1 Validation of the learning path

Learning path validation concerns the verification that a learning pathway meets the requirements for the award of a microcredential. This process may apply to:

- a **Short Learning Programme (SLP)** specifically designed to lead to the award of a microcredential (SLP + MC); or
- a **standalone microcredential** awarded without a formal learning programme, such as through **Recognition of Prior Learning (RPL)** or **Identification, Validation and Certification (IVC)** processes.

Learning path validation includes the assessment of elements such as:

- the alignment between learning objectives, learning outcomes, and competencies;
- the appropriateness of the learning activities or the evidence required from learners;
- the validity and reliability of the assessment methods and evaluation criteria;
- compliance with the quality standards established by the issuing organisation and, where applicable, by an endorsement or awarding body.

Successful completion of this validation confirms that the learning pathway—or, in the case of RPL or IVC, the competence recognition process—provides a sound basis for awarding the corresponding microcredential to learners who have demonstrated the required learning outcomes or competencies (proficiency).

5.2 Validation of the digital microcredential

Once issued, a microcredential may undergo a different type of validation aimed at verifying the authenticity and current validity of the digital credential itself.

This validation does not assess the quality of the learning programme or the assessment process. Instead, it verifies that:

- the microcredential was genuinely issued by the stated issuing organisation;
- its content has not been altered or tampered with after issuance (integrity);
- the digital signature or other cryptographic verification mechanism remains valid;
- the credential has not been revoked, suspended, or expired;
- the credential identifier corresponds to a valid record in the underlying trust infrastructure, such as a blockchain or another verifiable credential registry.

This validation enables employers, education and training providers, credential evaluators, and other stakeholders to independently verify the authenticity and trustworthiness of the digital microcredential presented by its holder.

In summary, **learning path validation** provides assurance regarding the quality and robustness of the educational or competence recognition process leading to the award of a microcredential, whereas **microcredential validation** provides assurance that the issued digital credential is authentic, has maintained its integrity, and remains valid. The two processes are complementary: the former guarantees the credibility of the learning and assessment process, while the latter guarantees the trustworthiness of the digital credential that represents its outcome.

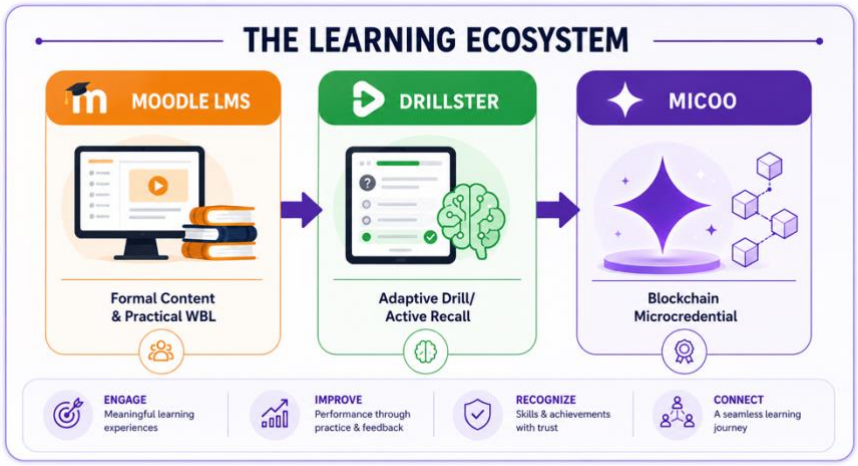
5.3 Issuing organisations and awarding/endorsing body

- **Issuing organisation:** the institution or organisation that designs, delivers, assesses, and issues the microcredential to the learner. It is responsible for ensuring that the learning outcomes, assessment, and evidence meet the defined quality standards.
- **Awarding or endorsing body:** an independent authority or recognised organisation that validates, authorises, or endorses the microcredential framework or the issuing organisation. It provides external recognition and quality assurance, increasing the credibility, trust, and portability of the microcredential without necessarily delivering the learning itself.

An **awarding body** has the authority to confer or authorise a credential, whereas an **endorsing body** does not issue the credential but publicly recognises its quality or relevance.

A typical governance model may involve three distinct actors:

- **Awarding body:** owns the credential framework and authorises the award.
- **Issuing organisation:** delivers the learning, assesses learners, and issues the microcredential under the awarding body's authority.
- **Endorsing body:** Independently recognises that the microcredential or its framework meets external quality or industry expectations.



5.4 Peer review

The Peer Review stage focuses on the structural, pedagogical, and methodological integrity of the short training program. It ensures that the learning architecture aligns with standard European educational design principles.

- **Composition of the Peer Review panel:** composed of instructional designers, vocational education and training (VET) coordinators, and academic peers from the AEROFUSE network who are external to the program's development team. This could be represented by the AEROFUSE steering committee and the Advisory Board.

- **Validation parameters**
    - **Learning outcomes formulation:** verifying that learning outcomes are formulated as measurable, observable and assessable statements broken down into *Knowledge, Skills, and Attitudes (KSA)* in compliance with the 2018 Council Recommendation.
    - **Workload and credit estimation:** evaluating the realism of the estimated total learning hours. Reviewers verify whether the assigned workload corresponds accurately to the depth required by the targeted EQF level.
    - **Adaptive learning architecture:** they verify that the core theory syllabus hosted in Moodle is mapped to corresponding adaptive learning modules called "Drills" (adaptive learning and assessment modules) that are hosted in Drillster or embedded in Moodle, for adaptive learning, practice, be assessed and refresh learning to combat the human forgetting curve.

5.5 Expert evaluation

Given the high-risk nature of the aerospace industry, the Expert Evaluation stage is the mandatory technical and regulatory compliance gate. It ensures that no training program compromises operational safety, airworthiness, or cybersecurity protocols.

- **Composition of the Expert Panel:** subject-Matter Experts (SMEs), including certified aerospace engineers, Quality Assurance (QA) managers from EN 9100-certified environments, and professionals familiar with National Aviation Authorities (NAAs) or EASA compliance frameworks.

- **Validation parameters**

- **Regulatory & safety alignment:** ensuring compliance with EASA standards (e.g., compatibility with Part-147/Part-66 principles where applicable), ICAO regulations and specific aviation safety protocols.
- **Proficiency threshold verification:** rather than validating traditional "one-off" exams, the expert panel defines the mandatory **Drillster proficiency target** (e.g., a required 95% score during 6 months) that proves a learner has truly retained critical safety regulations or operational checklists over time, beyond the 'baseline' of their individual forgetting curve. In the aerospace sector, however, different levels of risks might require different types of proficiency verification, e.g. three levels of risk (low, intermediate and high), to which three different standards for the assessment can be associated: low level of risk could require a simplified validation process and high level of risk would require stronger validation processes. This way, effort on low and intermediate levels can be reduced and validation can focus on the high-level activities.
- **Authentic assessment verification:** mandating that programs touching safety-critical operations contain robust practical or simulated validation methods. The panel reviews whether the chosen Work-Based Learning (WBL) settings (e.g., simulators, hangars, digital twins) track alongside Drillster's algorithmic feedback to prove real-time decision-making capability.

5.6 Stakeholder Feedback

The final validation phase guarantees industrial demand and labour market currency, mitigating the risk of credential inflation or the creation of obsolete training.

- **Composition of the stakeholder group:** Gathered through structural consultations with aerospace clusters (such as the European Aerospace Cluster Partnership - EACP), Tier-1/Tier-2 manufacturing supply chains, MRO facilities, and public employment services involved in the EU Pact for Skills.
- **Validation parameters:**
  - **Labor market semantic consistency:** Verifying that the skills and occupations listed in the SLP align directly with the ESCO taxonomy. This guarantees that vocabulary is used homogeneously across different EU national systems to favor cross-border mobility.
  - **Long-term competence retention:** Employers evaluate if the continuous practice model via Drillster modules adequately addresses the industry's

need for permanent competence maintenance, ensuring technicians remain sharp months after completing the course.

5.7 Description of the micro-credentials

Every short learning program (SLP) validated under the AEROFUSE framework must be issued as a secure, tamper-proof digital microcredential via the MICOO platform standard. This ensures strict technological compliance with the **EDC** infrastructure and semantic alignment with the **ELM** data scheme.

5.7.1 The Two-Track MICOO Issuance Model

To accommodate both structured educational paths and real-world shop floor expertise, AEROFUSE micro-credentials must be classified under one of two MICOO tracking pathways:

- **Learn-and-Earn Pathway (Moodle + Drillster Integrated):** Applied to structured training courses. The learner interacts with theoretical materials and coordinates Drillster practical sessions inside **Moodle**. Concurrently, they use **Drillster** activities (within Moodle) to engage in practical drills to cement the knowledge. The MICOO micro-credential is automatically unlocked and issued *only* when Moodle logs completion of practical/WBL tasks **and** Drillster tests / activities confirms the learner has reached the baseline proficiency score.
- **Earn (Skill Validation) Pathway:** Tailored for non-formal and informal learning (in line with the Council Recommendation on validating non-formal learning). Experienced aerospace technicians can bypass formal Moodle coursework. **They "Earn" the micro-credential by passing Drillster diagnostic proficiency drills (tests in this case)** to validate their existing knowledge, combined with uploading verifiable workplace evidence (e.g., QA logbooks) or passing activity-based simulator tests reviewed directly by an Expert Evaluator.

5.7.2 MICOO Metadata Schema & Interoperability

To ensure maximum portability and immediate readability by aerospace employers, the MICOO digital badge must structurally encode the following metadata parameters:

MICOO / ELM Core Data Field	Aerospace Sector Specific Requirement
Credential Title & ID	Explicit naming indicating technical scope and version control (e.g., *Ultrasonic Non-*

	Destructive Testing for Advanced Composites).
Credential Pathway	Explicitly flagged as either **"Learn-and-Earn"** (Course-based) or **"Earn"** (Prior Skill Validation).
EQF Level Alignment	Definitive positioning on the 8-level scale (Levels 3 to 5 for IVET/HVET; Levels 6 to 8 for Tertiary/Higher Education).
ESCO Mapping Code	Direct semantic linking to specific ESCO occupations (e.g., Code 2144.1.1 for Aerospace Engineer) and their underlying essential/optional skill codes.
Validation Mechanics	Hardcoded evidence showing completion logs from **Moodle** and the algorithmic proficiency retention score achieved in **Drillster**.
Cryptographic Verification	**MICOO Blockchain Seal:** A decentralized, unforgeable digital signature verifying the identity of the accredited issuing body, the validated assessors, and compliance with EQAVET protocols.
Validity & Currency Window	**Competence retention/expiry clause:** due to rapid technological changes and airworthiness requirements, credentials have a built-in MICOO expiry date (typically 2 to 3 years). Furthermore, if not maintained, competence may be lost due to a lack of practical application in a real-world context. However, the credential may remain automatically active if the student maintains the required competence score through continuous refresher exercises on Drillster, carried out on their mobile device or computer during the duration of the AEROFUSE programme. It is understood that these continuous refresher exercises will be adapted to technological and other changes, thereby ensuring that up-to-date competence is effectively maintained. It is worth noting the case where the expiry is due to regulatory or legal provisions; in

	such cases, the continued validity will be governed by those same regulations.

5.8 Examples of training to be provided

The following examples demonstrate how different short learning programs map across the AEROFUSE framework guidelines, showcasing the intersection of ESCO codes, EQF levels, and target validation approaches.

→ Example 1: Advanced Manufacturing (Safety-Critical & Material Science)

- **Course title:** Advanced Composite Materials Repair and NDT Inspection Techniques
- **Target profile/ESCO mapping:** Aircraft Maintenance Technician / Aerospace Engineering Technician (Related to ESCO 2144.1.1)
- **Indicative EQF level:** level 4[18]
- **Estimated workload:** 90 Learning Hours (Equivalent to 3 ECTS)
- **MICOO pathway:** Learn-and-Earn
- **Digital ecosystem & assessment delivery:**
    - **Moodle-based blended learning platform:** Used to deliver initial theory structural mechanics theory and coordinate scheduling for the mandatory hands-on workshop sessions.
    - **Drillster:** Adaptive learning content created in Drillster and hosted in Moodle is used by learners to learn by practice security regulations until a 95% proficiency score is hit.
    - **MICOO issuance:** Triggered automatically when the physical workshop assessor enters the practical pass mark into Moodle and Drillster verifies that the safety-knowledge retention target is active.

→ Example 2: Digital & Emerging Technologies (UAV systems)

- **Course Title:** Unmanned Air Systems (UAS) integration and Fleet Traffic Management
- **Target Profile/ESCO Mapping:** Drone systems supervisor / drone pilot (optional knowledge branch of ESCO 2144.1.1)
- **Indicative EQF level:** level 5

[18] See EQF framework description in ch. 2 and here: https://europass.europa.eu/en/european-qualifications-framework-eqf

- **Estimated Workload:** 45 learning hours (equivalent to 1.5 ECTS)
- **MICOO Pathway:** Earn
- **Digital ecosystem & assessment delivery:**
    - **Drillster:** experienced drone operators bypass formal classroom lectures. They log into Drillster or Moodle directly to complete drills covering local civil aviation authority (CAA) laws, airspace restrictions, and cyber-security protocols. Drillster's spaced-repetition algorithm ensures they retain this critical safety data.
    - **WBL / simulation:** combined with a challenge-based scenario in a flight simulator dealing with mid-air telemetry failure.
    - **MICOO issuance:** upon successful simulation verification and confirmation of Drillster knowledge validation, MICOO deploys an EDC badge to the professional's Europass wallet.

→ *Example 3: Space Technologies & Complex Data (Higher Education / Tertiary Sector)*

- **Course Title:** Orbit State Estimation and Satellite Geospatial Imagery Interpretation
- **Target Profile/ESCO Mapping:** Aerospace Systems Engineer / Geospatial Analyst (ESCO 2144.1.1 core branches)
- **Indicative EQF Level:** Level 6/7
- **Estimated Workload:** 60 Learning Hours (Equivalent to 2 ECTS)
- **MICOO Pathway:** Learn-and-Earn
- **Digital Ecosystem & Assessment Delivery:**
    - **Moodle:** Hosts theory and computer simulation software packages. Learners submit their final project-based portfolio through Moodle.
    - **Drillster:** Content created in Drillster and hosted in Moodle serves to practice critical orbital mechanics formulas, code variables, and satellite data interpretation rules. Spaced learning elements are injected throughout the academic semester to ensure long-term retention of theoretical concepts.
    - **MICOO Issuance:** A joint university alliance committee reviews the Moodle portfolio and Drillster logs to release a blockchain-secured digital micro-credential.

6. Application of the guidelines to AEROFUSE training programmes for the reactive response

In line with AEROFUSE's workplan, the guidelines have been implemented into two pilot courses (task 4.4) which will serve as the basis of the further courses to be delivered throughout the project cycle. The pilot courses are displayed below and address "Human factors in aviation" and "Soft skills as a starting point for high professional performance".

Pilot course 1

Training title	**Human Factors in Aviation**
Short Description	The objective of this course is to teach prospective technicians, involved in aircraft maintenance and operations, the critical impact of human factors on aviation safety, efficiency, and error management. It aims for students to internalize a "safety culture" in maintenance operations, by comprehending the relationships between human performance, the physical and social environment, communication, and workplace hazards.
Thematic Area	Airports and MRO Operations
Target Audience	VET Learners
Entry Requirements	Basic Digital Skills
Learning Objectives	In the end of this training, you will be able to: Define the fundamental impacts of human factors on aircraft maintenance operations and flight safety (including Murphy's Law). Analyse the effect of human performance and limitations (cognitive and physical) on maintenance tasks. Explain social psychological factors, corporate culture, and the importance of teamwork in the aviation work environment. Evaluate factors directly affecting performance, such as fatigue, stress, workload, and shift work. Comprehend human error models and develop preventive strategies to minimize errors in maintenance operations.
Key Outcomes and Competences developed	Participants will acquire knowledge of human factors principles and their impact on aircraft maintenance operations and flight safety. This will include human performance and limitations, organisational culture and

	teamwork, fatigue, stress, workload management and human error prevention. They will develop skills to analyse factors affecting human performance, identify risks related to human error, apply preventive strategies, communicate effectively within aviation work environments and contribute to safe and efficient maintenance operations. Participants will strengthen their responsibility for compliance with aviation safety requirements and their contribution to a positive safety culture. **Key competences developed (ESCO-aligned):** Communicate effectively Work in teams Promote health and safety awareness Ensure compliance with regulations Assess risks and hazards Manage stress in challenging situations Apply risk management processes
Main Contents	General introduction Human Performance and limitations The Social Environment Factors affecting performance Physical Environment Tasks Communication Human error Dirty Dozen Hazards in the Workplace
Level of complexity	Intermediate
Delivery Mode	Online, Self-paced
Estimated workload	20 hours (Asynchronous)
Instructor	Prof. Dr. Rustem Baris Yesilay
Host Institution	EGE University
Accreditation Status	Microcredential
Endorsement/Awarding Body	WAM - World Alliance for Microcredentials
Indicative EQF Level	Level 4
Number of Modules	10
Assessment Methods and Approval Criteria	A quiz at the end of each module (5 questions, 2 points per question, total: 10 points per quiz, 100 max grade).

	All other activities should be completed.
Training Schedule	Registrations are open from July 27 to August 15, 2026 Students are expected to finish the activities until the end of August 30, 2026 (1) (1) A possible extension of this period could be granted by the course coordinator
Language	English

Pilot course 2

Training title	Soft skills as a starting point for high professional performance
Short Description	This training uses the $E = mc^2$ formula as a starting point to reflect on the role of soft skills in professional performance. In this approach, E represents the effect or impact achieved, m represents methodology, and c represents attitude. The main idea is that technical knowledge and methodology are necessary, but their impact largely depends on how they are applied through soft skills. The course pays special attention to competences such as cognitive flexibility, intellectual curiosity and critical thinking, understood as key tools to face challenges, make better decisions and improve effectiveness in day-to-day work.
Thematic Area	Soft Skills
Target Audience	VET Learners; Mixed audience
Entry Requirements	Basic Digital Skills
Learning Objectives	The main objective of this course is to help learners understand and apply key soft skills that improve professional performance in real work contexts. In specific, by the end of the training, learners will be able to: Understand the importance of soft skills as a key element of daily professional performance. Recognise the added value of competencies such as cognitive flexibility, intellectual curiosity and critical thinking in real work contexts.

	Identify day-to-day situations in which soft skills can be applied to improve decision-making, collaboration and adaptation to change. Develop a practical approach to consciously and consistently integrate these competencies into their professional environment. Strengthen a proactive attitude towards new challenges, fostering initiative, continuous learning and improved professional performance.
Key Outcomes and Competences developed	Participants will acquire knowledge of key soft skills and their role in improving professional effectiveness in contemporary work environments. This will include intellectual curiosity, critical thinking, cognitive flexibility, adaptability, initiative, problem-solving, collaboration and interpersonal communication, as well as their application in day-to-day professional situations. They will develop skills to analyse situations from different perspectives, question assumptions, adapt to changing circumstances, address challenges proactively, collaborate effectively with others and apply reflective approaches to continuous learning and professional development. Participants will strengthen their confidence in responding to new challenges, contributing to constructive workplace relationships and enhancing their overall professional performance. **Key competences developed (ESCO-aligned):** • Adapt to change • Keep an open mind • Think critically • Show initiative • Address problems and issues • Plan and organise work activities • Collaborate with others in teams and networks • Interact with others effectively
Main Contents	Introduction to softskills and professional impact Intellectual Curiosity Critical Thinking Cognitive Flexibility Practical Application and assessment
Level of complexity	Intermediate
Delivery Mode	Online, Self-paced

Estimated workload	20 hours (Asynchronous)
Instructor	Garazi Catalan, Goizalde Santamarina
Host Institution	IMH Campus
Accreditation Status	Microcredential
Endorsement/Awarding Body	WAM - World Alliance for Microcredentials
Indicative EQF Level	Non formal/ Not applicable
Number of Modules	3
Assessment Methods and Approval Criteria	Learners will complete drills throughout each module and a final test at the end of each module. Module 1 includes one “drill“ and one final test, Module 2 includes three “drills” and one final test, and Module 3 includes one “drill” and one final test. The drills included throughout the modules require a minimum score of 60% to continue. The Final Test of each module (which is also a “drill”) requires a minimum score of 70% to move on to the next module.
Training Schedule	Registrations are open from July 27 to August 15, 2026 Students are expected to finish the activities until the end of August 30, 2026 (1) (1) A possible extension of this period could be granted by the course coordinator
Language	English

7. Conclusion and Recommendations

The chapters above highlight specific tools and guidelines to recognise and implement for the validation and recognition of skills, competences and previous training. While the first chapter contextualised the various skills needs and mismatches related to satellite manufacturing, aircraft production, MRO and airports, the following ones highlighted EU frameworks and principles that should guide the definition of VET and HEI courses in the sectors. The last chapter described in detail the various dimensions and characteristics of microcredentials for the validation of learning experiences. In general, previous chapters

pointed out to specific recommendation to stakeholders, which must be considered in view of a validation and recognition of skills and competences:

1. Understand the context of the sectors and subsectors, as well as their trends and evolution in the medium and long-term, to foresee specific upskilling and reskilling pathways impacted by transformation related to technological, social and geopolitical developments;
2. Choose and apply frameworks related to the sector(s), which are recognised at EU and/or international level, and that can grant a level of (indicative) alignment with present occupations, skills, competences and education/training levels;
3. Establish recognised and sound criteria and principles for the validation and recognition of skills, such as alignment with the frameworks, labour market trends and occupations in demand by industries, work-based learning integration (in the case of VET), quality assurance, assessment methods, recognition and transferability. Such criteria ensure a shared language on skills and qualifications, making it easier for training and upskilling to meet the needs of the private sector and their specific skills requests and facilitating the recognition of certifications once learners/employees/workers enter the labour market;
4. Define specific validation processes integrating mechanisms of microcredentials and drills implementation, based on sound processes of peer review, expert evaluation and stakeholder feedback. Microcredentials and validation processes should be issued in two tracks - “learn-and-earn” and “earn only” – to facilitate validation of existing skills and competences, as well as competences gained through training and learning experiences. Such validation should make use of digital badges (e.g. MICOO) to ensure maximum portability and immediate readability by aerospace employers.

These recommendations can function as specific steps to follow when issuing validation and recognition pathways for skills and training in VET and HEI within the aerospace sector. They aim to be simultaneously comprehensive and flexible in adapting to transformations, offering a way forward in upskilling, reskilling and filling skills gaps.