Education and Culture DG
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4

possible units of a mobility pass

Introduction

As remarked in the report on WP3, is it preferable but not really realistic that a learner acquires the LO of a whole unit in the host institution due to the short time of standard mobility periods. So the contents of the units (cp. WP2) were subsumed to mobility units (MU) which are integrated parts of the respective unit.
The meetings with the stakeholders related to this work package were focusing on 2 functions:

1.) The structure of the mobility passes
2.) A meaningful denomination of the MU

In summary led the remarks and additions to the following conclusions:

- The MU must be seen as single steps within the context of the whole unit of LO; there should be no formal crediting of the isolated MU.
- It is especially but not only in the field of maintenance not possible to list all potential MU, there should be space to add additional MU.
- Learning must be seen as a development of competence, single units (MU or LU) are not necessarily learnt from “0 to 100”.
- To achieve a sustainable learning outcome single MU must be performed several times, especially central skills like “drilling” or “rivetting” need several periods of training before they can be performed according to the sectoral quality demands.
- The relative relevance as well as the concrete LO are depending on the type of aircraft.
- The additional work load for teachers/trainers should be as small as possible.
- The matrices should be reduced as far as possible.
- Performing a MU independently is a necessary but not sufficient precondition for the awarding of a whole unit of learning outcomes.

These results were considered in the development of the mobility passes by

- describing only the headline of the unit and the denomination of the MU in the passes and only attaching the holistic description of the unit,

- reducing the amount of space per matrix to 2 pages, only 1 if possible,
- following the skills (cp. WP2) for the denomination of the single MU and clarifying by the attached unit and by listing the KSC for chosen MU that the denomination is meant holistic,
- adding the row “remarks” to open spaces for additional aspects, f. e. the type of airplane or the operated automated system,
- opening the possibility to document the reached level of autonomy for each learner on a 4-level, performance-oriented frame,
- establishing the possibility to add additional MU to each unit,
- clarifying that the last row (performing the MU above in context) ***cannot*** be assessed in a qualitative-performance-oriented manner.

The recognition of LO with the proposed instruments follows a 2-step approach. The teachers or trainers who are responsible for the single MU (independent of the place where the student is learning) are assessing the level of autonomy reached by the candidate on the 4 levels of our scheme. To inform other responsibilities about the concrete environment additional information like the place and the date is provided. So it might become obvious, that the only learning activities of a candidate related to a chosen MU were month ago and need refreshment. Functional represent the MU in our approach a kind of transcript of learning outcomes, but there is no simple additive handling foreseen: The use of the matrices as a kind of route card (in the meaning of: all signatures collected => LO of the whole unit acquired) is not possible. When the respective responsible teachers or trainers (independent of the place where the student is learning) judge that a candidate has acquired most of the relevant MU in a sufficient manner, than is it possible to acquire the whole unit. As the handling of the passes the assessment too should not lead to a lot of additional work for the teachers respective trainers. The assessment follows the guidelines developed by SEMTA for the English units: The candidate should work autonomously on a work order that is characteristic for the chosen unit. The processes as well as the product are part of the assessment. An example for unit 14 is the passing of bunched circuits by the candidate by combing the MU. Do the local trainers/teachers confirm that the LO were reached than this is certified. This certification – with respect to national regulations – can be used in fragmented systems like the British one as approval of the LO – f. e. units 12 & 13 correspond to SEMTA-Unit 87 “„Producing Aircraft Electrical

Sub-Assemblies, Cableforms and Looms“. In systems, which do not refer to the assessment of units, modules or something similar two actual added values are foreseen: Firstly, the certificate documents that additional teaching on this issue is not needed and secondly as equivalent to parts of formative assessment like interim demonstrations. Another possibly even more important case is the one when the LO of an unit are part of the (national) work tasks in the respective sector but not of the national curricula: The added value for the candidate in case of job application in his home country would be the confirmation of LO, that are wanted, but usually not acquirable in the home system.

Unit 1:								
Production of metallic components for aircraft or ground support equipment								
Remarks								
Mobility unit	Assessment					Place	Date	Signa-ture
	observed/ supported	under instruction	under surveil-lance	independ-ently				
Preparing wrought material								
Handling presses								
Using different moulds								
Knowledge of different characteristics of the presses								
Rigging and shutting down the presses								
Assessing the need for one or two work cycles for the respective workpiece								
Cooperating with the colleagues, asking for advice when needed								
Preparing workpiece for transport to the next workplace								
Demoulding work pieces								
Checking for damages, Rectifi-cation works (f. e. deburring)								
Production of metallic compo-nents for aircraft or ground sup-port equipment								

Unit 2:							
Production of components of plastics or composite materials for aircraft or ground support equipment							
Remarks							
Mobility unit	Assessment				Place	Date	Signature
	observed/ supported	under instruction	under surveillance	independently			
Preparing wrought material, vacuum equipment							
Run autoclave							
Knowledge of the appropriate pressure and heat							
Choosing the parameters for the process							
Knowledge of the characteristics of the different fibre composites							
Controlling the process							
Cooperating with the colleagues, asking for advice when needed							
Respecting safety regulations							
Demoulding work pieces							
Checking for damages, Rectification works (f. e. deburring)							
Production of components of plastics or composite materials							

Unit 3:								
Operating and monitoring of automated systems in the aircraft production								
Remarks								
Mobility unit	Assessment					Place	Date	Signature
	observed/ supported	under instruction	under surveillance	independently				
Equipping the respective automated system								
Setting and starting the respective automated system								
Running the respective automated system and controlling the production								
Recognising damages, assessing the quality of the products								
Knowledge of the quality standards								
Checking the results of the processes								
Cooperating with the colleagues from the quality department								
Performing additional tests								
Analysing the protocols of the production process								
Communicating results and/or possible improvements								
Maintaining the respective automated system								
Operating and monitoring of automated systems in the aircraft production								

Unit 4:							
Joining and dissolving of structural components and aircraft airframes							
Remarks							
Mobility unit	Assessment				Place	Date	Signature
	observed/ supported	under instruction	under surveillance	independently			
Preparing structural components for joining							
Choosing driller with respect to the material and drilling with the appropriate rotational speed							
Knowledge about the properties of drillers and drilling machines							
Ability to work accurate							
In case of drilling fibre glasses: Respect the especial health hazards							
(Even blind) communication and cooperation with the colleagues							
Self-critical control of the results							
Documentation of concessions							
Delivering the airframe to the next cycle							
Joining and locking parts or assemblies by riveting, screwing or bonding							
Mounting assemblies							
Orienting and calibrating assemblies or structural components by reference points, lines or levels							
Checking concessions, visual inspections							

Joining of structural components and aircraft airframes					

Unit 5:							
Assembly and disassembly of equipment and systems in/at the aircraft airframe							
Remarks							
Mobility unit	Assessment				Place	Date	Signature
	observed/ supported	under instruction	under surveillance	independently			
Assembling passenger and emergency doors							
Assembling air-condition unit							
Assembling Belly Fairing							
Assembling floors							
Clarify fitting with the quality department							
Checking work order and drawings							
Checking parts for defilements							
Knowledge about the tools							
Cooperating at assembly of the frames							
Inserting and screwing floor tiles							
Self-critical control of the results							
Documentation of concessions							
Assembling hydraulic equipment, preparing and performing hydraulic test							
Mounting cesspit and fresh water tank							
Assembling rotation shaft system for the flaps							
Mounting cargo-loading system							

Assembling fuel lines							
Connecting hoses							
Setting ground connections conforming to standards							
Assembling bleed air tubes							
Assembling plastic tubes							
Assembly and disassembly of equipment and systems in/at the aircraft airframe							

Unit 6:								
Functional checks and tuning at the aircraft								
Remarks								
Mobility unit	Assessment				Place	Date	Signature	
	observed/ supported	under instruction	under surveillance	independently				
Testing Aircraft Hydraulic Systems								
Setting and Testing Aircraft Pneumatic Systems								
Testing and/or replacing Aircraft Electric and Elektro-Pneumatic Systems								
Obtaining and using the correct issue of aircraft manuals and maintenance documentation								
Checking work order and drawings								
Respecting safety regulation, f. e. ensuring that the system is safely isolated								
Knowledge about the tools, expected values and possible error sources								
Performing the test by cooperating with the colleagues from safety department								
Analyzing and self-critical control of the results								
Documentation of the results and possible modifications								
Carrying Out Maintenance of safety systems esp. of Oxygen Masks								
Running and handling of auxiliary power units								
Performing “Weight and Balance”								

Maintaining ground equipment, tools and inspection equipment								
Testing and controlling components of aircraft systems								
Orienting and calibrating assemblies or structural components by reference points, lines or levels								
Functional checks and tuning at the aircraft								

Unit 7: Maintenance and inspection of the aircraft							
Remarks							
Mobility unit	Assessment				Place	Date	Signature
	observed/ supported	under instruction	under surveillance	independently			
Removing engines, ailerons, flaps, speed brakes and different head covers							
Washing and depainting the aircraft							
Determining compliance status of the structure, the body etc.							
Removing landing gear and cylinders							
Obtaining and using the correct issue of aircraft manuals and maintenance documentation							
Checking work order and drawings							
Respecting safety regulation							
Knowledge about the tools, possible technical difficulties and standard settings							
Cooperating and communicating with the colleagues							
Using approved removal and fitting techniques and procedures							
Marking parts and documentation of the work process							
Detecting flaws by magnetic or eddy-current tests							
Repairing simple malfunctions							
Adjusting repaired components							

Performing functional checks								
Performing tightness checks, replacing seals when necessary								
Maintenance and inspection of the aircraft								

Unit 8:							
Analysis and recondition of malfunctions at system components							
Remarks							
Mobility unit	Assessment				Place	Date	Signature
	observed/ supported	under instruction	under surveillance	independently			
Analysing malfunctions at pneumatic or hydraulic parts, components or systems							
Exchanging or reconditioning pneumatic parts, components or systems by using special tools							
Exchanging or reconditioning hydraulic parts, components or systems by using special tools							
Connecting and disconnecting bunched circuits							
Reading & understanding work order							
Work resource-saving							
Knowledge of different characteristics of the connectors							
Providing & preparing the material							
Checking the circuits for corrosion and distortion							
Crimping, connecting							
Cooperating with the colleagues, asking for advice when needed							
Approving work order							
Detecting flaws by magnetic or eddy-current tests							
Setting control systems							
Testing repaired components and documenting concessions							

Analysis and recondition of malfunctions at system compo-nents							

Unit 9:							
Analysis and recondition of malfunctions at system components							
Remarks							
Mobility unit	Assessment				Place	Date	Signature
	observed/ supported	under instruction	under surveillance	independently			
Analysing by visual inspection and reconditioning damages of body, steering gear or wings							
Carrying out maintenance of landing gear							
Detecting flaws by magnetic or eddy-current tests							
Rivetting aluminium-Patches							
Knowledge about the properties of drillers and rivets and the manuals							
Removing damaged part with respect to structural integrity							
In case of drilling fibre glasses: Respect the especial health hazards							
(Even blind) communication and cooperation with the colleagues							
Working conforming to standards							
Cooperating with the quality department when confirming							
Documentation of concessions							
Sealing repaired damages							
Recognising delaminations							

Running ultra-sonic systems								
Laminating fibre-composite-patches								
Repairing sand-wich components								
Documentation of concessions								
Analysis and reconditioning of damage on structure components								

Unit 10: Reconditioning of accessory equipment							
Remarks							
Mobility unit	Assessment				Place	Date	Signature
	observed/ supported	under instruction	under surveillance	independently			
Differentiating and using connectors for engines							
Maintaining mechanical accessory equipment							
Production or reconditioning of hydraulic, pneumatic or electrical accessory equipment							
Assembling and disassembling components, boxes, turbines and electrical engine systems							
Clarify fitting with the quality department							
Checking work order and drawings							
Checking parts for defilements							
Knowledge about the tools							
Cooperating at assembly of the components							
Respecting the health hazards when working with high-voltage current							
Self-critical control of the results							
Documentation of the work and possible modifications							
Equipping and removing engine systems, documentation of concessions							
Mounting brackets and seals							

Reconditioning of accessory equipment							

Unit 11:							
Independent quality inspections							
Remarks							
Mobility unit	Assessment				Place	Date	Signature
	observed/ supported	under instruction	under surveillance	independently			
Choosing and preparing of test control units and test control circuits to measure the function of assemblies, subassemblies and devices							
Measuring the function of assemblies, subassemblies and devices							
Documenting and interpreting the results of the measurement							
Orienting and calibrating assemblies or structural components by reference points, lines or levels							
Performing quality assurance measurements on assemblies, subassemblies and devices with respect to the manual							
Knowledge about the relevant chapters of the quality control manual							
Choosing the right control units							
Respecting the health hazards when working with high-voltage current							
Communicating and cooperating with the colleagues from the safety department							
Working conforming to standards							
Documentation of measurements and results							

Performing visual and non-destructive material testing of new and repaired components								
Performing and recording of the final quality control								
Performing independent quality inspections								

Unit 11: Independent quality inspections								
Remarks								
Mobility unit	Assessment				Place	Date	Signature
	observed/ supported	under instruction	under surveillance	independently			
Choosing and preparing of test control units and test control circuits to measure the function of assemblies, subassemblies and devices							
Measuring the function of assemblies, subassemblies and devices							
Documenting and interpreting the results of the measurement							
Orienting and calibrating assemblies or structural components by reference points, lines or levels							
Performing quality assurance measurements on assemblies, subassemblies and devices with respect to the manual							
Knowledge about the relevant chapters of the quality control manual							
Choosing the right control units							
Respecting the health hazards when working with high-voltage current							

Communicating and cooperating with the colleagues from the safety department								
Working conforming to standards								
Documentation of measurements and results								
Performing visual and non-destructive material testing of new and repaired components								
Performing and recording of the final quality control								
Performing independent quality inspections								

Unit 12:							
Production of bunched circuits							
Remarks							
Mobility unit	Assessment				Place	Date	Signa-ture
	observed/ supported	under instruction	under surveil-lance	independ-ently			
Production of copper bunched circuits							
Production of fibre glass bunched circuits							
Reading & understand-ing work order							
Work resource-saving							
Providing & preparing the material							
Knowledge about material property							
Cutting cables, crimp-ing							
Cooperating with the colleagues, asking for advice when needed							
Testing and preparing the circuit for transport to the next workplace							
Production of aluminum bunched circuits							
Production of bunched circuits							

Unit 13:							
Production or modification of electric devices							
Remarks							
Mobility unit	Assessment				Place	Date	Signature
	observed/ supported	under instruction	under surveillance	independently			
Producing or modifying bunched circuits following the manuals							
Producing electric devices of different elements following the manuals							
Modifying and/or upgrading electric devices following the manuals and/or the work-orders							
Working in modified or updated technical diagrams on assemblies or devices							
Clarifying work order with the engineering							
Checking drawings							
Checking assemblies for modification							
Knowledge about the technical drawings							
Working following the diagrams							
Respecting the health hazards when working with high-voltage current							
Self-critical control of the results							
Documentation of the modifications							
Testing and adjusting assemblies and devices to put them into opera-							

tion							
Production or modification of electric devices							

Unit 14:							
Passing bunched circuits in aircraft systems							
Remarks							
Mobility unit	Assessment				Place	Date	Signa-ture
	observed/ supported	under instruction	under surveil-lance	independ-ently			
Mounting brackets and splitters							
Setting ground points							
Mounting race-ways							
Passing bunched circuits							
Setting of connec-tors							
Reading & understand-ing work order							
Work resource-saving							
Knowledge of different characteristics of the connectors							
Providing & preparing the material							
Crimping, connecting							
Cooperating with the colleagues, asking for advice when needed							
Approving work order							

Appling test equipment and voltage								
Testing of connec-tivity & grounding								
Passing bunched circuits by performing the MU above in context								

Unit 15:								
Assembly and disassembly of subsystems and devices at aircraft systems								
Remarks								
Mobility unit	Assessment				Place	Date	Signa-ture
	observed/ supported	under instruction	under surveil-lance	independ-ently			
Checking the devices or sub-systems to be disassembled for zero-potential							
Disassembling electrical devices or subsystems							
Assembling de-vices or subsys-tems following the manuals							
Installing and adjusting electrical devices or sub-systems							
Checking drawings & work order							
Checking devices or subsystems							
Knowledge about the right setting							
Adjusting following the diagrams							
Respecting the health hazards when working with high-voltage current							
Cooperating with the colleagues							
Self-critical control of the results							
Documentation of the settings							
Assembling and connecting elec-trical drives and hydraulic or							

pneumatic connections								
Testing the assembled devices or subsystems following the documentations, repairing malfunctions and documenting modifications								
Assembly and disassembly of subsystems and devices at aircraft systems								

Unit 16:								
Modification of aircraft systems								
Remarks								
Mobility unit	Assessment				Place	Date	Signature
	observed/ supported	under instruction	under surveillance	independently			
Connecting and assembling subsystems of digital technologies for sending and receiving							
Connecting, assembling and adjusting subsystems of digital technologies for drive and control							
Testing assembly and installation following the documentations, repairing malfunctions and documenting modifications							
Clarifying settings with the engineering/colleagues							
Checking drawings and documentations							
Testing assemblies for modification							
Knowledge about the nominal values							
Repairing malfunctions							
Respecting the health hazards when working with high-voltage current							
Control of the results in cooperation with the safety department							
Documentation of the modifications							
Updating software							

Documenting modified and updated diagrams, settings and versions								
Modification of aircraft systems								

Unit 17:							
Functional checks and system audit of supply units and control systems							
Remarks							
Mobility unit	Assessment				Place	Date	Signa-ture
	observed/ supported	under instruction	under surveil-lance	independ-ently			
Installing, testing and operating power-supply units							
Installing and adjusting electrical devices or sub-systems							
Installing, testing and operating warning, hydrau-lic, pneumatic, fuel, engine and cabin air systems							
Selecting and configuring meas-urement equip-ment and test circuits for check-ing functions of assemblies and devices							
Clarifying work order with engineer-ing/colleagues							
Selecting equipment and test circuits							
Configuring test cir-cuits							
Knowledge about the nominal values							
Performing pre-tests							
Respecting the health hazards when working with high-voltage current							
Critical control of the results							
Documentation of the work steps							
Checking func-							

tions of digital and analog assemblies and devices								
Checking and configuring electromechanical assemblies								
Checking and configuring drive and control devices								
Performing functional checks and system audit of supply units and control systems								

Unit 18:							
Functional checks and system audit of information and communication systems							
Remarks							
Mobility unit	Assessment				Place	Date	Signature
	observed/ supported	under instruction	under surveillance	independently			
Checking and measuring electrical values in aerial systems							
Measuring and configuring sensors and transformers for non-electric values							
Checking information devices							
Checking and configuring warning systems							
Checking the functional relations and technical solutions of communication and information systems on ground and at the aircraft referring the manuals							
Clarifying work order with engineering/colleagues							
Reading and referring to the manual							
Checking functional relations and technical solutions							
Knowledge about the nominal values							
Working following the							

diagrams							
Respecting the health hazards when working with high-voltage current							
Critical control of the results							
Documentation of the test-results							
Modifying and operating sub-assemblies for information- and communication technology							
Checking, measuring and setting of analogue and digital signals							
Updating software							
Functional checks and system audit of information and communication systems							

Unit 19:							
Analysis and repair of malfunctions at bunched circuits in aircraft systems							
Remarks							
Mobility unit	Assessment				Place	Date	Signature
	observed/ supported	under instruction	under surveillance	independently			
Repairing power-supply units by analysing and operating							
Repairing sub-assemblies and devices							
Operating with automated diagnostic systems							
Selecting and configuring measurement equipment and test circuits for checking functions of circuits and devices							
Checking, measuring and setting of analogue and digital signals							
Clarifying work order with engineering/colleagues							
Choosing the right instruments (digital/analogue)							
Checking settings							
Knowledge about the nominal values							
Working following the diagrams							
Respecting the health hazards when working							

with high-voltage current							
Critical control of the results							
Documentation of the measured values							
Checking and setting of electro-mechanical sub-assemblies							
Modifying drawings							
Documenting and analyzing measured values							
Analysis and repair of malfunctions at bunched circuits in aircraft systems							

Unit 20:							
Analysis and repair of malfunctions at supply units and control systems							
Remarks							
Mobility unit	Assessment				Place	Date	Signature
	observed/ supported	under instruction	under surveillance	independently			
Repairing warning, hydraulic, pneumatic, fuel, engine and cabin air systems							
Analysing and repairing units for measurement and control en							
Checking and configuring electromechanical assemblies							
Clarifying work order with the engineering							
Checking drawings							
Checking assemblies for modification							
Knowledge about the technical drawings							
Working following the diagrams							
Respecting the health hazards when working with high-voltage current							
Self-critical control of the results							
Documentation of the modifications							
Measuring and configuring sensors and transformers for non-electric values							
Measuring, testing and adjusting analogue and digital input and							

output signals								
Documenting and analysing results of measurement, modifying technical drawings								
Analysis and repair of malfunctions at supply units and control systems								

Unit 21:							
Analysis and repair of malfunctions at information and communication systems							
Remarks							
Mobility unit	Assessment				Place	Date	Signature
	observed/ supported	under instruction	under surveillance	independently			
Checking functions of analogue and digital devices and assemblies							
Measuring, testing and adjusting analogue and digital input and output signals							
Checking and measuring electrical values in aerial systems							
Testing and adjusting functional units for measurement and control							
Modifying technical drawings							
Clarifying work order with the engineering							
Checking drawings							
Knowledge about the technical drawings							
Working following the diagrams							
Self-critical control of the results							
Documentation of the modifications							
Verifying modifications with engineering							

Documenting and analysing the results of tests and measure-ments								
Modifying and starting radio and IT- assemblies and devices								
Checking func-tional relations and technical solutions on ground and at the aircraft of IT- and communication systems following the technical documents								
Updating software								
Checking and starting alert sys-tems								
Analysis and repair of mal-functions at in-formation and communication systems								

Unit 22:							
Maintenance and inspection of aircraft systems							
Remarks							
Mobility unit	Assessment				Place	Date	Signature
	observed/ supported	under instruction	under surveillance	independently			
Checking functions of analogue and digital devices and assemblies							
Measuring, testing and adjusting analogue and digital input and output signals							
Checking and adjusting electromechanical assemblies							
Checking and measuring electrical values in aerial systems							
Testing, measuring and adjusting sensors and converters of non-electrical quantities							
Testing and adjusting functional units for measurement and control							
Clarifying work order with the engineering							
Checking drawings							
Checking functional units							
Knowledge about the technical drawings							

Working following the diagrams							
Respecting the health hazards when working with high-voltage current							
Self-critical control of the results							
Documentation of the results							
Checking and adjusting functional units of power electronics following the technical documentations							
Documenting and interpreting the results of the measurement							
Maintenance and inspection of aircraft systems							