R1.1 REPORT ON OCCUPATIONAL ANALYSIS IN AIR TRANSPORT

Date: 10.08.2018

Author: Deep Blue

Co-funded by the Erasmus+ Programme of the European Union

This project has been funded with support from the European Commission. This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein. Project Nº 588060-EPP-1-2017-1-RO-EPPKA2-KA

DOCUMENT CHANGES

Version	Date	Status	Author	Description
0.1	23/04/2018	Draft	L. Napoletano (DBL)	Creation of the ToC of the document
0.2	15/05/2018	Draft	S. Zaharia (UPB)	Review of the structure
0.3	10/07/2018	Review	All	Review of the list of current occupations
0.4	13/07/2018	First draft version	A.Golfetti, K. Cichomska, L. Napoletano (DBL)	First version ready for the external review, including all inputs received from project partners
0.5	23/07/2018	Review	P. Costa (Inova)	External review of the report
1.0	10/08/2018	Final	A.Golfetti, K. Cichomska, L. Napoletano (DBL)	Final version

Co-funded by the Erasmus+ Programme of the European Union

Table of Contents

Co-funded by the Erasmus+ Programme of the European Union

1 INTRODUCTION

1.1 SCOPE OF THE REPORT

KAAT project aims to bridge the gap between the two pathways for education and training in the aviation sector (vocational and academic) by issuing a methodology for the Aviation Sectorial Qualification Framework and modernising higher education through innovative approaches for teaching and learning.

This report describes the results of an occupational analysis of the aviation sector (WP1). The analysis contains the description of around 120 aviation occupations by providing definitions and descriptions of knowledge, skills and competences required by each of them, created in compliance with ESCO classification by using a number of other sources. The analysis also contains a part dedicated to the future aviation occupations for which the education and training programmes have to already be envisaged.

This report provides input for WP3 and WP4, led by the educational and training institutions of the KAAT Project. The two work packages aim to identify, develop and describe the learning outcomes of a number ofqualifications in the aviation sector.

The aim of this report is to provide insights into the knowledge, skills and competences required by current and future employers of the sector, in order to better align the identified qualifications to the needs of different different occupations and be able to adapt the study programmes based on feedback from the labour market.

1.2 STRUCTURE OF THE REPORT

The report is organised around 6 main sections as follows:

- Section 2 describes the methodology approach adopted for carrying out the occupational analysis in the aviation sector;
- Section 3 presents the competences framework created to describe the key competences, tasks and responsibilities associated to each occupation identified;
- Section 4 introduces the sectorial breakdown of the aviation sector, describing the high-level categories of activities and the respective carriers' paths. It also presents the complete list occupations identified. A specific paragraph within this section is dedicated to the emerging occupations.
- Section 5 reports the results related to current and future collaboration opportunities between industries and educational institutions;
- Finally, conclusions and next steps are discussed in section 6.
- Annexes include: the sectorial classification of the current occupations in the aviation sector (excel template) and the complete list of results gathered through the survey.

Co-funded by the
Erasmus+ Programme
of the European Union

1.3 DEFINITIONS AND ACRONYMS

Acronyms list	
EASA	European Aviation Safety Agency
ESCO	European Skills/Competences qualifications and occupations
ICAO	International Civil Aviation Organisation
IT	Information technology
IoT	Internet of Things
KAAT	Knowledge Alliance in Air Transport
WP	Work Package

2 METHODOLOGY OF WORK

In order to develop a sectorial breakdown (see Section 4) and the competency framework (see Section 3) for the aviation sector, the project used a combined methodological approach (see Figure 1) to identify and analyse the:

- current and emerging occupations;
- key competences, responsibilities, skills and knowledge required for those occupations;
- current and future collaboration opportunities for industries and educational institutions.

The **top-down approach** focuses on a structured review of current official documentation produced at European (EU) level and the analysis of past and ongoing EU funded projects.

The top-down approach is complemented by a **bottom-up** approach where the involvement of external aviation stakeholders is a key element in evaluating and validating the sectorial breakdown and the competences framework. Two different activities were organised: (1) the administration of an online survey for collecting feedback regarding current occupations and competences in the aviation sector; and (2) the organisation of the 1st KAAT workshop on "Smart qualifications for smart air transport occupations" for validating the results achieved within WP1.

Figure 1: Combined methodological approach for the breakdown for the aviation sector

The following paragraphs describe more in detail the top – down and bottom – up approaches.

Co-funded by the Erasmus+ Programme of the European Union

2.1 TOP-DOWN: SOURCES

The top-down approach was based on the following activities:

1. The review of reports and documents developed by European policy entities;
2. The review and analysis of materials and documentation produced in past and ongoing EU topic-related funded projects (e.g. AIRVET, SKILLFUL, EDUCAIR, FLYHIGHER and AirTN);
3. The collection of relevant input and material from KAAT project partners.

Table 1 shows the main sources used for developing the sectorial breakdown for current and future occupations and the competences framework.

Table 1: Top-down approach sources

TOP DOWN APPROACH - SOURCES	
Sources for current occupations and competences framework	**Sources for Future occupations**
• **ESCO platform**: the classification of European Skills, competences, qualification and occupations. https://ec.europa.eu/esco/portal/home?resetLanguage=true&newLanguage=en • **ICAO** (International Civil Aviation Organisation) classification of Civil aviation activities https://www.icao.int/Pages/default.aspx • **EASA** framework on key competences in the aviation sector https://www.easa.europa.eu/ • **CIGREF** document on "Information Systems roles in large companies • https://www.cigref.fr/cigref_publications/RapportsContainer/Parus2011/2011_IS_roles_in_large_companies_HR_nomenclature_CIGREF_EN.pdf • **EntreComp**: Entrepreneurship Competence framework [13]	• **AIRVET** *(Aeronautic Industry Skill Resolution for a more efficient VET offer)* Lifelong Learning Programme. http://airvet-project.eu • **SKILLFUL** *(Skills and competences development of future transportation professionals at all levels),* Horizon 2020. http://www.skillfulproject.eu/ • **EDUCAIR** (*Assessing the EDUcational gaps in Aeronautics and AIR transport*), FP7 project. http://web.tecnico.ulisboa.pt/~vascoreis/projects/educair/ • **FLYHIGHER** *(Shaping the new evolving generation of aeronautic professionals)*, FP7 project. http://www.flyhigher.eu/ • **AirTN** *(Air Transport Net).* https://www.airtn.eu/project/overview/ • **AIRBUS white paper.** The engineer of the future. http://company.airbus.com/careers/partnerships-and-Competitions/The-Engineer-of-the-Future-White-Paper.html • **IATA report, 2015.** StB (Simplify the business). Transformation in progress and explorations underway. https://www.iata.org/whatwedo/stb/Documents/StB-White-Paper-2013.pdf • **World Economic Forum, 2016.** The future of jobs: Employment, skills and workforce strategy for the fourth industrial revolution [5].

The review of the EU sources was used to define the high-level categories and sub-categories of occupations, developing their sectorial breakdown. Relevant documentation from EU reports, aviation

Co-funded by the Erasmus+ Programme of the European Union

documentation and past and ongoing EU projects collected from project partners was used for identifying emerging and future occupations and enriching the descriptions of the current occupations.

2.2 BOTTOM-UP: SURVEY

2.2.1 DESIGN OF THE SURVEY

To obtain information on current and emerging occupations and to consolidate the sectorial breakdown for the aviation sector, an online survey was developed for collecting feedback from various employees working in the aviation sector. The participants were asked to share their experiences and views regarding (a) the skills and competences required in their current occupations; (b) the emerging skills and competencies necessary for the future workforce; and (c) the past and present training and collaboration opportunities between industries and educational institutions.

The survey was structured around five main sections:

1. **Background and employment** (Q1 – Q8). The first section contained general questions about the background and employment of the respondents including age, gender, country and area of the aviation sector in which they currently work, as well as information about what they like the most and the least about their job.
2. **Education and training** (Q9 – Q18). The second section included questions related to the educational qualifications of the respondents and the training they have received within their organisation.
3. **Collaboration with educational institutions and training providers** (Q19 – Q23). As the KAAT project aims to bridge the gap between the vocational and academic educational pathways by fostering new university-business collaborations, this third section was included to explore the respondents' views regarding the synergies and collaborations between educational institutions and industry.
4. **Key competences** (Q24 – Q28). This section collected feedback on the competences needed in the aviation sector and validated key competences identified within WP1 that were included in the competences framework for the aviation sector developed as part of this work.
5. **New and emerging occupations** (Q29 – Q32). This last section explored respondents' views regarding the changing nature of work in the next years: the occupations that are going to disappear and those that will be created.

The survey questions were developed based on the project scope, the identified list of occupations and their descriptions, and additional information required for the development of the mapping between occupations and qualifications. As such, the questions helped to further explore and validate the described occupations and understand how well the skills are required for them aligned with the learning outcomes of undertaken qualifications and training. The questions were generated based on the review of several external sources, current and past projects, and review of the questions by KAAT project partners. A copy of the KAAT survey is provided in Annex 8.2.

Co-funded by the Erasmus+ Programme of the European Union

2.2.2 TARGET PARTICIPANTS AND DISTRIBUTION

The purpose of the online survey was to gather input from employees working in all areas of the aviation sector value chain including: Commercial Aviation, General Aviation, Airport Operations, Air Navigation Services, Regulatory Functions, Other Transportation Support Activities, and Aviation Training.

A strong effort was made to disseminate the survey to get a relevant amount of feedback. All KAAT project partners were encouraged to spread the survey among their contacts. Moreover, business-oriented and social-oriented networking media channels like Twitter and LinkedIn were used to disseminate and promote the survey.

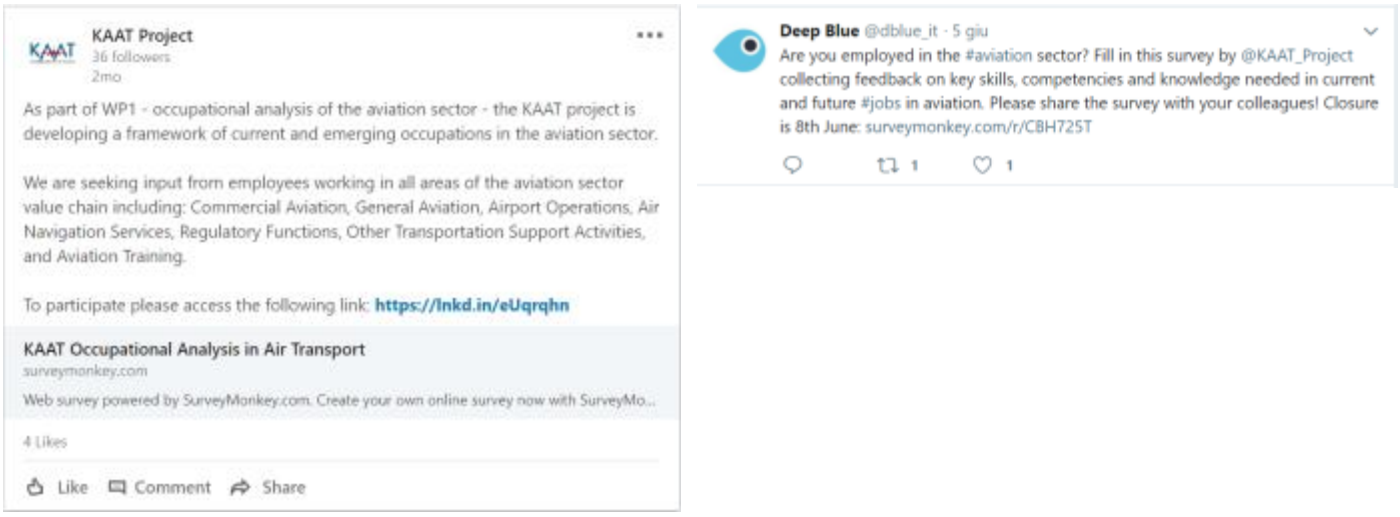


Figure 2: Examples of dissemination of the online survey

The survey was uploaded in the platform SurveyMonkey (www.surveymonkey.com) and it is available at: https://www.surveymonkey.com/r/CBH725T.

The data analysed and reported in the following sections refer to a period of three months, from 15.05.18 to 31.07.18. The survey will be kept open for the entire duration of the KAAT project to continue collecting data.

2.2.3 SURVEY PARTICIPANTS: BACKGROUND INFORMATION

The survey was open for a period of 3 months, from 15.05.18 to 31.07.18. During this time, a total of 132 responses were received. Information about participants' age and gender is shown in Figure 3 and Figure 4. While the most of participants were male and aged 25 to 44, feedback was received from employees of all ages and both genders.

Co-funded by the Erasmus+ Programme of the European Union

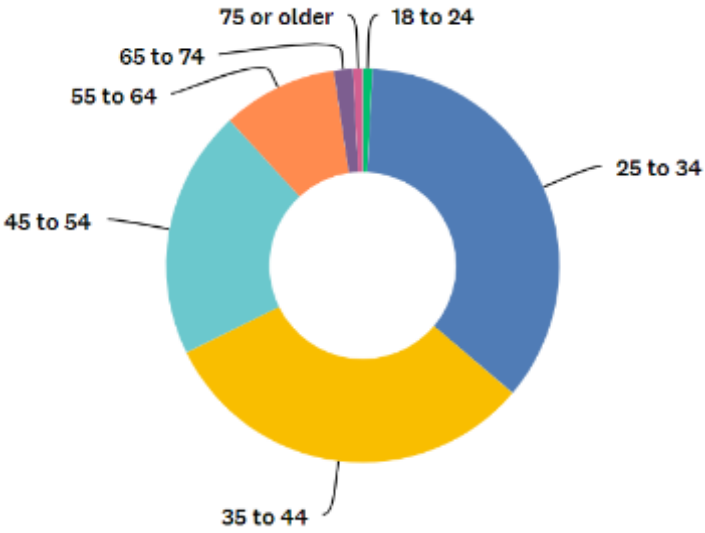


Figure 3: Q1 – What is your age?

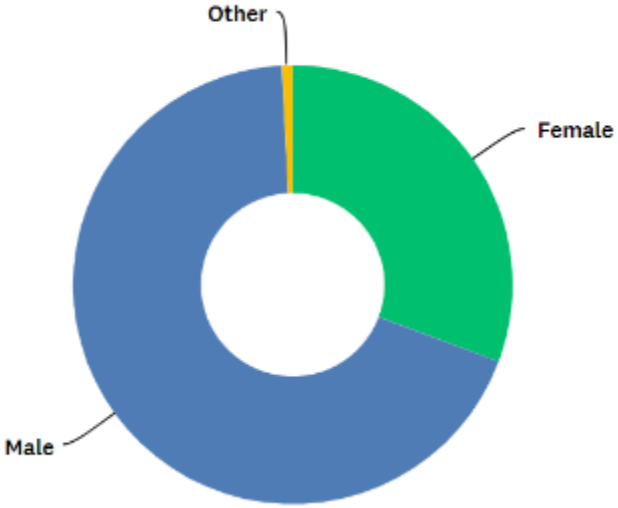


Figure 4: Q2 – What is your gender?

The distribution of respondents per country is shown in Table 2, participants worked in a number of European countries, as well as outside of the EU. The countries with more responses are: Romania (28%), Italy (18%) and Portugal (15%). The distribution of participants likely reflects the national countries composition of KAAT partners where – understandably- they have more contacts.

COUNTRY	PARTICIPANTS (IN %)	COUNTRY	PARTICIPANTS (IN %)	COUNTRY *("Other")*	PARTICIPANTS (IN %)
Albania	0.79%	Netherlands	1.57%	Singapore	0.79%
Belgium	1.57%	Norway	1.57%	Qatar	0.79%
Croatia	8.66%	**Portugal**	**14.96%**		
Czech Republic	1.57%	**Romania**	**28.35%**		
France	9.45%	Spain	0.79%		
Germany	7.09%	Switzerland	1.57%		
Italy	**18.11%**	UK	2.36%		

Table 2 Participants' countries of employment

Participants' distribution also represented a number of different roles and departments within the aviation sector (see Figure 5 and Figure 6).

Co-funded by the
Erasmus+ Programme
of the European Union

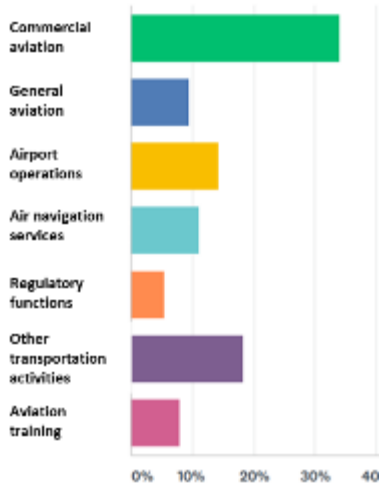


Figure 5: Participants' work areas in the aviation sector.

Figure 6: Main roles indicated by participants

2.3 VALIDATION ACTIVITES

In order to validate the list of occupations and generate adequate questions for the survey, input from KAAT project partners was requested at a regular basis.

In the first instance, this included the following activities related to the **identification of the 120 occupations** in the aviation sector:

- validation of the sectorial breakdown of occupations;
- identification of additional occupations in the aviation sector (i.e., any roles not yet identified in the preliminary list);
- description of the proposed occupations (i.e., their mission and required for them competences, knowledge and skills);
- validation of the final list of occupations and associated with their competences.

Partners' feedback was also requested when generating the questions for the **survey**. This was done to ensure that all necessary aspects are covered and that it will generate sufficient outputs for all elements of the work, not only for WP1, but also other WPs of the KAAT project.

The final outputs of WP1 were subsequently presented and validated during the **Stakeholder Workshop** held in Lisbon on 10th July 2018. KAAT project partners together with external experts, representing a range of departments within the aviation sector, participated in the workshop. The stakeholders were first briefed on the main outcomes of the study during a 30min presentation which explained the process of generating the classification of occupations and summarised key results of the survey study. The updated competency framework was then presented for validation purposes. A session of the workshop was dedicated to four parallel working groups as follows:

- Working group 1 - AIRPORTS (A)
- Working group 2 - AVIATION AND AIRLINE COMPANIES (AC)
- Working group 3 - AIR TRAFFIC CONTROL (AT)
- Working group 4 - HANDLING (H)

Co-funded by the Erasmus+ Programme of the European Union

During the working group tasks, having familiarised themselves with the key outputs of WP1, participants were given an opportunity to provide their feedback on the presented results of the analysis. Each working group was asked to validate the classification of competences and the structure of the sectorial breakdown of occupations. Groups' discussions were really fruitful and participants provided suggestions for adding new occupations and merging and moving others. They also provide input for re-ordering and re-organising some competences.

The feedback collected through the workshop led to development of the final classification of occupations. This included an updated list of occupations and their descriptions, based on the revised competency framework. Information regarding educational and training opportunities as well as emerging and future occupations in the aviation sector was also gathered to further expand the analysis.

A summary of each working group discussion is available in the "Report on workshop 1: smart qualifications for smart air transport occupations" [14].

3 COMPETENCY FRAMEWORK FOR THE AVIATION SECTOR

This section introduces the KAAT competency framework developed in WP1 to describe the identified occupations. The need to develop such framework emerged from the analysis of competences and tasks, conducted based on ESCO classification, associated with the different roles identified. While undertaking the analysis, it was observed that the skills, competences and tasks for each occupation were presented together under "essential/optional skills and competences" section of the website. It was felt necessary to make a distinction between these different elements to better align the descriptions of the occupations with the language of the labour market. Consequently, a number of possible competency frameworks were reviewed through an Internet search. The example used by EASA [1] was ultimately relied upon to describe and group some key, high-level competencies and tasks identified within WP1, although other resources (e.g., [13]) were also drawn upon.

Specifically:

- We analysed and compared the EASA framework with our list of competences and tasks based on ESCO classification.
- We modified the EASA framework to better align the key categories of competences with the tasks and responsibilities identified through the ESCO website. We then expanded the framework by adding missing competences; thus, creating our competency framework for occupations in the aviation sector.

As a final step, tasks, responsibilities and skills/personal qualities associated with the identified occupations were mapped onto the categories of competences forming the framework. This was done with the help of project partners.

Following the inclusion of additional occupations and associated with them tasks, responsibilities, skills and knowledge components, and based on the initial review of the framework by the project partners, the KAAT competency framework was revised. This included re-categorisation of some of the competences and tasks as well as their modification (separation or merging of their sub-components) to reflect a more

Co-funded by the Erasmus+ Programme of the European Union

accurate and cohesive picture of tasks and responsibilities. The framework was also further validated during the Stakeholders Workshop held in Lisbon on 10th July 2018 (see Section 2.3). The final version of the competency framework comprises eight main categories of competence and 28 specific competences. These are described in the next section of the report.

3.1 COMPETENCY FRAMEWORK: CATEGORIES OF COMPETENCE AND KEY COMPETENCES

The KAAT competency framework developed within WP1 aims to identify, put together and group relevant competences, skills and tasks required by the current occupations in the aviation domain.

The KAAT framework is composed of eight categories of competence, representing "behavioural" competences (categories 1-4) and "technical and functional" competences (categories 5-8), including: (1) interpersonal skills and teamwork, (2) communication and reporting, (3) personal resilience and critical thinking, (4) training and development, (5) operational expertise, (6) customer focus, (7) leadership, management and planning, and (8) safety and responsibility. The key competences associated with each of these categories are shown in Figure 7.

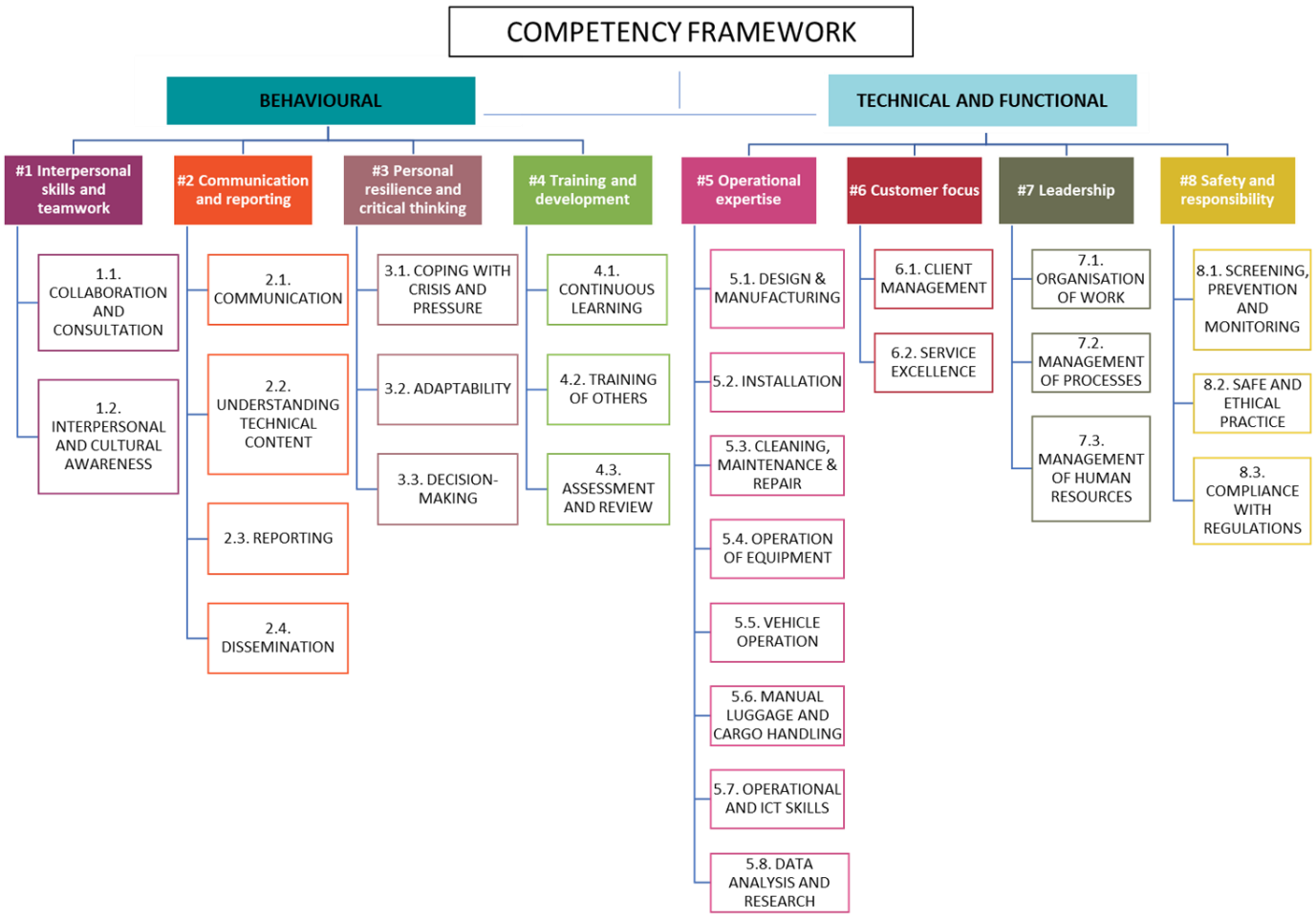


Figure 7: Competency Framework final classification

Co-funded by the Erasmus+ Programme of the European Union

As can be seen in Figure 7, each category of competence is composed of a number of competences. These emerged naturally from the analysis of the requirements associated with the identified occupations, and were subsequently validated by the KAAT project partners and stakeholders. The 28 competences shown above represent key components necessary to possess to accurately, safely and successfully perform and complete the tasks and responsibilities required by different jobs within the aviation sector. While the importance of different competences will depend on specific roles, they are interlinked, interdependent and complimentary, not only within each of the key categories, but also across them; and as such can be seen as transversal. For example, safe operation of an airplane requires, amongst other competences, compliance with regulations, operational and ICT skills, the ability to understand technical content, as well as effective communication and collaboration with others. As such, each occupation requires a number of these competences, not just one. This was also evident from the feedback received during the Stakeholders Workshop in Lisbon. When asked to identify the most important competences for the selected occupations, the participants indicated that they require a range of skills representing different components of the framework.

Table 4 reports the complete list of different categories of competences together with their associated key competences and their descriptions. Each category contains the following components:

- A brief explanation of the **key competences** for each category of competences;
- A list of keywords related to **supporting skills and personal qualities**;
- A list **of task and responsibilities** that have been used for describing the occupations identified.

Co-funded by the
Erasmus+ Programme
of the European Union

Table 3: KAAT Competency Framework

CATEGORY OF COMPETENCE	KEY COMPETENCES	SUPPORTING SKILLS AND PERSONAL QUALITIES *(KEYWORDS)*	TASKS AND RESPONSIBILITIES
BEHAVIOURAL COMPETENCES			
1. INTERPERSONAL SKILLS AND TEAMWORK	**1.1. COLLABORATION AND CONSULTATION:** Collaboration with other members of staff including joint completion of tasks; consultation with other professionals; smart distribution of tasks with consideration of individual strengths and responsibilities; team leadership	cooperating consulting facilitating teamwork interacting liaising teamworking	• complete work tasks as part of an aviation team • consult with industry professionals • cooperate with colleagues • facilitate teamwork between students • interact with airport stakeholders • liaise with engineers • work in an aviation team • work in a logistics team
	1.2. INTERPERSONAL AND CULTURAL AWARENESS: Interpersonal skills; global and cultural awareness	having cultural awareness	• ability to work in multicultural environments • apply intercultural teaching strategies • show intercultural awareness
2. COMMUNICATION AND REPORTING	**2.1. COMMUNICATION:** The ability to communicate effectively in both written and spoken language to various stakeholders using a number of different communication channels; responding to customer inquiries; providing instructions and guidance to staff and passengers	actively listening communicating instructing informing	• apply technical communication skills • assist passengers with timetable information • communicate by telephone • communicate with customers • communicate verbal instructions • communicate in English at a competent user level • conduct R/T communication • effectively communicate with customers and respond to their inquiries • effectively communicate with airlines and respond to their inquiries • ensure efficient communication in air traffic services • give clear and concise instructions • give instructions to aircraft staff • give instructions to flight and ground crew • give instructions to staff • give pilots clearance to take-off or landing • instruct aircraft to climb or descend • issue the “clear to land” instruction • issue the “clear to take off” instruction • listen carefully to pilot’s requests, and respond by speaking clearly • maintain radio and telephone contact with adjacent control towers and other area control centres • provide information to passengers • provide information to aircraft about weather conditions

			• respond to customers' inquiries • use different communication channels • write emergency instructions for handling of dangerous goods
	2.2. UNDERSTANDING TECHNICAL CONTENT: Understanding written and visual information (including technical and specialist documentation)	possessing visual literacy reading understanding information using documents	• read engineering drawings • read maps • read standard blueprints • read stowage plans • read 3D displays • use of air traffic services document • use technical documentation
	2.3. REPORTING: Effective reporting and preparation of materials	recording data reporting writing reports and notices	• communicate reports provided by passengers • complete the documents required with all stock related activities, and anticipate problems • create content title • fill out paperwork associated with cargo • keep and maintain records of what has been loaded and unloaded • keep records of work progress • operate warehouse record systems • prepare flight reports • prepare financial auditing reports • record test data • report airport security incidents • report any issue related with the luggage to higher officials • report on fuel distribution incidents • write inspection reports • write records for repairs • write work-related reports • write work-related reports and keep records of tasks
	2.4. DISSEMINATION: Dissemination of information and materials	disseminating information distributing materials marketing	• conduct mobile marketing • disseminate flight information • distribute local information materials • examine advertisement layout • promote environmental awareness • prepare exhibition marketing plan • prepare flight dispatch release • prepare notices to airmen for pilots • prepare notices to airmen for airport terminal services

Co-funded by the Erasmus+ Programme of the European Union

3. PERSONAL RESILIENCE AND CRITICAL THINKING	**3.1. COPING WITH CRISIS AND PRESSURE:** Dealing with complex and stressful situations; the ability to cope with and assist in emergency situations; the ability to work under pressure	acting as contact person assisting coordinating dealing with challenges handling emergencies helping providing support	• act as contact person during equipment incident • assist passengers in emergency situations • assist pilot in execution of emergency landing • carry out evacuation of airport in an emergency • coordinate rescue missions • deal with challenging work conditions • deal with stress • handle emergency situations • handle stressful situations • handle unexpected events, emergencies and unscheduled traffic • handle veterinary emergencies • help to control passenger behaviour during emergency situations • perform search and rescue missions • provide first aid • work under some time pressure
	3.2. ADAPTABILITY: Adaptability to changing working conditions; flexibility	adapting coping with change multitasking	• adapt instruction to labour market • adapt teaching to student's capabilities • adapt to changing situations • perform multiple tasks at the same time • perform services in a flexible manner • respond to changing navigation circumstances
	3.3. DECISION-MAKING: The ability to make independent decisions and act responsibly ensuring everyone's safety and security	considering various criteria decision-making problem-solving working independently taking action	• build up 'mental picture' of traffic situation • consider economic criteria in decision making • create solutions to problems • creative thinking • make independent operating decisions • make time-critical decisions • parallel thinking • perform manual work autonomously • prioritize tasks to guide several pilots at the same time • take weather conditions into account
4. TRAINING AND DEVELOPMENT	**4.1. CONTINUOUS LEARNING**: Continuous learning and improvement of skills and competencies associated with the changing requirements of the role; staying up to date with recent developments, new procedures and market needs	facilitating learning monitoring	• be prepared to study continuously • be prepared to be examined regularly • continues learning and improvement of skills and competencies associated with the changing requirements of the role • create a work atmosphere of continuous improvement • learn about customer service • monitor aviation growth trends

Co-funded by the Erasmus+ Programme of the European Union

			• monitor developments in field of expertise
	4.2. TRAINING OF OTHERS: Teaching; providing training and feedback to others; examination; coaching and advising	advising assessing assisting coaching examining providing feedback preparing materials teaching training	• advise on teaching methods • apply intercultural teaching strategies • apply teaching strategies • assess students • assist students in their learning • coach employees • conduct examination processes for apprentices • give constructive feedback • give theory lessons to pilots • observe student's progress • perform classroom management • prepare examinations for vocational courses • prepare lesson content • prepare syllabuses for vocational courses • provide advice on pilot licence application procedures • provide lesson materials • teach air cabin crew procedures • teach air traffic control • teach customer service techniques • teach flying practices • train air force crew • train employees • train staff in navigational requirements
	4.3. ASSESSMENT AND REVIEW: Evaluation and assessment of training and education	evaluating identifying needs	• evaluate education programmes • evaluate training • identify training needs

Co-funded by the Erasmus+ Programme of the European Union

TECHNICAL AND FUNCTIONAL COMPETENCES			
5. OPERATIONAL EXPERTISE	**5.1. DESIGN & MANUFACTURING:** Design and manufacturing of an aircraft (including interior and exterior design) and supporting aviation systems	aligning assembling cutting fastening manufacturing sewing	• align components • apply preliminary treatment to workpieces • assemble electrical components • bolt engine parts • cut fabrics • design customised maps • design scientific equipment • develop product design • fasten components • manufacture fabric furnishings • sew pieces of fabric • sew textile-based articles • upholster transport equipment's interior pieces
	5.2. INSTALLATION: Installation and integration of system components	installing integrating	• install bleed air systems • install de-icing boot • install electrical and electronic equipment • install electrothermal de-icing systems • install floor coverings • install low voltage wiring • install passenger service units • install plumbing systems • install pneumatic systems • install transport equipment lighting • install transport vehicle interior components • install wall coverings • integrate system components

Co-funded by the Erasmus+ Programme of the European Union

	5.3. CLEANING, MAINTENANCE & REPAIR: Carrying out cleaning, maintenance and repair activities; troubleshooting; ensuring accurate functioning of parts and systems	addressing issues adjusting changing cleaning diagnosing disassembling reassembling keeping in good condition maintaining repairing removing troubleshooting washing	• address aircraft mechanical issues • adjust tightness of engine parts • calibrate optical instruments • carry out preventive airport maintenance • change the curtains or seat covers if found unclean • clean contaminants from airport runways • clean line equipment and ramp areas • clean the seats and arrange the seat covers properly in the plane • diagnose defective engines • disassemble engines • keep airport drainage systems functional • keep airport maintenance equipment in suitable condition • keep airport runways clear of obstacles • keep markings legible • keep signs legible • maintain equipment • maintain test equipment • perform aircraft maintenance • perform upholstery repair • re-assemble engines • remove snow from airport operational areas • repair engines • repair wiring • replenish water supply and service lavatories • send faulty equipment back to assembly line • troubleshoot • wash and clean the exterior of plane

Co-funded by the Erasmus+ Programme of the European Union

	5.4. OPERATION OF EQUIPMENT: Calibrating, connecting and operating technical equipment	calibrating operating using	• calibrate electronic instruments • operate handheld riveting equipment • operate meteorological instruments • operate precision measuring equipment • operate remote sensing equipment • operate scientific measuring equipment • operate soldering equipment • operate welding equipment • position engine on test stand • tend riveting machine • use manual sewing techniques • use meteorological tools to forecast meteorological conditions • use modern electronic navigational aids • use geographic information systems • use power tools • use testing equipment
	5.5. VEHICLE OPERATION: Piloting of an aircraft and operation of vehicles providing specific ground services (e.g., refuelling, baggage handling, passenger ramps)	driving operating fuelling setting-up	• conduct aviation fuel servicing operations • connect electrical power unit/gpu to aircraft • connect tow bar and tug for push back or towing aircraft • driving a variety of light and heavy duty vehicles • fuelling planes • handle fuels • operate forklift • operate fuelling vehicles • operate lifting equipment • operate various kinds of grass maintenance equipment • perform flight manoeuvres • perform take-off and landing • position passenger stairs/Jetway to aircraft • provide airstart and air-conditioning • set up ramps in airports • use material handling equipment, such as forklifts, conveyor belts, and freight delivery vehicles

Co-funded by the Erasmus+ Programme of the European Union

	5.6. MANUAL LUGGAGE AND CARGO HANDLING: Manual handling of luggage and cargo; lifting heavy weights	handling lifting loading unloading transferring	• ensure efficient baggage handling • handling of passenger luggage before boarding it to plane • lift heavy weights • loading and unloading of luggage from conveyor belts • move luggage properly to its allocated flight • read checked baggage tags • responsible for loading and unloading baggage/cargo • transfer luggage
	5.7. OPERATIONAL AND ICT SKILLS: Operation of information and communication technologies; use of computer software; solving ICT issues	operating utilising having computer literacy resolving computer issues setting-up	• analyse software specifications • carry out pre-flight duties • conduct search engine optimization • execute software tests • operate airport control tower • operate cockpit control panels • operate headset/radio to provide communication between ground crew, flight crew, and tower • operate radar equipment • operate radio equipment • operate radio navigation instruments • operate two-way radio systems • use CAM software • use ICT equipment in maintenance activities • use ICT systems • use modern electronic navigational aids • use specialized computer models for weather forecasting • use a computer • utilise computer-aided software engineering tools • set up automotive robot • solve ICT system problems

Co-funded by the Erasmus+ Programme of the European Union

	5.8. DATA ANALYSIS AND RESEARCH: The ability to analyse, interpret and use complex data to conduct routine activities and identify potential hazards and threats; ensuring data accuracy; conducting measurements	analysing calculating comparing compiling detecting ensuring accuracy interpreting measuring studying thinking analytically having spatial awareness	• analyse data for aeronautical publications • analyse scientific data • analyse weather forecast • analyse work-related written reports • analyse the need for technical resources • apply scientific methods • apply statistical analysis techniques • assist scientific research • carry out measurements of parts • carry out meteorological research • carry out navigational calculations • carry out research on ground systems • collect weather-related data • compare contractors' bids • compile airport certification manuals • compile data for navigation publications • conduct airport environmental studies • conduct research on climate processes • data collection, analyses, treatment • detect bottlenecks • develop models for weather forecast • do arithmetic accurately and quickly (e.g. calculate peed, time, and distance problems, and recommend heading and altitude changes) • ensure accuracy of aeronautical data • execute analytical mathematical calculations • execute feasibility study • interpret financial statements • make numerical calculations • measure software usability • interpret and use meteorological information • perform data analysis • perform navigational calculations • perform scientific research • review meteorological forecast data • study aerial photos • translate requirement concepts into content • use theoretical marketing models

Co-funded by the
Erasmus+ Programme
of the European Union

6. CUSTOMER FOCUS	**6.1. CLIENT MANAGEMENT:** Maintenance of relationships with different stakeholders; effectively resolving conflicts and handling customer complaints	customisation identifying client needs managing services maintaining client relationships	• define geographic sales areas • ensure customer focus • identify client needs • identify customer needs • identify potential markets for companies • maintain customer service • maintain relationship with customers • manage the customer experience • monitor customer service • perform market research • plan and manage customers' orders • provide assistance to a variety of airport users • provide customised upholstery • strive to provide high quality customer service

Co-funded by the
Erasmus+ Programme
of the European Union

	6.2. SERVICE EXCELLENCE: Providing excellent customer service; facilitating customer experience; customer assistance	assisting clients boarding and checking-in passengers delivering outstanding service greeting and assisting passengers preparing services processing orders	• assist customers • assist clients with special needs • assist passenger embarkation • assist VIP guests • board aircraft passengers • check-in baggage when required • check in luggage • check in passengers • deal with complaints (respond to clients) • greet guests • guarantee customer satisfaction • handle customer complaints • handle guest luggage • handle financial transactions • interact with passengers in a polite manner • prepare mixed beverages • prepare simple meals on board • process booking • process customer orders • provide food and beverages • satisfy customers • sell souvenirs • sell tickets • serve food in table service • upsell products

Co-funded by the Erasmus+ Programme of the European Union

7. LEADERSHIP, MANAGEMENT AND PLANNING	**7.1. ORGANISATION OF WORK:** Planning and organisation of work; coordination and scheduling	coordinating organising planning scheduling	• align efforts towards business development • arrange event needs • coordinate flight schedules • create a flight plan • create an airport master plan • create and execute flight plans • create media plan • coordinate events • define measurable marketing objectives • determine maintenance schedules for airport equipment • develop audit plan • develop business plans • develop online community plan • ensure equipment availability • ensure flights run to schedule • ensure smooth on board operations • ensure the availability of parts, materials and equipment • estimate profitability • execute flight plans • forecast catering services • forecast sales over periods of time • maintain availability of spare parts • maintain stock supplies for guest cabin • meet deadlines • organise aircraft maintenance • organise and prioritise own workload • organise on-site amenities • perform resource planning • plan and coordinate en route air traffic • plan procedures for cargo operations • plan maintenance activities • prepare audit activities • prepare transportation routes • receive and control the products ordered from the suppliers • schedule maintenance of airport electrical systems • set sales goals

Co-funded by the Erasmus+ Programme of the European Union

	7.2. MANAGEMENT OF PROCESSES: Management of processes; supervision of activities	applying concepts implementing strategies leading tasks managing activities supervising activities	• arrange audit • apply social media marketing • apply transportation management concepts • approve advertising campaign • direct the movement of aircraft en route or at an airport • ensure quality of aeronautical information management services • execute ICT audits • implement marketing strategies • implement sales strategies • implement strategic management • integrate marketing strategies with the global strategy • integrate strategic foundation in daily performance • lead inspections • manage accounts • manage air navigation services • manage airport development resources • manage airport workshops • manage budgets • manage content development projects • manage content metadata • manage distribution channels • manage event structure installation • manage feedback • manage financial risk • manage health and safety standards • manage inventory • manage lost and found articles • manage maintenance operations • manage, plan and foresee the supplies according to the stocks, the internal and external needs and time requirements • manage profitability • manage resources for educational purposes • manage schedule of tasks • manage the handling of promotional materials • manage the parts, materials and equipment stocks in order to avoid being either over-stocked or out-of-stock • manage warehouse inventory • manage warehouse operations

Co-funded by the
Erasmus+ Programme
of the European Union

			• supervise loading of cargo • supervise maintenance activities in airports • supervise sales activities • supervise unloading of cargo • track key performance indicators • use computerised maintenance management systems • use content management system software
	7.3. MANAGEMENT OF HUMAN RESOURCES: Leadership and supervision of staff	directing leading supervising people	• direct airport subcontractors • exert a goal-oriented leadership role towards colleagues • manage contracts • manage human resources • manage personnel • manage staff • supervise crew • supervise staff • supervise work
8. SAFETY AND RESPONSIBILITY	**8.1. SCREENING, PREVENTION AND MONITORING:** Conducting safety checks; undertaking prevention and monitoring activities; risk management	checking ensuring functionality inspecting monitoring patrolling preventing recognising defects testing	• audit contractors • carry out preventive airport maintenance • check aircraft • check carriages • check passenger tickets • comprehensively inspect aircraft • conduct full-scale emergency plan exercises • conduct flight proficiency checks • conduct performance tests • conduct quality assurance checks on aircraft cargo • conduct quality assurance inspections on fuel operations • conduct security screenings • continuously monitor weather conditions • continually survey meteorological conditions • ensure accurate screening of luggage in aerodromes • ensure functionality of airport lighting systems • ensure public safety and security • ensure safety in international aviation • ensure student welfare • evaluate engine performance • identify airport safety hazards • identify security threats

Co-funded by the Erasmus+ Programme of the European Union

			• inspect aircraft documentation • inspect aircraft for airworthiness • inspect aircraft manufacturing • inspect cabin service equipment • inspect quality of products • look for any luggage left in the flight and report it to the officials • monitor aviation meteorology • monitor airworthiness certifications • monitor customer safety on apron • monitor security procedures in warehouse operations • monitor performance of meteorological equipment • patrol areas • perform risk analysis • perform routine flight operations checks • perform test run • recognise signs of corrosion • review meteorological forecast data • run preventive simulations • security check of luggage on conveyor belt • test electronic units • test ground system performance

Co-funded by the
Erasmus+ Programme
of the European Union

	8.2. SAFE AND ETHICAL PRACTICE: Ethical and responsible practice; knowledge and application of policies and procedures	acting responsibly applying standards carrying out procedures demonstrating procedures ensuring safety and security facilitating safety behaviours guaranteeing safety protecting showing responsibility	• apply air force procedures • apply airport lighting cleaning procedures • apply airport lighting maintenance procedures • apply airport standards and regulations • apply company policies • apply health and safety standards • apply military aviation regulations • apply safety policies • apply signalling control procedures • carry out airside safety procedures • demonstrate emergency procedures • ensure maintenance of fuel distribution facilities • facilitate safe disembarkation of passengers • guarantee students' safety • handle high voltage of airport lighting • know the regulations • identify legal requirements • implement airside safety procedures • maintain counterweight inside modes of transport • perform small vessel safety procedures • prepare forecasts for take-off and landing • show responsibility • wear appropriate protective gear

Co-funded by the
Erasmus+ Programme
of the European Union

	8.3. COMPLIANCE WITH REGULATIONS: Acting in compliance and ensuring the compliance of others with rules and regulations	complying following rules and regulations meeting requirements	• adhere to standards of national and international safety programs • comply with air traffic control operations • comply with checklists • comply with food safety and hygiene • ensure adherence to organizational ICT standards • ensure aircraft compliance with regulation • ensure compliance with airport security measures • ensure compliance with civil aviation regulations • ensure compliance with legal requirements • ensure compliance with types of weapons • ensure data protection in aviation operations • ensure information privacy • ensure ongoing compliance with regulations • follow airport safety procedures • follow airport snow control plan • follow ethical code of conduct in transport services • follow given instructions • follow industry codes of practice for aviation safety • follow manufacturer guidelines in use of airport equipment • follow written instructions • follow verbal instructions • know the regulations • issue licences • undertake procedures to meet aircraft flight requirements • undertake procedures to meet helicopter flight requirements • undertake procedures to meet requirements for flying aircraft heavier than 5,700 kg

Co-funded by the
Erasmus+ Programme
of the European Union

4 SECTORIAL BREAKDOWN OF CURRENT AND EMERGING OCCUPATIONS

The main aim of the sectorial breakdown is to get a comprehensive view of the labour market on the aviation sector at EU level. This section presents the structure of the sectorial breakdown for current occupations including the description of the high-level areas of the civil aviation activities, the categories of air professional paths and the list of around 120 air occupations. A specific paragraph is also dedicated to the description of the emerging occupations and the main societal and technological changes that will have a significant impact on future jobs.

4.1 CURRENT OCCUPATIONS IN THE AVIATION SECTOR

The main output of the analysis of the aviation sector was the development of a sectorial breakdown, a system of definitions of the current occupations and the related descriptions in terms of knowledge, skills and competences.

The development of the sectorial breakdown has been conducted in compliance with the European classification of skills, competences and occupations (ESCO platform [2]) aiming at being used as source for integrating and improving the labour market occupations in the aviation sector.

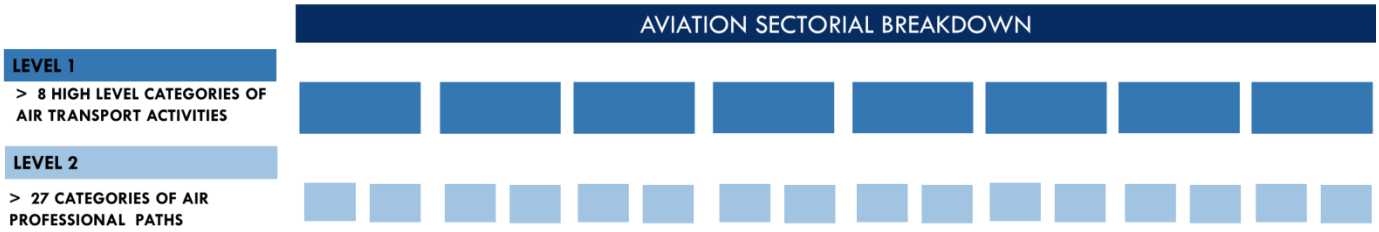


Figure 8: Structure of the sectorial breakdown

The general structure of the sectorial breakdown is made up of two levels (see Figure 8):

1. **Level 1** includes the eight high level areas of aviation activities identified according to the ICAO classification of civil aviation activities [3] such as: Commercial aviation (Passenger and freight air transport operations with aircraft heavier than 5700 kg); General aviation (business aviation, instructional flying, aerial work, leisure flying); Airport services; Aerodrome services; Air navigation services; Regulatory functions; Other transportation support activities; Aviation training (not initial education but further training).
2. **Level 2** includes the 23 air professional areas describing different career paths related to the eight high level areas identified in level 1. For instance, for the commercial aviation category, the following professional areas have been identified: flight crew, cabin crew, other airline staff, commercial aircraft maintenance and aircraft manufacturing.

These two levels constituted the basis for creating the current list of occupations in the aviation sector. Around 120 occupations were identified and fully described by providing definitions and descriptions of the key competences, tasks, responsibilities, skills and knowledge. The ESCO platform and EU relevant documentation were used as initial source for filling in the sectorial breakdown. In addition, input from KAAT project partners was requested at different stages of the process for validating the occupations already included and for identifying additional or missing occupations (see Section 2.3). Figure 9 shows an overview of the sectorial breakdown for the aviation sector including the complete list of occupations.

All occupations mapped onto and summarised in the sectorial breakdown tab were organised under specific tabs associated with their specific work areas/departments, and thoroughly described including the following elements:

- Occupation: name of the occupation;
- Alternative label (only when available);
- Mission: brief description of the scope of each occupation;
- Regulatory aspect: description of the legal requirements related to each occupation identified;
- Essential competences and skills required for fulfilling a specific occupation;
- Tasks and responsibilities related to a specific occupation;
- Learning outcomes (comprising "skills" – supporting skills and personal qualities, and "knowledge") that represent skills and knowledge expected from employees as result of education and experience;
- Educational level.

The complete list of current occupations and the description of their mission is reported in Section 4.1.2.
The full descriptions of the essential competences, tasks and responsibilities and learning outcomes for each occupation are reported in Annex 8.1.

Co-funded by the
Erasmus+ Programme
of the European Union

LEVEL 1	A. COMMERCIAL AVIATION (Passenger and freight air transport operations with aircraft heavier than 5700 kg)					B. GENERAL AVIATION (business aviation, instructional flying, aerial work, leisure flying)		C. AIRPORT SERVICES					D. AERODROME SERVICES: GROUND HANDLING	
LEVEL 2	A1. FLIGHT CREW	A2. CABIN CREW	A3. OTHER AIRLINE STAFF	A4. COMMERCIAL AIRCRAFT MAINTENANCE	A5. AIRCRAFT MANUFACTURING	B1. FLIGHT CREW	B2. REMOTE PILOTS	C1. AIRPORT OPERATIONS	C2. AIRPORT MAINTENANCE	C3. AERODROME MAINTENANCE	C4. GENERAL MANAGEMENT	C5. AIRPORT SAFETY AND SECURITY	D1. SAFETY & SECURITY	D2. HANDLING
	A1.1. Commercial pilot	A2.1 Flight attendant/ Air cabin crew	A3.1. Flight Operations Officer	A4.1. Aircraft maintenance technician	A5.1. Aircraft gas turbine engine overhaul technician	B1.1. Private pilot	B2.1. RPAS pilot	C1.1. Airport operations officer	C2.1. Aviation ground systems engineer	C3.1. Maintenance Agent	C4.1. Quality control manager	C5.1. Airport security agent	D.1.1. Aviation ground staff	
	A1.2. Airline transport pilot		A3.2. Ticketing agent	A4.2. Aircraft maintenance coordinator	A5.2. Aircraft interior technician	B1.2. Helicopter pilot		C1.2. Aircraft cargo operations coordinator	C2.2. Maintenance manager	C3.2. Airport Environmental Officer	C4.2. Airport manager/ Station manager & Supervision	C5.2. Rescue and fire fighting personnel	D1.2. Marshaller	
	A1.3. Multi crew pilot		A3.3. Ground steward/stewardess	A4.3. Aircraft maintenance engineer	A5.3. Aircraft engine specialist	B1.3. Aerial crop sprayer		C1.3. Monitoring and Inspection of Movement Area and Related Facilities officer	C2.3. Airport maintenance technician	C3.3. Wildlife control and management	C4.3. Airport director	C5.3. Hand luggage inspector	D1.3. Safety manager/ officer	D2.1. Ramp agent
	Different roles within the 3 occupations above,		A3.4. Crew control	A4.4. Flight test engineer	A5.4. Aircraft manufacturing engineer	B1.4. Manufacturing engineer		C1.4. Manager of Operational Services	C2.4. Airport electric systems personnel	C3.4. Aerodrome Data officer		C5.4. Screening officers (persons, baggage, items carried)	D1.4. Flight planning specialist	D2.2. Turnaround coordinator
	Commander		A3.5. Fuel Specialist	A4.5. Aircraft engine inspector	A5.5. Aircraft electrical installer			C1.5. Cleaning agent	C2.5. Operations Support Engineer	C3.5. Data Quality officer		C5.5. Screening officers (cargo)	D1.5 Power plant design engineer	D2.3. Aircraft fuel system operator
	Safety pilot		A3.6. Sustainable development specialist		A5.6. Flight simulator operator									D2.4. Baggage terminal agent
	Technical pilot		A3.7. Ground Handling Agreement Specialist		A5.7. Flight test, electronics and telecommunications engineer									D2.5. Baggage area coordinator (incl. Lost & Found)
	First officer		A3.8. Commercial Agreements Specialist		A5.8. Aircraft engine assembler									D2.6. Cargo handling agent (loaders)
	Second officer		A3.9. Space control and integrity sepcialist		A5.9. Embedded software engineer									
			A3.10. Flight Schedule and distribution specialist		A5.10. Aircraft painter									
			A3.11. Tariff specialist		A5.11. Sheet-metal worker									
			A3.12. Aircraft weight and balance staff		A5.12. Test technician									
					A5.13. Structural engineer									
					A5.14. CNC operator									
					A5.15. Composite technician									
					A5.16. Quality technician									
					A5.17. Interactive cockpit design engineer									

E. AIR NAVIGATION SERVICES					F. REGULATORY FUNCTIONS		G. OTHER TRANSPORTATION SUPPORT ACTIVITIES			H. AVIATION TRAINING (not initial education but further training)		
E1. AIR TRAFFIC MANAGEMENT	E2. METEOROLOGICAL SERVICES	E3.AERONAUTICAL INFORMATION SERVICES	E4. COMMUNICATIONS, NAVIGATION AND SURVEILLANCE	E5. MAINTENANCE OF AIR NAVIGATION EQUIPMENT	F1.REGULATIONS	F2. SURVEILLANCE	G1. BUSINESS & FINANCE	G2. COMMUNICATION & MARKETING	G3. AIRPORT & ENVIRONMENTAL PLANNING	H1. FLIGHT TRAINING	H2. ATCO TRAINING	H3. OTHERS
E1.1. Area Control Surveillance ATCO	E2.1. Aviation meterologist	E3.1. Aeronautical information service operator	E4.1. Flight information service officer (FISO)	E5.1. Air traffic safety technician (ATSEP)	F1.1. Aviation safety officer	F2.1. Audit supervisor	G1.1. Logistics technician	G2.1. Marketing manager	G3.1. Airport Planning Engineer	H1.1. Flight instructor	H2.1. Air traffic controller instructor	H3.1. Cabin crew instructor
E1.2. Ground ATCOs	E2.2. Meteo systems - technician	E3.2. Aeronautical information specialist		E5.2. OGTI for ATSEP		F2.2. Aviation inspector	G1.2. Business development manager				H2.2. OGTI/STDI Practical Instructors	H3.2. Flight attendant instructor
E1.3. Tower ATCOs						F2.3. ICT auditor manager						H3.3. Theoretical knowledge instructor
E1.4. Approach Control Surveillance ATCO						F2.4. Aviation and air traffic engineering inspector						H3.4. Vocational teacher of air traffic management subjects
E1.5. Air Traffic Control supervisors (incl. Unit Chiefs of Air Traffic services)												
E1.6. Air Space Manager												
E1.7. Accessors												
E1.8. Flow manager												

Figure 9: Complete overview of the sectorial breakdown for the aviation sector

Co-funded by the Erasmus+ Programme of the European Union

4.1.1 CLASSIFICATION OF THE OCCUPATIONS

This section describes in detail the definitions of the 8 high-level areas of the civil aviation activities, including the categories of air professional paths. The description of each category of aviation activities and the related professional carries were generated in compliance with the ESCO classifications.

The following tables describe in detail each category and carrier paths identified within the sectorial breakdown.

Table 4: Commercial aviation and the different career paths

Level 1	A. Commercial aviation (Passenger and freight air transport operations with aircraft heavier than 5700 kg)				
Description	*This class includes: a) transport of passengers or freight by air over regular routes and on regular schedules; b) charter flight for passengers; c) non-scheduled transport of freight by air*				
Level 2	**A1. Flight crew**	**A2. Cabin crew**	**A3. Other airline staff**	**A4. Commercial aircraft maintenance**	**A5. Aircraft manufacturing**
Description	Personnel who manipulates the flight controls of an aircraft during flight time: a)Pilot-in-command (PIC) means the pilot designated as being in command and charged with the safe conduct of the flight, b) Co-pilot' means a pilot operating other than as pilot-in-command, on an aircraft for which more than one pilot is required, but excluding a pilot who is on board the aircraft for the sole purpose of receiving flight instruction for a licence or rating.	Air crew personnel on board of an aircraft perfoming specific qualifed tasks in order to ensure flight safety during operation	Personnel who supports and contributes to flights departure and arrivals	The performance of tasks required to ensure the continuing airworthiness of an aircraft, including any one or combination of overhaul, inspection, replacement, defect rectification, and the embodiment of a modification or repair.	Personnel who contributes to test and monitor aircraft performance and funtions

Table 5: General Aviation and the different career paths

Level 1	B. General Aviation (business aviation, instructional flying, aerial work, leisure flying)	
Description	*GA is all civil aviation operations other than scheduled air services and non-scheduled air transport operations. GA covers a large range of activities, both commercial and non-commercial, including also flying clubs, flight training, agricultural aviation, ultra-light aircraft operations.*	
Level 2	**B1. Flight Crew**	**B2. Remote pilots**
Description	The non-commercial operation or use of aircraft by a company for the carriage of passengers or goods as an aid to the conduct of company business, flown by a professional pilot employed to fly the aircraft. GA flights range from gliders and powered parachutes to corporate jet flights. Flight missions are designated for agriculture, photography, observation and patrol, aerial advertisement, construction, surveying, search and rescue and other aerial work. It also includes transport of passengers by aero clubs for structure or pleasure.	Remote pilot is an emerging career with growth expected in many sectors and industries such as: Aerial Photography, Mapping, Asset Inspections, Defence operations, Agriculture, Environmental monitoring, Fire Fighting.

Co-funded by the Erasmus+ Programme of the European Union

Table 6: Airport services and the different career paths

Level 1	C. Airport Services				
Description	*The Airport services Section is responsible for the day-to-day control and organization of the safe and expeditious movement of aircraft around the airport and to and from the aircraft stands.*				
Level 2	**C1. Airport operations**	**C2. Airport maintenance**	**C3. Aerodrome maintenance**	**C4. General management**	**C5. Airport safety and secuirity**
Description	Airport traffic operations activities include guiding aircraft for landing, take off and also manoeuvring through the runways to parking position at various sections of an airport.	Maintenance includes measures to keep or restore the operational function as well as measures to check and to evaluate the present function of an element. The basic elements of maintenance are: inspections, servicing and overhaul, repair.		General management of an airport includes professional profiles like: quality control manager, airport manager and airport director.	Landside operations mean clearing international passengers and goods through government inspection services; passenger and luggage check-in; security screening process; VIP handling.

Table 7: Aerodrome services and different carrier paths

Level 1	D. Aerodrome Services: Ground handling	
Description	*The Airport services Section is responsible for the day-to-day control of safety and security issues within the aerodrome. It also refers to all the handling activities carried out in the aerodrome area.*	
Level 2	**D1. Safety and Security**	**D2. Handling**
Description	Personnel who aims to guarantee safety and security operations inside the aerodrome areas	One or more specialised ground services provided for aircrafts, passenger, freight and poste using specific facilities.

Table 8: Air navigation services and the different career path

Level 1	E. Air navigation services				
Description	*Services provided to air traffic during all phases of operations including air traffic management (ATM), communication, navigation and surveillance (CNS), meteorological services for air navigation (MET), search and rescue (SAR) and aeronautical information services (AIS).*				
Level 2	**E1. Air traffic management**	**E2. Meteorological Services**	**E3. Aeronautical information services**	**E4. Communications, navigation and surveillance**	**E5. Maintenance of air navigation equipment**
Description	A generic term meaning variously, flight information service, alerting service, air traffic advisory service, air traffic control service (area control service, approach control service or aerodrome control service). Air traffic controllers assist pilots by providing information concerning the height, speed and course. They assist pilots in order to facilitate a safe take-off and landing of aircrafts. They are responsible for maintaining a secure and orderly movement of aircraft along major air routes up in the sky and around airports. They control air traffic in and within vicinity of airports according to established procedures and policies to prevent collisions and to minimise delays arising from traffic congestion.	A service designated to provide meteorological service for international air navigation.	A service provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights.	A telecommunication service between specified fixed points provided primarily for the safety of air navigation and for the regular, efficient and economical operation of air services. A surveillance technique in which aircraft automatically provide, via a data link, data derived from on-board navigation and position-fixing systems, including aircraft identification, four-dimensional position and additional data as appropriate.	Maintenance includes measures to keep or restore the operational function of any ground air navigation equipment designated to Radio Navigation Aid.

Table 9: Regulatory framework and the different career paths

Level 1	F. Regulatory functions	
Description	*The giving of authoritative direction to bring about and maintain a desired degree of order.*	
Level 2	**F1. Regulations**	**F2. Surveillance**
Description	The provision of adequate regulations to address, at a minimum, national requirements emanating from the primary aviation legislation and providing for standardized operational procedures, equipment and infrastructures (including safety management and training systems), in conformance with the Standards and Recommended Practices (SARPs) contained in the Annexes to the Convention on International Civil Aviation. The term "regulations" is used in a generic sense to include but is not limited to instructions, rules, edicts, directives, set of laws, requirements, policies, and orders.	The implementation of processes, such as inspections and audits, to proactively ensure that aviation licence, certificate, authorization and/or approval holders continue to meet the established requirements and function at the level of competency and safety required by the State to undertake an aviation-related activity for which they have been licensed, certified, authorized and/or approved to perform. This includes the surveillance of designated personnel who perform safety oversight functions on behalf of the CAA. Limited to instructions, rules, edicts, directives, sets of laws, requirements, policies.

Co-funded by the Erasmus+ Programme of the European Union

Table 10: Other transportation activities and the different career paths

Level 1	G. Other transportation support activities		
Description	*Business, financial and marketing activities having as objectives the support and administration of air transport sector.*		
Level 2	**G1. Business & Finance**	**G2. Communication & marketing**	**G3. Airport & Environmental Planning**
Description	Business and financial activities having as objectives the support of air transport sector.	The management process responsible for identifying, anticipating and satisfying air transport customer requirements profitably.	This includes airport noise compatibility planning (Part 150), airport noise and access restrictions (Part 161), environmental review for airport development, and the application of the European Regulations on this subject.

Table 11: Aviation training and the different career paths

Level 1	H. Aviation Training		
Description	All categories of training for regulated occupations in aviation according to Annex 1 of ICAO [4].		
Level 2	**H1. Flight training**	**H2. ATCO training**	**H3. Others**
Description	Flight crew training activities organised by a Contracting State in accordance with the requirements of Annex 1 ICAO, 1.2.8.2 and Appendix 2 under the supervision of the state [4].	Training for ATCO	Other types of training for obtaining licences according ICAO or EASA regulations.

4.1.2 LIST OF CURRENT OCCUPATIONS

This section reports the complete list of around 120 occupations identified within WP1. As mentioned in the previous sections, different sources were used for collecting the occupations such as the review of EU documentation (e.g. ESCO classification) and partners' feedback.

The table below reports the detailed description of the mission for each of the identified occupations[1]. The full description of the occupations including the related key competences, tasks, responsibilities, skills and knowledge is in available in Annex 8.1.

Table 12: A. Commercial aviation – list of current occupations

A. COMMERCIAL AVIATION	
LIST OF OCCUPATIONS	**DESCRIPTION OF THE MISSION**
A1. FLIGHT CREW	
A1.1. Commercial pilot	Commercial pilot navigates flight of fixed-wing and multi-engine aircrafts for the transport of passengers and cargo. Commercial pilot needs to obtain the commercial pilot licence (CPL). S/he is licenced to fly as pilot-in-command.
A1.2. Airline transport pilot	Airline transport pilots fly large aircrafts with a maximum take-off weight of more than 5700 kilograms, to transport passengers, mail, or freight on long or short-haul flights for leisure, business or commercial purposes. They have the overall responsibility for the safe and efficient operation of aircrafts and the safety of crew and passengers. The airline transport pilot needs to obtain the Airline Transport pilot licence (ATPL). S/he is licenced to fly as pilot-in-command.
A1.3. Multi crew pilot	Multi crew pilots fly the aircraft as their occupation/profession. They must be able to operate aircraft systems and transport people, mail and freight. Many times it is deemed as an all life occupation. The multi-crew pilot licence (MPL) was developed as an alternative way of obtaining ATPL Licence by enhancing simulator training. Licence could be obtained in certified organisations usually closely linked with an airline company. Pilots are highly specialised for commercial and jet aircraft. They are not licenced to fly as pilot-in-command.
A2. CABIN CREW	
A2.1 Flight attendant/ Air cabin crew	Flight attendants perform a variety of personal services conducive to the safety and comfort of airline passengers during flight. They greet passengers, verify tickets, and directs passengers to assigned seats. They prepare reports after landing describing how the flight went in terms of operations, procedures, and anomalities.
A3. OTHER AIRLINE STAFF	
A3.1. Flight Operations Officer	Aircraft dispatchers authorise, regulate, and control commercial airline flights according to governmental and company regulations. They expedite and ensure flight flow by preparing logs of flights, delays, cancellations, and changes in schedules or flight plans.
A3.2. Ticketing agent	Ticketing agents issue tickets and perform inputs in the passengers's reservations. The agents also collect charges for diffrences of bagagge collections.

[1] Only four descriptions are missing for: B1.3. Aerial crop sprayer, E1.7. Accessors, E5.2. OGTI for ATSEP and H3.2. Flight attendant instructor.

A3.3. Ground steward/stewardess	Ground stewards and ground stewardesses assist passengers before they board. They check in passengers and also perform customer service duties such as booking the tickets and helping passengers to apply for refunds after a delay or cancellation.
A3.4. Crew control	Person responsible for a monthly/weekly/ daily flight and cabin crew schedule.
A3.5. Fuel Specialist	Person responsible for planning fuel quantity needs of aircraft fleet according to annual flight plan or on ad hoc basis and executes fuel procurement process, negotiates and contracts commercial conditions with suppliers, monitors quality aspects of contracted and assists in communication between OPC and Supplier in case of irregularities or disruption in fuel supply chain.
A3.6. Sustainable development specialist	Person responsible for compliance with environmental regulations, handles environmental aspects of an airline business, noise reduction, waist management, energy efficiency and monitors and reports emissions of CO2 according to EU ETS Scheme.
A3.7. Ground Handling Agreement Specialist	Person responsible for contracting ground handling agreement (landing and passengers service, handling of aircraft, passengers and cargo, supervision), handling of ATC (Eurocontrol) services and terminal charges as well as coordinates and handles accommodation and transport for crew and in case of traffic disruption passengers.
A3.8. Commercial Agreements Specialist	Person in charge for commercial agreements.
A3.9. Space control and integrity sepcialist	Person responsible for flight's capacity control, publishing aircraft seats availability, in controlling revenue integrity
A3.10. Flight Schedule and distribution specialist	Person responsible for the airline flight schedule creation and distribution.
A3.11. Tariff specialist	Person in charge of tariff structure creation and distribution.
A3.12. Aircraft weight and balance staff	Performs weight nad balance for the handled a/c
A4. COMMERCIAL AIRCRAFT MAINTENANCE	
A4.1. Aircraft maintenance technician	Aircraft maintenance technicians perform preventive maintenance to aircrafts, aircrafts components, engines and assemblies, such as airframes and hydraulic and pneumatic systems. They perform inspections following strict protocols and aviation laws.
A4.2. Aircraft maintenance coordinator	Aircraft maintenance coordinators plan, schedule, and manage the preparation and maintenance works in the hangars and workshops. They communicate with higher level managers in order to prepare the necessary resources for smooth and efficient operations in airports.
A4.3. Aircraft maintenance engineer	Aircraft maintenance engineers make preflight and postflight inspections, adjustments, and minor repairs to ensure safe and sound performance of aircrafts. They inspect aircraft prior to takeoff to detect malfunctions such as oil leaks, electrical or hydraulic problems. They verify passenger and cargo distribution and amount of fuel to ensure that weight and balance specifications are met.
A4.4. Flight test engineer	Flight test engineers work with other systems engineers to plan the tests in detail and to make sure that the recording systems are installed for the required data parameters. They analyse the data collected during test flights and produce reports for individual test phases and for the final flight test. They are also responsible for the safety of the test operations.
A4.5. Aircraft engine inspector	Aircraft engine inspectors inspect all types of engines used for aircrafts in factories to ensure compliance with safety standards and regulations. They

Co-funded by the Erasmus+ Programme of the European Union

	conduct routine, post-overhaul, pre-availability and post-casualty inspections. They provide documentation for repair activities and technical support to maintenance and repair centres. They review administrative records, analyse the operating performance of engines and report their findings.
A5. AIRCRAFT MANUFACTURING	
A5.1. Aircraft gas turbine engine overhaul technician	Aircraft gas turbine engine overhaul technicians perform overhaul, maintenance and repair work on gas turbine engines. They disassemble, inspect, clean, repair and reassemble the engines using engine-specific tooling.
A5.2. Aircraft interior technician	Aircraft interior technicians manufacture, assemble and repair interior components for aircrafts such as seats, carpeting, door panels, ceiling, lighting etc. They also replace entertainment equipment such as video systems. They inspect incoming materials and prepare the vehicle interior for new components.
A5.3. Aircraft engine specialist	Aircraft engine specialists advise on maintaining procedures to engines of aircrafts and helicopters. They perform operability tests to components and parts of aircrafts to diagnose suitability for usage and possible operations to improve performance. They interpret and provide support to understand the technical specifications given by manufacturers for application at the airport's premises.
A5.4. Aircraft manufacturing engineer	The Manufacturing Engineer performs standard engineering assignments usually representing a significant portion of a larger project. Additional responsibilities include selecting engineering techniques to solve problems and make design recommendations.
A5.5. Aircraft electrical installer	Operates electrical components in the aircraft
A5.6. Flight simulator operator	Perform standard Simulator support activities such as: installation, operation, inspection, periodic maintenance (align & adjust), of Simulator components and systems
A5.7. Flight test, electronics and telecommunications engineer	Writing test plans, flight cards, conducting briefs/debriefs, problem reporting, and provide flight test data to verification. Assist with on aircraft troubleshooting and failure resolution of the sensor systems as needed to ensure test aircraft mission capability.
A5.8. Aircraft engine assembler	Aircraft assemblers use hand tools, power tools and other equipment such as CNC machines or robots to construct, fit and install prefabricated parts to manufacture fixed or rotary wing aircrafts and aircraft subassemblies such as flight controls, aircraft skins, rigging and other mechanical systems etc. They read and interpret blueprints. They operate control systems to determine functional performance of the assemblies and adjust accordingly.
A5.9. Embedded software engineer	Responsible for the design, development and validation of embedded software features. S/he manages the development cycle of new embedded software features
A5.10. Aircraft painter	Aircraft painters work outside or in a hangar, depending on what they are going to paint (body aircraft, little piece…). Because of the paint, chemical fumes and the substances they work with, they wear security clothes and accessories.
A5.11. Sheet-metal worker	Sheet-mental worker shapes metal sheets following a blueprint,creates and assembles parts of the structure; controls and repairs the metal parts
A5.12. Test technician	Test technician controls the conformity of the part, tests the prototype before its launch and analyses the results
A5.13. Structural engineer	Designs aircraft structure and ensures that the structure will respect technical, environmental and safety requirements
A5.14. CNC (Computer	The aim of this job is to create new parts avoiding unnecessary waste of

Co-funded by the Erasmus+ Programme of the European Union

Numerical control) operator	materials and also to gain time. In this way, the production stage becomes less costly.
A5.15. Composite technician	Composite technician handles different materials such as, fibres, weave, of carbon, Kevlar, glass and also different substances such as resins, catalysts, liquids, … to produce a rigid, strong, cost effective and environmentally-friendly material. The composite technician knows how to cut, mix, mould, cure, shape and repair composites with the help of different methods and tools.
A5.16. Quality technician	A quality technician has the important role of ensuring that the products manufactured by the company are in-line with the customer's order and expected quality. In order to fulfil this mission, the quality technician examines closely every detail of the manufactured product before it is machined. Moreover, the quality technician has to take into account the specific features of the products imposed by the Design department.
A5.17. Interactive cockpit design engineer	The Main goal of the Interactive Cockpit Design Engineer is to find solutions to embed advanced technologies in flight decks. S/he prepares mock-ups and prototypes of part or whole interactive elements of the flight deck (weather radar, primary flight display, new tactile display…). S/he may also prepare a 3D model of the pilot post in order to analyse conformance between interface layout and pilot position.

Table 13: B. General aviation: list of current occupations

B. GENERAL AVIATION	
LIST OF OCCUPATIONS	**DESCRIPTION OF THE MISSION**
B1. FLIGHT CREW	
B1.1. Private pilot	Private pilots operate non-commercial airplanes for leisure with a limited amount of seats and engine horsepower. They also provide private transport for people. Private pilot needs to obtain the private pilot licence (PPL).
B1.2. Helicopter pilot	Helicopter pilots fly helicopters in order to transport passengers and cargo from one place to another. They plan flights using aeronautical charts and navigation instruments. Prior to departure, they inspect helicopters following checklists to detect leaking hydraulic fluid, inoperative control, low fuel level, or other unsafe conditions.
B1.3. Aerial crop sprayer	*Description not available*
B1.4. Manufacturing engineer	The day-to-day work of a manufacturing engineer typically takes place at an aircraft factory. S/he has to ensure that it will be possible to assembly all the pieces of an aircraft together in a proper way. Even a small part can have a huge impact on the larger product. If that is not the case, they have to find a solution that will be acceptable for each stakeholder.
B2. REMOTE PILOTS	
B2.1. RPAS pilot	RPAS pilot operates unmanned aerial vehicle (UAV) to carry out different activities like: Aerial Photography, Inspections, Defence operations, Environmental monitoring, Fire Fighting.

Co-funded by the Erasmus+ Programme of the European Union

Table 14: Airport services: list of current occupations

C. AIRPORT SERVICES	
LIST OF OCCUPATIONS	**DESCRIPTION OF THE MISSION**
C1. AIRPORT OPERATIONS	
C1.1. Airport operations officer	Airport operations officers perform supervisory and administrative work monitoring operational activities on an assigned shift at a large airport. They ensure the safe take-off and landing of aircrafts
C1.2. Aircraft cargo operations coordinator	Aircraft cargo operations coordinators direct and coordinate air transport terminal cargo and ramp activities. They review data on incoming flights as to plan the working activities. They direct preparation of loading plans for each departing flight and confer with supervisory personnel to ensure workers and equipment are available for air cargo and baggage loading, unloading, and handling activities.
C1.3. Monitoring and Inspection of Movement Area and Related Facilities officer	Ensure inspections of movement area of the airport and related facilities
C1.4. Manager of Operational Services	Coordinates, manages and checks the activity of the Ground Operational Service
C1.5. Cleaning agent	Ensures the cleaning of the aircrafts for the Carriers with a valid contract according to handling company / Airline spoecific procedures; The cleaning agent is responsible with waste disposal from aircraft , according to local regulations
C2. AIRPORT MAINTENANCE	
C2.1. Aviation ground systems engineer	Aviation ground systems engineers are in charge of supervising the maintenance of the equipment of the airport, for example, the visual aids, airport electrical systems, luggage systems, security systems, pavements, drainage, maintenance of unpaved areas and equipment and vehicles.
C2.2. Maintenance manager	Coordinate the entire staffing activity of the Airport Infrastructure Maintenance Service, maintain in good working conditons the landing runway, airport runways and platforms, maintain the indoor areas in the airport perimeter
C2.3. Airport maintenance technician	Airport maintenance technicians are in charge of the maintenance of all equipment necessary for ensuring the functionality of the airport, for example, visual aids, airport electrical systems, luggage systems, security systems, pavements, drainage, and maintenance of unpaved areas.
C2.4. Airport electric systems personnel	Personnel responsible to operate and maintain airport lighting systems, electrical systems and back-up systems
C2.5. Operations Support Engineer	Apply standard practices and techniques in specific situations, adjust and correlate data, recognize discrepancies in results, and follow operations through a series of detailed steps or processes.
C3. AERODROME MAINTENANCE	
C3.1. Maintenance Agent	Knowledge and rigorous application of regulations, instructions and procedures, on how to conduct activities on the surface of the movement, in order to ensure the safety of aircraft, facilities, persons and vehicles on the surface of movement.
C3.2. Airport Environmental Officer	Airport environment officers monitor environmental issues such as emissions, contamination, and wildlife activity in the premises of airports. They report environmental attractors for animals such as nearby rubbish dumps or wetland areas. They can engage in studying the environmental impact that airports are having in the surrounding communities in reference to the diverse contamination that airports produce. They implement the rules to ensure the sustainable development of the airport.
C3.3. Wildlife control and management	The personel is responsible for reliable wild life control to guarantee safe airplane operation. Maintain safe and reliable airport operation with respect to wild life hazards on the other side environmental protection.
C3.4. Aerodrome Data	Determine, document and maintain data relevant to the aerodrome and

officer	available services; provide data relevant to the aerodrome and available services to the users and the relevant air traffic services and aeronautical information services providers.
C3.5. Data Quality officer	Ensure, determine, document and maintain data quality relevant to the aerodrome and available services; provide data relevant to the aerodrome and available services to the users and the relevant air traffic services and aeronautical information services providers.
C4. GENERAL MANAGEMENT	
C4.1. Quality control manager	Personnel responsible for designing and control of airport processes
C4.2. Airport manager/ Station manager & Supervision	Plan, direct, and coordinate the operations, construction, and maintenance of airport facilities in accordance with all laws, rules, regulations and policies. Recomends, develops, and implements airport policies and procedures.
C4.3. Airport director	Airport directors oversee a group of managers who lead or supervise a particular area of the airport, programme or a project.
C5. AIRPORT SAFETY AND SECURITY	
C5.1. Airport security agent	Ensures airport security
C5.2. Rescue and fire fighting personnel	Provide the rescue and firefighting service, to save lives in the event of an aircraft accident or incident occurring at the aerodrome. create and maintain survivable conditions on the airport
C5.3. Hand luggage inspector	Hand luggage inspectors check individuals' luggage to detect potential threatening objects. They comply with public safety regulations and company's procedure.
C5.4. Screening officers (persons, baggage, items carried)	Inspect baggage and screen passengers to detect and prevent potentially dangerous objects from being transported into secure areas or onto aircraft.
C5.5. Screening officers (cargo)	Inspect to detect and prevent potentially dangerous objects from being transported into secure areas or onto aircraft.

Table 15: D. Aerodrome services – Ground handling: list of current occupations

D. AERODROME SERVICES: GROUND HANDLING	
LIST OF OCCUPATIONS	**DESCRIPTION OF THE MISSION**
D1. SAFETY & SECURITY	
D.1.1. Aviation ground staff	Aviation Ground Staff is responsible for every work which is not carried by on-flight attendants. The job of Aviation ground staff includes handling of passenger luggage, freight management and moving luggage on and off the conveyor belts.
D1.2. Marshaller	Marshaller is responsible for aircraft guidance / parking Using signals according to local regulations approved by CAA based on ICAO rules of Air. S/he ensures adherence to proper cooperation between airport / Air navigation company (tower) & Handling companies , establishing rules / responsibilities between all players on the airport Apron
D1.3. Safety manager/ officer	Ensures airport safety
D1.4. Flight planning specialist	The flight planning specialist works for an airliner and is primarily responsible for providing computerized flight plans. He assists in the preparation and guidance of the flight and provides the crew with the essential information required for safety of flight. He ensures that services are professionally arranged in a timely manner in accordance with all applicable policies, procedures, regulations and client preferences by collaborating closely with external providers, internal team members and other departments. He also

Co-funded by the Erasmus+ Programme of the European Union

	conducts monitoring and audits.
D1.5 Power plant design engineer	Power plant desing engineeer is responsible for fleet reliability, powerplant engineering documentation and review of aircraft maintenance and inspection programme.
D2. HANDLING	
D2.1. Ramp agent	The Ramp Agent is responsible for all ground servicing of a commercial airliner, including loading and unloading of baggage and cargo. Ramp agents typically operate a variety of machinery and equipment, including baggage loader belts, diesel pushback tractors and small baggage cart tugs. In cold weather, ramp agents operate aircraft deicing trucks, working aloft to spray deicer fluids on assigned airliners.
D2.2. Turnaround coordinator	Turnaround coordinator is responsible for the following activties: 1. Monitoring & Organizing / coordination of all handling actitivities related to aircraft turnaround according to function F2 , described in IATA Airport Handling Manual chapter 590 2. complete Load & Balance sheet according to IATA AHM 590 , functions F1 and F3 3. cooperations with all persons involved in aircraft handling to respect the Service Level Agreement of the Carrier
D2.3. Aircraft fuel system operator	Aircraft fuel system operators maintain fuel distribution systems and ensure the refuelling of planes.
D2.4. Baggage terminal agent	Baggage terminal agent monitor the flow of baggage in airports to ensure baggage makes connections, arrives at the destinations in a timely manner. They communicate with baggage managers to ensure compliance with regulations and apply correct solutions. Baggage flow supervisors collect, analyse and maintain records on airline data, passenger, and baggage flow, as well as creating and distributing daily reports regarding staff needs, safety hazards, maintenance needs and incident reports. They ensure cooperative behaviour and resolve conflicts.
D2.5. Baggage area coordinator (incl. Lost & Found)	Provides assistance for customers who have lost items within the Central Passenger Terminal. Answers phone, email, and in-person inquiries regarding lost items. Accepts found items from multiple sources and enters items in our computerized system. Performs administrative functions.
D2.6. Cargo handling agent (loaders)	Aircraft cargo operations coordinators direct and coordinate air transport terminal cargo and ramp activities. They review data on incoming flights as to plan the working activities. They direct preparation of loading plans for each departing flight and confer with supervisory personnel to ensure workers and equipment are available for air cargo and baggage loading, unloading, and handling activities.

Table 16: E. Air navigation services: list of current occupations

E. AIR NAVIGATION SERVICES	
LIST OF OCCUPATIONS	**DESCRIPTION OF THE MISSION**
E1. AIR TRAFFIC MANAGEMENT	
E1.1. Area Control Surveillance ATCO	Area control surveillance ATCOs monitor aircraft once they leave an airport's airspace. They work at air route traffic control centers located throughout the country, which typically are not located at airports.
E1.2. Ground ATCOs	Ground controllers is responsible for traffic on the manoeuvring area with the exception of runways. In other words, the GND is responsible for the safety of aircraft that are taxing on the runways.
E1.3. Tower ATCOs	Tower Air traffic controllers direct the movement of vehicles on runways and

Co-funded by the Erasmus+ Programme of the European Union

	taxiways. They check flight plans, give pilots clearance for takeoff or landing, and direct the movement of aircraft and other traffic on the runways and other parts of the airport. In brief, the first responsibility of the TWR controller is to ensure that sufficient runway separation is kept between landing and departing aircraft.
E1.4. Approach Control Surveillance ATCO	Approach and deperture controllers ensure that aircraft traveling within an airport's airspace maintain minimum separation for safety. They give clearances to enter controlled airspace and hand off control of aircraft to en route controllers. They use radar equipment to monitor flight paths and work in buildings known as Terminal Radar Approach Control Centers (TRACONs). They also provide information to pilots, such as weather conditions and other critical notices.
E1.5. Air Traffic Control supervisors (incl. Unit Chiefs of Air Traffic services)	Air Traffic Control Supervisor is responsible for the coordination and facilitation of the inbound movement of airplane, oversees the daily traffic within assigned airspace, and control moving aircraft and service vehicles at airports.
E1.6. Air Space Manager	Air space managers coordinate the planning of ground control, the maintenance of the aircrafts, and the handling of customers. They strive for the most efficient use of resources in directing the aircraft. They manage safety, quality, and risks in everyday work. They also plan and compare performance with other air navigation service providers.
E1.7. Accessors	*Description not available*
E1.8. Flow manager	Airspace Flow Manager manages the current and potential Air Traffic System disruptions.
E2. METEOROLOGICAL SERVICES	
E2.1. Aviation meterologist	Aviation meteorologists forecast weather conditions in airports. They provide day-to-day, hour-to-hour observations, analysis, forecasts, warnings, and advice to pilots, airport operators and airlines in meteorological matters. They report weather conditions expected at airports, current conditions, and en route forecasts.
E2.2. Meteo systems - technician	Meteorology technicians collect large amounts of meteorological information for weather information users such as aviation companies or meteorological institutions. They operate specialised measuring instruments to make accurate weather predictions and report their observations. Meteorology technicians assist meteorologists in their scientific operations.
E3.AERONAUTICAL INFORMATION SERVICES	
E3.1. Aeronautical information service operator	Aeronautical information service officers maintain the operational timing from sunrise to sunset in order to ensure that the information passed by agencies is authentic. They strive to ensure safety, regularity and efficiency.
E3.2. Aeronautical information specialist	Aeronautical information specialists provide high quality aeronautical information management services through technological means. They provide support to senior aeronautical information specialists and assess changes in aeronautical information affecting charts and other products. They answer requests of aeronautical data needs for airway companies operational groups and systems.
E4. COMMUNICATIONS, NAVIGATION AND SURVEILLANCE	
E4.1. Flight information service officer (FISO)	Aerodrome Flight Information Services Officer provides flight information service including, traffic information, meteorological information, information on runway state and other information useful for the safe and efficient conduct of flight. The pilot must use this information and make up his own mind about certain aspects e.g. flight route.
E5. MAINTENANCE OF AIR NAVIGATION EQUIPMENT	
E5.1. Air traffic safety	Air traffic safety technicians provide technical support regarding the safety of

Co-funded by the Erasmus+ Programme of the European Union

technician (ATSEP)	air traffic control and navigation systems. They design, maintain, install and operate these systems both in the airport and on board the aeroplane according to regulations. ATSEPs support of the ground-based electronic hardware and software systems used to support air navigation and Air Traffic Management. ATSEPs are mainly engineers, technicians, hardware and software specialists who are responsible for the specification, procurement, installation, integration, calibration, maintenance, safety assurance and monitoring of these systems.
E5.2. OGTI for ATSEP	*Description not available*

Table 17: F. Regulatory functions: list of current occupations

F. REGULATORY FUNCTIONS	
LIST OF OCCUPATIONS	**DESCRIPTION OF THE MISSION**
F1.REGULATIONS	
F1.1. Aviation safety officer	Aviation safety officers plan and develop safety procedures for aviation companies. They study safety regulations and restrictions relative to aviation company operations. Hence, they direct activities of personnel in order to safeguard the application of safety measures in compliance with regulations.
F2. SURVEILLANCE	
F2.1. Audit supervisor	Audit supervisors oversee audit staff, planning and reporting, and review the audit staff's automated audit work papers to ensure compliance with the company's methodology. They prepare reports, evaluate general auditing and operating practices, and communicate findings to the superior management.
F2.2. Aviation inspector	Aviation inspectors perform inspections of the procedures followed in the matters of maintenance, air navigational aids, air traffic controls, and communications equipment. They check compliance with ICAO, EU, national and environmental regulations.
F2.3. ICT auditor manager	ICT auditor managers monitor ICT auditors responsible for auditing information systems, platforms, and operating procedures in accordance with established corporate standards for efficiency, accuracy and security. They evaluate ICT infrastructure in terms of risk to the organisation and establish controls to mitigate loss. They determine and recommend improvements in the current risk management controls and in the implementation of system changes or upgrades.
F2.4. Aviation and air traffic engineering inspector	Aviation and air traffic engineering inspector inspects and verifies proper completion and documentation of safety of flight discrepancies. Evaluates personnel for maintenance qualifications, including verification of skills, training, and experience. Performs audits and inspections of work centers and ongoing maintenance actions, procedures, equipment, and facilities.

Table 18: G. Other transportation support activities: list of current occupations

G. OTHER TRANSPORTATION SUPPORT ACTIVITIES	
LIST OF OCCUPATIONS	**DESCRIPTION OF THE MISSION**
G1. BUSINESS & FINANCE	
G1.1. Logistics technician	Logistics technicians are active both before and after the production stage. They are in charge of ordering, receiving and warehousing the necessary materials to manufacture products. They have to co-ordinate the dispatch of

Co-funded by the Erasmus+ Programme of the European Union

	the finished products to the customers as well. Consequently, they are in contact with both internal and external personnel.
G1.2. Business development manager	Business development manager analyses the market and the competition and Identifies new business opportunities
G2. COMMUNICATION & MARKETING	
G2.1. Marketing manager	Marketing managers carry out the implementation of efforts related to the marketing operations in a company. They develop marketing strategies and plans by detailing cost and resources needed. They analyse the profitability of these plans, develop pricing strategies, and strive to raise awareness on products and companies among targeted customers.
G3. AIRPORT & ENVIRONMENTAL PLANNING	
G3.1. Airport Planning Engineer	Airport planning engineers manage and coordinate the planning, design, and development programs in airports.

Table 19: H. Aviation training: list of current occupations

H. AVIATION TRAINING (not initial education but further training)	
LIST OF OCCUPATIONS	**DESCRIPTION OF THE MISSION**
H1. FLIGHT TRAINING	
H1.1. Flight instructor	Flight instructors train both new and experienced pilots seeking to gain licences or experience in flying new aircraft, how to properly operate an aircraft according to regulations. They teach their students both the theory and practice of how to optimally fly and maintain an airplane, and they observe and evaluate student technique. They also focus on the regulations relating to operational and safety procedures specific to different (commercial) airline aircraft.
H2. ATCO TRAINING	
H2.1. Air traffic controller instructor	Air traffic instructors train people in all the matters regarding with the operations in air navigation services such as the management of flight traffic and the communication for navigation in aerodromes. They teach all the directives issued by air traffic control for the purpose of passing to trainees the sense of safety and expeditious flow of air traffic.
H2.2. OGTI/STDI Practical Instructors	Provide training to SATCOs and ATCOs
H3. OTHERS	
H3.1. Cabin crew instructor	Cabin crew instructors teach trainees all the matters regarding the operations in aircraft cabins. They teach, depending on the type of airplane, the operation carried out in the aircraft, the pre and post flight checks, the safety procedures, the service equipment, and client service procedures and formalities.
H3.2. Flight attendant instructor	*Description not available*
H3.3. Theoretical knowledge instructor	Chief Theoretical Knowledge Instructor (CTKI) is responsible to the Head of Training (HT) and closely cooperates with the Chief Flight Instructor (CFI). In the case of an ATO offering integrated courses, the HT, the chief flying instructor (CFI) and the chief theoretical knowledge instructor (CTKI) should be employed full-time or part-time, depending upon the scope of training offered.
H3.4. Vocational teacher of air traffic management subjects	Plans, develops and conducts classes in the ATM subject(s). Utilizes various teaching techniques and activities to assist students with their educational advancement. Responsible for the supervision of inmates assigned to the class.

Co-funded by the Erasmus+ Programme of the European Union

4.2 THE CHANGING NATURE OF WORK - UPSKILLING AND FUTURE OCCUPATIONS IN THE AVIATION SECTOR

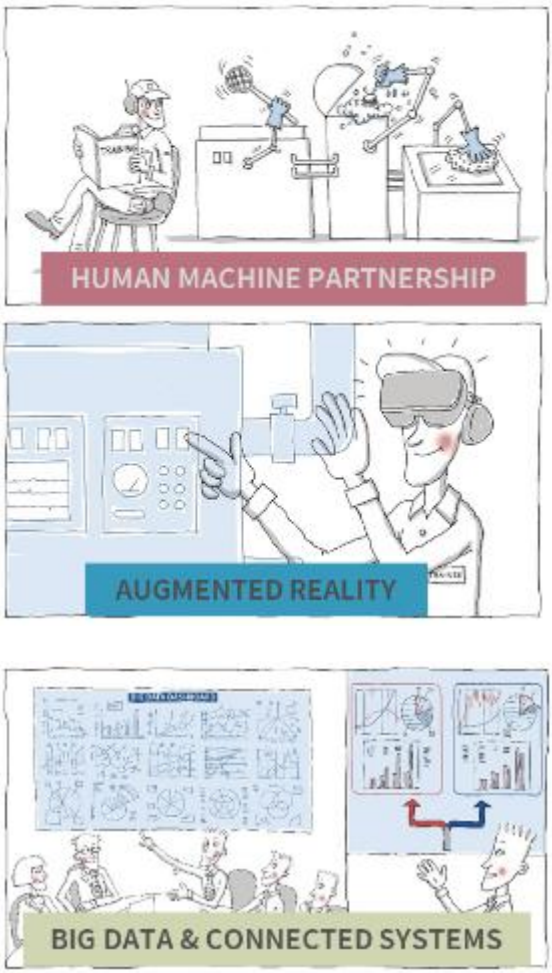
Many of the major societal changes currently affecting the transportation system are expected to have a significant impact on jobs. Together, technological, socio-economic, political and demographic changes will generate new categories of jobs and occupations while changing and displacing others [5]. These macro changes are going to require new sets of skills in both current and emerging occupations within the transport system and to transform how and where people work.

The following long-term societal changes are expected to be relevant for the future transport system including the aviation sector:

- **Urbanisation**: more and more people tend to move in cities. The growing and extending cities lead to the emerging concept of city-regions, which combines several spatial scales imposes different transport modes. The implementation of the smart city will further push the digitization and deployment of new technologies in transport.
- **Digitalisation**: technological change is occurring faster than past years, creating a gap between technological innovation and societal progress. This will have a significant impact on the future generations of workers.
- **Demographic changes**: as people live longer and retire later, the demographic composition of the workforce is also changing. These demographic changes together with technology innovations will require more flexibility in labour conditions.
- **Climate change**: climate change, air pollution and the shortage of resources are gaining importance within society. They have strong impacts in policy making e.g. for traffic prevention, emission control or funding programmes and result in societal demand for sustainable transport offers including their production. Novel mobility concepts, new kinds of vehicles and innovative usage will result from these developments. The electrification and transport sustainability are important factors that will bring changes into the transport sector.
- **Globalisation**: increasingly integrated global labour markets will lead to higher mobility across countries requiring transversal, international skills.
- **Safety and Security**: safety and security are of primary concern for any transport system. Safety agencies such as EASA (European Aviation Safety Agency), ERA (European Union Agency for Railways) and EMSA (European Maritime Safety Agency) contribute to advances in safety in all transport modes by ensuring the development of advanced technologies and manufacturing process, promoting European safety certifications and standards. On the other side, transport security is a sensitive issue that affects all transport users and providers. Governments are more and more concerned about security threats especially related to terrorism and cyber threats. New technologies can play an important role for developing high-security systems for the future by reducing the duration of security checks.

According to the survey conducted by the World Economic Forum [5], artificial intelligence, machine learning, robotics, virtual and augmented reality, big data, Internet of Things (IoT) are some of the main technologies that will shape the future of transport industries and that will underpin the formation of new human-machine partnerships. The main key technological transformations are shown in (Figure 10).

Co-funded by the Erasmus+ Programme of the European Union



KEY TECHNOLOGICAL TRANSFORMATIONS

- MASSIVE CLOUD COMPUTING, ANYWHERE, ANYTIME
- BIG DATA ANALYTICS
- ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
- EVERYTHING BECOMES DIGITALLY CONNECTED
- ADDICTIVE MANUFACTURING (3D PRINTING)
- NEW FORMS OF HUMAN-MACHINE INTERACTION
- AUGMENTED REALITY
- VIRTUAL REALITY

Figure 10: Main technological transformations

The understanding of the global trends influencing the future working world will be required from the businesses to stay competitive. These changes will increase the need for continuous education, training and qualification of the transportation workforce.

4.2.1 New skills

The impact of new technologies such as robotics, autonomous vehicles and big data is transforming the working environment conditions, changing the skills that employers need for doing their job.

This trend had been highlighted also from the results gathered through the KAAT survey were most of the respondents reported that information technologies, cooperative systems, big data and augmented reality interfaces will heavily affect the current occupations and the way of working, requiring new skills (see Figure 11).

Co-funded by the Erasmus+ Programme of the European Union

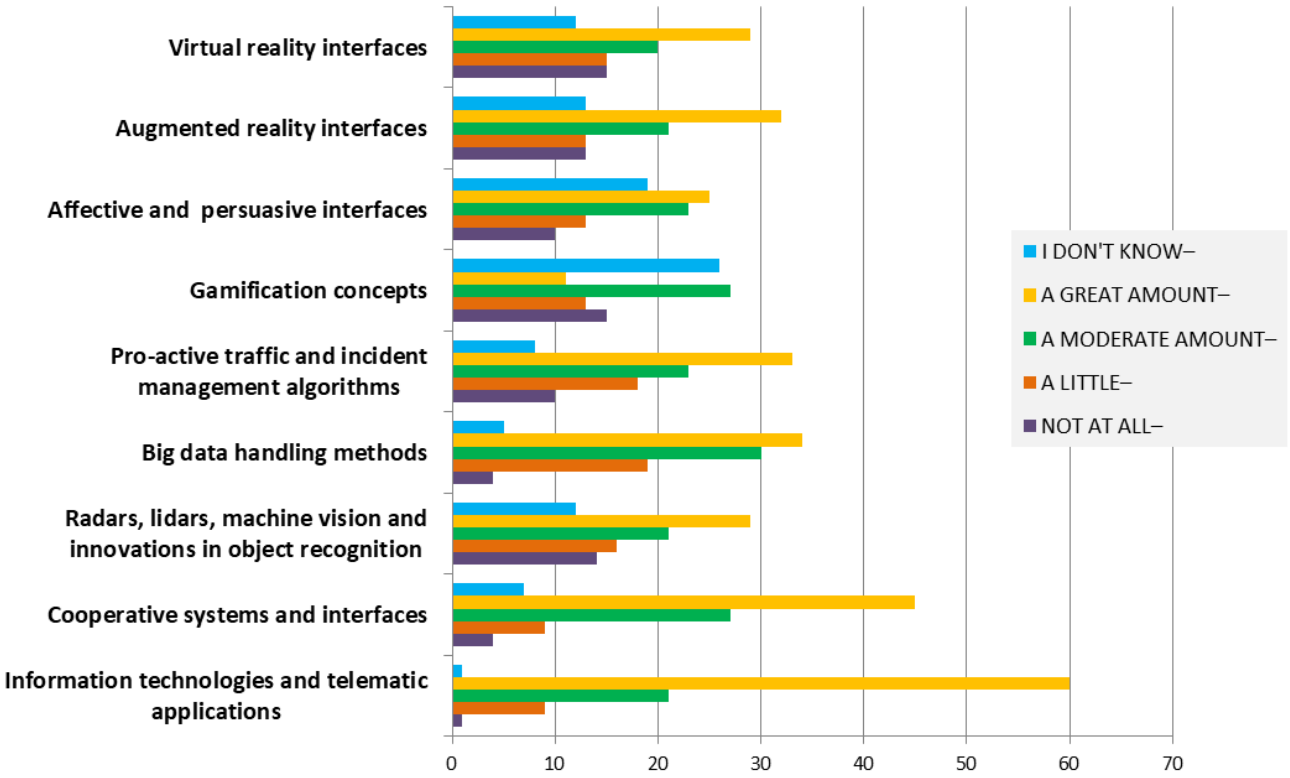


Figure 11: Q29 - In your opinion, to what degree will the following changes and key technologies affect your current occupation in the aviation sector?

These new skills will not replace the existing ones; they will be required in addition to the current ones. As depicted by the World Economic Forum the 21st century skills are mostly related to problem solving, critical thinking and creativity (see Figure 12). [6] reported that future workers generations will need to be equipped a plethora of skills, like the ability to respond to complex problems, effective communication and team working.

Co-funded by the Erasmus+ Programme of the European Union

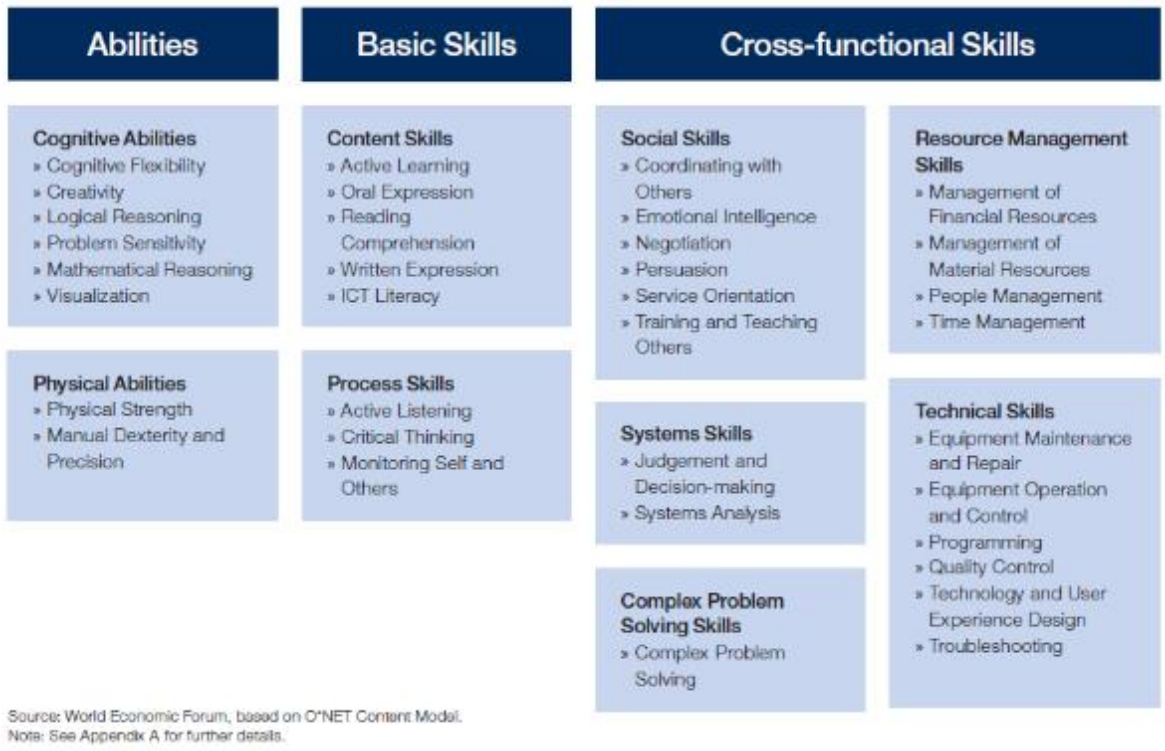


Figure 12: Core work- related skills identified by the World Economic Forum

These findings are also in line with the results gathered from the KAAT online survey (Figure 13 and Figure 14). Most respondents indicated dealing with complexity, critical thinking, communication and reporting, teamwork and collaboration as the essential competences that will be more required in the near future and that are expected to be the critical success factor for the future carriers. At the same time, the importance of competences such as teaching & coaching and technical expertise will be less required in the coming years.

Co-funded by the
Erasmus+ Programme
of the European Union

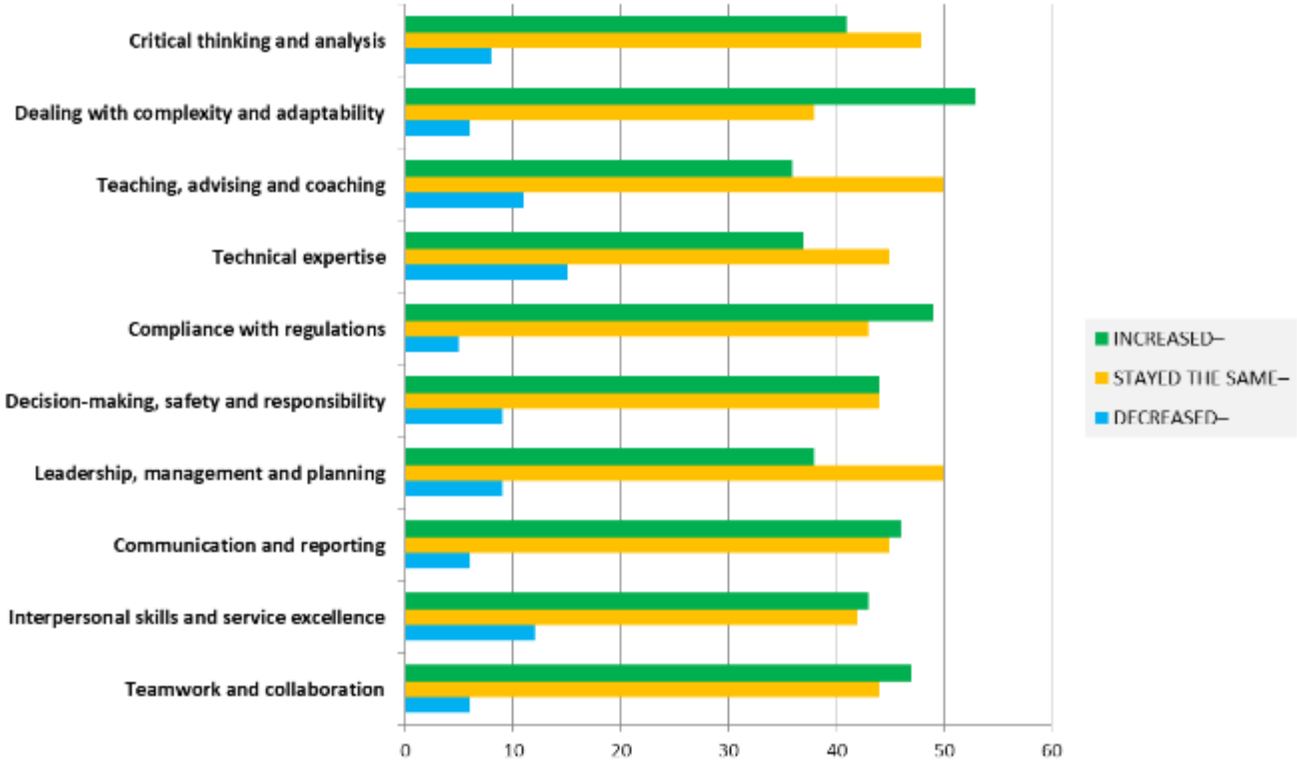


Figure 13: Q25 - In the past 5 years, has the importance of these competences stayed the same, increased or decreased?

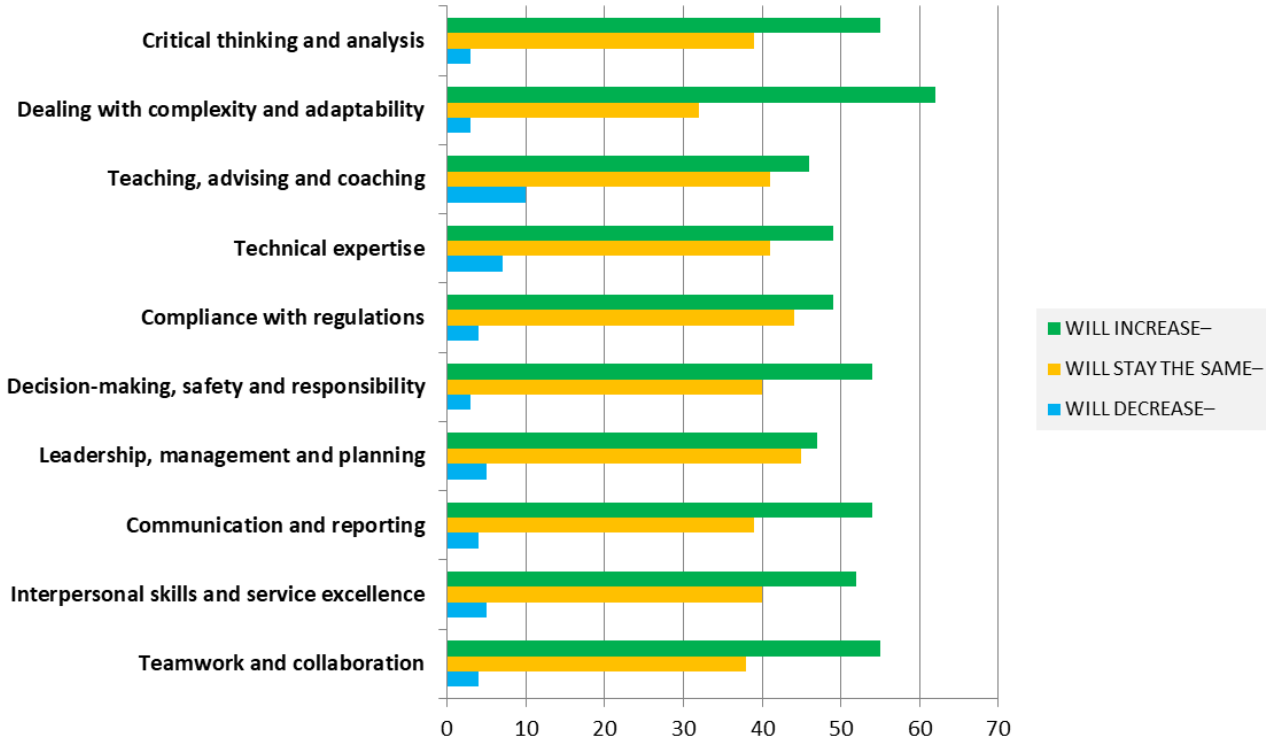


Figure 14: Q26 - In the next 10 years, do you think the importance of these competences will stay the same, increase or decrease?

Co-funded by the
Erasmus+ Programme
of the European Union

As reported in a recent Airbus publication [7], and also in line with the growing importance of the cross functional skills, the aviation engineer of the future will require a mixture of technical and soft skills that are related to the current context of digitalisation and increasingly rapid technological change, including:

- Digital competencies (advanced analytics and big data, cloud and as a service platform, mobility, etc.);
- Design thinking;
- Entrepreneurial thinking;
- Cyber security skills;
- Skills related to virtual/augmented reality.

In line with these changes in skills, experts across Airbus [7] have highlighted the growing need for graduates trained in cyber security, and in data science due to the vast digitalisation trend in companies. In the future, there will be a huge demand of specialists who will analyse and interpret transport big data collected.

A recent study conducted by McKinsey Global institute [8] found that future workforce will spend more time on activities of control, supervision, managing of people and communication. They will spend less time on physical activities, where machines already exceed human performance.

4.2.2 Displacing and emerging occupations in the aviation sector

According to the major societal changes envisioned to affect working tasks and activities, future "scenarios" representing some of the main trends and technological transformations within the aviation sector can be identified such as:

1. Virtualization and automation of the Air Traffic Control and Air Traffic Management;
2. The introduction of autonomous systems in the airport operations;
3. The introduction of security checks for improving seamless passengers' journey;
4. More demand for sustainable flying and renewable resources.

These four scenarios were used for describing some of the main labour challenges that are expected to occur within the aviation sector. Scenarios were also used to identify some of the occupations that will be changed or displaced and the new ones that will be created. Each scenario contains the following information:

- brief description of the context;
- major labour challenges;
- displacing and emerging occupations;
- emerging occupations.

The online survey conclusions and the input obtained from the workshop participants were used as main sources for identifying the changing and displacing occupations as well as the emerging ones. Figure 15 shows some of the occupations that are going to drastically change or disappear. As indicated by the respondents to the survey, Air Traffic Controllers, Pilots, Cabin crew, Check – in agents or Ramp handing operators are some of the occupations that will be drastically affected by the technological transformations.

Co-funded by the
Erasmus+ Programme
of the European Union

Figure 15: Q30 - Which occupations do you think are going to drastically change or disappear by 2030?

The complete description of the four scenarios is reported in the following paragraphs.

4.2.2.1 Scenario 1- Virtualization and automation of the Air Traffic Control (ATC) and Air Traffic Management (ATM)

ATC/ATM VIRTUALIZATION AND AUTOMATION

The European ATM system is expected to face challenging situations, with the growth of air traffic, the increase of its complexity, the introduction of innovative concepts and increased automation.
The concept of remote tower is replacing the actual tower. Augmented multimodal sensorial solutions and new human-system interaction concepts can support ATCOs in managing remote tower operations in high performance and demanding scenarios.

LABOUR CHALLENGES

Co-funded by the
Erasmus+ Programme
of the European Union

The roles and tasks of air traffic controllers will change in the future. This will be caused by several factors such as the introduction of highly automated systems for supporting controllers in dealing with the increasing volume and complexity of air traffic.
Thanks to the major technological changes, ATCOs of the future might be fully immersed in virtual environments, managing the traffic complexity through 3D images of the airspace they are controlling.
Furthermore, as highlighted during the workshop in Lisbon, the unmanned traffic management[2] will represent a future challenge for the current ATM operations requiring ATCOs to have different competences and skills from the current ones.

DISPLACING OR CHANGING OCCUPATIONS

- En-route, tower, ground, approach and departures ATCOs are expected to change their tasks and roles in the future

EMERGING OCCUPATIONS

- Remote tower controllers
- Unmanned traffic controllers
- AI engineers/VR experts
- Big data analysts
- Robotics engineering

4.2.2.2 Scenario 2 - The introduction of autonomous systems in the airport operations

AUTONOMOUS SYSTEMS

Autonomous systems are expected to act as one of the major technology drivers in the aviation sector. The demand for air transportation is growing, and the operations at airports and associated facilities are becoming progressively congested.
As highlighted by the IATA report [9] will affect the following areas of application:

- **People transportation (air buses)**: driverless buses are likely to be introduced in the airports in the next years.
- **Aircraft movements:** electric pushback devices remote controlled offer the possibility to reduce the pushback operation to one person, improving the operational performance.

[2] The unmanned aircraft system management is a new air traffic management ecosystem for unmmanned aerial systems.

Co-funded by the Erasmus+ Programme of the European Union

- **Baggage:** the introduction of fully autonomous baggage robots able to conduct check-in might enhance the efficiency of check –in operations at airports, enhancing the overall passengers' experience.
- **Aircraft inspections:** there are different types of inspections e.g. planes (for damage), runways (foreign objects detection), airport perimeter (for security). In the future part of these inspections can be done using drones.

LABOUR CHALLENGES

Autonomous vehicles will have an impact on the current occupations in the aviation sector. Some of the roles currently working in the area of Airport Operations such as the day-to-day control and organization of the aircraft movements around the airport; the inspections of aircraft and manoeuvring area and the airport maintenance; will require a change on current tasks, skills and knowledge.
New jobs will be created in developing; managing and monitoring autonomous vehicles equipment, while others job profiles need to be re-skilled to avoid job losses.

DISPLACING OR CHANGING OCCUPATIONS

- Ticketing agent
- Ground steward/stewardess
- Ramp agent
- Monitoring and inspection of movement area and related facilities officer
- Hand luggage inspector
- Baggage handling operator
- Lost & found coordinator
- Maintenance agent
- Airport Maintenance Technician

EMERGING OCCUPATIONS

- Drone operators
- Automated vehicle operators
- Designers of autonomous vehicles
- Safety officers for unmanned systems

Co-funded by the Erasmus+ Programme of the European Union

4.2.2.3 Scenario 3 - The introduction of security checks for improving seamless passengers' journey

SEAMLESS SECURITY AIRPORTS

In order to reduce time, seamless security checks at airport enable seamless passenger processes through the airport. Big data analytics may enable the pre-selection and adaptation of the security check according to passenger security status. IATA[3] already envisioned the key features of checkpoint the future:

- concept of three different security tunnels dividing passengers into three different groups: "stranger", "normal" and "unknown traveller";
- reduction of process times through pre-selection and adapted security check according to passenger security status
- passenger screening within a walk-through metal detector (WTMD)

Source IATA Checkpoint of the future - http://1.f.ix.de/imgs/18/7/0/8/9/9/1/checkpoint1-large.jpg-6e2458b6935e60d9.jpeg

LABOUR CHALLENGES

In the future the use of Big Data will enable the collection of several information about passengers (e.g. biometrics, travel behaviour), that will be used for the passenger pre-selection process. In the next years, machine will be able to read the x-ray will probably substitute or change some of the working activities currently performed by the security screening officers at airports.

DISPLACING OR CHANGING OCCUPATIONS

- Security screening officer
- Hand luggage inspector

EMERGING OCCUPATIONS

- Software and AI engineers
- Big Data and analytics experts
- Security & cyber security experts
- Legal services personnel and ethics and privacy protection specialists

[3] https://www.iata.org/pressroom/pr/Pages/2011-06-07-01.aspx

Co-funded by the Erasmus+ Programme of the European Union

4.2.2.4 Scenario 4 - More demand for sustainable flying and renewable resources

ELECTRIC AND SUSTAINABLE AIRCRAFT

Environmental protection is gaining importance within society. As reported in the Flightpath 2050 the environmental challenges and the use of renewable resources will be a key driver for the aviation sector. Aviation can reduce CO2 emissions by developing and promoting use of sustainable alternative fuels (e.g. batteries, biomass, coal-to-liquid, natural gas) in air transport through technology, operations and infrastructure.

LABOUR CHALLENGES

The growing importance of the environmental issues will require new investments in the development and deployment of renewable fuels and respective technologies. New demand for workers in a range of occupations, including in manufacturing, construction, and installation might be created [8]. However, air transport is likely to be the last to adopt alternative fuels in large-scale because of limited selection of suitable alternatives and sector's strict safety regulation.

DISPLACING/CHANGING OCCUPATIONS

- Fuel specialist/ Aircraft fuel system operator

EMERGING OCCUPATIONS [10]

- Energy and maintenance engineer
- Electrical engineer/ Alternative Vehicle Developers
- Climate Change Reversal Specialist
- Consumer Energy Analysts
- Battery Technician
- Solar Flight Specialists

5 EDUCATION AND TRAINING

The fast-changing job market will require graduates to be equipped with new technical and professional skills needed to fill a specific job occupation specification. In this context, universities and organisations need to collaborate for making the school-to-work transition as smooth as possible and to be able to prepare future generations for the world of work [6]. One of the main objectives of the occupational analysis was to identify current and future collaboration opportunities between industries and educational institutions.

Co-funded by the Erasmus+ Programme of the European Union

A specific section of the questionnaire was dedicated to exploring the educational qualifications background of the respondents and the training they have received within their organisation.
Half of the respondents got a postgraduate degree (Figure 16), most of them in the field of Engineering (Figure 18). In general, the competences acquired during the educational career were considered relevant by more than a half of respondents (Figure 17).

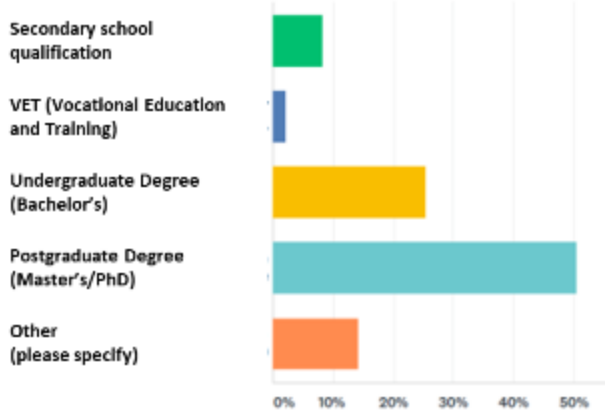


Figure 16: Q09 - What is the highest level of education you have completed or the highest degree you have received?

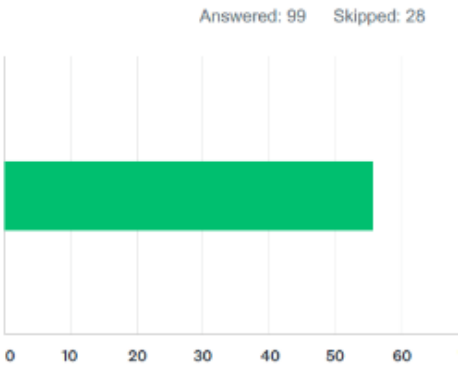


Figure 17: Q11 – How relevant were the competences acquired during your education to your first role in the aviation sector?

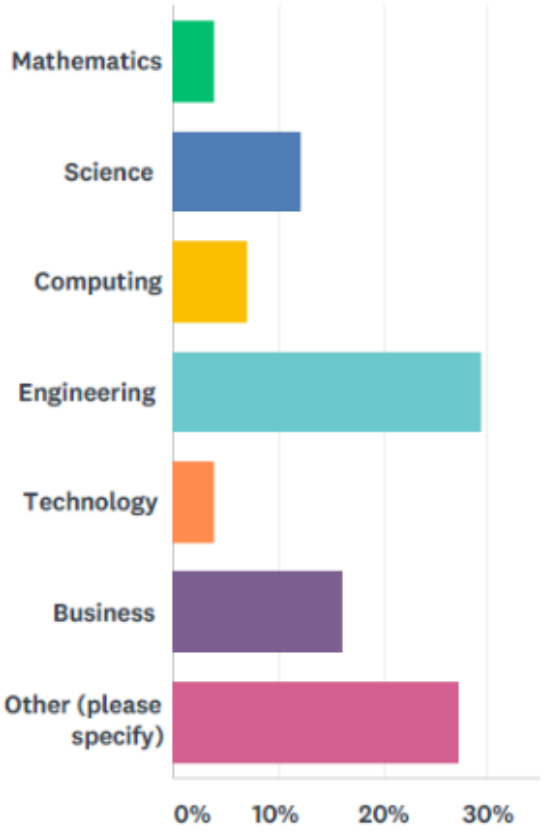


Figure 18: Q10 - Which of the following best describes the field in which you received your highest educational qualification?

As shown by Figure 19 more than 60% of the respondents considered the initial training received extremely or very helpful. On average, the majority of people interviewed agreed on the fact that organisations invest on training and education (Figure 20), and most of them receive training every year (Figure 21).

Co-funded by the Erasmus+ Programme of the European Union

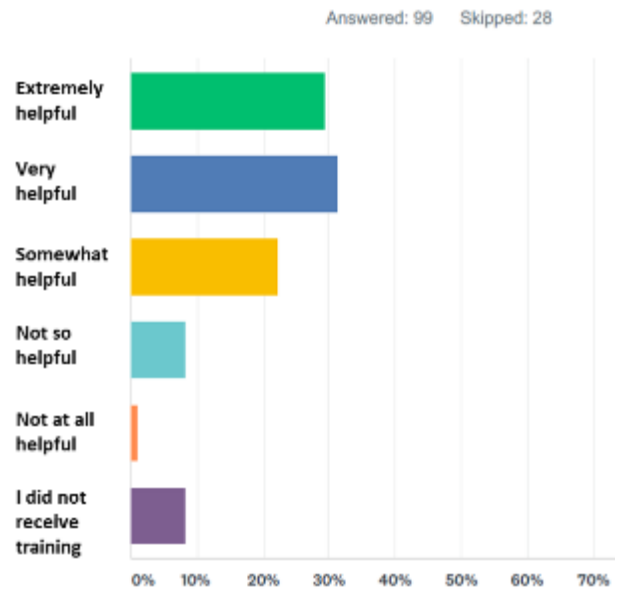


Figure 19: Q13 - How helpful was the initial training you received from the organisation you work for when you started your job?

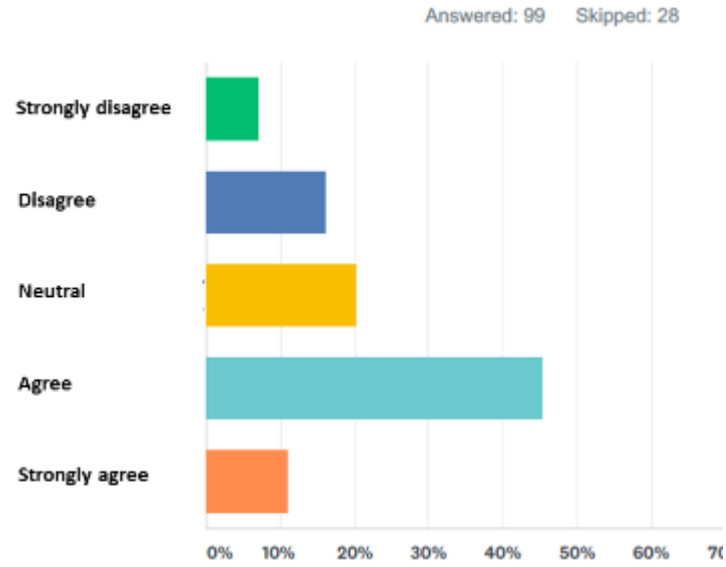


Figure 20: Q15 - I am satisfied with the investment the organisation I work for makes in training and education.

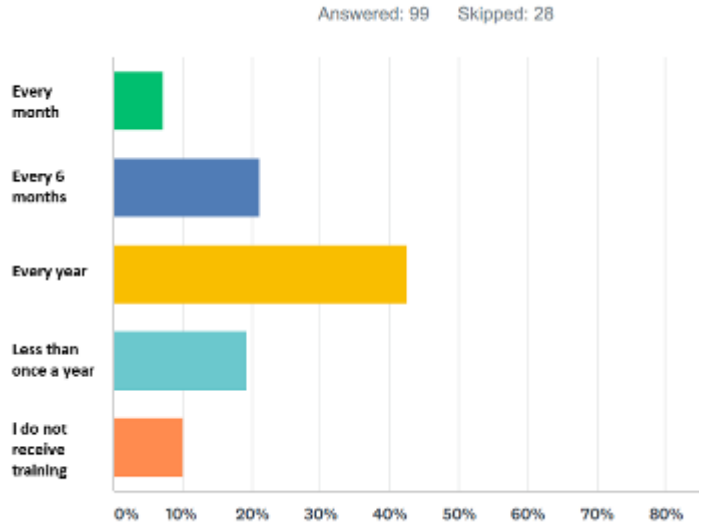


Figure 21: Q14 – How often do you receive training in the organisation you work for

In question 16 (Figure 22), respondents were asked to indicate the training institutions that should be responsible for providing the training for improving the following competence areas:

1. Teamwork and collaboration
2. Interpersonal skills and service excellence
3. Communication and reporting
4. Leadership, management and planning
5. Decision making, safety and responsibility
6. Compliance with regulations
7. Technical expertise

Co-funded by the Erasmus+ Programme of the European Union

8. Teaching, advising and coaching
9. Dealing with complexity
10. Critical thinking and analysis

Further qualification and courses, on the-job-training, and higher education/VET seemed to be the most preferred training solutions for improving the different competences areas. These results emphasize the importance of education and training throughout the professional career paths, highlighting the need of continuous collaboration between educational institutions and industries.

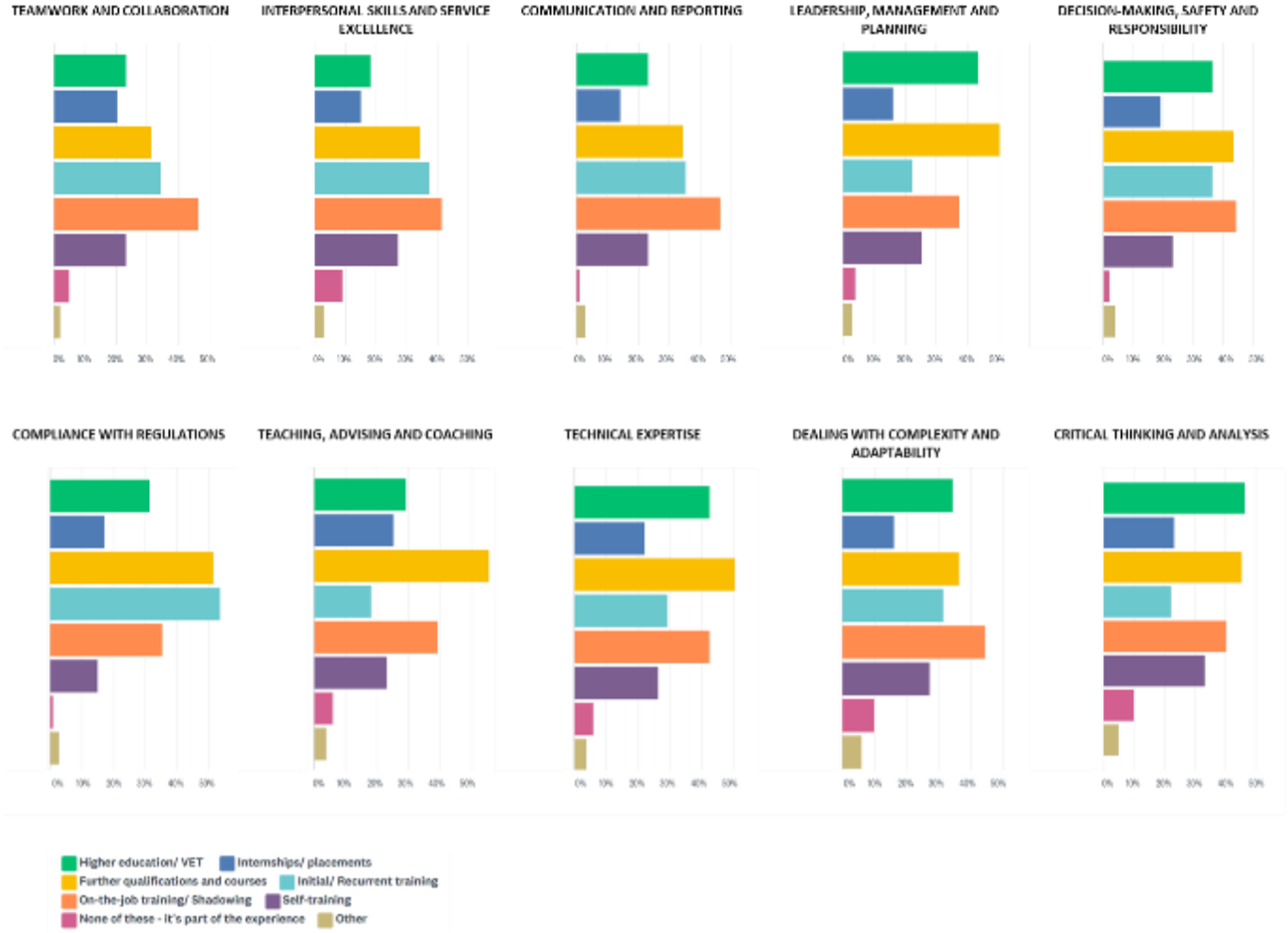


Figure 22: Q16 - In your opinion, who should be responsible for providing training in the following competence areas?

Synergies between educational institutions and industry were further explored through a dedicated section of the online survey: "collaboration with educational institutions". In this respect, participants were asked to share their knowledge and opinions on the following aspects in order to understand:

- who are the main training providers within the organisations;
- the status of collaboration between organisations and high level educational institutions;
- the availability of representatives of educational institutions within organisations;
- the nature of collaborations between organisations and educational institutions;
- the level of effectiveness of educational bodies in preparing students for the world of work.

Co-funded by the Erasmus+ Programme of the European Union

As shown in Figure 23 most of the respondents highlighted that the most of the training within their organisation is provided internally (50%) or using a combination of different training providers (25%).

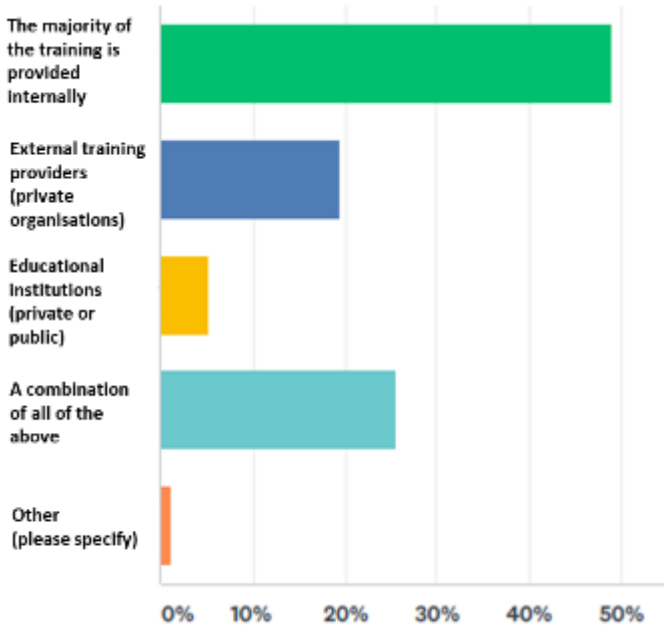


Figure 23: Q19 - To the extent of your knowledge, who are the main training providers at the organisation you work for?

Although only 5% of the respondents reported that the training within their organisation is being provided by educational institutions; the majority of respondents (on average 60%), indicated a good level of interaction between the organisations they work for and higher education institutions (see Figure 24). However, only 30% replied that there are representatives of educational bodies within the organisations (see Figure 25).

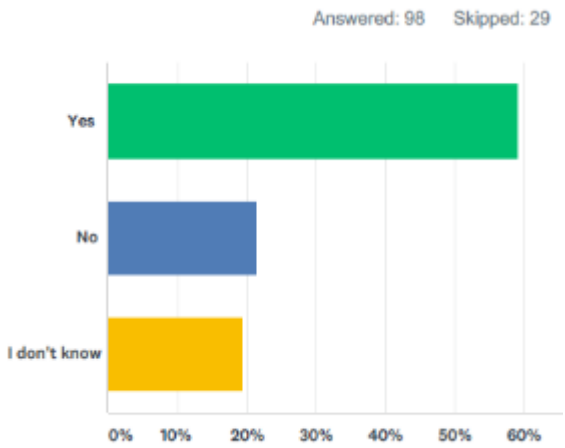


Figure 24: Q20 – To the extent of your knowledge, does the organisation you work for collaborate with any higher education institutions?

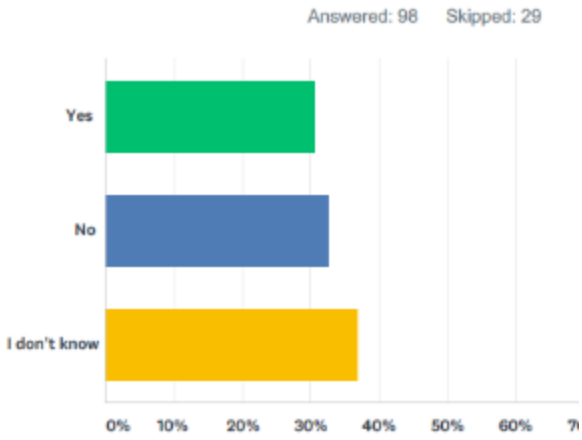


Figure 25: Q21 – Are there representatives of educational bodies in the organisation you work for (e.g., in an HR or a training department, or in the board of directors) in order to ensure the match between the competences and the requirements of the aviation industry?

Co-funded by the Erasmus+ Programme of the European Union

Looking into the nature of the possible synergies between organisations and educational institutions (Figure 26), 1) student dissertations, internship and placements, 2) joint research programmes - externally funded, and 3) developmental events and conferences seem to be the most preferred ways of collaborations between organisations and educational institutions.

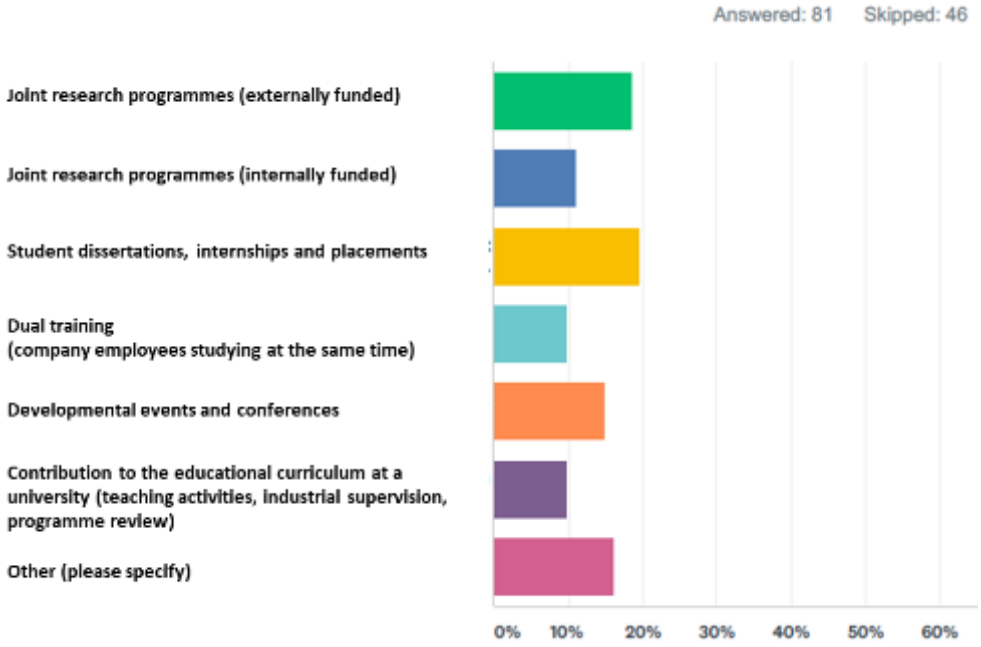


Figure 26: Q22 – If so, in what way does the organisation you work for collaborate with educational institutions?

The final question was made for understanding how effective the educational institutions are in preparing students for their future carrier paths within the aviation industry. Results collected are quite positive (see Figure 27), 33% of the respondents reported that educational institutions are extremely or very effective in preparing the students for their future occupations, while almost the 50% of respondents considered educational institutions relatively able to prepare students for the world of work and the remaining 20% considered them not so effective.

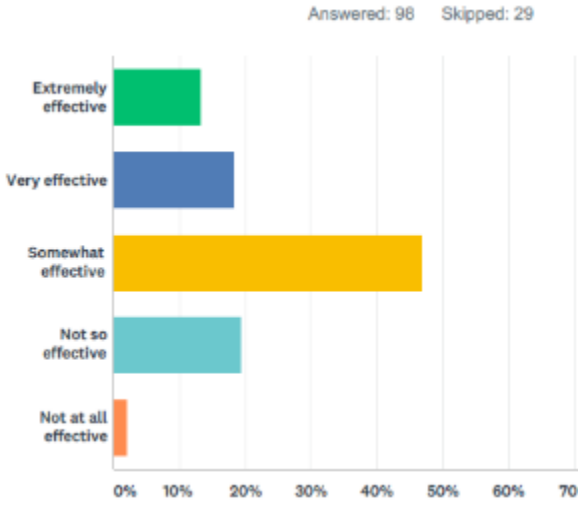


Figure 27: Q23 – Overall, how effective do you think educational institutions are in preparing students for the requirements of their future occupations in the aviation sector?

Co-funded by the Erasmus+ Programme of the European Union

This result highlights the need to foster collaboration between organisations and educational institutions and to ensure an involvement of key stakeholders from industries and universities in order to allow educational programs to be effective and up-to-date with the real issues required by the world of work.

6 CONCLUSIONS AND NEXT STEPS

This report has provided an analysis of the occupations in the aviation sector. The main outcomes of the analysis were the competences framework and the sectorial breakdown of current and emerging occupations.

The **competency framework**, developed through a participatory process with a continuous involvement of project partners, is composed of eight categories of competence representing "behavioural" competences and "technical and functional" competences, including: (1) interpersonal skills and teamwork, (2) communication and reporting, (3) personal resilience and critical thinking, (4) training and development, (5) operational expertise, (6) customer focus, (7) leadership, management and planning, and (8) safety and responsibility.

The competences framework, developed within WP1, combines and integrates all the relevant competences and skills required to cover a given role. The categories of competences were used to describe the wide range of occupations in terms of personal qualities, supporting skills and tasks and responsibilities.

The **sectorial breakdown** presents a comprehensive view of the labour market on the aviation sector at European level. Indeed, around 120 occupations were identified and fully described by providing insights into the key competences, tasks, responsibilities and learning outcomes required by the current employers in the aviation sector. The development of the sectorial breakdown has been conducted in compliance with the ESCO classification of skills, competences and occupations. In addition, input from KAAT project partners was requested at different stages of the process for validating the occupations already included and for identifying additional or missing occupations.

A specific section of this report is dedicated to the description of the major societal changes and technological transformations that are expected to have a significant impact on jobs. These macro changes will generate new categories of jobs and occupations while changing and displacing others. According to these major societal changes envisioned to affect working activities, four future "scenarios", representing some of the major technological transformations within the aviation sector, have been identified as follows:

1. Virtualization and automation of the Air Traffic Control and Air Traffic Management;
2. The introduction of autonomous systems in the airport operations;
3. The introduction of security checks for improving seamless passengers' journey;
4. More demand for sustainable flying and renewable resources.

These four scenarios, together with the input collected through the survey and the workshop, were used for identifying some **emerging occupations** as shown in Figure 28.

Co-funded by the Erasmus+ Programme of the European Union

ATC/ATM VIRTUALIZATION AND AUTOMATION	AUTONOMOUS SYSTEMS	SECURITY AND CYBER-SECURITY	ELECTRIC AND SUSTAINABLE AIRCRAFT
• Remote tower controllers • AI engineers/VR experts • Big data analysts • Robotics engineering	• Drone operators • Automated vehicle operators • Designers of autonomous vehicles • Safety officers for unmanned systems	• Software and AI engineers • Big Data and analytics experts • Security (& cyber security) experts • Legal services personnel and ethics and privacy protection specialists	• Energy and maintenance engineer • Electrical engineer/ Alternative Vehicle Developers • Climate Change Reversal Specialist • Consumer Energy Analysts • Battery Technician • Solar Flight Specialists

Figure 28: List of emerging occupations

The fast-changing of job market will require **new sets of skills** in both current and emerging occupations within the transport system [11].

To face-up these challenges industries and educational bodies need to collaborate for making the school-to-work transition as smooth as possible and to be able to prepare future generations for the world of work.

In order to pragmatically address these changes **educational institutions** need to align the educational programs and teaching methods to the needs of the future generations of workers (e.g. Millennials). Indeed, millennials generation is generally characterised by an increased use of and familiarity with digital technologies. To meet the learning needs of future generations, teachers need to move away from traditional teaching methods and adopt educational approaches that are more in line with the way students learn today [6]. Furthermore, a major emphasis on professional and vocational training will be needed.

On the other hand, in order to make current and future workforce ready to meet the labour market requirements, **industries** need to: (1) identify productive ways of planning job transitions pathways; (2) prioritise actions, time and investments on reskilling and upskilling opportunities; (3) recognise and understand the future skills demand; (4) re-design training courses to foster continued learning and (5) promote on-the-job training opportunities to facilitate chances to acquire new skills in the workplace [11].

This report on occupational analysis of the aviation sector will be used as main input for the next activities of KAAT project that will be carried out within WP2 "Qualification analysis", WP3 "Conception and implementation of a new innovative study program "IT applied in aviation" and WP4 "Improvement of university study programmes and of adult trainings".

The table below shows the main sections of this report that can be used as basis for the next activities within WP2, WP3 and WP4.

Co-funded by the Erasmus+ Programme of the European Union

Table 20: WP1 input for the upcoming activities within the project

Upcoming activities	WP1 input
WP2 WP3 WP4	*Competences framework* (section 3) can be used to: - check the list of competences, personal qualities, supporting skills and tasks and responsibilities currently required by the labour market to cover a given role. - align the training courses and educational programmes to current competences required by the labour market *Sectorial classification of occupations* can be used to (section 4): - align industries and educational institutions regarding the current occupations available and the related descriptions in terms of knowledge, skills and competences

7 REFERENCES

[1]. EASA Report. Proposal for a Competency Framework for the Competent Authorities' Inspectors, 2015.https://www.easa.europa.eu/sites/default/files/dfu/EASA%20Aviation%20Inspector%20Competencies%20Report.pdf

[2]. ESCO classification of European Skills/Competences, qualifications and occupations. https://ec.europa.eu/esco/portal/home

[3]. ICAO working paper (2009). Review of the classification and definitions used for civil aviation activities. https://www.icao.int/Meetings/STA10/Documents/Sta10_Wp007_en.pdf

[4].ICAO, 2011. International Standards and Recommended Practices, Annex 1: Personnel licencing. http://web.shgm.gov.tr/documents/sivilhavacilik/files/pdf/saglik_birimi/mevzuat/ICAO_Annex%201-ed11.pdf

[5].World Economic Forum. (2016, January). The future of jobs: Employment, skills and workforce strategy for the fourth industrial revolution. In World Economic Forum.

[6].Lappas, I., & Kourousis, K. I. (2016). Anticipating the need for new skills for the future aerospace and aviation professionals. Journal of Aerospace Technology and Management, 8(2), 232-241.

[7].Airbus Employment Marketing, 2018. The engineer of the future. White paper. http://company.airbus.com/careers/Partnerships-and-Competitions/The-Engineer-of-the-Future-White-Paper.html

[8].Manyika, J., Lund, S., Chui, M., Bughin, J., Woetzel, J., Batra, & Sanghvi, S. (2017). Jobs lost, jobs gained: Workforce transitions in a time of automation. McKinsey Global Institute. https://www.mckinsey.com/~/media/mckinsey/featured%20insights/future%20of%20organizations/what%20the%20future%20of%20work%20will%20mean%20for%20jobs%20skills%20and%20wages/mgi-jobs-lost-jobs-gained-report-december-6-2017.ashx

[9].IATA report, 2015. StB (Simplify the business). Transformation in progress and explorations underway. https://www.iata.org/whatwedo/stb/Documents/StB-White-Paper-2013.pdf

[10]. Talwar, R. & Hancock, T. (2010). The shape of jobs to come Possible New Careers Emerging from Advances in Science and Technology (2010 – 2030). Fast Future Research.

[11]. World Economic Forum. (2017). Accelerating workforce reskilling for the fourth industrial revolution: An agenda for leaders to shape the future of education, gender and work (White Paper). World Economic Forum, Geneva, Switzerland. http://www3.weforum.org/docs/WEF_EGW_White_Paper_Reskilling.pdf

[12]. Catalyst TM, 2017. Building a workforce of the future – Upskilling/Reskilling in Global in – House Centers. https://www2.everestgrp.com/Files/previews/Everest%20Group%20-%20Building%20a%20Workforce%20of%20the%20Future%20%20Upskilling%20and%20Reskilling%20in%20GICs%20-%20Complimentary%20Abstract.pdf

[13]. Bacigalupo, M., Kampylis, P., Punie, Y., & Van den Brande, G. (2016). EntreComp: The entrepreneurship competence framework. Luxembourg: Publication Office of the European Union

[14]. KAAT 2018, "Report on workshop 1: smart qualifications for smart air transport occupations".

8 ANNEXES

8.1 Sectorial classification of current occupations

The **sectorial classification** template includes:

- the different areas of the aviation sector together with the mapping of the current occupations;
- the full description of the current occupations including the related key competences, tasks, responsibilities, skills and knowledge specific to the aviation sector.

Link to the sectorial classification template: https://seafile.dblue.it/f/fc974f61b0/?dl=1

8.2 Survey results

Co-funded by the
Erasmus+ Programme
of the European Union

WP1

KAAT Occupational Analysis in Air Transport: *Survey*

Selected results_12.06.18, Deep Blue

Co-funded by the Erasmus+ Programme of the European Union

This project has been funded with support from the European Commission. This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein. Project Nº.: 588060-EPP-1-2017-1-RO-EPPKA2-KA

TABLE OF CONTENT

KAAT Survey


KAAT Occupational Analysis in Air Transport

Welcome to KAAT project survey

ABOUT THIS PROJECT

This survey is being conducted as part of the Erasmus+ Knowledge Alliance in Air Transport (KAAT) Project funded by the European Union. The KAAT project is an international, multi-partner project aiming to bridge the gap between the two pathways for education and training in the aviation sector (vocational and academic) by creating a methodology for the Aviation Sectoral Qualification Framework and modernising higher education through innovative approaches for teaching and learning. The project fosters a new attitude towards university-business cooperation in aviation, anticipating the future demand of the aviation labour market in terms of skills and competences, and ensuring a better-skilled workforce for facing a globalised force competition.

ABOUT THIS SURVEY

As part of this research, the KAAT project is developing a framework of current and emerging occupations in the aviation sector. With the use of this survey we aim to:

- Identify and validate the current occupations and competences in the aviation sector.
- Identify the needs and roles in the aviation sector in the next 10 years.
- Map the learning outcomes of study programmes with the demands of airport labour market in terms of competences, knowledge and skills.

We are seeking input from employees working in all areas of the aviation sector value chain including: Commercial Aviation, General Aviation, Airport Operations, Air Navigation Services, Regulatory Functions, Other Transportation Support Activities, and Aviation Training.

The survey is anonymous and will take approximately 15 minutes to complete. The questions ask about your experience and views regarding:

- the skills and competences required in your current occupation
- emerging skills and competences necessary for the future
- past and present training and collaboration opportunities
- your background and education

ABOUT YOUR PARTICIPATION

Your participation in this study is fully voluntary and all data collected will be treated confidentially. The research outputs resulting from this work will only include collated data, without the possibility for anyone to identify your individual answers. The survey does not require you to provide any information that could identify you personally (e.g., your name). If, while completing the survey, you wish to withdraw, please just close the browser without submitting your answers.

By proceeding with this survey you confirm that you are at least 18 years old, have read and understood this consent form, agree to participate in this research study and are happy for your data to be included in our analysis

1. This survey is being conducted as part of the **Erasmus+ Knowledge Alliance in Air Transport (KAAT) Project** funded by the European Union.
2. As part of this research, we are developing a framework of **current and emerging occupations in the aviation sector**.
3. With the use of this survey we aim to:
   - **Identify and validate** the current occupations and competences in the aviation sector.
   - Identify the **needs and roles** in the aviation sector in the next 10 years.
   - Map the learning outcomes of study programmes with the demands of airport labour market in terms of **competences, knowledge and skills**.
4. We are seeking input from employees working in **all areas of the aviation sector value chain** including:
   - Commercial and General Aviation,
   - Airport Operations,
   - Air Navigation Services,
   - Regulatory Functions,
   - Other Transportation Support Activities,
   - and Aviation Training.

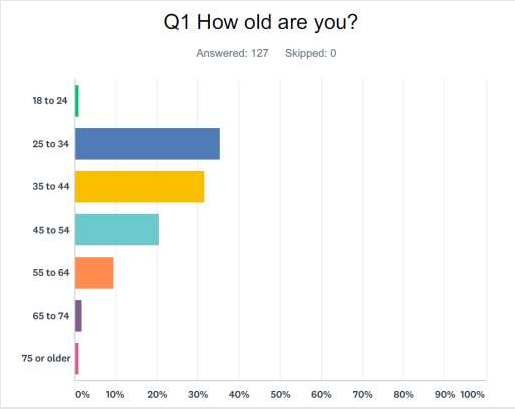
1 BACKGROUND AND EMPLOYMENT

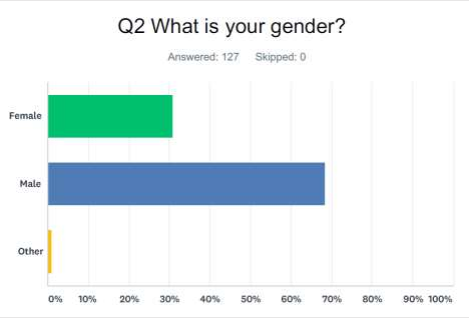
1

Background and employment (Q1-Q8)

Q1: How old are you?
Q2: What is your gender?
Q3: In what country do you work?
Q4: Which aviation sector do you currently work in?
Q5: How long have you been working in your current position?
Q6: What do you like the most about your job?
Q7: What do you like the least about your job?
Q8: Are you currently enrolled as a student (alongside your employment)?

Q1: How old are you?
Q2: What is your gender?



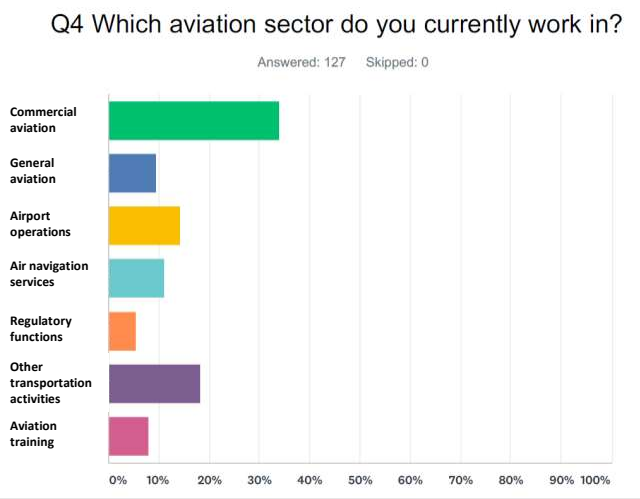


Q3: In what country do you work?

COUNTRY	PARTICIPANTS (IN %)	COUNTRY	PARTICIPANTS (IN %)	COUNTRY *("Other")*	PARTICIPANTS (IN %)
Albania	0.79%	Netherlands	1.57%	Singapore	0.79%
Belgium	1.57%	Norway	1.57%	Qatar	0.79%
Croatia	8.66%	**Portugal**	**14.96%**		
Czech Republic	1.57%	**Romania**	**28.35%**		
France	9.45%	Spain	0.79%		
Germany	7.09%	Switzerland	1.57%		
Italy	**18.11%**	UK	2.36%		

Answered: 127, Skipped: 0

Q4: Which aviation sector do you currently work in?
Q5: How long have you been working in your current position?



Q5: How long have you been working in your current position?

Average: 7.07 years
SD: 7.02
Min: 2 months
Max: 36 years

Q4: Which aviation sector do you currently work in?

Please specify your role

(1/2)

I work in the production planning team for FCS (Fuel and Control Systems Business Unit) in Zodiac Aerospace (now Safran)
manager
engineering
Deputy handling manager - manager for OPS department
First officer
First officer
ATC
senior manager sales and business develompment
External Relations
Aerospace Engineer
R&T
general director
I work on data-packages related to Aircraft simulators.
I am business analyst and account manager for a software editor who provides digital tools to manage airlines operations (flight scheduling, flight watch/OCC, crew scheduling). I am a provider for several european airlines.
EUROCONTROL
the major role is in conception, design, testing and certification of aircraft (rotary and fixed wing) structures
Aviation Lawyer
Specialist for strategical planning and development
Quality, Environment and Safety Technique
Chief pilot DHC8 fleet, Croati Airlines
Captain Examiner
composite laminator
Researcher
Senior Cabin Crew

Operational Control Centre
Aviation Safety Consultant
Teschi grazie, Educator
I work both with commercial aviation and ANS but it was not possible to select two options
Senior Cabin Crew
Ground instructor
hlnk
First Officer
Cabin Crew
commercial assistant
Research and consultancy with focus on Human Factors, safety and related training activities.
Atco
Air traffic controller
Pax area
health and safety expert
Researcher
Researcher
academic researcher
R&TD Engineer
Research program manager in European OEM
Research
Manager
Senior partner in Qualified Entity EuroUSC Italia
Pilot
Head of Section Operational ANS Performance
Airport infrastrutures project manager and airport equipments and systems studies
Powerplant Engineer
responsable of research lab

Q4: Which aviation sector do you currently work in?

Please specify your role

(2/2)

aviation safety research assistant
Training consultant for CRM, Instructors, Examiner training
Head of Health and Human Performance
ACI EUROPE Liaison Officer to EASA
Researcher
research engineer in CNS systems, EMC studies
Air Traffic Manager
Consultant in ATM, Airport and RPAs domains
Logistics & Purchase Director
Captain
Human Factor Consultant and Data Analyst
IT mainly support and maintenance.
Security office
I work for a company that delivers training courses for RPAS Pilots and Higher Education Courses for all the personnel variously involved in the RPAS operations, in Italy and all around the world.
Maintenance
Research, Development & Innovation Management
I work for a company that delivers training courses for RPAS Pilots and High Educational Courses for all the personnel variously involved in RPAS operations, in Italy and all around the world
DCS
Human Factors Consultant
Purser
Expert reviewer in Accounting Department
AIRPORTATION SECURITY
IT Engineer
Safety Manager
internal auditor
internal auditor
Chief of Regulation Office

economist
Commercial department - Network Development and Alliances (Code-share and Interline)
Expert Reviewer I European Funds Office
Cabin crew
cabin crew training assistant manager
HR Officer
General Manager
Senior cabin crew
planning the travels for pilots simulator, offering support regarding accommodation and transfers; arranging transport for ground courses for pilots; operate the positioning for flight crew in the company system (for duty travels) asking for company tickets for flight crew (duty travel-training); creating personal profile in our company operational system; administrating type rating contracts - asking for signatures (bought sides), issuing invoices, archiving; issuing the per diems (allowances) documents after simulator travel and ground courses
R&T international cooperation in aeronautic industry
Engineering
Head of E-Commerce
student
investments
Dispatch
handling sector - station manager
HR Manager
Airport Planning
Contact Center Manager
Handling Manager
Research and Innovation in Aviation
HR
Standardization specialist
Learning and Development Manager- HR Training
Performance engineer

Q6: What do you like the most about your job?

(1/3)

I like working in a cross-functional service which allows me to make lots of solutions to improve the production and satisfy the customer.
The implementaton my ideas into real life.(traffic, airport development)
flexibility
every day is different, you will not get bored
Friendly enviroment, and to be honest the views
Independence, safety relevance, responsibility
The most I like is the opportunity to fly with a lot of experienced pilot from which I can learn many things.
New technologies
operational matters
to be part of aviation industry, to help stakeholders adopt our solutions and benefit from our products and services, to influence sales, to teach young professionals
diversified activity, media relation, wide domestic and international relations range
Manufacturing components for the aerospace industry.
Operations and systems improvements
Development (personal and professional) of others.
To work around flight physics / researchs are interresting
To meet a lot of people found of aviation and to see the different ways to work among the different airlines
Solving problems and improving performance - delivering clear solutions - global impact.
the variety of projects and the complexity of products
Diversity of topics and the chance to apply knowledge in international/EU law
Inovations, working on new solutions
the challenge of meeting customer requirements in the production of parts
Organisation challanges

flying
What i like the most about my job is the fact that i literally make airplane parts from simple flat sheets of thermoplastic composite materials.
challenges
the fact that i get to improve myself as a human being interacting with passengers
Solving problems challenge
Doing research in different projects
Interaction with young people
Leading innovations and societal benefits
work schedule, interactive job, visiting places
Regularity
Dynamic and challenging
fhass
You never stop learning
Flying And Human interaction
Is a non routine job
freedom
Variety and contact with professionals with the most different backgrounds
Earnings
sense of complexity
Everiday we have news experinces.
to deal with preventive and protective activities in accordance with the applicable legislation in force
The multitude of roles one need to assume.
An innovative sector, exiting research challenges
The possibility to broad my knowledge, meet new people and open my mind
Responsibility and change
the dynamism
international contacts
New developments.

Q6: What do you like the most about your job?

(2/3)

Planning
very dynamic evlution of the UAS sector and more in general of the business models, rules and technologies for aviation, boith manned and unmanned
Everything
It is a dynamic environment with a never ending list of things to assess, analyse, and learn.
Different systems and more tecnologic than another in other industrys
challenges to maintain the fleet to the safest standard taking into account business aspects; continuous improvements in internal processes; relations with stakeholders
Innovation
meeting aviation stakeholder from different areas/countries learning new things working in an international environment
To stay in contact with aircrew an pilot problems and contribute to solve them
Responsability of flying passengers to their destinations, safetly
The opportunity to make a difference to enhance the wellbeing of our people and safety of our operation
Improve the current awareness on weather conditions
It covers a wide range of activities and provides frequent opportunities for working with all aviation stakeholders.
Working as well with operational experts as with scientists
Aircrafts & Air Transportation
The fact that I'm dealing with practival actual issues, team working
the heterogeneous activities
the heterogeneous activities
the thrill, continuous learning
Every day with a new challenge
There's always something new you need to understand
Comunication
Working with the PC's
Planning
I like that you have to be always updated about new regulations, considering that the RPAS sector is definitely young and continuously changing, developing and evolving.
challenge

Develop mew ideas for more innovative solutions and lower cost
I like that you have to be always updated about new regulations. The RPAS sector is definitely a young field always changing,developing and evolving.
The possibility to work on new rules an systems for operations with unmanned Aircraft and study their interaction with manned aviation.
Challenge
The technologie
Simulation with pilots and ATCOs. Working environment studies.
Responsabilities
i like the most my job because is not a routine
DISCIPLINE
Regular and Non regular activities
International environment
Airside Operations
Dynamic and challenging environment, sharing tasks, human relationship
working in the airport, interaction with aviation part
the fact that the internal auditing provides value to governing bodies and senior management as an objective source of independent advice
Work environment
Aviation field.
everything
I am involved in the network development. I am in permanent touch with airports where we currently operate and with airports that we might start operating. I like that in my day to day job I work a lot with external partners.
Airport specificity
I like to socialize with people from different cultures
interaction with cabin crew/ givving new informations to new comers
My colleagues
Role in aviation development
Interaction with people
i like the uniqueness of every month, discovering the aviation world, dealing and crating a good connection with the providers, offering details and support to flight crew employees and students, dealing with limit situations

Q6: What do you like the most about your job?

(3/3)

the international aspect of cooperation, the future technologies that will shape the sector, the environmental challenges, the new technologies not aeronautic-specific that will challenge the traditional way things are done in the sector,...
Working on a challenging and demanding global sector
It's dynamic and challenging.
Creative thinking
complexity you have to know every department expectation
Interesting day-to-day situations Problem solving
engaging environment, always having to solve challenging situations; work with people
new challenges every day
multi-disciplinarity & System approach
work with people
Each day is different.
People
Team work
- Soft skills part of the training sector; - assessments activities
Ever changing

Q7: What do you like the least about your job?

(1/3)

Nothing
The politicians interference.
pressure
the roster
Lack of crew meal
Poor planning ion aviation domain
I do not have enough time to spend with my family and friends.
paperwork
shift work
bureaucracy and red tape
stress
The amount of hours and extra-hours.
Customer support
Administration
some parts are really repetitive
Pressure when a bug lead a customer to not completely follow the regulation
Burocracy and political agendas
some delay in awarding the projects by the manufacturers
Administration and lack of sufficient number of aviation lawyers
Repetitive work (monthly statistics)
time pressure
nothing
What i like the least about my job is the fact that it is a bit repetitive.

burocracy
the night flights
Not having problems to solve (routine)
internal administration issues
Bureaucracy
Focus on compliance affects creativity sometimes
people with bad manners
To continue
Boring
zshs
Disruptive schedule
Emergency situations
The stress
Not being fully involved in the design process (but this depends on being an external consultancy)
Extra shifts
distance between operative and management
Incompreention and pax not polite.
The competitiveness aspects.
Nothing in particular
To work 8 hours per day behind a computer, far from my house, with a low salary and few prospectives and certainties
Legacy hurdles
slow progress
Difficult to measure progess that is made due to my efforts.
Notams
... the connected administrative burden
Disrupted scheduling
Tiring hours, long duty days

Q7: What do you like the least about your job?

(2/3)

Political agendas impairing real change in our (European) air transport industry.
Burocracy
Unfortunately the industry is still driven by the occurrence of events, so it is still mainly reactive
burocracy
the administrative burden
The unreasonable pressures in training time that operator's put forward and the little interest they have in quality and effective training
Airport facilities
The workload is very high
People don't believe we can forecast weather!
Too many meetings.
Finding money for research activities
Regulation
I would like to be given more responsabilities on research or studies axis and management
Sometimes you don't see the results
Nothing
when there are overdue debts with suppliers
payroll
There's always something new you need to understand
I can not say yet
Time is wasted
I do not like the stringent regulation the RPAS sector is submitted to and the fact that there is no mutual recognition of the Title between the EU countries. All this burocracy, in fact, risks to stop the development of this innovative field.
Not being able of giving an immediate response
Of uncertainty as to whether the solution is adequate
I do not like the stringent regulations the RPAS sector is actually submitted to and the fact that, at present, there is still no mutual recognition of the Titles between different EU countries. All this burocracy risks to stop the development of this interesting sector.
The time it takes
Collaboration with the industry because most of the time is not done as it should be (most of the time the industry stays in research projects not for reaching the project objectives but for pursuing other interest)

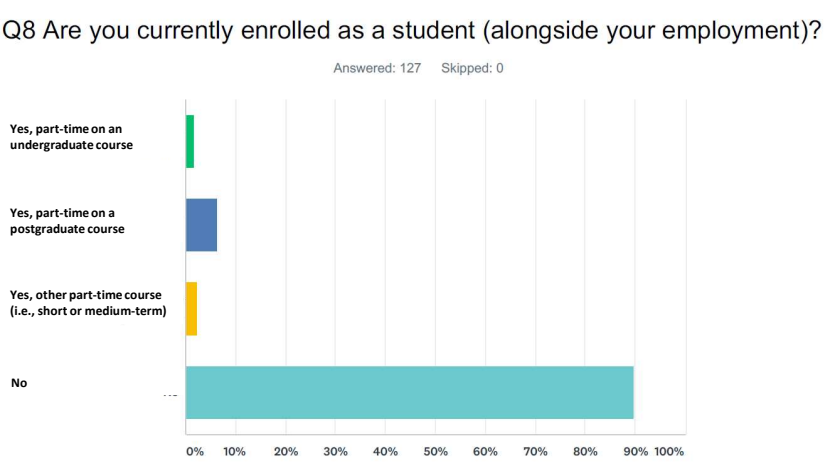
Low consideration we receive
i don t like when legislation is modified too often
THE FACT THAT MORE ENTITIES HAVE COMPETENCE TO ASSURING SECURITY ON AIRPORT
Opportunity
salary
Airport equipment operations.
.
working in the office, accountancy
bureaucracy
I haven't figured it out yet
I didn't think about it.
everithing
The lack of communication between departments (internally)
I have no idea
Flights delayed
Not enought time to spend with the Cabin Crew to explain more aviation procedures and terminology
My manager
Too much papers
Delayed flights
that we don`t have training for learning how to operate systems and to improve our skills that we don`t have a performance evaluation system
the time-consuming negociations to reach cooperation agreements
n/a
Paperwork
slow changes
-
Ad-hoc flights
odd hours, no break even on holidays, the fact that it is harder and harder to find people interested to work under stressful situations and with medium pay

Q7: What do you like the least about your job?

(3/3)

staff fluctuation
Little flexibility
stress
salary
Bureaucracy
Job is not very mind demanding
To give negative feedback. In general , our employees do not perceive a feedback like a gift, but as a reprimand, something wrong-aspects that may momentarily damage and unbalance the relationship.
Stress

Q8: Are you currently enrolled as a student (alongside your employment)?



TYPE OF COURSES:

- Engineering mechatronics
- Data analytics & machine learning
- Doctoral studies in EU law
- Management Engineering
- AI
- MSc in human computer interaction and e-learning
- Online flying car nano degree (Udacity)
- Bachelor in Economics
- PhD in Transportation Systems
- IRM
- Security management
- Administration

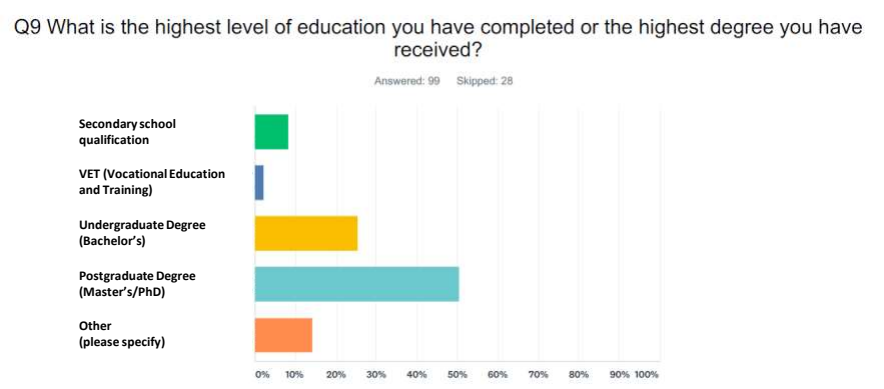
2 EDUCATION AND TRAINING

2

Education and training (Q9-Q18)

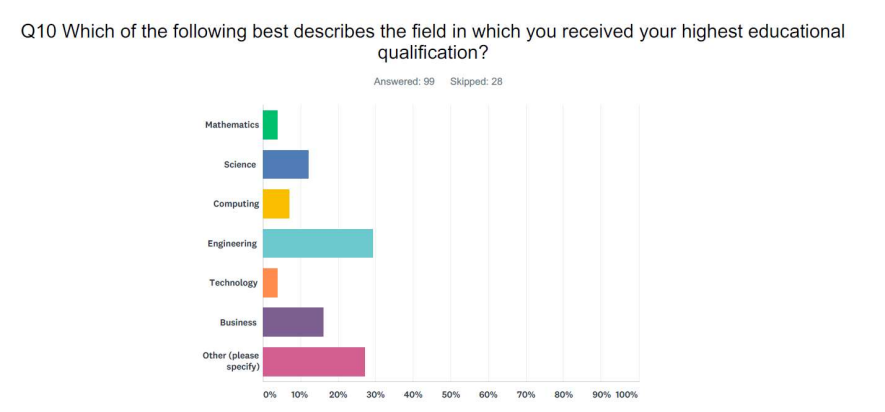
Q09: What is the highest level of education you have completed or the highest degree you have received?
Q10: Which of the following best describes the field in which you received your highest educational qualification?
Q11: How relevant were the competences acquired during your education to your first role in the aviation sector?
Q12: Apart from your main educational qualification, what other specific or specialised certification/accreditation have you acquired, if any?
Q13: How helpful was the initial training you received from the organisation you work for when you started your job?
Q14: How often do you receive training in the organisation you work for?
Q15: I am satisfied with the investment the organisation I work for makes in training and education.
Q16: In your opinion, who should be responsible for providing training in the following competence areas?
Q17: If you could choose, what new training courses or topics would you consider valuable/essential for your current occupation?
Q18: Do you have a preference for how this training should be delivered?

Q09: What is the highest level of education you have completed or the highest degree you have received?



OTHER (14%):
- *College graduate:* **1%**
- *Master's degree:* **7%**
- *PhD:* **4%**
- *Faculty licence*: **1%**
- *Unspecified:* **1%**

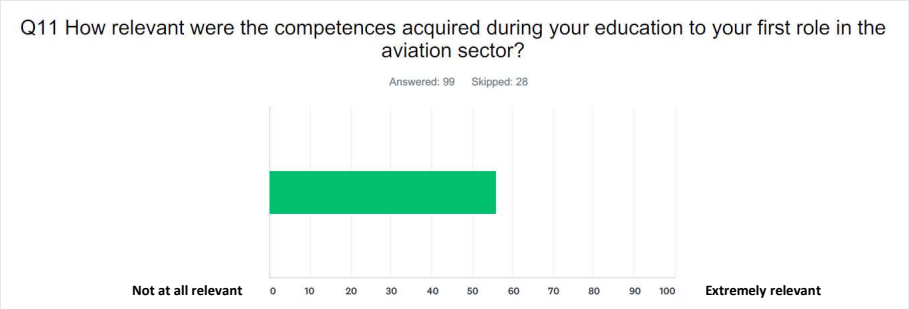
Q10: Which of the following best describes the field in which you received your highest educational qualification?



OTHER (27%):

- *Psychology, Human Factors, HR, Human Sciences, Humanities:* **9%**
- *Communication, Foreign languages, Philology:* **4%**
- *British Literature, Classics, Fine Art:* **3%**
- *Economy, Tourism, Tourism Economy:* **4%**
- *Law:* **3%**
- *Aerospace Engineering, Aviation, Air Transport Management:* **3%**
- *Joint science, engineering & technology:* **1%**

Q11: How relevant were the competences acquired during your education to your first role in the aviation sector?



Q12: Apart from your main educational qualification, what other specific or specialised certification/accreditation have you acquired, if any? (1/2)

IATA Fares an Ticketing
highschool degree for telecommunications networks
Computer Science
Basic ATCO Training, Project management
I graduated the Romanian Civil Aviation Academy.
project management at Stanford, 1A training
ICAO / ACI International Airport Professional certification
Order of Engineers
Finances (DESS) Business & Strategy (MBA)
Post graduate teaching certification
CAP - Electrician in aeronautics BAC pro - Electrician in aeronautics BTS - Technician in aeronautics
project management
Numerous trainings provided by EASA, IATA etc.
Lot of courses and seminars
safety training, quality and environment management system, national legislation, practical training in client tools
No
instructor and examiner
Specialised course in graphic design
none
cabin crew instructor, customer care trainer, CRM instructor.
Comercial Pilot License

none
None
Specialized aircraft type certification training and courses. Specialized regulation courses. Project management, leadership and innovation courses
first aid certificate,certificate for digital competences
EUROCONTROL Safety assessment
Self defense instructor
Air traffic control certification
postgraduate diploma in safety and health at work
Signal processing master
No certification
PM certificates, Strategy and Steering courses
CPL/MEP/IR.
Flight Test Engineer Project Manager
None
Air Transport Pilot License
None
-
ATPL training and licence
Comercial Pilot
I have participated in various training programmes of ACI.
Accreditation with EAAP
Instructor & Auditor
Not any
ATC - Instructor - Assessor - Inspector - Examiner - Trainer
business focused trainnings and diplomas
Aviation specific certification
engeeniering
none

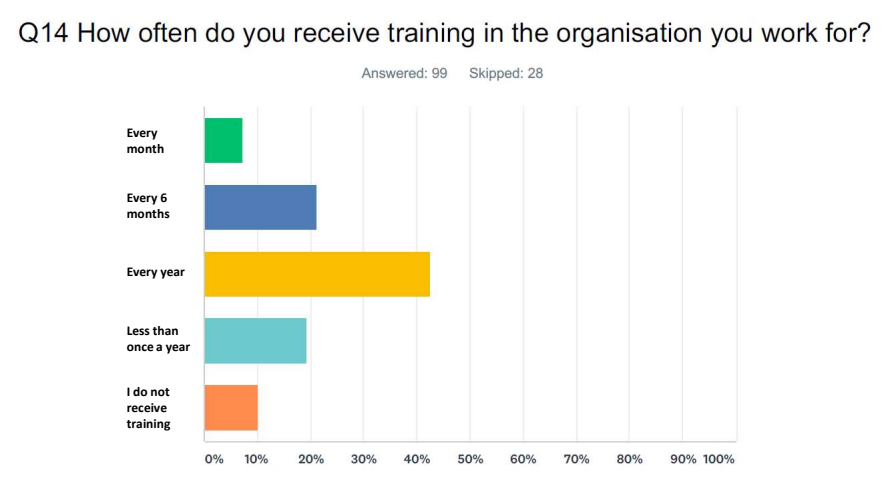
Q12: Apart from your main educational qualification, what other specific or specialised certification/accreditation have you acquired, if any? (2/2)

Security. Safety. Handling
Electronics
RPAS Theory Ground Course
Graduate in innovation and environment Certification in airport operations
English speaking
Business
Foreign languages
Certification for Win-mentor Accounting program Certification for Human resources analyst
It Security consultant and IT aduditor
Autodesq 2014 designer
Flying Instructor Certificate
economics and law degree certified financial auditor personal development coach
public procurement, risk management
Certifications in aviation.
n/a
IATA - DG/ SMS ONLINE/ AVIATION BASIC PROCEDURES EUROPEAN STUDIES AND INTERNATIONAL RELATIONS
European Funds Expert Reviewer
Informatics certification
A lot of specific aviation courses
Informatics certification
Carrier counselor
digital disruption training, public-private partnership training, accounting training
CSEP (Certified Systems Engineering Professional) from INCOSE
specialised courses - reservation system, communication skills, management skills and similar
Flight training as a part of university program
trainer qualification commercial knowledge
n/a
Pilot license

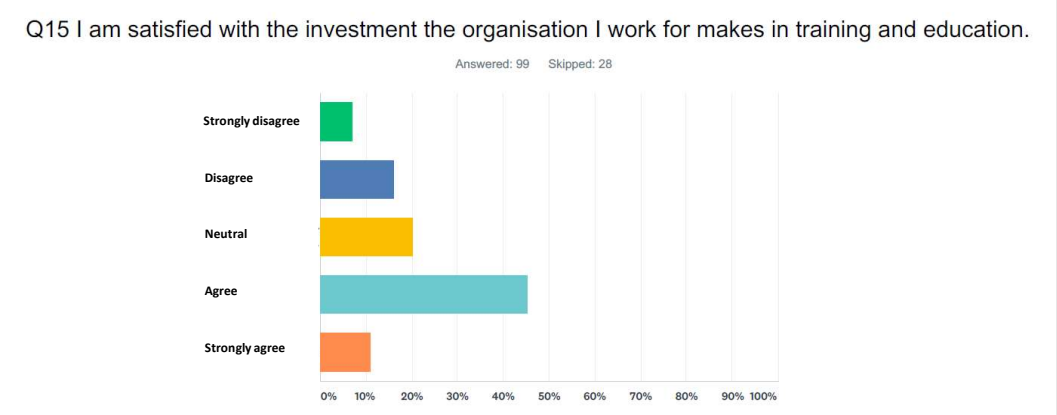
Contact Center Academy
I don't have any
CNFPA authorization; Financial advisory - master Trainer
IT

Q13: How helpful was the initial training you received from the organisation you work for when you started your job?

Q14: How often do you receive training in the organisation you work for?

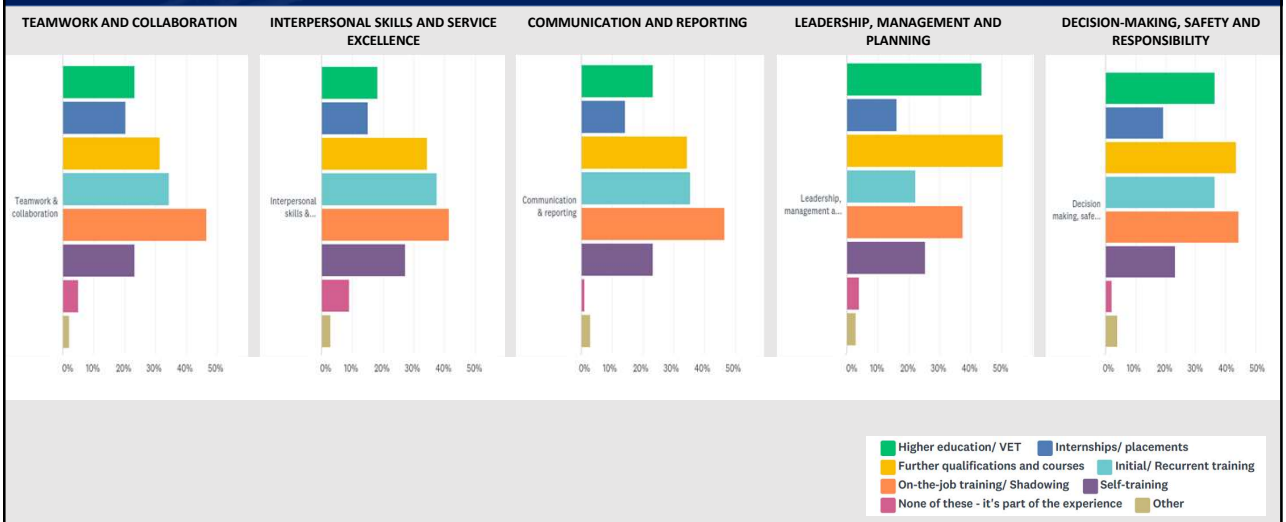


Q15: I am satisfied with the investment the organisation I work for makes in training and education.



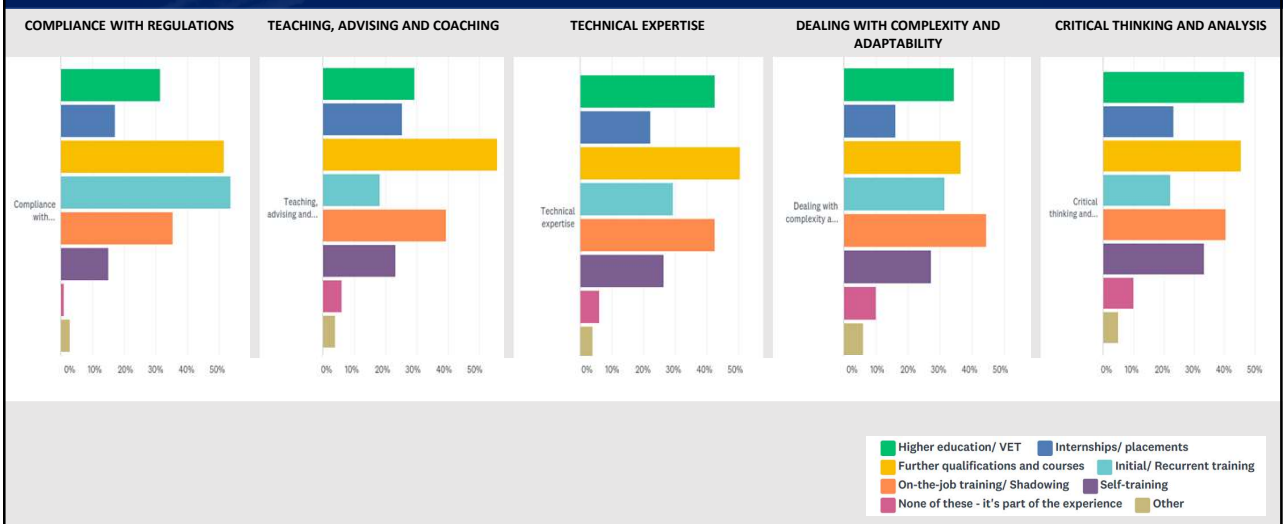
Q16: In your opinion, who should be responsible for providing training in the following competence areas?

(1/2)



Q16: In your opinion, who should be responsible for providing training in the following competence areas?

(2/2)



Q17: If you could choose, what new training courses or topics would you consider valuable/essential for your current occupation?

(1/2)

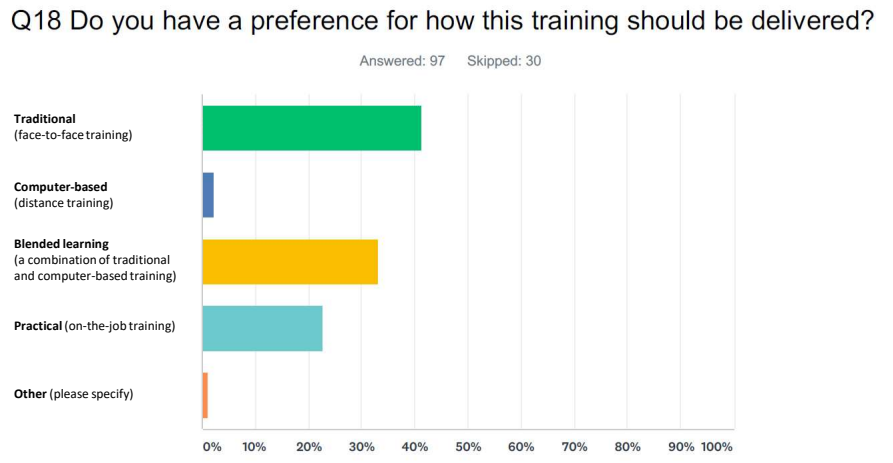
Meteorology	Technical Purchases
management training	Aviation Safety
System Engineering	Machine Learning and Data Science applied to aviation/air traffic management
Complex systems, systems of systems, resilience, cyber security, social and humanities, agile development, change management	learning linux
sales relative	Risk management
More time critical scenarios in sim sessions	I would like to have more training about the EASA new regulation and the way of participating to European Projects (applications, reporting periods...)
First aid, recurrent training	Management of projects Leader of teams and management of time
Stress management	Management
office 365	Enginering
Statistical thinking	More first aid and emergency procedures training
Statistics	Deep Description of IT application in aviation CUTE and CUPPS
risk and safety management resilience engineering in complex sociotechnical systems	Safety Training Courses
audit of conformity in the field of security and health at work	Compliance Monitoring
Group leadership Project development and management	Recurrent Training
How to apply semantic technologies for improved information exchange in the aviation sector	financial planning and analysis
New technologies and digital revolution	aviaton safety
At my age: none anymore.	Human factors course and Leadership, management and planning course.
Refreshment courses about updates on legislation	Passenger Proration, Airline Business Foundations, International Air Law
Thoughtful disagreement in a meritocracy	ABILITIES IN HANDLING PAX REQUESTS AND HANDLE DIFFERENT SITUATIONS THAT CAN ARISE AT WORK. DEVELOP OF COMMON SENSE TO BE USE AND BASED ON EXPERIENCE
Pure engineering training and commercial/operations workshops to understand the impact of actions on the company	Project manager
Human Factors	Customer care
none	Customer care training
Fatigue efect in aviation	communication and reporting, critical thinking and analysis, planing training for operator flight system
Principles of European Rulemaking Compliance Monitoring	Artificial intelligence, Machine Learning, Big Data
Dissemination and transfer of knoledge	Design for Safety Facilitation Interdisciplinary skills Life Cycle skill Concept Development and Experimentation
Aviation industry trends for the futur	e-commerce courses/academy
Foreign languages	Really don't know
management	

Q17: If you could choose, what new training courses or topics would you consider valuable/essential for your current occupation?

(2/2)

New trends in airport operation.
I would like more to work on other bigher stations to earn like this more experience
CRM
none
Group meeting/team building.(to prevent critical situations and sharing your experience with others)
IT systems, emotional inteligence
Coaching
Composite and Lean Manufacturing
Leadership
Training in diversity and unconscious bias
Machine learning
Conflict management, Crisis management, Fighting resistance to change
Project Management and some technical aspects
Multidisciplinary courses aiming to provide training in both law and technical part of legislation
Statistical methods, SQL tools
aeronautical culture, quality tools
Managment training
regulation
Hand layup technics
Project Management
joined communication trainings with all departments involved in operation.
negotiation training
coaching
foreign languages
IATA
Coaching
Quality managment
Aviation and HR assessments tools
Autocad

Q18: Do you have a preference for how this training should be delivered?



3

COLLABORATION WITH EDUCATIONAL INSTITUTIONS

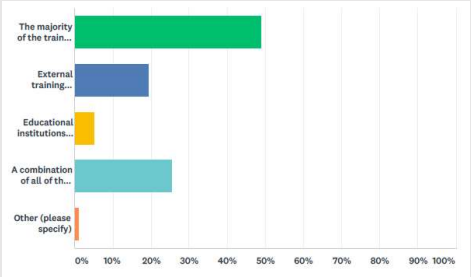
3

Collaboration with educational institutions (Q19-Q23)

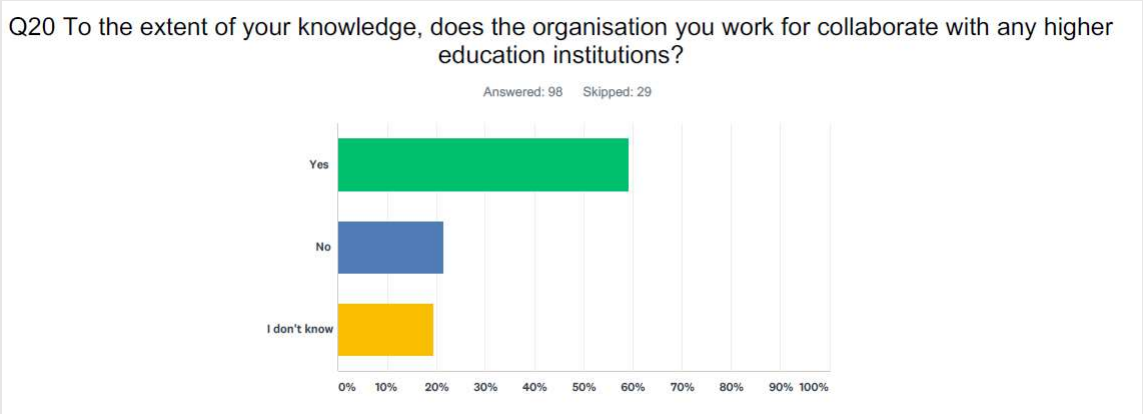
Q19: To the extent of your knowledge, who are the main training providers at the organisation you work for?
Q20: To the extent of your knowledge, does the organisation you work for collaborate with any higher education institutions?
Q21: Are there representatives of educational bodies in the organisation you work for (e.g., in an HR or a training department, or in the board of directors) in order to ensure the match between the competences and the requirements of the aviation industry?
Q22: If so, in what way does the organisation you work for collaborate with educational institutions?
Q23: Overall, how effective do you think educational institutions are in preparing students for the requirements of their future occupations in the aviation sector?

Q19: To the extent of your knowledge, who are the main training providers at the organisation you work for?

ANSWER CHOICES	RESPONSES	
The majority of the training is provided internally	48.98%	48
External training providers (private organisations)	19.39%	19
Educational institutions (private or public)	5.10%	5
A combination of all of the above	25.51%	25
Other (please specify)	1.02%	1
TOTAL		98



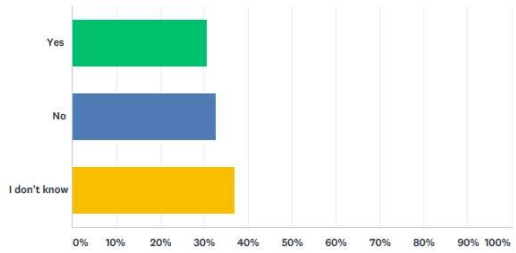
Q20: To the extent of your knowledge, does the organisation you work for collaborate with any higher education institutions?



Q21: Are there representatives of educational bodies in the organisation you work for in order to ensure the match between the competences and the requirements of the aviation industry? (1/2)

Q21 Are there representatives of educational bodies in the organisation you work for (e.g., in an HR or a training department, or in the board of directors) in order to ensure the match between the competences and the requirements of the aviation industry?

Answered: 98 Skipped: 29

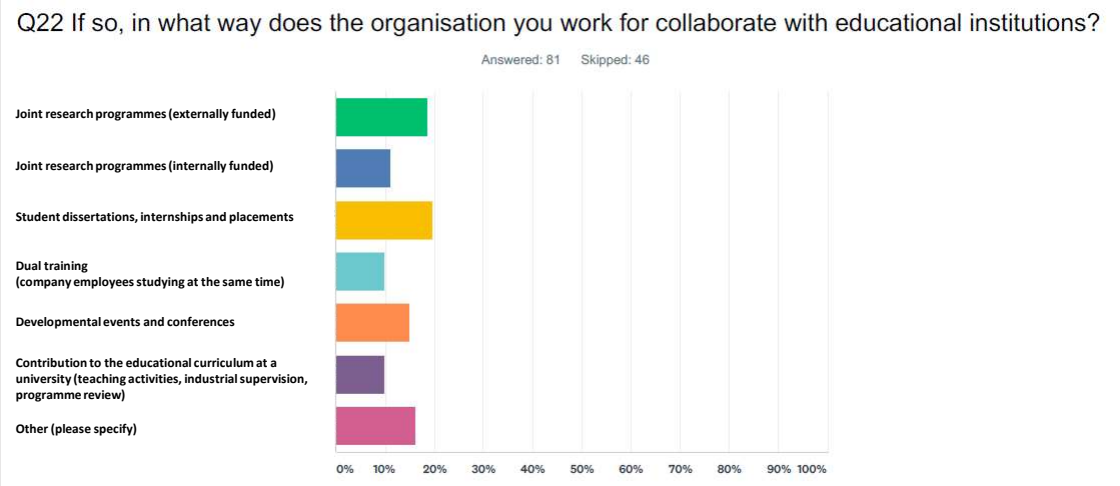


Q21: Are there representatives of educational bodies in the organisation you work for in order to ensure the match between the competences and the requirements of the aviation industry? (2/2)

If "YES", please provide more information …

to certain extend, it is not a universal law
We have a really well structured department around this area since we have deleguation from the regulation and we can have audits and we also have to audits our suppliers
some trainnes
Human Resources Technicians, Recruitment Technicians
Representatives from universities are involved in our strategic decisions e.g. Norwegian University of Science and Technology and University of Oslo
Partners working with University
But process if more bottom-up, training are provided according to the needs of the people from the company.
EuroUSC Italia is a SME. We discussed in the BoD which competencies are needed and how our colleagues could achieve them
This is mostly tackled as part of the contract bidding process.
People director sits in the board of directors
I work in a research lan that is attached to a high school
Our Senior Partner cooperate with some important training organizations in the field of aviation, like for example the JAA-TO
Exist a training department and every year did the analysis of training per worker is made
Training programs are coordinated with regulations and requirements.
all areas are interconnected, trainers have a good knowledge of the procedures and end product

Q22: If so, in what way does the organisation you work for collaborate with educational institutions? (1/2)

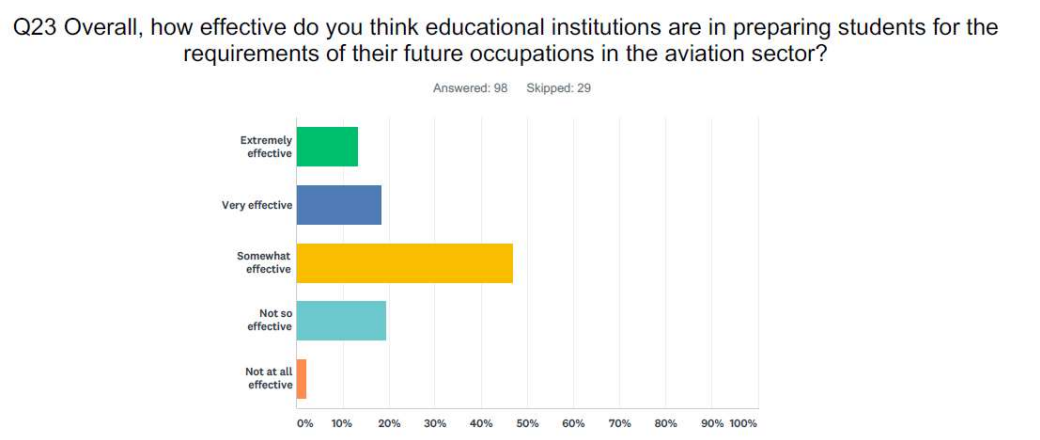


Q22: If so, in what way does the organisation you work for collaborate with educational institutions? (2/2)

If "other", please specify …

I dont know
My company is in a partnership with ENAC school, to allow students to work on our software. We also teach some airlines process with the help of our software at ENAC school. We receive internship and we ask professors recommendations when we want to employ a junior engineer among graduated students. There were also similar partnerships with Engineering School of Geneva and EPFL in the past, not anymore active currently.
None
All of the above
they don't collaborate with educational institutions
All of the previous (except the last one).
I do not know.
see previous
combination of all of the above
Are there no representatives of educational bodies in the organisation I work for.
Not sure
I work in educational institution.
i don't Know

Q23: Overall, how effective do you think educational institutions are in preparing students for the requirements of their future occupations in the aviation sector?



4 KEY COMPETENCES

4

Key competences (Q24-Q28)

Q24: Out of the following competences, how important do you feel they are for your current occupation within the aviation sector?
Q25: In the past 5 years, has the importance of these competences stayed the same, increased or decreased?
Q26: In the next 10 years, do you think the importance of these competences will stay the same, increase or decrease?
Q27: Please list any other competences that you consider essential for your occupation.
Q28: How effectively do you feel your skills are applied in your current occupation?

Q24: Out of the following competences, how important do you feel they are for your current occupation within the aviation sector?

	NOT IMPORTANT	FAIRLY IMPORTANT	VERY IMPORTANT	N/A	TOTAL	WEIGHTED AVERAGE
Teamwork and collaboration	1.05% 1	4.21% 4	94.74% 90	0.00% 0	95	2.94
Interpersonal skills and service excellence	1.05% 1	15.79% 15	82.11% 78	1.05% 1	95	2.82
Communication and reporting	1.05% 1	12.63% 12	86.32% 82	0.00% 0	95	2.85
Leadership, management and planning	1.05% 1	23.16% 22	74.74% 71	1.05% 1	95	2.74
Decision-making, safety and responsibility	2.11% 2	18.95% 18	76.84% 73	2.11% 2	95	2.76
Compliance with regulations	5.26% 5	17.89% 17	73.68% 70	3.16% 3	95	2.71
Technical expertise	3.16% 3	29.47% 28	65.26% 62	2.11% 2	95	2.63
Teaching, advising and coaching	6.32% 6	43.16% 41	48.42% 46	2.11% 2	95	2.43
Dealing with complexity and adaptability	0.00% 0	28.42% 27	71.58% 68	0.00% 0	95	2.72
Critical thinking and analysis	0.00% 0	24.21% 23	73.68% 70	2.11% 2	95	2.75

Q25: In the past 5 years, has the importance of these competences stayed the same, increased or decreased?

	DECREASED	STAYED THE SAME	INCREASED	TOTAL	WEIGHTED AVERAGE
Teamwork and collaboration	6.32% 6	44.21% 42	49.47% 47	95	2.43
Interpersonal skills and service excellence	12.63% 12	43.16% 41	44.21% 42	95	2.32
Communication and reporting	6.32% 6	46.32% 44	47.37% 45	95	2.41
Leadership, management and planning	9.47% 9	50.53% 48	40.00% 38	95	2.31
Decision-making, safety and responsibility	9.47% 9	45.26% 43	45.26% 43	95	2.36
Compliance with regulations	5.26% 5	43.16% 41	51.58% 49	95	2.46
Technical expertise	15.79% 15	45.26% 43	38.95% 37	95	2.23
Teaching, advising and coaching	11.58% 11	51.58% 49	36.84% 35	95	2.25
Dealing with complexity and adaptability	6.32% 6	38.95% 37	54.74% 52	95	2.48
Critical thinking and analysis	8.42% 8	49.47% 47	42.11% 40	95	2.34

Q26: In the next 10 years, do you think the importance of these competences will stay the same, increase or decrease?

	WILL DECREASE	WILL STAY THE SAME	WILL INCREASE	TOTAL	WEIGHTED AVERAGE
Teamwork and collaboration	4.21% 4	38.95% 37	56.84% 54	95	2.53
Interpersonal skills and service excellence	5.26% 5	41.05% 39	53.68% 51	95	2.48
Communication and reporting	4.21% 4	40.00% 38	55.79% 53	95	2.52
Leadership, management and planning	5.26% 5	45.26% 43	49.47% 47	95	2.44
Decision-making, safety and responsibility	3.16% 3	41.05% 39	55.79% 53	95	2.53
Compliance with regulations	4.21% 4	44.21% 42	51.58% 49	95	2.47
Technical expertise	7.37% 7	42.11% 40	50.53% 48	95	2.43
Teaching, advising and coaching	10.53% 10	42.11% 40	47.37% 45	95	2.37
Dealing with complexity and adaptability	3.16% 3	32.63% 31	64.21% 61	95	2.61
Critical thinking and analysis	3.16% 3	40.00% 38	56.84% 54	95	2.54

Q27: Please list any other competences that you consider essential for your occupation. (1/2)

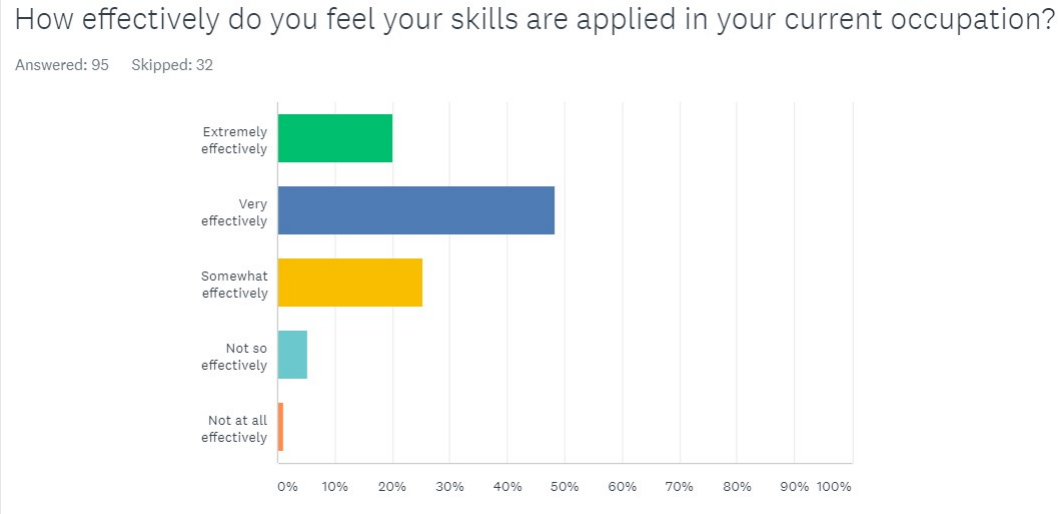
sensitive to human thinking for management of people
Work under pressure
None
N/A
calm balance coherence honesty intelligence
Aerospace Industry culture for all company members.
Strategy
Systems and automatics
Creativity
na
Knowlegde of applicable legal framework
Statistical methods
Computer knowledge
none
thinking out of the box
Awareness
Most important is critical thinking and analysis skills
Abilità to link simulation and mesurements
Multicultural aspects, virtual collaboration
linguistic competence
Multitasking
Pay attention on details
Resilience, risk assessment

Love for your own job
-
None.
English language
Common sense
intercultural communication and negotiation
leadership, interpersonal skills, communication, technical experties
Networking / Stakeholder management
N/A
Business development
Regulatory understanding and implementation
empathy
honesty and fairplay. Able to adapt to evolving situation and conditions
none that i can think of
critical thinking
patience
Curiosity and Updating
Management of teams and time to execute the actions
Awaerness of international devlopments
Formation
Punctuality
n/a
english, airport security, aviation safety
consulting activity
I don't know.
I have no idea
COMMUNICATION, DECISION TAKEN, IMPROVE THE QUALITY OF THE CABIN CREW

Q27: Please list any other competences that you consider essential for your occupation. (2/2)

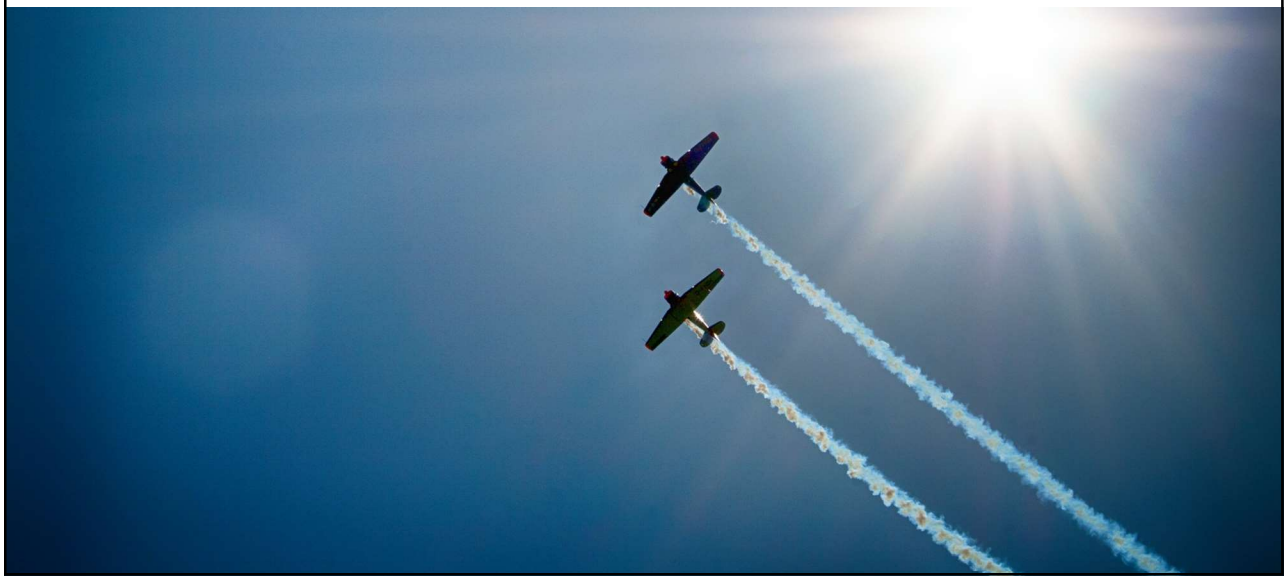
digital approach, digital thinking, quantitative decision making
Influence and trust others Foster open two-way discussions and views Understand and manage change Understand what my work means within the organization Systems Thinking
Adaptability
Definetly above are all competetences that we require
foreign language interpersonal skills
n/a
System engineering
x
Complex problem solving Persuasion
None
.
Communication

Q28: How effectively do you feel your skills are applied in your current occupation?



5

NEW AND EMERGING OCCUPATIONS

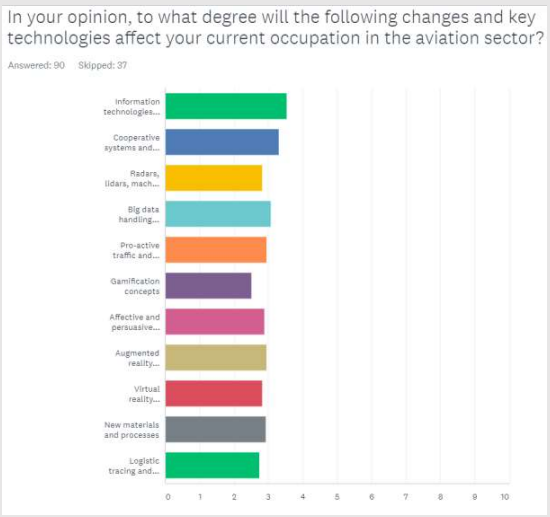


5

New and emerging occupations (Q29-Q32)

Q29: In your opinion, to what degree will the following changes and key technologies affect your current occupation in the aviation sector?
Q30: Which occupations do you think are going to drastically change or disappear by 2030?
Q31: What new occupations do you expect will be created in the organisation you work for in the next 10 years?

Q29: In your opinion, to what degree will the following changes and key technologies affect your current occupation in the aviation sector?



	NOT AT ALL	A LITTLE	A MODERATE AMOUNT	A GREAT AMOUNT	I DON'T KNOW	TOTAL	WEIGHTED AVERAGE
Information technologies and telematic applications	1.11% 1	10.00% 9	22.22% 20	65.56% 59	1.11% 1	90	3.54
Cooperative systems and interfaces	4.44% 4	10.00% 9	30.00% 27	47.78% 43	7.78% 7	90	3.31
Radars, lidars, machine vision and innovations in object recognition	14.44% 13	17.78% 16	23.33% 21	31.11% 28	13.33% 12	90	2.82
Big data handling methods	4.44% 4	21.11% 19	32.22% 29	36.67% 33	5.56% 5	90	3.07
Pro-active traffic and incident management algorithms	10.00% 9	20.00% 18	24.44% 22	36.67% 33	8.89% 8	90	2.96
Gamification concepts	16.67% 15	14.44% 13	28.89% 26	12.22% 11	27.78% 25	90	2.51
Affective and persuasive interfaces	11.36% 10	14.77% 13	25.00% 22	28.41% 25	20.45% 18	88	2.89
Augmented reality interfaces	13.33% 12	13.33% 12	23.33% 21	35.56% 32	14.44% 13	90	2.96
Virtual reality interfaces	15.73% 14	15.73% 14	22.47% 20	32.58% 29	13.48% 12	89	2.83
New materials and processes	13.33% 12	18.89% 17	21.11% 19	38.89% 35	7.78% 7	90	2.93
Logistic tracing and tracking	14.44% 13	20.00% 18	27.78% 25	26.67% 24	11.11% 10	90	2.75

OTHER:

- *Machine learning; Aircraft regulations; modelisation enhancement;*
- *UAS technology and services;*
- *Systems Engineering, Machine Learning, Cybersecurity*

Q30: Which occupations do you think are going to drastically change or disappear by 2030? (1/2)

passenger handling
Manual labour in some fields (eg agricultural)
None. Many have been said to disappear already in the 1960ies which are still there, however in achnaged manner.
Many people will be affected by advanced technology.
those that can be easily superseded by technology/robots
ground controller handling agent
N/A
Low added value occupation
Systems Propulsion IT services around aeronautics Personnal mean of transport (automatic cars / drones cars / taxis)
Flight deck crew members. Post flight data ingest - Post flight check people. Flight Dispatchers.
lauyer
-
Manual work
Documentation offices
First officer
none
Sales dept changing all to online
no idea
Painting
Engineering, use of social science
any job that could be replaced by a computer or a machine
reduced number of ATC sectors
Pilot, flight dispatcher, atco

I do not know at which degree, but piloting and controlling aircraft will be affected by a drastic transformation
Non critical applications. "Button pushers" Field experts. High responsibility, yet simple task occupations.
Not disappear, but change: service provision
Don't know
-
I do not know.
Pilots
None
Business intelligence (will be embedded in each organizational unit) and communication related jobs (technology revolution).
In aviation there will still be more or less the same amount and types of occupation, as automation will take longer to replace the human (compared to road industry)
secretaries will probably disappear
Don't know
Airport Security, many terminal flow related activities due to automation stand allocation etc.
Administrative careers where computers will take over.
air plane pilots, car drivers
generally "the archivist", in the aviation world, Pilots and Air Traffic Controllers will mainly change their roles and responsibilities
pilots
Check-in agents
I don't now. I thing, the occupations with hands are going disappear
handling
Cabin crew
I don't know
air traffic controller pilots travel agents accountants paymasters
ramp handling operators
None.
I have no idea
CHECK-IN COUNTERS, PLANNING OF CABIN CREW ROSTERS,

Q30: Which occupations do you think are going to drastically change or disappear by 2030? (2/2)

Commercial seller
administrative ocupations
repetitive works, activities where calculation is central (computers/Artififical intelligence will do it better), activities not involving creativity, isolated activities, knowledge based activities (knowledge will become a comodity)
Those ones related to administrative roles or supporting functions
Don't know
In aviation: maybe less physical work (baggage)
anything that can be taken over by computes/robots
loader, check in agent
Manual handling, data processing, BackOffice functions
translators
Airline Crew merbers (PIC, flight crew)
Flight preparation engineer
I have no ideea
Classic sales job

Q31: What new occupations do you expect will be created in the organisation you work for in the next 10 years?

(1/2)

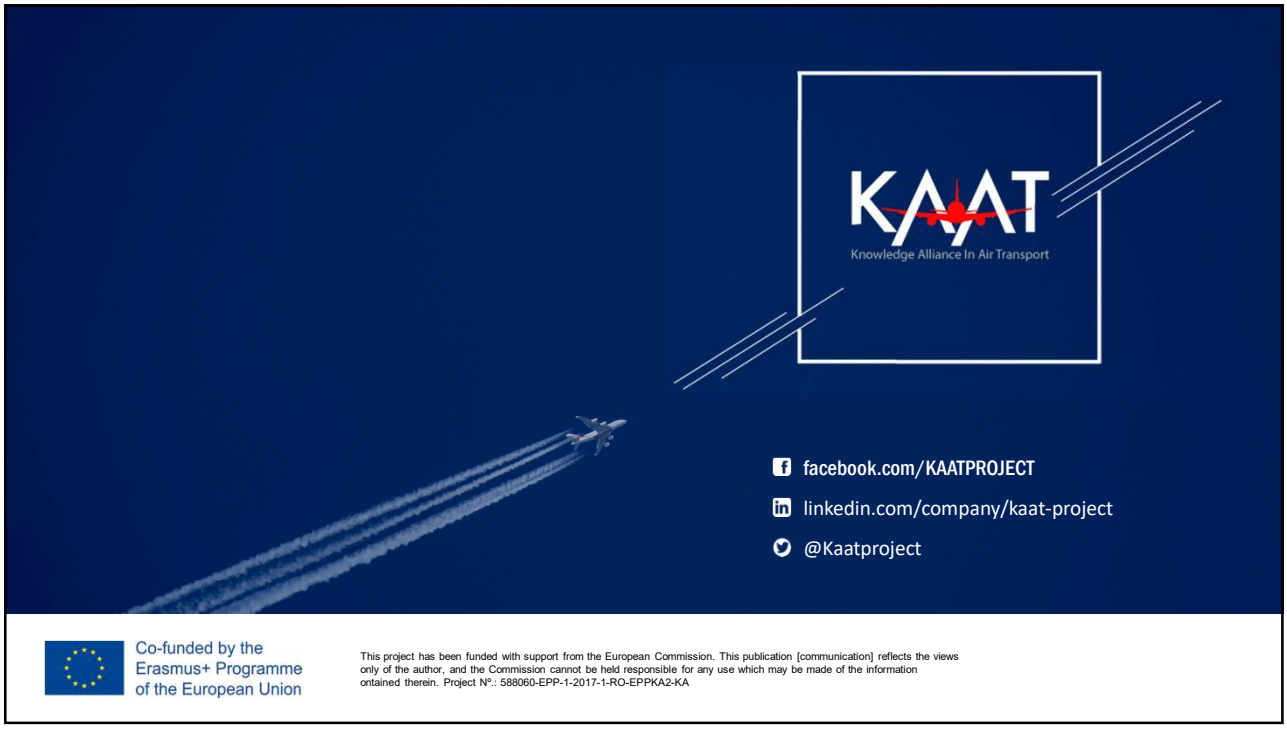
Automation (industry 4.0) Staff
Considerable growth of the company and staff needed
None
N/A
VR managers, complex BD/sales staff, ancillary revenue developers
reputation manager
IT techs
Chief engineer of one Airbus program
Aircraft IT security managers. Operational research and IT algorithm experts. On ground pilots.
IT services
Some kind of subspecialisation for drones and their integration in ATM
Process management, BI and AI and machine learning experts, robot maintenance
fund offices
dont know
a department of trainers training future trainers
New IT related occupations
none.
Improving of use of new technologies
Virtual reality, AI
I don't think the company will create new positions in the next 10 years, since the organisational structure already coveres its necessities
Remote TWR operator

Q31: What new occupations do you expect will be created in the organisation you work for in the next 10 years?

(2/2)

I do not know, but management of traffic will increase its importance compared to control traffic
None.
Positions related to automation and robot control
-
In my organisation: I do not know.
safety managers
None
web technologies and visualization, interface design for seamless office communication and technical collaboration
Big data is already big, but there will be a greater and greater focus in it, especially in the high cost parts of the business (e.g. logistics); augmented reality tools for engineers working with their hands on the aircraft
recruitment of more IT security experts, AI experts, big data experts
Don't know
occupation dealing with analysis of big data for smoother operational processes and improvements in capacity bottlenecks
More focus on human factors
market analysts, organizational analysts, new flight pilots and technicians with different profile.
surveillance occupations
No new occupations but many current occupations will change their role
don't know
Maybe someone dealing with new tools for the application of SORA (a new Operational Risk Assessment) methodology.
Handling controllers
I don't now
system integrator
aviation safety auditor
virtual assistant media specialist business architect

Same as in present
Some on the Safety Area and Data Operators.
I have no idea
MORE INSTRUCTORS AND EXAMINERS FOR THE CABIN CREW
operating high technology systems and offering maintenance
creative thinking activities, collaborative activities, multidisciplinary activities (mix of hard sciences and soft sciences), emotion-based management, ...
Cyber-security experts Safety Officers for Unmanned Systems Concept Developers Integrators Experts on integrative methods and tools
Occupations dealing with digital technology
Really don't know
n/a
no idea
System analysts
experts in informatics
NONE
e-documentation specialist
...
VR simulation



Co-funded by the Erasmus+ Programme of the European Union

This project has been funded with support from the European Commission. This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information ontained therein. Project Nº.: 588060-EPP-1-2017-1-RO-EPPKA2-KA