Best-Practice - Training in aviation professions @ Airbus

The national training systems in the European countries developed in very different historical conditions. As a consequence various types of education and training systems matured, dependent on the particular historical development process of the economic and social structure of the respective countries, with organisation of training being developed in different ways, particularly in relation to intermediate-level vocational training. Even inside the same branch or occupation differences can exist between different countries.

In the context of the Leonardo-da-Vinci pilot project AEROnet these topics become particularly noticeable in different dimensions. The Aerospace industry, and thereby the industrial project-partner EADS with its Airbus division, is already collaboratively producing aircrafts built in four European countries – Germany, France, Spain and UK – for civil aviation. The qualification of workers in this industry in these four countries occurs, however, on basis of four distinct vocational training systems. The German organisation of vocational training is based on the traditions of the dual system with defined occupational profiles, the French on a national vocational tradition based around occupational profiles, the British system is in part based upon a modularised system that allows for the achievement of vocational, rather than occupationally specific, modules and greater flexibility in terms of entry to different occupations and the Spanish

system can be identified as a school-based system where general vocational qualifications are developed but without a clear relationship to defined occupational profiles.

As a result of this background the LEONARDO-project AEROnet offers for this industry almost ideal conditions to analyse whether a Best Practice approach exists for the organisation of training, and, if so, whether it is possible to produce a single integrated approach to the organization of training in the different countries. This question appears to have particular relevance because of the harmonization thesis that was developed following the trend towards the universalization of manufacturing processes and material applications evident over recent years.

An initial empirical analysis of the current organization of in-plant-training in the industry was the first milestone of the project and has now been completed. The results are represented in the following text. It should be mentioned that there is no further comment on the formal-legal basic conditions of the national education systems in the four countries as these conditions are well-known. The comparison starts with a view of practice in France and Germany, where the EADS/Airbus sites of Toulouse and Bremen are participating in the project. The basis for comparison was vocational activities in aircraft mechanics and/or avionics that were common in all the AEROnet countries. In Germany this basis corresponds to all the activities in the career profile aircraft mechanic in all three

specializations or fields as well as the career profile of the electronics engineer for aero-technical systems, existing at present[1].

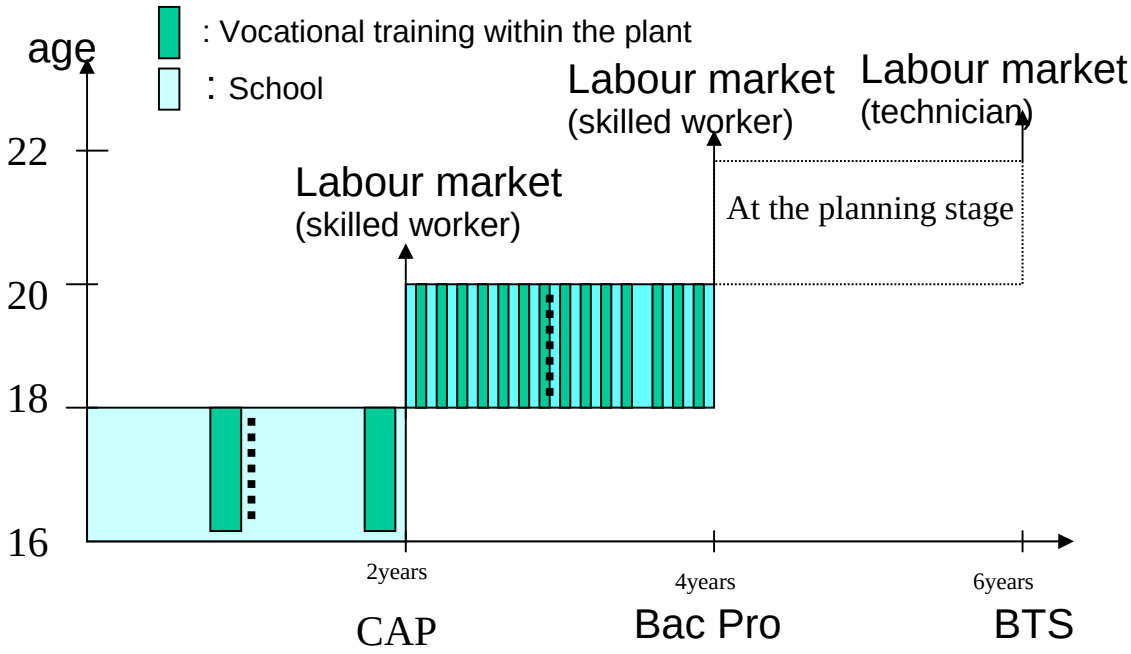

Diagram 1: *The training inside EADS/Airbus at the French site Toulouse [source: PEYRAN, O. / PETIT, P.: "The training at the position Toulouse in co-operation with the Airbus-internal school for aero-technical occupations", presented May 2006 in Barcelona,]*

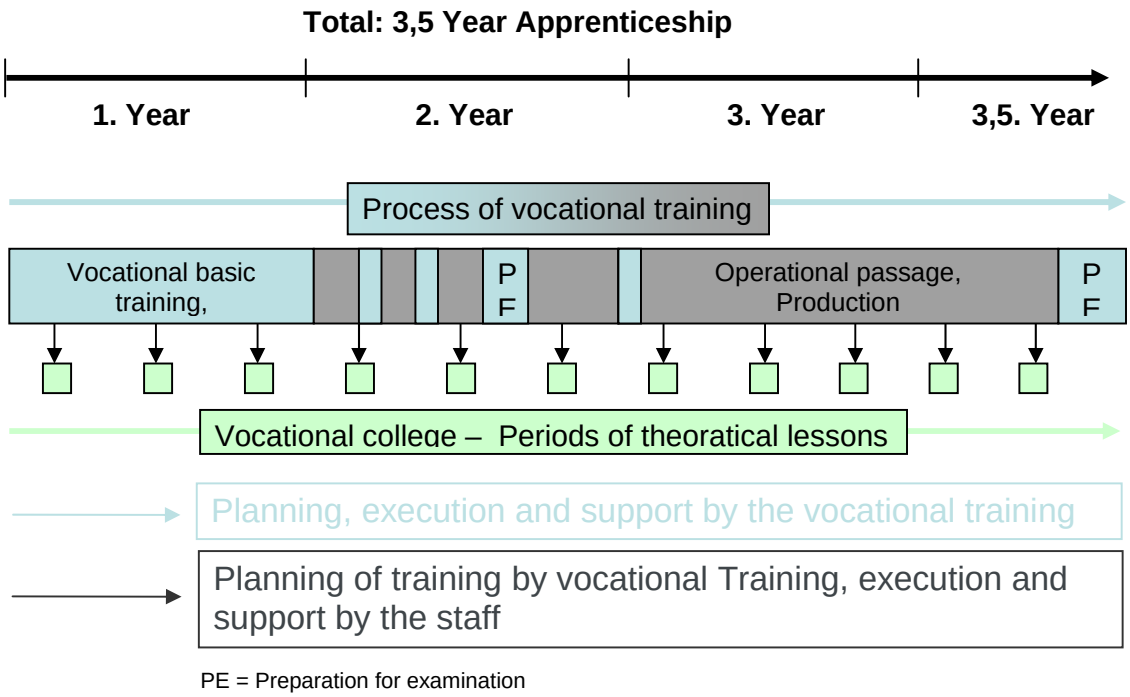

Diagram 2: *The training inside EADS/Airbus at the German site Bremen [source: SCHROEDER, B. in: "The training in the binary system of the Federal Republic of Germany and their conversion for the occupation aircraft mechanic in the field finishing technique at the site Bremen", presented May 2006 in Barcelona,]*

The first obvious difference that is shown by the diagrams is the separation of vocational training into two different levels with two different outcomes at Airbus in France. In contrast a division like that in Germany would be prohibited by legal regulations as there is no modularized apprenticeship allowed by the national system. An interesting observation of the French system is, that one of the two apprenticeships on the higher level, leading to BacPro, are recruiting their apprentices out of three different apprenticeships from the lower level. All this together shows a higher structural flexibility of the French system if one

compares the combination of the two year CAP/BEP-apprenticeship plus the two-years training for a BacPro with a standardized German apprenticeship. Whereas the German apprenticeship is not divisible a French apprentice can go onto the job-market after two years as “Mécanicien Cellule Aéronef”, “Réalisation D' Ouvrages Chaudronnés” or “Mécanique Informatisée” or go ahead towards BacPro, where all these three directions are summarized and then deepened. The following diagram shows how the two apprenticeships heading for BacPro are recruited from four different CAP/BEP specializations.

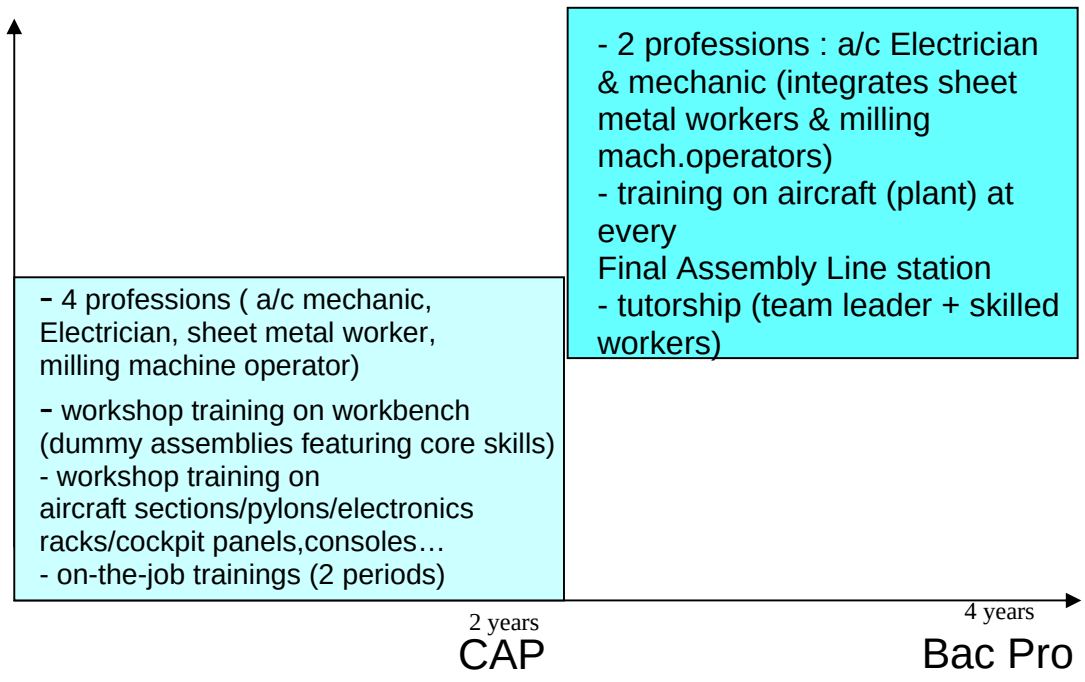

Diagram 3): *The apprenticeships within EADS/Airbus at the French site Toulouse. Structure and organization, arranged according to qualification steps [source: BOUDER, A.: “The implementation of apprenticeship in the French system by EADS /Airbus at the site Toulouse”, presented November 2006 in Hamburg]*

The practical mediation of skills described in the lower level of CAP - or BEP - apprenticeship is done predominantly in a shop floor atmosphere inside the training college. During these apprenticeships the participants have two periods of three weeks in-plant. Compared with the German system this first level of the Airbus apprenticeship system in France appears to be more knowledge-orientated and less geared towards the production process, as the trainees attend 30 weeks in school with only six weeks of work experience in departments. As well as leading to the three fore-mentioned mechanical specialisations the training is also similar for achievement of the avionics occupational profile, where most of the development again takes place mainly in the training centre.

The content, or more appropriately the target level of skills and competences, of the BacPro-apprenticeships “Mécanicien Systèmes Cellules” and “Mécanicien Systèmes Cellules” are, at least in an abstract way, comparable with the targeted skills and competencies of a German apprenticeship. Real average competence levels will be examined in an exemplary way at the end of the project by completion of an evaluation task.

For the occupational profile of an aeronautic electrician at EADS/Airbus Germany the training is orientated close to the production process. This process-orientation means that already during the first year of training apprentices are regularly assigned inside specific departments of production in order to expose the trainees to real work conditions, even while they are learning. As shown in

the diagram above, training for the occupational profile of aircraft mechanic is organized in a process-orientated way from the second year.

In both countries a national law regulates apprenticeship. In Germany for all occupations the vocational education law (BBiG) has to be respected. In France the vocational education for the “réalisation d`ouvrages chaudronnés” (BEP) the law valid since October, 21st of 1999 regulates the organisation of training, for the CAP-profession “Mécanicien Cellule Aéronef” a law from October, 24th, 2000 has to be respected and for the BEP-apprenticeship forming “Métiers de la production Mécaniques” as also for the BacPro-occupations a law from July, 31st 1996 provides the regulatory framework.

A major difference between the two countries is, on the one hand, the binary qualifying character of the French system and, on the other hand, its higher permeability, compared to the German system. If one regards the whole four year period, in France the young people receive after two years a professional certificate and also an admission to attend further school training or enter an apprenticeship. Doing so, after two more years, they have another professional certificate with a direct authorisation for entry into an occupation and they get the general qualification for university entrance. In Germany a comparable apprentice can receive after four years of training direct job-admission but this carries no general right for admission to attend university.

Whereas responsibilities for the first step of the EADS/Airbus training in France are assigned exclusively to the school, they are divided between school and plant during the second period, the BacPro apprenticeship. In Germany during the whole apprenticeship the enterprise is responsible for the in-plant-training focused on the job-specific contents whereas the state, delegated by national law and the division of federal and state-controlled competencies inherent in the constitution, is responsible for occupational schools and through this for the theoretical job-specific components and any general educational content. Chambers control the final exams in Germany, while in France the certified school is responsible also for the final test – at least concerning the practical part.

Due to the different systems and responsibilities between the countries we can also observe a different 'market', a different circle of participants in the training. All the apprentices in France have completed nine years in national schools when they enter the first step of the CAP/BEP training programme, while the general entrance condition for almost all apprenticeships in the Dual system in Germany is the CSE. That means a student has also had nine years of school education when entering vocational training. Empirically, due to a type of market process, EADS / Airbus hires almost exclusively alumni of 'Realschule' (after at least 10 years of schooling) or even people holding the diploma from German secondary school qualifying for university admission or matriculation, the 'Abitur' (completed after 13 years of schooling).

Considerably different from the two fore-mentioned systems of France and Germany is the Spanish one and this applies to apprenticeship practice at EADS/ Airbus in Spain. The Spanish Vocational Education System does not offer the required qualifications for occupations in the Aeronautics sector like aircraft mechanic or a CFK-apprenticeship. As a consequence Airbus Spain offers qualification training of three months duration. The participants have already spent 13 to 16 years in schools or institutes beforehand. In general they have passed national apprenticeship training in this time-period and have already a qualification as an aircraft electrician or car mechanic. A lot of participants have also finished higher vocational training, some even in aircraft maintenance.

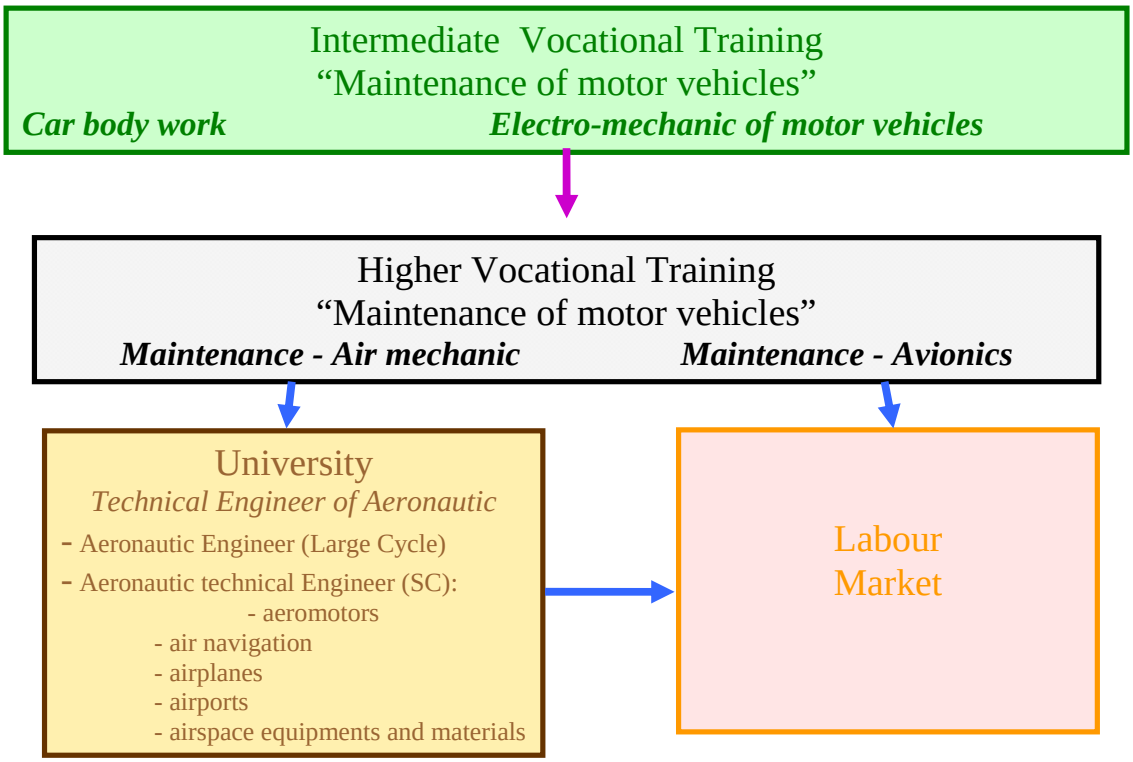

Diagram 4: *The training with EADS/Airbus in the Spanish system with adjustment on the qualification ways for positions in Getafe [source: JIMENEZ, L.: "VET@Spain", presented May 2006 in Barcelona,]*

Due to the widely varying backgrounds of the young people and variation in the duration of their schooling the ages of trainees upon starting training at Airbus in Spain is more divergent than in other countries, the average age is 18-22 years (and the duration of training is only three months!) As the training is organised privately so the qualification is firm-specific. The qualification is examined only by company representatives. The training is not regarded as a national qualification that would give permission to study at a University – apart from the fact that some of the students have already achieved such a status previously. However, for both types of Airbus-Spain training (Montador de estructuras aeronáuticas and Fabricación Materiales Compuestos) national and regional legislation is relevant.

The approach to apprenticeship inside EADS/Airbus UK follows the long established apprenticeship tradition in engineering in England and Wales is very similar to the system already described above for Germany. It is important for the AEROnet-project to say that the relevant peer-groups are apprentices in engineering and elsewhere in Airbus and not trainees trained under the new system of Modern Apprenticeship in the UK where apprenticeship was extended well beyond its traditional boundaries and was undertaken in a wide variety of settings. The Airbus apprentices are trained in ways that would be recognisable under the previous classical apprenticeship system of the United Kingdom although the forms of assessment are innovative.

Apprenticeship at the Airbus-UK site in Broughton (Wales) is delivered in cooperation with Deeside College and is divided into a basic training year at College and dual training in the following years in a way that is similar to the approach adopted in the German system to train Aircraft Mechanics. This duality is established by progression through phases of practical training inside the plant and theoretical blocks at the college. The system is qualifying in a double way as it delivers a skilled worker qualification and the can be used as a basis for application to university. GSCE, the General Certificate of Secondary Education, is the required educational level at the beginning of the apprenticeship, although Airbus / EADS applies selection criteria to choose those it regards as best suited to undertake training before issuing private training contracts with the enterprise.

The Broughton site offers Modern (Craft) Apprenticeships annually to 100 young persons in six occupations:

- Aircraft Fitters
- Aircraft Electricians
- Machinists
- Tooling operation Fitters
- Electrical maintenance Fitters
- Aircraft system testers

of which the first two of them have relevance for the AEROnet project. Modern Apprentices can also be trained to meet the occupational profile ‘Assembly Aircraft Fitters’ at the British Airbus site at Filton. Furthermore the Broughton site

offers a ‘Higher Engineering Apprenticeship’ Programme whereby 50 young trainees, typically aged 18, get the possibility to learn in the fields of:

- Design
- Manufacturing
- Engineering
- Quality and
- Supply chain Logistics.

An interesting thing about the “Higher Engineering Apprenticeship” at the Broughton site is the fact that most of the students are not recruited directly out of the ‘Modern Apprenticeship’ system within Airbus. Each year only two of the apprentices out of this lower level training programme go directly on to a ‘Higher Engineering Apprenticeship’, whereas in France, for example, at the Toulouse site mentioned above, 30% choose a progression path like this. Airbus UK chooses Higher Engineering Apprentices out of a pool of 100 candidates who apply either from inside the company or are external candidates. The ratio of candidates/places for the ‘Modern Apprenticeship’ much higher, for the 100 places Airbus can choose from 800 candidates.

Both the apprenticeship programmes are regulated by national law, with Qualifications and Curriculum Authority (QCA) the regulatory authority in England and the equivalent authority in Wales being the Welsh Assembly Government’s Department for Education Lifelong Learning Skills (DELLS). The regulations

dictate all knowledge-based and competency-based elements as well as key qualifications and the labour relevant basic conditions or responsibilities. These authorities accept accredited qualifications as technical certificates. By this a huge part of the knowledge-based elements in the apprenticeship is already covered. Furthermore the authority that is responsible for training in the aeronautic sector (and in the engineering sector as well), called SEMTA (Science, Engineering, Manufacturing and Technology Authority), controls and accredits the qualifications for the 'Higher Engineering' training. These qualifications are also acknowledged as certificates. The competency-relevant elements are all covered by NVQs on both levels of training. The actual training paths are defined in relation to job-specific competence standards that have to be accepted by the QCA. Additionally all licences and certificates acquired are under control of the Civil Aviation Authority (CAA). Finally the IATA sets standards for certain certificates like IATA part 21 b.

Taken together this means a broad spectrum of relevant conditions and influences have to be accommodated by the organisations with responsibility for delivery in the apprenticeship system. The detailed curriculum results from negotiations between employer and the College based on these conditions.

The first year of the Modern Apprenticeship is organised as a basic course at Deeside College. This college has specialised to meet the demands of EADS/Airbus in a way, that – to give an example – a whole wing of an A 319 is

used as practical object on which to work and learn. Time spent inside the college is calculated as working time and contains four full shifts plus one half day shift. The ‘lessons’ are divided up into 70 % practical and 30 % theoretical content. Additionally in the first year the students take part in the international Airbus ICT-programme on the island of Juist.

The major part of the training is skill-driven. These skills are developed mainly by executing tasks. In the second year the apprentices are mainly based in the plant and move through a lot of different departments with the aim of this rich learning while working approach being to demonstrate achievement of the relevant competences that comprise the NVQs. What is interesting here is the role of the tutor: in this model in Broughton starting in the second year, in plant, the trainers accompany their apprentices into the departments in order to assess the achievement of the relevant competences. In the third year the apprentices already perform a particular work role for a longer period in a department. Apart from this the apprentices also attend college part-time during their second and third year. Upon completion of their programmes the apprentices achieve NVQ-level 3, while the students in the ‘Higher Engineering’ programme reach level 4.

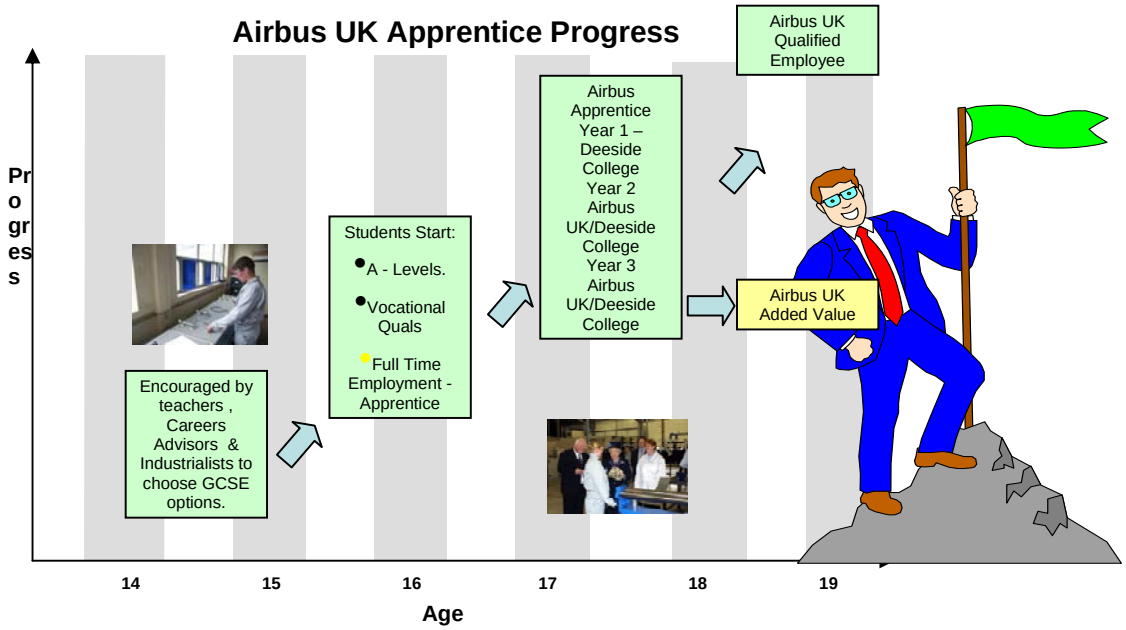

Diagram 5: *The training with EADS/Airbus in the British system, cooperating with the Deeside-College [source: TYSON, N.: "Vocational Training linked to Airbus UK' 14 -19", presented May 2006 in Barcelona,]*

The normal entry option requires successful completion of four A*-C GSCEs (usually obtained at a comprehensive school) in mathematics, English, science and preferably design or information technology. Knowledge of another language is also desirable. The usual alternative for young people in England not receiving an apprenticeship is direct entry into the labour market or continuing their education in college, while Wales offers in addition to this a programme called 'Learning Pathways 14-19' with additional qualification possibilities.

[1] All data, in this chapter, are drawn from analyses based on results of a Questionnaire surveying the practice of apprenticeship at EADS /Airbus in Bremen, Broughton, Getafe and Toulouse. The data was collected by Alan BROWN, Annie BOUDER, Alain SAVOYANT, Laure JIMENEZ and Juergen LEDL from July to November 2006.