

# PLANE

PROMOTION OF LEARNING IN AVIATION  
TECHNOLOGY NETWORKS IN EUROPE



Report: Evaluation on accordance of EASA modules  
with competence based approaches of  
technical vocational education and training

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Chair and Institute of Industrial Engineering and Ergonomics  
Department for Technical Vocational Education and Training

Prof. Dr. phil. Dipl.-Ing. Martin Frenz

Lutz Thelen

Maren Klöckner

Bergdriesch 27 D-52056 Aachen

Phone: (+49)241 8099440

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**PLANE – Promotion of Learning in Aviation Technology Training  
Networks in Europe**

**Report**

**Evaluation on accordance of EASA modules with competence  
based approaches of TVET: intellectual output no 3**



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## IV List of abbreviations

CAT A / B	CAT A = Line Maintenance Certifying Mechanic; CAT B = Maintenance Certifying Technician Mechanical/Avionical
DQR	Deutscher Qualifikationsrahmen = German Qualification Framework
EASA	European Aviation Safety Agency
EQAVET	European quality assurance in vocational education and training
EQF	European Qualification Framework
ERASMUS	<b>Eu</b> Ropean Community <b>A</b> ction <b>S</b> cheme for the <b>M</b> obility of <b>U</b> niversity <b>S</b> tudents
IAW	Chair and Institute for Industrial Engineering and Ergonomics of the RWTH Aachen University
JAA	Joint Aviation Authorities
JAR	Joint Aviation Requirements
LBA	Luftfahrt Bundesamt
NQF	National Qualification Framework
VTC	Vocational training center



# 1 Project description

The project can be classified as a strategic partnership to support innovation including intellectual outputs. It is located in the area of vocational training in aviation technology. This area is currently and in the foreseeable future characterized by strong growth, which is reflected in a growing demand for well-trained technical personnel.

Although the European Aviation Safety Agency (EASA) has established an overarching binding training framework for all 28 member states, there are strong differences in the concrete implementation at national level. This represents a formal obstacle for joint transnational training activities. In order to provide an impulse towards a European convergence already within the training of future specialists working throughout Europe, this project attempts to harmonize the training of aircraft maintenance and repair. The future labor market for skilled workers in this sector is characterized by a high degree of internationality. The project contributes to raising awareness of this characteristic and promotes the flexibilization of training in the partner countries. (Berufskolleg Alsdorf der StädteRegion Aachen, 2017)

In accordance to the project outline, the focus of the project is on the development of relevant and high-quality skills and competences, on the transparency and recognition of skills and qualifications and on developing institutional partnerships supporting the set up and implementation of an internationalization strategy of VET learners and apprentices.

## 1.1 Occupational field and vocational education

### From school to the world of work

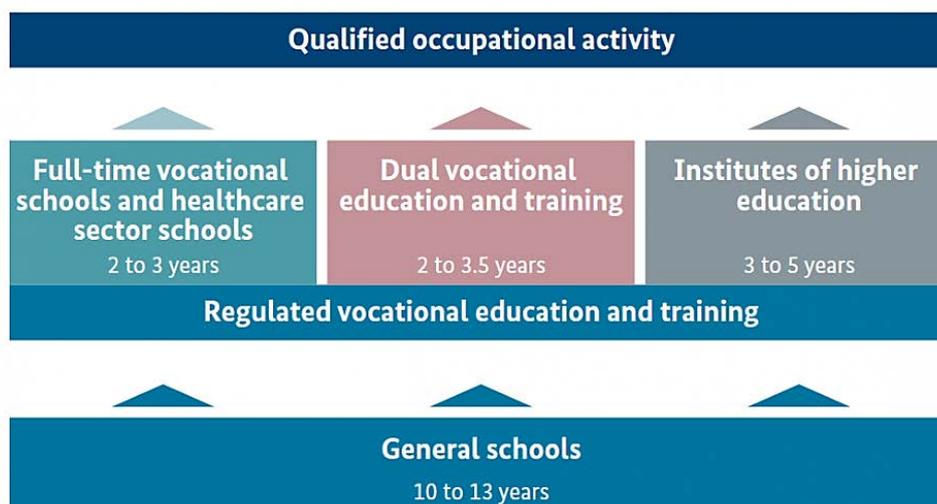


Figure 1: German vocational education system (BMBF, 2017)

The vocational training considered in this project is an assistant training for the field of aircraft maintenance and repair. Considering Figure 1 this training is part of the Full-time vocational school. It is an assistant training with one year compulsory internship which at the vocational

training center Alsdorf (VTC Alsdorf) lead to a vocational degree of state-certified mechanical engineering assistant according to NRW state law (in accordance with the APO-BK Annex C) with the profile aircraft maintenance and repair, to a certifying mechanic CAT A1/A2 (EASA, 2014) and to an advanced technical college entrance qualification (FHR). One part of the training is covered by the EASA regulations (EASA, 2014), which on the one hand cover the technical content and on the other hand represent the authorization to exercise the profession. Compared to other vocational programs, this program has a quite small number of students.

In Germany, Aircraft mechanics can also be trained through the dual vocational education and training system in direct cooperation with companies (Figure 1).

The EASA regulations represent a certified training content which is by some certified providers, for example by airlines who train their own staff, used in isolation without any connection to state-certified degrees.

## 1.2 Aims of the ERASMUS+ Project

In the course of the project several aims related to vocational training are being pursued. One of the aims is the harmonization in the training of aircraft maintenance and repairs to make training more flexible in partner countries. This correlates with the intention of a spatial flexibilization of training shares to achieve recognition of qualifications acquired abroad. Another aim is the extension of transnational networks of the training institutions in the aviation sector. Through a harmonization of training activities and training quality within aircraft maintenance and repair in the EASA area this project aims at joint transnational standards and that training materials produced are suitable for both transnational training groups and conventional national training courses.

Broader speaking this includes the development of relevant and high-quality skills and competences like supporting individuals in acquiring and developing basic skills and key competences. And in order to foster employability and socio-educational and personal development, as well as participation in civic and social life. This priority will include, among others, actions to develop partnerships between learning institutions, businesses and intermediary bodies, with a view to promote lifelong learning and to improve the quality and effectiveness of learning mobility experiences. The project will also support actions that develop or disseminate tools for the assessment of such competences, as well as actions that apply "learning outcomes"-based approaches in education, training and youth activities or assess their quality, impact and relevance.

Another aim is the transparency and recognition of skills and qualifications, which includes that priority will be given to actions that support employability as well as learning and labor mobility and facilitate transitions between different levels and types of education and training, between education/training and the world of work, and between different jobs. Priority will be given to actions enabling and promoting recognition as well as transparency and comparability of qualifications and learning outcomes, including through the provision of better services and information/guidance on skills and qualifications. This includes promoting innovative solutions

for the recognition and supporting the validation – at local, regional, national or European/international level – of competences acquired through informal and non-formal learning.

With regard to vocational education and training, the development of institutional partnerships supports the set up and implementation of an internationalization strategy for VET learners and apprentices. The aim is to create the necessary support infrastructure and the relevant institutional and/or contractual frameworks to promote quality mobility work placements of VET learners and apprentices in another country. (Berufskolleg Alsdorf der StädteRegion Aachen, 2017)

### 1.3 Procedure

The first project phase 2018/19 involves the comparison of the design of the national training plans (modules) in order to identify commonalities and national specifics, the agreement on the contents and standards of the teaching materials to be developed in the second phase of the project. As well as a summary of the different national training framework plans as common national standards in the participating member states.

The second project phase 2019/20 will contain the creation of various types of teaching material (including digital media) and testing in the project network. Those jointly produced training materials are to be tested at the project locations with real trainees and trainers and in teaching/ training/ learning activities with mixed national student groups. The results will then be evaluated by all participating institutions and being made available to the respective national supervisory authorities. The training courses and materials will be methodically and didactically accompanied and evaluated in order to obtain impulses for improvement and alignment with the EASA standards (EASA; 2014). In the end an eBook will be established to be used by all partners.

## 1.4 Partner institutions

Table 1: Partner Institutions

<b>Institution</b>	<b>Country</b>	<b>Curricular Situation</b>
Berufskolleg Alsdorf der StädteRegion Aachen	Germany	EASA and national curriculum – state school
Technifutur	Belgium	only EASA – private school, committed to the industry
Association pour la Formation aux Métiers de l’Aérien (AFMAe)	France	only EASA – private school, committed to the industry
Istituto Statale di Istruzione (Andrea Ponti)	Italy	Part 66 and national curriculum – state school
Kouvola Regional College (KSAO)	Finland	EASA – state school

## 2 Scientific monitoring by IAW, RWTH Aachen University

### 2.1 Introduction

The focus on human work has a long history and tradition at RWTH Aachen University. The Chair and Institute of Industrial Engineering and Ergonomics (IAW) was found in 1928 and is therefore the oldest German institute in the field of ergonomics. It is currently headed by Prof. Dr. Verena Nitsch and consists of four departments, which focus on different topics within the field of ergonomics and work organization.



Figure 2: Organization chart of the Institute of Industrial Engineering and Ergonomics

The Ergonomics and Human-Machine-Systems department's focus is on people in their specific work environment. This includes, for example, the investigation of human-machine interfaces or workplace design according to ergonomic criteria. Research focuses are product and production ergonomics and human-robot collaboration. Main focus areas in System Ergonomics department are the integration of humans and technical systems as a combination of Human Factors, System Engineering and Design Thinking. By designing human-automation cooperation with the use of adaptive systems and cognitive automation, cooperative human-machine systems are getting optimized in terms of use. The Work Organization department focusses on the holistic work process and analysis, modeling, simulation and optimization of work systems and processes or more specifically the design of flexible, holistic work systems. One of the focus areas of the Technical Vocational Education and Training department, under the management of Prof. Dr. Frenz, is vocational training in public schools and the industrial-technical area. Multidisciplinary teams develop innovative didactic concepts, methods and tools for public and private sector of vocational training in close cooperation with partners from industry and research.

The IAW offer university classes in ergonomics as well as didactics in the technical fields for teacher training for vocational schools in the state of North Rhine-Westphalia. Altogether the IAW is involved in numerous national and international research projects.

## 2.2 Task of the IAW

The contribution of the IAW is in the framework of an unsubsidized cooperation and not in the sense of an empiric scientific study.

For the investigation it needed to be clarified what the object of investigation is and what the given circumstances are. Through this some key questions and tasks which shall be answered throughout the project came up. Analyzing which curricula are currently in use and if they do correspond to the EQF concept of competence is one task. Regarding the current training, it is important to clarify whether it meets the EQF standards, and if not, which aspects should be added in order to meet the EQF level of competence. Another factor is looking at the differences which hinder the recognition of partial achievements which were gained at other institution and which make the harmonization more difficult. As didactic concepts build a basis to achieve extensions of competence and to achieve the EQF level 4, a closer look at the concepts in combination with some recommendations are part of the tasks. Other recommendations could point to the further development of curricula and training as well as the design of teaching material. These tasks could not yet be performed in the project support. However, they are suitable for a follow-up project as they are fundamental tasks within the framework of the implementation of European education policy. General tasks of the IAW are looking at the materials which are used for the theoretical and practical training and observing exemplary teaching activity and interviews with teacher and student to gain an insight if the prevailing framework conditions enable the students to reach level 4 of the EQF at completion of their training. Using the example of the vocational training at the VTC Alsdorf, with EASA specifications, under national supervision of the LBA and closely connected with the state educational mission.

## 2.3 Hypotheses

Three hypotheses, which build the starting point for the analysis and evaluation, were formulated to accompany the project. These hypotheses were presented and discussed at the project meetings in Alsdorf and Kouvola.

The first hypothesis is that the training is generally compatible with the EQF standards and fulfils the EQF concept of competence partially or completely. If the concept is only partly fulfilled, a complete fulfilment of the concept of competence can be achieved by small extensions.

The second hypothesis says that the content standards of the training can be established in a competence-oriented way within the theoretical training with employability-oriented references.

The third hypothesis is concerning the practical training. It says that it takes place through order-oriented learning in real or simulated problem contexts, which leads to a competence expansion in the sense of the EQF concept of competence.

### 3 Requirements and framework conditions of vocational education and training in the EU

For the concrete example of the profession aircraft mechanic there are not only national but also the mentioned European regulations and recommendations which have an impact on the training. A broad overview of the factors can be found in Figure 3. The factors used for the analysis are marked with a green border.

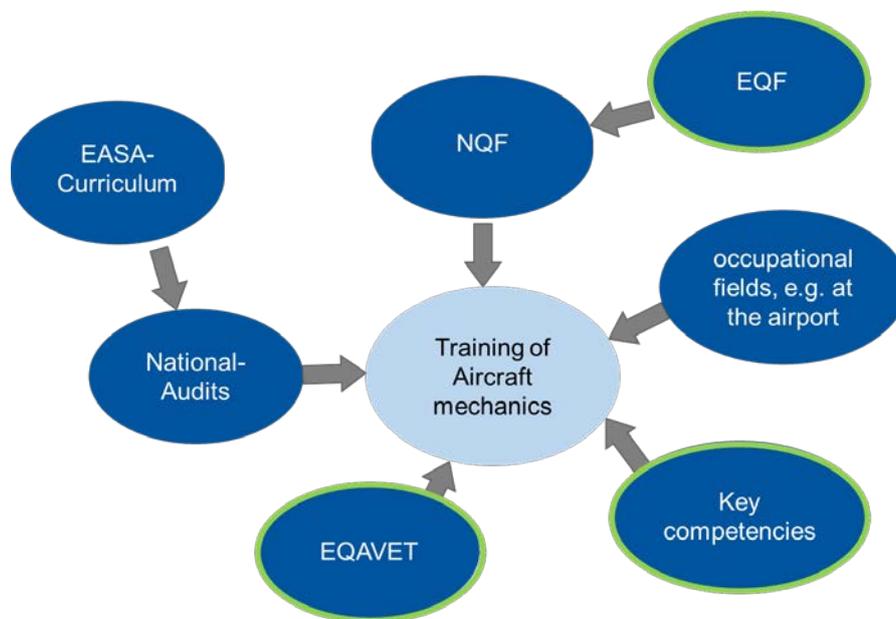


Figure 3: Factors that influence the training of Aircraft mechanics

#### 3.1 EQF

In the European Union there are 28 different countries with partly very different national qualification frameworks. As it can be seen in Figure 4, each national framework level can be transferred to the European qualification framework (EQF) to make the qualification level comparable with the frameworks of other nations. Therefore, the EQF is used, in this statement and within the project, as an overall qualification framework. The profession of aircraft mechanics is classified on level 4 of the EQF and DQR.

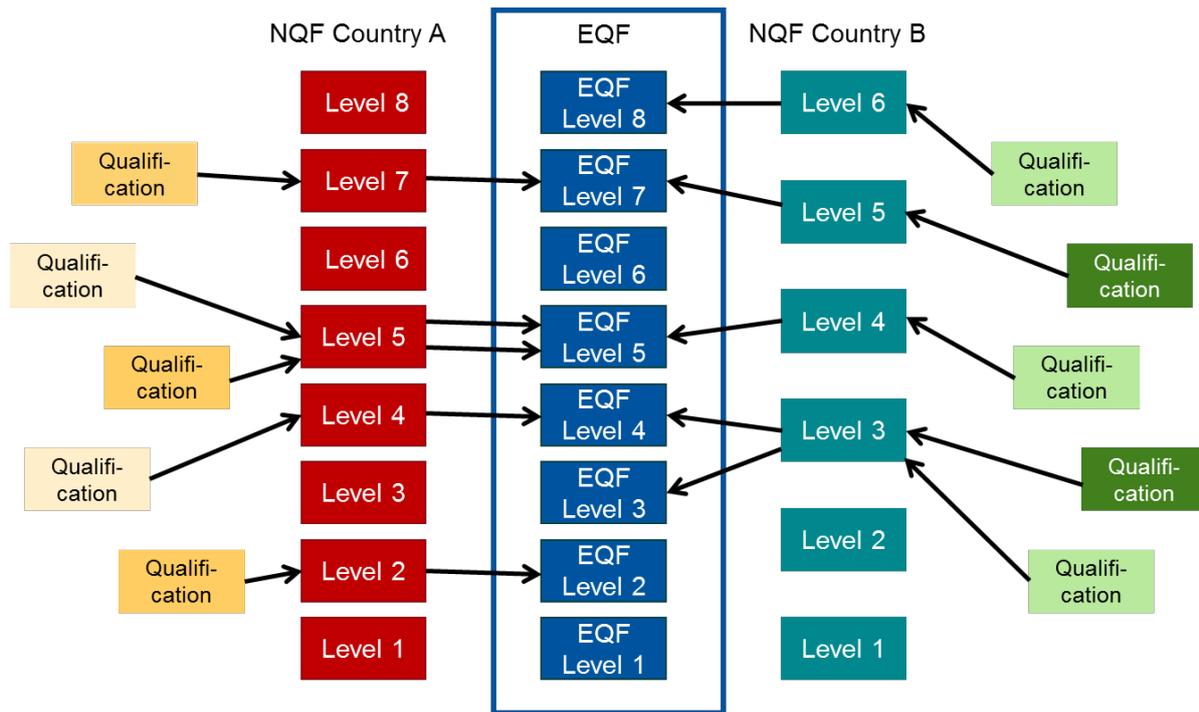


Figure 4: The European Qualification Framework compared to National Qualification Frameworks

To make clear the deviation between the German qualification framework and the European qualification framework it is important to take a closer look at the level description. Table 2 shows the subdivision of the EQF level 4 and the GQF level 4. The GQF is more differentiated than the EQF but in the broader sense they carry the same content.

Table 2: Level 4 of the European Qualification Framework (European Qualification Framework, 2018)

Level 4 (EQF)		
knowledge	skills	competence
<b>Factual and theoretical knowledge</b> in broad contexts within a field of work or study	A range of <b>cognitive and practical skills</b> required to generate solutions to specific problems in a field of work or study	Exercise <b>self-management</b> within the guidelines of work or study contexts that are usually predictable, but are subject to change. <b>Supervise the routine work of others</b> , taking some responsibility for the <b>evaluation and improvement</b> of work or study activities.

Table 3: Level 4 of the German Qualification Framework (German Qualification Framework for lifelong learning, 2011)

Level 4 (GQF)			
Be in possession of competencies for <b>the autonomous planning and processing</b> of technical tasks assigned within a comprehensive field of study or field of occupational activity subject to change.			
professional competence		personal competence	
knowledge	skills	social competence	autonomy
Be in possession of deeper knowledge or <b>theoretical professional knowledge</b> within a field of study or field of occupational activity.	Be in possession of a broad spectrum of <b>cognitive and practical skills</b> which facilitate autonomous preparation of tasks and problem solving and the evaluation of work results and processes according consideration to alternative courses of action and reciprocal effects with neighboring areas. Provide transfers of methods and solutions.	Help shape the <b>work within a group</b> and the learning or working environment of such a group and offer ongoing support. Justify processes and results. Provide <b>comprehensive communication</b> on facts and circumstances.	Set <b>own learning</b> and work objectives, reflect on and assess such objectives and <b>take responsibility</b> for them.

Table 4: Conclusions of EQR level 4 based on didactic models such as action-oriented-learning as a didactical concept for vocational training in Germany (didactic concept according to Ministerium für Schule und Weiterbildung des Landes Nordrhein-Westfalen, 2014)

Conclusions based on didactic models		
knowledge	skills	competences
Problem or project oriented and application oriented learning, the knowledge must be reflected against the background of the applications.	Within the framework of theoretical and practical training the learner is required to transfer and apply knowledge and solve problems with the use of his/her knowledge.	Higher learner activity, self-organized learning, ability to reflect, knowledge of work planning in theory and practice.

The descriptions of the subcategories of EQF level 4, which can be seen in Table 2, can be interpreted based on didactic models. The knowledge level for example can be achieved through problem-oriented and application-oriented learning and reflected knowledge against the background of the application. The skills level can be interpreted that within the framework of theoretical and practical training the learner is required to transfer and apply knowledge and solve problems by using the knowledge. The competence level can be achieved by a high

learner activity, self-organized learning, ability to reflect and knowledge of work planning in theory and practice (Ministerium für Schule und Weiterbildung des Landes Nordrhein-Westfalen, 2007).

### 3.2 EQAVET

Apart from the EQF there are also other instances for quality assurance on European level. One voluntary system is the European Quality Assurance Reference Framework (EQAVET), which sets up national reference points for quality assurance. EQAVET is a reference instrument designed to help EU countries promote and monitor the continuous improvement of their vocational education and training systems on the basis of commonly agreed references. The framework should not only contribute to quality improvement in VET but also, by building mutual trust between the VET systems, make it easier for a country to accept and recognize the skills and competencies acquired by learners in different countries and learning environments. EU countries use the framework to improve their quality assurance systems in a way that involves all relevant stakeholders. This includes setting up national reference points for quality assurance, actively participating in the relevant European-level network and developing a national approach aimed at improving quality assurance systems and making the best possible use of the framework (EQAVET, 2019).

### 3.3 ET 2020

The European policy cooperation for education and training called “ET 2020” contains four common European objectives and some benchmarks which are aimed to be realized by the year 2020. The objectives are making lifelong learning and mobility a reality, improving the quality and efficiency of education and training, promoting equity, social cohesion, and active citizenship and enhancing creativity and innovation, including entrepreneurship, at all levels of education and training. EU benchmarks for 2020 for education, which are relevant for the vocational education and training are that the rate of early leavers from education and training aged 18-24 should be below 10%, that at least 40% of people aged 30-34 should have completed some form of higher education at least 15% of adults should participate in lifelong learning and that at least 20% of higher education graduates and 6% of 18-34 year-olds with an initial vocational qualification should have spent some time studying or training abroad. (Council of the European Union, 2009)

### 3.4 Key competences for lifelong learning

The key competences for lifelong learning are council recommendation which describe the key competences with which every learner should be confronted in his or her life. Newest version was published in May 2018.

The Reference Framework sets out eight key competencies: literacy competence, multilingual competence, mathematical competence and competence in science, technology and

engineering, digital competence, personal, social and learning to learn competence, civic competence, entrepreneurship competence and cultural awareness and expression competence.

Those key competences can be promoted by providing high-quality education, training and lifelong learning for all, supporting educational staff, promoting a variety of learning approaches and contexts, in a lifelong learning perspective and exploring approaches to assessment and validation of key competencies.

## 4 Methodical approach

### 4.1 Analysis of documents

#### 4.1.1 EQF (and NQF)

For each country there is a national qualification framework. Comparing those national qualification frameworks it becomes clear, according to their differences, that the qualification framework which is valid for all the partner institutions is the European Qualification Framework. Levels of the EQF can be transferred into the respective NQF levels. For the training focused on in this project the students need to reach level 4 of the EQF with the completion of their training.

#### 4.1.2 Examinations

The partner institution VTC Alsdorf made some examinations available, this includes module examinations to the modules M9 and M11, the final examination of 2018 and the practical examination of 2018 which are all accredited by the LBA and fulfil the EASA standards. In addition, a class test for module M11, which includes not only programmed questions but also free text tasks, was made available. The free text tasks are not accredited by the LBA, but are additional material which the VTC Alsdorf uses to prepare their students for the national final examination (advanced technical college entrance qualification FHR).

#### 4.1.3 Training manual

The VTC Alsdorf also made their training manual, which is a document that describes the training course. This document is as well accredited by the LBA and changes in the training manual or in the module examinations require a further accreditation by the LBA to make sure that it still fulfils the EASA standards (Berufskolleg Alsdorf der StädteRegion Aachen, 2018).

#### 4.1.4 Teaching materials from the project partners

In the course of the project, teaching materials for the modules M03, M04, M05, M06, M07, M09 and M11 will be created and collated by our partners and put into one comprehensive E-book format. These documents were not yet available at the time of the document analysis and therefore are not subject of the statement.

### 4.2 Observation of training sessions

Exemplary, an observation of the lessons at one of the partner institutions for theoretical and practical training was carried out.

### 4.2.1 Berufskolleg Alsdorf

The VTC Alsdorf is licensee for the basic course according to part 66 CAT A1/A2. All theoretical and a large part of the practical training as well as the module examinations are carried out there (Berufskolleg Alsdorf der StädteRegion Aachen, 2018). A teaching unit for module 6.8.3 on the subject area M6 was observed on 29<sup>th</sup> January 2019.

### 4.2.2 Rheinland Air Service (RAS)

Parts of the practical training which cannot be completed at the VTC Alsdorf are carried out at the cooperation partner Rheinland Air Service (RAS) within the framework of several internships. The cooperation with RAS in particular guarantees the availability of demonstration equipment (engines, electronic components, etc.) that are not available at the VTC Alsdorf (Berufskolleg Alsdorf der StädteRegion Aachen, 2018).

The Observations of the practical part at Rheinland Air Service (RAS) Mönchengladbach were made on 29<sup>th</sup> January 2019.



Figure 5: Rheinland Air Service (RAS)

At RAS the students work on real customer orders. Training plans ensure the completeness, scope and quality of the training during the work on the customer orders. The students are systematically supervised by trainers during their training.

## 4.3 Interviews

In connection with the observation at the VTC Alsdorf and the RAS a guided teacher interview and a semi-structured student interview were done. The interview questions were constructed in order to get an impression if the training enables students to fulfil the competences of the EQF level 4 at the completion of their training.

## 5 Results

The results are presented on the basis of the EQF independently of the NQFs. The national German curricula are only included in the analysis if they seem relevant.

### 5.1 EU-Standards

#### 5.1.1 EQF

The used curricula for the training part 66 CAT A at the VTC Alsdorf are on the one hand the module descriptions of the EASA and on the other hand the national curriculum. The national curriculum fulfils the EQF level 4. During the training there are situations where the students can reach aspects of the competence level 4 of the EQF, for example self-organization when planning their apprenticeship abroad. Another situation where the students need to be self-reliant is the entry of each lesson where they need to fill in the exact time span and the corresponding module into their personal logbook. The competence of problem orientation or case-orientation is more frequent in the practical training than in theoretical lessons. Nevertheless, there are some examples for a focus on practical work in the theoretical lessons. The focus of module 7 for example is on practical work and maintenance, whereas module 6 focusses on the theory about maintenance. As said before, the national curriculum fulfils the EQF 4 level, but looking only at the module description of EASA, the time scope is very low and forms of work like group work are not allowed because they would not ensure that every individual student works on every topic. The time scope and the regulated forms of work are difficult points.

The programs are strongly focusing on the requirements of the EASA/LBA and the formal qualification or formal examination of the students (EASA, 2014; Luftfahrtbundesamt, 2014). The objectives of the national curriculum with the aspired degree of the advanced technical college entrance qualification are hardly considered and are completely overlaid by the formal requirements of the EASA/LBA. The competence extensions can also be seen with that in mind but in this case the perspective is merely the formal qualification, which is predominantly located in Requirement Area I. The competence extensions which go beyond the formal qualification, including the personal competences in theory lessons and the training in practice, are hardly taken into account. In theoretical training in particular, the requirements of the EASA/LBA are implemented with the approved script. The additional competence extensions resulting from the national curriculum are not explicitly named and not an intentional goal of the training. The possibilities of integrating the formal requirements of the EASA/LBA into competence-oriented and more far-reaching training are not seen and therefore not implemented.

Evidence that EQF 4 or the more differentiated DQR 4 has been achieved is formally provided in the form of module examinations and the final examination for the advanced technical college entrance qualification and the passed practical training examinations insofar as they are available. One solution could be competence-oriented training with very formal

documentation in the teaching report (class register) that meets the requirements of the EASA/LBA. Since the numbers of hours, specified by the EASA/LBA curriculum, are very low, formal fulfilment of those minimum hours is always met. To make this statement more tangible: only one hour is listed in the EASA/LBA curriculum for the entire topic of rolling bearings, at the VTC Alsdorf this topic is implemented with significantly more hours. The EASA Curriculum should be understood as a necessary building block for professional practice within the framework of the training concept.

### **5.1.2 EQAVET**

Quality assurance of education at the VTC Alsdorf is assured through five different instances. First of all there is the state school supervision of the district government (Bezirksregierung). Secondly, there is the "Qualitätsanalyse", which is an external quality assurance system. Third system is the VTC Alsdorf itself as an internal one, the fourth and most regulated system is the LBA who audits and gives admissions to the VTC Alsdorf. The fifth and last quality assurance system is the Rheinland Air Service (RAS), they send an external quality manager to the school to prepare and consult for the audits of the LBA and does preliminary audits.

### **5.1.3 ET 2020**

As mentioned in chapter 3.3, some of the European benchmarks are written down in the "Strategic framework for European cooperation in education and training - ET 2020". Three of those benchmarks which are relevant and applicable for vocational education and training were asked in the interview. First, is that the rate of early leavers from education and training aged 18-24 should be below 10%, which is not given at VTC Alsdorf. The quote of early leavers is around 40%-70% due to different motifs. The second benchmark is that at least 20% of higher education graduates and 6% of 18-34 year-olds with an initial vocational qualification should have spent some time studying or training abroad. At VTC Alsdorf it is an essential part of the vocational training which leads to a percentage of 100% by the graduates. The third benchmark is that at least 40% of people aged 30-34 should have completed some form of higher education and at least 15% of adults should participate in lifelong learning, which is applicable for all graduates at VTC Alsdorf. Focusing on the graduates a significant aspect is that 100% have very good employment perspectives. Some of the students afterwards go to university, some go to the military and 40%-50% work as a CAT A mechanic and continue their training to become a CAT B technician.

## **5.2 Interviews**

### **5.2.1 Interview with a teacher from VTC Alsdorf**

The key competences for lifelong learning are complied through the national curriculum. The didactic annual planning is only available in a rudimentary form. In general the students are trained to work on tasks which are more complex than the ones they will be certified to sign for. This is a special point in the aviation industry, a CAT A mechanic can for example sign for

changing a wheel but he is not allowed to sign a brake evaluation because this would already fall under the responsibility of a CAT B technician. Nevertheless it is common that during their training CAT A mechanics will do brake evaluations but additionally a CAT B needs to look at the breaks to sign for it. In those particular cases the CAT A mechanic is able to gain deepened general knowledge or specialist theoretical knowledge during his training.

As the training is preparing for the practical examination, it is structured in such a way that the students can acquire a wide range of cognitive and practical skills. Independent problem solving and assessment is part of many assignments which enables students to work independently on tasks. A typical task would be to judge a leaking shock strut which is rather easy to recognize and judge, windshield damages for example are more difficult to judge. In the narrower sense of CAT training, opportunities to assess own alternative courses of action may be less frequent, as the narrow CAT training only schedules 800 hours. The CAT training at the VTC Alsdorf goes beyond these hours, and within the framework of project work the students are enabled to assess own alternative courses of action. Each module ends with a module examination which represents a partial performance.

Transfer performances of the students are part of the training but not ongoing in all tasks and modules. As in most cases in the aviation industry the processes are set in a concrete order, there is not a great margin for changing the order. But nevertheless it is part of the training that the students learn to understand and justify those concrete orders. In addition there are possibilities for the students to develop skills for setting individual learning and working goals as well as achieving the ability of self-reflection. During the training at VTC Alsdorf there are social forms like for example partner and group work. The students acquire the competence to realize mistakes and to take responsibility for them.

### **5.2.2 Interview with a student from VTC Alsdorf at RAS during his practical year**

Additionally to the guided teacher interview there was a semi-structured student interview which included questions according to the tasks the student was working on. The interviewed student finished his three years of vocational training and is now carrying out his practical year at RAS. Because of the fact that the student finished his vocational training he should be able to demonstrate the competences and skills on a level 4 of the EQF. Due to his explanations and the descriptions of his tasks, he showed that his knowledge goes beyond a factual knowledge and beyond a simple order-oriented workflow.

## 6 Summary

The curricula that are currently in use at the VTC Alsdorf are the EASA/LBA curriculum and the national curriculum. Formally only the national curriculum, which is based on EQF level 4 and prescribes training in all areas of competence, corresponds to the EQF standards. There is a gap between the curricular objectives of EASA and the requirements of the EQF. By fulfilling the national curriculum which is formally certified with the additional national final examination (advanced technical college entrance qualification FHR), this gap is ensured.

At this stage it is not apparent if there are differences which hinder the recognition of partial achievements and qualifications or which make a harmonization more difficult. This would have to be clarified in a further investigation by analyzing the training concepts of selected partners and for this the consent of the partners for the analysis is necessary.

For the creation of the common training material it is important to understand that the EASA requirements for all EU countries represents the minimum standard of knowledge and practical skills for the training materials, this includes uniform exams. Consequently national concepts need to go beyond the EASA requirements in order to fulfill the aspired EQF 4. This can include an extension of the overall hours and the use of different task types. On the national level an extension of competence in order to achieve EQF level 4 can be among other things achieved by the use of didactic concepts which aim at training all areas of competence. There are various concepts which are suitable, for example action oriented learning, competence based training or project methods. The didactic concept and the procedure for achieving the objectives are left to the expertise of the training institutions on their own responsibility. The content standards of the training can be established in a competence-oriented way within the theoretical training with employability-oriented references. During the observation it got clear that the practical training takes place through order-oriented learning in real or simulated problem contexts, which leads to a competence expansion in the sense of the EQF concept of competence.

### 6.1 Outlook and recommendations

The development and use of teaching materials is essentially determined by the technical and non-technical objectives and the didactic concept. One way is to start with the compilation of information media such as technical texts, instruction videos and exercises, as these can be used comparatively universal in different didactic concepts. An exchange of didactic concepts with examples from the training should take place and make it possible to use the tasks, problem-based cases or project tasks internationally.

Teaching materials need to extend the EASA curriculum, which is to be regarded as a minimum standard, to be applicable in all partner countries. Through the task types for example in a problem-oriented way, it can be made sure that the students reach EQF level 4.

The advantages of the training for aircraft mechanics can be summarized as followed: there is one common European standard for the training, the qualification system is covert through the

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national agencies, there are binding standards for exams and there are good requirements for the international mobility of skilled workers.

Quality assurance by the LBA should be carried out with regard to practical training, equipment, organization of internships and the final examination.

LBA is comparable to a quality assurance which controls processes and co-determines auditing standards. But content and organizational design should in this case be the responsibility of the VTC Alsdorf. They should be free to decide on the design of the lessons, the choice of social forms, methods and media as well as the division and extent of the lessons.

With the central and certified examinations the achievement of the level and adherence to the quality requirements is guaranteed and easily verifiable.

Further research and development work could be in the areas of further development of curricula and training as well as the design of teaching material.

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