

ATPL/CPL THEORETICAL TRAINING CHANGES

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Summary. This Paper discusses changes to the CPL/ATPL theoretical training proposed by NPA NPA2016-03. The most important change is the newly proposed subject of 100KSA KNOWLEDGE, SKILLS AND ATTITUDES.

Keywords: theoretical training, CPL/ATPL, KSA,

1. INTRODUCTION

In this article we are trying to focus the attention of ATOs on proposed changes in theoretical training of CPL/ATPL. The upcoming changes will change actual training in many ways and if not reflected properly, they may lead to future problems in CPL/ATPL training certification. Considering the date of this conference, there is still time to address issues in NPA 2016-03 and change the AMC to PART-FCL.

2. CHANGES IN PART-FCL IN 2016

During 2016 there was a significant change in PART-FCL related to theoretical training of CPL/ATPL. This change was brought about by Annex II to ED Decision 2016/008/R as given in the new AMC/GM to PART-FCL. There are two reasons why this AMC/GM is divided in two parts.

The first reason why theoretical training for CPL/ATPL was changed was to achieve a state in which PBN navigation will not require SPA for the operator. The new philosophy of EASA is that PBN is the new standard and to achieve satisfactory theoretical knowledge of all pilots in this area, a new part of theoretical training is introduced, focused solely on PBN. This shall ensure that all pilots be ready for PBN operations without any need of further theoretical training. This will lower the burden on operators because they will not need to prove that their pilots have this knowledge. Today the only way to allow PBN operations is to provide operator's theoretical training for PBN.

To achieve the desirable state that pilots in training will receive adequate training, EASA introduced so called Learning Objectives. Learning Objectives are the second main change introduced by Annex II to ED Decision 2016/008/R.

2.1. Learning Objectives re-introduction

Learning objectives are a feature which existed formerly in JAA materials which are, however, obsolete. Because it is crucial to understand the role of Learning Objectives (LOs), there is direct quotation of the purpose of learning objective in Annex II to ED Decision 2016/008/R .

The LOs define the theoretical knowledge that a student should have acquired upon successful completion of an approved theoretical knowledge course prior to undertaking the theoretical knowledge examinations. They refer to measurable statements of the skills and knowledge that a student should be able to demonstrate following a defined element of training. The LOs are intended to be used by an approved training organisation (ATO) when developing Part-FCL theoretical knowledge elements of the respective course. It should be noted, however, that the LOs do not provide

a ready-made ground-training syllabus for individual ATOs, and should not be seen by organisations as a substitute for thorough course design. Adherence to the LOs should become part of the ATO's compliance monitoring scheme as required by ORA.GEN.200(a)(6). Any consequential changes to the organisation's documentation should not result in an approval process in accordance with ORA.GEN.130(a). In any case, the ATO should remain responsible for ensuring that the respective theoretical knowledge training courses are carried out while taking into account the LOs provided in this AMC.

LOs are meant to contain necessary theoretical training topics, but they are not necessarily sufficient. ATO still have the obligation to amend or add other topics or LOs to prepare the theoretical training syllabus. The first feedback on this regulation suggests that changes needed compared to this document will only be minimal and we may also presume that this document will become the core of all theoretical training syllabuses in all ATO in EASA countries.

As mentioned before the main reason why EASA introduced LOs was the need to publish specific topics to be learnt during theoretical training to allow PBN navigation use without SPA. However, before this AMC to PART-FCL there had been no course syllabus to which PBN theory could be newly added. This is the main reason why the concept of former JAA learning objectives has been revived to enable the addition of PBN theory to be clearly and specifically added to the syllabus.

That leads to several problems. Because the time frame has been quite tight, EASA has had only limited time to prepare these learning objectives. EASA focused on preparing the new part of LOs related to PBN. This part has been introduced as a completely new chapter compared to JAA learning objectives, added to subject 062 Radionavigation as subchapter 062 07 PBN.

But the vast majority of all other LOs in other subjects have been copied directly from JAA learning objectives. The age of these varies but in general these LOs have not been changed for at least 10 years, because they were not mandatory. However, taking into consideration that these learning objectives last revised in the 20th century have now become mandatory, all CPL/ATPL training shall be based on these old documents. The division of LOs in subjects can be found in Table 1 and you may see that there are only small changes against JAA learning objectives.

But as mentioned before, notwithstanding the fact that these LOs are sometimes obsolete and they are missing a significant amount of crucial information developed during the last 10 years, these LOs are officially published in AMC to PART-FCL and hence they are mandatory for all ATOs. Nevertheless, EASA is aware of the fact that these LOs are far from ideal so they introduce a transition period to allow ATOs to change their training manuals and more importantly to give EASA some time to change these LOs in an effort to increase the level and quality of all subjects to a level of comparable to that of the newly developed chapter 062 07 PBN, which was mentioned earlier.

3. Upcoming changes to LOs

As mentioned before, changes in AMC to PART-FCL are not always ideal. EASA plans to change this AMC to "to modernise the learning system and to update the learning objectives and the current professional pilots' syllabi. As technology evolves and the industry is demanding well-prepared pilots, with strongly built core competencies, it is important that student pilots are taught theory which reflects the operational environment they will encounter as professional pilots. It is also important that their theoretical knowledge is oriented towards practical application already from day 1 of their ground training". [2]

For these reasons EASA decided to review and update existing LOs. Changes are made to address advance in technology or legislation. Orientation on practical application is maybe more controversial. EASA decided that pilots do not need such deep knowledge about principles of functioning of a number of systems. The limitation of theoretical principles allows to spend more time on practical applications. On the other hand, pilots will not have as high level of theoretical knowledge as today's pilot and several theoretical chapters to be removed are important for the understanding of the limitations of a given system.

Reference	Subject	Chapter
010	<i>Air law and ATC procedures</i>	A.
020	<i>Aircraft general knowledge</i>	
021	<i>Airframe and systems, electrics, power plant and emergency equipment</i>	B.
022	<i>Instrumentation</i>	C.
030	<i>Flight performance and planning</i>	
031	<i>Mass and balance</i>	D.
032	<i>Performance (Aeroplane)</i>	E.
033	<i>Flight planning and monitoring</i>	F.
034	<i>Performance (Helicopter)</i>	G.
040	<i>Human performance and limitations</i>	H.
050	<i>Meteorology</i>	I.
060	<i>Navigation</i>	
061	<i>General navigation</i>	J.
062	<i>Radio navigation</i>	K.
070	<i>Operational procedures</i>	L.
080	<i>Principles of flight</i>	
081	<i>Principles of flight (Aeroplane)</i>	M.
082	<i>Principles of flight (Helicopter)</i>	N.
090	<i>Communications</i>	
091	<i>VFR communications</i>	O.
092	<i>IFR communications</i>	P.

Table 1 List of subject division [1]

3.1. A proposal for a paradigm shift in initial training for commercial pilots

To address these issues, EASA prepared NPA 2016 – 03. This NPA proposes changes to LOs. What is most important is that this NPA is opened to proposals until September 12, so there is still time to express your opinions.

Changes are made in all subjects and the whole NPA has more than 1000 pages. There will be discussion before this NPA turns into AMC but it is very probable that most of these changes will make it to AMC.

We post here brief comments on several changes across subjects. We mostly aimed those changes at subjects related to PBN, because PBN was the first reason to introduce these LOs.

Remarks to 010 – AIR law

Only eliminated obsolete parts and replaced abbreviations – no changes in legislation incorporated. This is a very important issue because there have been a lot of changes in air law since JAA learning objectives. This chapter from our point of view needs a more thorough update, and the current state proposed in NPA focuses knowledge training more on practical use but does not fulfil the first aim, to keep pace with the development.

Remarks to 030 – Flight performance and planning

There are no new LOs concerning PBN. The main issue is the topic of FMS with PBN. We recognize that PBN will be the most commonly used type of navigation in the foreseeable future. Theoretical knowledge shall be focused more on this area. The amount of LOs aimed at this area is significantly lower than that on conventional navigation. We found it most important to add LOs related to the use of FMS PBN. This area is usually covered only in type rating, but with PBN concept established, it is possible to move part of such training into earlier training stages. In subject 030, it is essential to state limitations and obligations of PBN during flight planning. In other words, the syllabus is still focused primarily on conventional navigation and the time spent on theoretical training of PBN seems still not sufficient, especially in proportion to conventional navigation.

Remarks to 062 Radionavigation

The most important issue concerning the whole NPA is connected with GNSS, part of 062. We found that information about the various GNSS signals and services planned in the nearest future is completely missing. L5 E5 and LC will be probably in operation sooner before this NPA turns in AMC. The L5 signal is meant to be the new standard for aviation. Glonass will introduce its own SBAS system. Multi-constellation of several GNSS systems will solve problems with achievability and will change the flight planning process, etc. This information is essential and important and shall be incorporated in theoretical training. Specifically proposed LOs are in the second part of this document.

Other issue in 062 is inadequate explanation of several types of RNAV/RNP operation. We are not sure if this agenda is part of subject 010 or 062, but the information about PBN in this NPA is perceived as scattered across different subject and it may help to consolidate it more.

4. New subject 100KSA - Knowledge, Skills and Attitudes

The NPA also introduces a new subject. Subject 100 KSA - Knowledge, Skills and Attitudes. This new subject definition seems a little bit vague. The main focus shall be the development of proper skills and attitudes, such as leadership, determination, teamwork, communication, etc. Future pilots will be challenged to apply the already acquired theoretical knowledge to practical exercises involving their decision-making abilities and their capacity to think under pressure, identify and correctly manage threats and errors, developing the right attitudes at assessing a problem to find the correct solution.

Subject 100 KSA seems to be meant to connect theoretical training, practical training and CRM/MCC training. Because this type of training shall be slightly different from the existing one, it also introduces two new verbs which shall determine the purpose of the LOs.

The new verbs are ‘demonstrate’ and ‘show’, where ‘demonstrate’ means the selection and use of the appropriate KSA within a strategy to achieve an effective outcome. It signifies a high taxonomy level and would normally be assessed using multiple indicators from more than one core competence. — ‘show’ means the acquirement of knowledge, skill or attitudes. It signifies a lower taxonomy level than ‘demonstrate’ and would normally be assessed by a single indicator.

Main chapters of 100KSA are:

COMMUNICATION - more similar to crew resource management than to subject 090 communications (seems to some extent like duplication of existing chapters)

MANAGEMENT OF FLIGHT PATH — automation - this chapter is described only in vague, it seems that it shall be aimed at the use of computer based training in area of FMS operation or autopilot usage. The main problem is that there is no generic computer simulator. All usable computer based simulators are type specific.

LEADERSHIP AND TEAMWORK and PROBLEM-SOLVING AND DECISION-MAKING - again very similar to CRM/MCC training and subject 040.

WORKLOAD MANAGEMENT – this chapter may incorporate knowledge from previous chapters to teach how to distribute workload between the airplane systems and the pilot.

UPSET PREVENTION AND RECOVERY TRAINING (UPRT) – training how to avoid upset.

MENTAL MATHS – 1-60 rule, computation without any device, headwind crosswind – this is a combination of elementary school mathematics and subject 061 navigation.

From the list of chapters in subject 100, it seems that this subject shall bring about several changes in theoretical training to make it more close to CRM and practical training. On the other hand, one subject consists of very different topics such as human health, crew resource management, FMS usage, upset presentation and navigational computation. Theoretical knowledge instructors should have a very broad area of knowledge.

However, it must be mentioned that it is not sure if subject 100 will actually be incorporated in Part-FCL. NPA 2013-03 presents three possible scenarios of development.

1. No changes – this is unacceptable because the necessary knowledge is not covered by the existing syllabus.
2. Changes in existing subjects 010-090.
3. Update of subjects 010 to 090 (Option 2) and the introduction of a new LO area (Area 100 KSA) on knowledge, skills and attitudes.

Option 2 will prevent the risks associated with learning outdated information. However, the ICAO core competencies are not sufficiently developed, and training effectiveness and retention is restricted as ‘learning by doing’ during ground training is not required.

Option 3 with the additional area of 100 KSA LOs, EASA believes, students will be better prepared for flight training, as they will have to demonstrate their ability already in the classroom instead of only in the flight deck environment. Practical exercises where they should apply the theory already learned, will challenge them to face difficult situations against a deadline, in the classroom or other suitable environments, stimulating them to find timely solutions.

Let us leave for now the planned outcomes of both options in terms of safety and let us focus on a more important aspect of this change for ATOs.

EASA estimates that the change of LOs will be associated with significant costs. These costs are connected with the preparation of presentations, instructor additional costs, learning material preparation, management of courses and changes in ATO documentation. These costs are estimated at 40 000 EUR for option 2 and 58 000 EUR for option 3. These costs are calculated for larger ATOs. Smaller ATOs with units of pilots are estimated to be about half of this amount.

The costs are based on the UK CAA approximations only and on its current scheme of charges and may vary. However, it is important to mention that if or when these changes are introduced in PART-FCL, they will incur significant additional costs for every ATO which provide CPL/ATPL training. Because of that, it is very important for ATOs to

address this issue when there is still time to state what is deemed necessary and what only seems as additional burden on ATOs.

5.CABILAVI project

This research was partially funded by EU H2020 project CABILAVI (<http://cabilavi.gnss-centre.cz/>) which is aimed at improving the use of GNSS in Europe. As part of this research we are also preparing changes to PPL and LAPL theoretical training. Because EASA initiative for these licenses is still in the discussion phase and there is no NPA today, we would like to use this opportunity to address all subjects interested in PPL and LAPL training and to ask for any comments about this topic in order to incorporate them in our outputs for the EU.

References

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