



**ČESKÉ VYSOKÉ UČENÍ TECHNICKÉ V PRAZE**  
**FAKULTA DOPRAVNÍ**

**KRISTÝNA JUPOVÁ**  
**MANUAL FOR CONTROLLED 0-ATPL FROZEN**  
**MODULAR TRAINING**

Bakalářská práce

**2017**



**K621**..... **Ústav letecké dopravy**

## **ZADÁNÍ BAKALÁŘSKÉ PRÁCE** (PROJEKTU, UMĚLECKÉHO DÍLA, UMĚLECKÉHO VÝKONU)

Jméno a příjmení studenta (včetně titulů):

**Kristýna Jupová**

Kód studijního programu a studijní obor studenta:

**B 3710 – PIL – Profesionální pilot**

Název tématu (česky): **Manuál řízeného modulového výcviku 0-ATPL  
frozen**

Název tématu (anglicky): Manual for Controlled 0-ATPL Frozen Modular Training

### **Zásady pro vypracování**

Při zpracování bakalářské práce se řiďte osnovou uvedenou v následujících bodech:

- Popis řízeného modulového výcviku
- PPL výcvik
- Time building
- Noční výcvik
- IR výcvik
- MEP výcvik+ IR MEP
- CPL výcvik
- Závěrečné zkoušky



Rozsah grafických prací: dle pokynů vedoucího bakalářské práce




Rozsah průvodní zprávy: minimálně 35 stran textu (včetně obrázků, grafů a tabulek, které jsou součástí průvodní zprávy)

Seznam odborné literatury: Nařízení Komise (EU) č. 1178/2011  
AIP ČR, LIS ŘLP ČR, s.p.  
Učebnice Oxford Aviation Academy (PPL/ATPL)

Vedoucí bakalářské práce: **Ing. Michal Markovič**  
**doc. Ing. Bc. Jakub Hospodka, Ph.D.**

Datum zadání bakalářské práce: **28. října 2016**  
(datum prvního zadání této práce, které musí být nejpozději 10 měsíců před datem prvního předpokládaného odevzdání této práce vyplývajícího ze standardní doby studia)

Datum odevzdání bakalářské práce: **28. srpna 2017**  
a) datum prvního předpokládaného odevzdání práce vyplývající ze standardní doby studia a z doporučeného časového plánu studia  
b) v případě odkladu odevzdání práce následující datum odevzdání práce vyplývající z doporučeného časového plánu studia

  
doc. Ing. Stanislav Szabo, PhD. MBA              
vedoucí      prof. Dr. Ing. Miroslav Svítek, dr. h. c.  
Ústavu letecké dopravy      děkan fakulty

Potvrzuji převzetí zadání bakalářské práce.

  
Kristýna Jupová  
jméno a podpis studenta

V Praze dne ..... 28. října 2016

## **Prohlášení**

Předkládám tímto k posouzení a obhajově bakalářskou práci zpracovanou na závěr studia na ČVUT v Praze Fakultě dopravní.

Prohlašuji, že jsem předloženou práci vypracovala samostatně a že jsem uvedla veškeré použité informační zdroje v souladu s Metodickým pokynem o dodržování etických principů při přípravě vysokoškolských závěrečných prací.

Nemám závažný důvod proti užívání tohoto školního díla ve smyslu §60 Zákona č. 121/2000 Sb., o právu autorském, o právech souvisejících s právem autorským a o změně některých zákonů (autorský zákon).

V Praze 28. 8. 2017



Kristýna Jupová

## **Poděkování**

Tímto bych ráda poděkovala panu Ing. Michalu Markovičovi za odborné vedení při psaní bakalářské práce a za poskytnutí možnosti získání praxe týkající se tématu. Dále bych ráda poděkovala panu doc. Ing. Bc. Jakobovi Hospodkovi Ph.D. za cenné připomínky ke struktuře a obsahu práce.

**ČESKÉ VYSOKÉ UČENÍ TECHNICKÉ V PRAZE  
FAKULTA DOPRAVNÍ**

**MANUAL FOR CONTROLLED 0-ATPL FROZEN  
MODULAR TRAINING**

**ABSTRAKT**

Cílem této bakalářské práce je zpracovat manuál pro studenty Řízeného modulového výcviku ATPL(A), který detailně popisuje průběh jednotlivých modulů a obsahuje doporučení vhodných studijních materiálů včetně rad pro teoretickou a praktickou přípravu.

**ABSTRACT**

The aim of this bachelor thesis is to create a manual for students of Controlled Modular Training ATPL(A), which in details describes particular modules of the training and also contains recommendation of suitable study materials including advice for practical and theoretical preparation.

**KLÍČOVÁ SLOVA**

Výcvik, osnova, letoun, licence, letecká škola, ATPL(A) výcvik

**KEY WORDS**

Training, syllabus, aeroplane, licence, flight school, ATPL(A) training

# TABLE OF CONTENTS

<b>TABLE OF CONTENTS .....</b>	<b>4</b>
<b>ABBREVIATIONS .....</b>	<b>6</b>
<b>1 INTRODUCTION.....</b>	<b>9</b>
<b>2 DESCRIPTION OF CONTROLLED MODULAR TRAINING .....</b>	<b>11</b>
<b>3 PPL(A) TRAINING.....</b>	<b>12</b>
3.1 REQUIREMENTS.....	12
3.2 THEORETICAL TRAINING .....	13
3.3 PRACTICAL TRAINING .....	14
3.3.1 Phase II. Aeroplane Piloting Technique .....	14
3.3.2 DIFFERENCES TRAINING .....	21
3.4 THEORY EXAMS AT CAA .....	22
3.5 PRACTICAL TRAINING .....	22
3.5.1 Phase III. Navigation Flights.....	22
3.5.2 Phase IV. Optional Exercises.....	26
3.6 SKILL TEST.....	26
<b>4 ICAO ENGLISH EXAM .....</b>	<b>27</b>
<b>5 TIME BUILDING – PART I.....</b>	<b>28</b>
5.1 ABROAD FLIGHTS .....	28
5.2 PLANNING AND NAVIGATION SOFTWARE .....	29
5.3 SUITABLE DESTINATIONS FOR TIME BUILDING .....	29
<b>6 ATPL(A) THEORY 650 .....</b>	<b>30</b>
6.1 STUDY MATERIALS USED BY OTHER FLIGHT SCHOOLS .....	31
<b>7 NIGHT TRAINING .....</b>	<b>32</b>
7.1 THEORETICAL TRAINING .....	32
7.2 PRACTICAL TRAINING .....	32
<b>8 IR(A) TRAINING .....</b>	<b>35</b>
8.1 REQUIREMENTS.....	35
8.2 BEFORE THE FIRST LESSON .....	35
8.2.1 Knowledge of IFR Charts.....	35
8.2.2 Knowledge of Instruments .....	37
8.3 PRACTICAL TRAINING .....	39
8.3.1 Phase II. Basics of Instrument Flying (SIM) .....	39
8.3.2 Phase III. Basics of Instrument Flying (SEP) .....	41
8.3.3 Phase IV. Procedural Instrument Flight - On Approach (SIM) .....	42
8.3.4 Phase V. Procedural Instrument Flight - On Route (SIM) .....	43
8.3.5 Phase VI. Procedural Instrument Flight On Route and On Approach (SEP).....	44
8.4 FLIGHT PLANNING SOFTWARE FOR IFR FLIGHTS .....	46

<b>9</b>	<b>TIME BUILDING – PART II</b>	<b>47</b>
<b>10</b>	<b>MEP(A) + IR MEP(A) TRAINING</b>	<b>48</b>
10.1	REQUIREMENTS	48
10.2	THEORETICAL TRAINING	48
10.3	PRACTICAL TRAINING	48
10.3.1	Phase II. Piloting Technique	48
<b>11</b>	<b>TIME BUILDING – PART III</b>	<b>51</b>
<b>12</b>	<b>CPL(A) TRAINING</b>	<b>52</b>
12.1	REQUIREMENTS	52
12.2	PRACTICAL TRAINING	52
<b>13</b>	<b>FINAL EXAMS</b>	<b>53</b>
<b>14</b>	<b>FIND EMPLOYMENT</b>	<b>54</b>
<b>15</b>	<b>CONCLUSION</b>	<b>55</b>
	<b>REFERENCES</b>	<b>56</b>



## ABBREVIATIONS

ADF	Automatic direction finder
AIP	Aeronautical Information Publication
AME	Aero-Medical Examiner
ASI	Air speed indicator
ATIS	Automatic terminal information service
ATO	Approved training organisation
ATPL	Airline transport pilot licence
ATS	Air traffic services
BC	Back-Course
CAA	Civil aviation authority
CBT	Computer-Based training
CDFA	Continuous descent final approach
CDI	Course deviation indicator
Complex aeroplane	aeroplane certified for the carriage of at least 4 persons that has a variable pitch propeller and retractable landing gear
CPL(A)	Commercial pilot licence (aeroplanes)
Cross-country flight	Flight between a point of departure and a point of arrival following a pre-planned route, using standard navigation procedures
CTR	Control zone
DME	Distance measuring equipment
EASA	European Aviation Safety Agency
FAA	Federal Aviation Administration
FAF	Final approach fix
FAP	Final approach point
FI	Flight instructor

FNPT	Flight and navigation procedures trainer
G1000	Garmin G1000
GP	Glide path
HSI	Horizontal situation indicator
IBS	Integrated briefing system
ICAO	International civil aviation organization
IFR	Instrument flight rules
ILS	Instrument landing system
IR(A)	Instrument rating (aeroplanes)
LOC	Localizer
MCC	Multi-crew cooperation
MEP	Multi-engine piston
MPL	Multi-crew Pilot Licence
NDB	Non-directional beacon
NOTAM	Notice to airmen
OBS	Omni bearing selector
PIC	Pilot-In-Command
POH	Pilot's operating handbook
PPL(A)	Private Pilot Licence (aeroplanes)
QDM	Magnetic bearing to station
QDR	Magnetic bearing from station
RMI	Radio magnetic indicator
RNA	Radio navigation aid
RNAV	Area Navigation
R/T	Radiotelephony
RWY	Runway

SEP	Single-engine Piston
SID	Standard instrument departure
SOP	Standard operating procedure
SSR	Secondary surveillance radar
STAR	Standard instrument arrival
TOD	Top of descent
TT	Total time
U/S	Unserviceable
VFR	Visual flight rules
VNAV	Vertical navigation
VOR	VHF Omni-directional Range

# 1 INTRODUCTION

The reason why I have decided to write this thesis is to help students, not only the ones from abroad, to orient in the process of flight training, obtaining the licence and dealing with all the things connected with it. This document should serve as a guidance material which will answer questions of student during his/her training. It will also prevent flight school ground staff from forgetting to forward some essential piece of information to clients, which could cause problems in future. This is why this document should also serve as a material for standardisation of processes of ATO.

Proposed manual covers whole content of Controlled Modular ATPL(A) pilot training, which is further described in the following chapters. The main advantage of this type of training is the fact that students perform whole training in one ATO, it means they are supervised during whole duration by flight school's ground staff and instructors' team.

Chapters in this thesis, which relates to particular training modules, includes brief introduction about specific requirements and ways how to meet them, theoretical and practical training syllabus with indicated concrete study materials and description of final exams. Recommended study materials include not only official textbooks, but also other various sources, such as videos, CBTs, web-based applications, etc., which makes studying more interesting and acceptable for students.

The main sources of study materials mentioned in the thesis are from my own experience with professional pilot training in flight school F AIR.

The whole manual is adjusted for operations and methodology of ATO F AIR, which is one of the largest flight schools in the central Europe and the first private flight school established in the Czech Republic, at 1990. Main base of this flight school has a great position in the middle of the Czech Republic at Benešov airport - LKBE. F AIR provides a wide range of trainings including complete 0-ATPL(A) training. The company has spreaded also into two other airports – Brno and Příbram and employs about 40 employees. Since its establishment F AIR has already trained hundreds of foreign students from about 45 countries from all over the world who are annually successfully accepted by worldwide airlines.

The major growth in demand for trainings in our country from foreign clients has mainly been seen in the last 3 years. The reason, why people choose the Czech Republic as a place of their training is because of low prices of the training compared to for example western Europe, good quality of the training and definitely also because of aviation facilities in the Czech Republic. It means that there are many available airports in our country in a very good condition, with low fees, great services from our ATS and in general, the support from the

government to aviation in the Czech Republic is on a high standard. What I think is really important, because aviation is strongly rooted in our history and national character. Moreover, strategic position of our country in the middle of Europe could be profited from as travelling around the continent is easy. The weather here is also quite stable during the year, what is important for the fluency of trainings.

## 2 DESCRIPTION OF CONTROLLED MODULAR TRAINING

Controlled Modular 0-ATPL Training is considered as a training where all its parts are performed solely in one ATO, in our case ATO F AIR. In this special programme, consequence of particular trainings is given and also progress in particular phase is strictly controlled by the flight school. The major difference between non-controlled modular training and this training is for example in the Time building part, where students have prescribed training programme which includes specific cross-country flights with routing mostly directed abroad, which is much more effective than spending the Time Building part of the training by towing or just flying around the Czech Republic for pleasure. Unlike in the Integrated course, in modular course pilots are allowed to enroll and it is also recommended by ATO as means of extending students' skills with additional ratings like Aerobatic, Mountain flying, etc. Another advantage of this type of training compared to the Integrated one is the fact that students can suspend the training anytime because the training is not time limited. The shortest time to pass all parts of training is around 14 months, depending on students' skills etc. As far as price is concerned, costs for Controlled Modular Training or Integrated training are more or less similar, the price in F AIR flight school starts at 37 000 €. In recent years new and popular MPL training costs around 79 000 €, but includes type rating [1].

Here is stated the sequence of the trainings in Modular course and detailed syllabus of the Controlled Modular Training is described in the following chapters. There are more options how to compose the trainings, but I chose the most common one.

- 1) PPL(A) training including theoretical exams, skill test and ICAO english examination
- 2) Time building part I
- 3) ATPL(A) theory 650 including exams
- 4) Night training
- 5) IR SEP(A) training including skill test
- 6) Time building part II
- 7) MEP(A) + IR MEP(A) training including skill tests
- 8) Time building part III
- 9) CPL(A) training including skill test

### 3 PPL(A) TRAINING

PPL(A) Training is the first step for each pilot who wants to start the career of professional pilot in modular training course. Basic training consists of 100 hours of theory out of which around 40 hours is with a ground instructor and the rest is self-study using books, presentations, videos, CBTs, etc. Practical training is created by minimum 45 hours (including minimum 25 hours of dual flight instruction and 10 hours of supervised solo flight time) [2]. Usually students with no prior experience exceed this minimum time. The training consists of basic piloting techniques, traffic patterns, solo flights, navigation flights, basics of instrument flying and other parts which are presented in the chart Syllabus of PPL(A) practical training. PPL(A) training is performed on SEP aeroplanes like Cessna 172, Cessna 150, Piper PA-28, Tecnam P2008 JC.

#### 3.1 REQUIREMENTS

- 1) Age: For the first solo flight student shall be over 16 years old, the applicant for the licence shall be at least 17 years old [2].
- 2) Medical fitness: For the first solo flight student needs to obtain at least Medical Certificate II. class. I would like to recommend to students to undergo the examination for Medical certificate I. class before commencing the PPL(A) training, to be sure that they are not limited by any medical disorder. Medical certificate I. class is required for issuing CPL(A).

In the Czech Republic Medical Certificate I. class may be obtained only in the Institute of Aviation Medicine in Prague – Dejvice. The testing there takes about 2 days during which various physical and psycho tests are held.

It is necessary to book the examination in advance and it is good to ask the staff which documents it is necessary to bring (usually records from practising physician). The price of the examination is about 11 000 CZK. Other information may be found here: <http://www.ulz.cz/en>

Medical certificate I. class needs to be revalidated annually in the issuing institute or by approved AME.

- 3) For the first flight student needs to have a Pilot logbook where he/she will record all his/her flights and exercises. There are many kinds of logbook but student has to buy one which is according to Part-FCL. [2]

- 4) Clients do not have to have own headsets, it is possible to borrow them for the flight at F AIR dispatching.
- 5) Radiotelephone Operator's Certificate of Aeronautical Mobile Service: Before the first solo flight student needs to obtain this certificate to be able to communicate via radio on his/her own. The first possibility where to pass the examination is at the Czech Telecommunication Office, but it is possible to take the examination here only in the Czech language. There is a possibility to choose between the General Certificate VFL (test+oral exam) and Restricted Certificate OFL (test). The Restricted Certificate can be used only in the Czech Republic. To register for the exam student needs to send the authority the filled in form+photo (see the websites below) and choose the term of the exam. The price of the exam is 600 CZK (including issuance of the certificate). [3] Other information, including test questions, can be found here: <https://www.ctu.eu/get-professional-competence-certificate-basis-test>

For foreign students there is the possibility to pass this exam via Dutch examiner through F AIR. The price of the examination is 120 € and when the student registers for the exam he/she receives study materials from F AIR staff.

### **3.2 THEORETICAL TRAINING**

Before the first flight it is necessary to pass at least such an amount of theory that is required for smooth performing of flight training (around 25 hours). The rest of the theory might be done simultaneously with the practical training.

The syllabus of theoretical training may be found in this link from page 115:

<https://www.easa.europa.eu/system/files/dfu/AMC%20and%20GM%20to%20Part-FCL.pdf>

The recommended study books are Oxford Aviation PPL books (Picture 1) and CBTs.





Picture 1: Oxford Aviation PPL Books [4]

Czech speaking students may also use textbook “Učebnice Pilota” for better understanding of the topics in their mother language. [28]

### 3.3 PRACTICAL TRAINING

#### 3.3.1 Phase II. Aeroplane Piloting Technique

Syllabus of Phase II. is indicated at Chart 1 and 2.

Chart 1: Syllabus of PPL(A) practical training – Aeroplane Piloting Technique Part 1 [42]

Task No.	Contents	Dual/ <i>Solo</i>		Recommended study materials
		flights	hours	
1	<b>Ground preparation - I. part</b> - aeroplane description, performance, limitations - on board familiarization with controls, instruments, radio-equipment, SSR transponder		2:00	POH SSR Transponder, Radio Manual and Avionics manual (F AIR e-learning) for Czech students also: Učebnice pilota chapter 1.1 [30]

	<p>- normal procedures-aeropleane pre flight inspection, star up procedures, taxi procedures-wind effect, emergency procedures</p>			<p>POH</p> <p>Aeroplane SOP (F AIR e-learning)</p> <p>Engine start up: <a href="https://www.youtube.com/watch?v=-yVMskFQZsw">https://www.youtube.com/watch?v=-yVMskFQZsw</a></p> <p>Taxi procedures-wind elimination: <a href="https://www.facebook.com/FAA/photos/a.179563502085280.35688.174311909277106/1054505621257726/?type=3&amp;theater">https://www.facebook.com/FAA/photos/a.179563502085280.35688.174311909277106/1054505621257726/?type=3&amp;theater</a></p> <p>Jeppesen private pilot: chapter 4-9 [5]</p> <p>Taxi procedures: <a href="https://www.youtube.com/watch?v=h3gC96bflyw">https://www.youtube.com/watch?v=h3gC96bflyw</a></p> <p>Chapter 2 Ground operations [32]</p> <p>for Czech students also: Učebnice pilota chapter 1.3 [30]</p>
	<p>- familiarization with airport and its area, refueling</p>			<p>LKBE charts: <a href="http://lis.rlp.cz/vfrmanual/actual/lkbe_text_en.html">http://lis.rlp.cz/vfrmanual/actual/lkbe_text_en.html</a></p> <p>Jeppesen private pilot: chapter 4-17, chapter 2-30 [5]</p> <p>OA JAA/EASA PPL Air law and operational procedures: Aerodromes [25]</p>
2	<b>Familiarization flight</b>	1	0:15	See Task No. 1
3	<p><b>Ground preparation - II. part</b></p> <p>- effect of controls, flaps position, trim</p>		1:30	<p>POH</p> <p>Jeppesen private pilot: chapter 2-4, chapter 3-12 [5]</p>

				<p>Aircraft trim:  <a href="https://www.youtube.com/watch?v=FPfR9tQ1ksl">https://www.youtube.com/watch?v=FPfR9tQ1ksl</a></p> <p>OA JAA/EASA PPL Aircraft general and principles of flight: Flight and trimming controls [25]</p> <p>for Czech students also: Učebnice pilota chapter 2.1-2.3, 2.6 [30]</p>
	- controlling of mixture, carburettor heat, ventilation system			<p>POH  Jeppesen private pilot: chapter 2-18 [5]</p>
	- R/T communication			<p><a href="http://lis.rlp.cz/vfrmanual/actual/enr_6_en.html">http://lis.rlp.cz/vfrmanual/actual/enr_6_en.html</a></p> <p>OA JAA/EASA PPL VFR RT Communications [25]</p>
4	<b>Flight controls operation demonstration</b>	1	0:45	<p>See Task No. 3  Chapter 3 Basic Flight Maneuvers [49]</p>
5	<b>Simple piloting and elements connection</b> - level flight	2	1:30	<p>Chapter 3 Basic Flight Maneuvers [49]</p>
	- climbing, descending			<p>Jeppesen private pilot: chapter 3-46, chapter 3-51, chapter 8-16 [5]</p> <p>Chapter 3 Basic Flight Maneuvers [49]</p>
	- glide without engine power			<p>Jeppesen private pilot: chapter 3-52 [5]</p>
	- turns (15°/30°) - horizontal, climbing, descending			<p>Jeppesen private pilot: chapter 3-56 [5]</p> <p>Chapter 3 Basic Flight Maneuvers [49]</p> <p>for Czech students also: Učebnice pilota chapter 2.4 [30]</p>

6	<b>Low air speed flights</b> - flights at minimum safe speed - slips	1	0:45	for Czech students also: Učebnice pilota chapter 3 and 7 [30]
7	<b>Ground preparation</b>		1:30	Aeroplane SOP (F AIR e-learning) Jeppesen private pilot: chapter 4-18 [5]  Chapter 8 Approaches and Landings [48]
	- traffic pattern, procedures, shape, wind drift elimination, noise abatement procedures			See Task No. 9  Chapter 8 Approaches and Landings [48]
	- faulty landing correction, go-around			Jeppesen private pilot: chapter 4-2 [5] OA JAA/EASA PPL Air law and operational procedures: Rules of the air [25]
	- rules of priority and avoidance, crash avoidance and precaution			
8	<b>Traffic pattern flights</b>	35	3:30	See Task No. 7  Chapter 7 Airport Traffic Patterns [31]  for Czech students also: Učebnice pilota chapter 5 [30]
9	<b>Faulty landings correction</b>	8	1:00	<a href="https://www.youtube.com/watch?v=SScI7GjNzDE">https://www.youtube.com/watch?v=SScI7GjNzDE</a>  <a href="https://www.youtube.com/watch?v=PGSJr_uFkN0E">https://www.youtube.com/watch?v=PGSJr_uFkN0E</a>  for Czech students also: Učebnice pilota chapter 6 [30]
9a	<b>Low air speed flights</b> - aeroplane recovery from initial and full overpitching (stalls)	1	1:15	Aeroplane SOP (F AIR e-learning)  Jeppesen private pilot: chapter 3-36 [5]

				<p>Chapter 4 Maintaining Aircraft Control: Upset Prevention and Recovery Training [33]</p> <p>for Czech students also: Učebnice pilota chapter 4.1 [30]</p>
	- spin precaution			<p>Aeroplane SOP (F AIR e-learning)</p> <p>Jeppesen private pilot: chapter 3-38 [5]</p> <p>OA JAA/EASA PPL Aircraft general and principles of flight: Stalling and Spinning [25]</p> <p>Chapter 4 Chapter 4 Maintaining Aircraft Control: Upset Prevention and Recovery Training [33]</p> <p>for Czech students also: Učebnice pilota chapter 4.2 [30]</p>
10	<p><b>Ground preparation</b></p> <p>- engine shut down during ground roll, airborne, in traffic pattern</p> <p>- blocked flaps, brakes failure</p>		0:45	<p>POH</p> <p>Aeroplane SOP (F AIR e-learning)</p> <p>Chapter 16 Emergency procedures [49]</p>
11	<p><b>Emergency and non-standard traffic pattern procedures</b></p> <p>- aborted take-off</p>	10	2:00	<p>POH</p> <p>Aeroplane SOP (F AIR e-learning)</p>
	<p>- engine shut down during ground roll, airborne, in traffic pattern</p>			<p>POH</p> <p>Aeroplane SOP (F AIR e-learning)</p> <p>for Czech students also: Učebnice pilota chapter 10 [30]</p> <p>Chapter 16 Emergency procedures [49]</p>
	- traffic pattern without use of ASI, altimeter			

	- flapless landing, landing without brakes			POH
12	<b>Ground preparation</b> - blocked control and flaps, carburettor icing, engine fire, cockpit, electrical installation fire		0:20	POH Aeroplane SOP (F AIR e-learning) for Czech students also: Učebnice pilota chapter 12.6-12.7 [30] Chapter 16 Emergency procedures [49]
<b>Before examination to 1. solo flight it is necessary to arrange liability insurance with F AIR staff</b>				
13 P	<b>Examination before 1. solo flight</b>	3	0:20	See Tasks above
14	<b>1. solo traffic pattern</b>	2	0:10	See Tasks above
15	<b>Inspection traffic pattern flights</b>	3	0:20	See Tasks above
16	<b>Solo traffic patterns</b>	20	2:00	See Tasks above

Chart 2: Syllabus of PPL(A) practical training – Aeroplane Piloting Technique Part 2 [42]

Task No.	Contents	Dual/Solo		Recommended study materials
		flights	hours	
17	<b>Piloting technique</b> - steep turns up to 45° - aeroplane recovery from initial and full overpitching (stalls) in turn, spin precaution - aeroplane recovery from unusual flight attitudes - spirals, aeroplane recovery from spirals - flight at speeds getting closer to Vno or Vne	2	1:30	POH Aeroplane SOP (F AIR e-learning) Chapter 9 Performance maneuvers [49] for Czech students also: Učebnice pilota chapter 11 [30]
18	<b>Ground preparation</b> - reasons for engine shut down, recognition and precaution		0:30	Chapter 16 Emergency procedures [49]
	- procedures for engine and systems fire			POH Aeroplane SOP (F AIR e-learning)

	- emergency landing - field selection, gliding distance consideration, procedures, procedures after landing			Chapter 16 Emergency procedures [49]
	- R/T communication			POH  Aeroplane SOP (F AIR e-learning) for Czech students also: Učebnice pilota chapter 12 [30]  Chapter 8 Approaches and Landings [48]  Chapter 16 Emergency procedures [49]
				Jeppesen private pilot: chapter 5-32 [5] OA JAA/EASA PPL VFR RT Communications [25]
19	<b>Emergency landings into terrain</b>	1	1:15	See Task No.18
20	<b>Ground preparation</b> - reasons for precautionary landing - procedures – field selection, low pass – field check, traffic pattern, downwind procedures, approach		0:35	for Czech students also: Učebnice pilota chapter 13 [30]
21	<b>Precautionary landings</b>	1	1:15	See Task No. 20
22	<b>Piloting technique</b> - turns up to 45°, climb and descent, low air speed flights, recovery from initial and full overpitching (stall)	2	1:00	See Tasks above
23	<b>Ground preparation</b>		1:00	
24	<b>Basics of instrument flights</b>	1	1:00	For this exercise students get special glasses at F AIR dispatching: <a href="http://ecx.images-amazon.com/images/I/41xN20qu-zL.01_SL500_.jpg">http://ecx.images-amazon.com/images/I/41xN20qu-zL.01_SL500_.jpg</a>

<b>TOTAL PHASE II.</b>	<b>70/24</b>	<b>16:40/ 3:10</b>	
------------------------	--------------	------------------------	--

**3.3.2 DIFFERENCES TRAINING**

After completion of Phase II. of PPL(A) training it is possible to attend Differences Training for another type of aeroplane. When student finishes complete differences training including solo flight, then the new airplane type is logged in first pages of student’s Logbook.

**3.3.2.1 Differences Training to Cessna 172 G1000**

In case that student will retrain for example for Cessna 172 G1000, it is necessary to get used to the new aeroplane characteristics with the use of POH (knowledge is verified by test in F AIR) and the Garmin Avionics. For familiarization with G1000 I would recommend application for iOS called Jeppesen Garmin G1000 Mobile Training (Picture 2).

This interactive application with many exercises audiovisually instructs how to operate the G1000 during various phases of IFR or VFR flight. We can find there chapters like: Using Bugs, Audio Panel Tour, Engine Leaning, Creating VNAV Waypoints and many more. Nearly every exercise starts with “Demo mode” - explanation of the chosen part of G1000 (by narration, text and graphics) and is finished by “Training mode” where student press the particular bugs according to the instructions. The price of the package of VFR+IFR part is 155,99 €, but it is possible to purchase separately VFR part and IFR part. [6]



Picture 2: Jeppesen Garmin G1000 Mobile Training [7]



### **3.4 THEORY EXAMS AT CAA**

In this part of training, students should start to plan their theoretical exams at CAA. The registration for the exams is done by F AIR staff, exam days are published on CAA web sites. For enrolment the F AIR staff sends to CAA application form and statement about completion of theoretical training. Original has to be delivered to CAA on the day of the exam.

Student has to take paper test from 9 subjects (Air law and ATC procedures, Human performance, Meteorology, Communication, Principles of flight, Operational procedures, Flight performance and planning, Aircraft general knowledge and Navigation), all in one day. Students need to achieve at least 75 % from each subject. In case that he/she fails in some subject it is possible to repeat the subject in next published term in next month. However, for each subject student has maximum 4 attempts and all the exams must be finished in 18 months and maximum in 6 blocks. After successful completion of all the subjects, student obtains a certificate which is valid 24 months, it means that in this period student needs to obtain PPL(A). The price of the exam, for all subjects is 5 000 CZK and has to be paid on a cash desk before the exam. [8]

Examples of questions in tests at CAA might be found here:

<http://www.aeroweb.cz/testy/default.aspx>

### **3.5 PRACTICAL TRAINING**

#### **3.5.1 Phase III. Navigation Flights**

Syllabus of Phase III. is indicated at Chart 3.

Necessary aids for navigation flights: students will need an ICAO map of the Czech Republic 1:500 000, it is good to buy one in the package with Aerodrome database from Avion, then navigation triangle, calculator, pencil, rubber and navigation computer E6-B. Manual for navigation computer:

[http://e-atpl.net/pdf/Jeppesen\\_E6B\\_flight\\_computer\\_manual.pdf](http://e-atpl.net/pdf/Jeppesen_E6B_flight_computer_manual.pdf)

Chart 3: Syllabus of PPL(A) practical training – Navigation Flights [42]

Task No.	Contents	Dual/Solo		Recommended study materials
		flights	hours	
25	<p><b>Ground preparation (performed a day before flight)</b></p> <p>- flight planning, flight log filling, meteo-documentation analysing, NOTAMs analysing</p>		2:00	<p>ICAO chart 1:500 000</p> <p>Aerodrome database</p> <p>Tips:  <a href="http://lis.rlp.cz/vfrmanual/actual/gen_2_en.html">http://lis.rlp.cz/vfrmanual/actual/gen_2_en.html</a></p> <p>Chart symbols:  <a href="http://lis.rlp.cz/ais_data/aip/data/valid/g2-3.pdf">http://lis.rlp.cz/ais_data/aip/data/valid/g2-3.pdf</a></p> <p>Sunrise/sunset:  <a href="http://lis.rlp.cz/ais_data/aip/data/valid/g2-7.pdf">http://lis.rlp.cz/ais_data/aip/data/valid/g2-7.pdf</a></p> <p>Airspace classification:  <a href="http://lis.rlp.cz/vfrmanual/actual/enr_1_en.html">http://lis.rlp.cz/vfrmanual/actual/enr_1_en.html</a></p> <p>VFR flights operation  <a href="http://lis.rlp.cz/ais_data/aip/data/valid/e1-2.pdf">http://lis.rlp.cz/ais_data/aip/data/valid/e1-2.pdf</a></p> <p>Abbreviations:  <a href="https://lis.rlp.cz/ais_data/aip/data/valid/g2-2.pdf">https://lis.rlp.cz/ais_data/aip/data/valid/g2-2.pdf</a></p> <p>Jeppesen private pilot: chapter 9-2 [5]</p> <p>Fuel management:  <a href="https://www.youtube.com/watch?v=cJrn3QO89Dc">https://www.youtube.com/watch?v=cJrn3QO89Dc</a></p> <p>OA JAA/EASA PPL Meteorology:                      Weather Briefing [25]</p>

				<p>OA JAA/EASA PPL Flight performance and planning [25]</p> <p><a href="http://www.f-air.cz/meteo/">http://www.f-air.cz/meteo/</a></p> <p>Weight and balance calculator (F AIR e-learning)</p> <p>Jeppesen private pilot: chapter 4-22 [5]</p> <p>Jeppesen private pilot: chapter 4-22 [5]</p> <p>OA JAA/EASA PPL VFR RT Communications: Communications failure [25]</p> <p><a href="https://lis.rlp.cz/vfrmanual/actual/enr_2_en.html">https://lis.rlp.cz/vfrmanual/actual/enr_2_en.html</a></p> <p>Procedures for SSR operation: <a href="http://lis.rlp.cz/vfrmanual/actual/enr_4_en.html">http://lis.rlp.cz/vfrmanual/actual/enr_4_en.html</a></p> <p>Phraseology: <a href="http://lis.rlp.cz/vfrmanual/actual/enr_6_en.html">http://lis.rlp.cz/vfrmanual/actual/enr_6_en.html</a></p> <p>OA JAA/EASA PPL VFR RT Communications [25] SSR transponder manual (F AIR e-learning)</p>
	- non controlled airports arrivals and departures			
	- controlled airport arrivals and departures			
	- communication loss procedures			
	- flight to alternate airport			
	- orientation loss procedures			
	- familiarization with SSR transponder, R/T procedures			
26	<b>Navigation flights</b>	2	2:00	See Tasks above for Czech students also: Učebnice pilota chapter 14 [30]
27	<b>Cross-country navigation</b>	3	2:00	See Tasks above
28	<b>Cross-country navigation at minimum height</b>	2	1:20	See Tasks above
29	<b>Ground preparation</b> - RNA tuning, identification		1:00	OA JAA/EASA PPL Navigation and

	- VOR – OBS, CDI, TO/FROM identification, flying radial, VOR flyover			Radio aids: VHF Omni-directional range (VOR) [25]
	- ADF – orientation, passive and active flight, NDB flyover, inbound from intended heading			OA JAA/EASA PPL Navigation and Radio aids: Automatic direction finder (ADF) [25]
	- DME – operational regimes, distances, ground-speed, time			OA JAA/EASA PPL Navigation and Radio aids: Distance measuring equipment (DME) [25]
30	<b>Basics of radionavigation</b>	2	2:00	See Tasks above for Czech students also: Učebnicepilota chapter 16 [30]
31P	<b>Examination before 1. Solo navigation flight</b>	2	1:20	See Tasks above
32	<b>Navigation flights</b>	2	2:00	See Tasks above
33	<b>Cross-country navigation</b>	4	3:00	See Tasks above
34	<b>Cross-country flight at distance min. 270 km with full stop landing at two different airports from take-off airport</b>	3	2:00	See Tasks above
	<b>Ground preparation</b> - flight plan filling For Flight plan filling and distribution I would recommend to register to application IBS: <a href="https://ibs.rlp.cz/home.do">https://ibs.rlp.cz/home.do</a>			Flight planning: <a href="http://lis.rlp.cz/ais_data/aip/data/valid/e1-10.pdf">http://lis.rlp.cz/ais_data/aip/data/valid/e1-10.pdf</a> Flight Plan form: <a href="http://www.flyingineurope.be/images/CA48.pdf">http://www.flyingineurope.be/images/CA48.pdf</a>
35	- R/T procedures, communication loss procedures		2:00	OA JAA/EASA PPL VFR RT Communications: Communications failure [25]
	- cruise level flights-leaning			POH
	- navigation with use of RNA and GPS			Avionics manual (F AIR e-learning)
	- moving on controlled airports			<a href="https://www.youtube.com/watch?v=9d8EQ1mMbFU">https://www.youtube.com/watch?v=9d8EQ1mMbFU</a>

36	<b>Cross-country navigation in controlled airspace</b>	3	3:00	See Tasks above for Czech students also: Učebnice pilota chapter 15 [30]
<b>TOTAL PHASE III.</b>		<b>14/9</b>	<b>11:40/ 7:00</b>	
<b>TOTAL PHASE II. – III.</b>		<b>84/33</b>	<b>28:20/ 10:10</b>	

### 3.5.2 Phase IV. Optional Exercises

Optional exercises are used for repetition of exercises from Phases II. and III. It is also convenient to perform Differences Training in this phase. [41]

### 3.6 SKILL TEST

After completion of the prescribed syllabus of the training, student gets his/her pilot logbook and student's logbook checked by F AIR staff and then he/she takes the documents to CAA for final check. At CAA the student also gets a form for the examiner. After this procedure it is possible to arrange skill test with F AIR's examiner. The skill test takes around 2 hours and consists of three parts – Theoretical part, then Navigation flight, mostly performed through CTR LKPR, and the third part is piloting technique. In case of successful passing CAA issues to student PPL(A) with rating SEP, which is valid for 2 years. In case of failure of a part of the skill test, student repeats only this part of exam.

## 4 ICAO ENGLISH EXAM

During or after PPL(A) training it is necessary to pass the ICAO English exam. The examination is just oral and takes place once a month in F AIR and takes around 30 minutes. The content of the examination is: introduction, description of pictures with aviation theme, decoding NOTAM, listening an ATIS, use of modal verbs and phraseology. If student passes the exam, then he/she obtains ICAO English level which is written by CAA into his/her licence. Level 4 has to be revalidated after 4 years, level 5 has to be revalidated after 6 years and level 6 is valid permanently. [9]

Here is a useful material for preparation to exam:

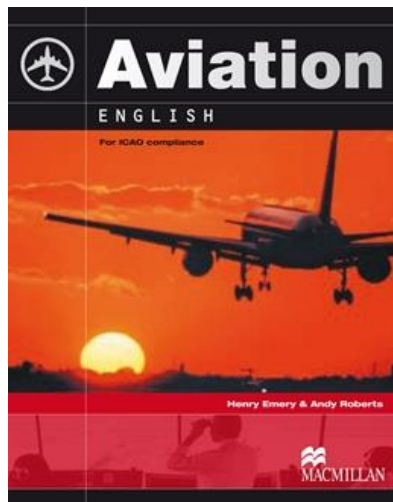
L Frazeologie:

[https://lis.rlp.cz/predpisy/predpisy/dokumenty/L/L-Frazeologie/data/print/Frazeologie\\_cely.pdf](https://lis.rlp.cz/predpisy/predpisy/dokumenty/L/L-Frazeologie/data/print/Frazeologie_cely.pdf)

Glossary of aviation terms:

[http://vyre-legacy-access.cambridge.org/servlet/file/Flightpath+Glossary+of+Aviation+Terms.pdf?ITEM\\_ENT\\_ID=6607662&ITEM\\_VERSION=1&COLLSPEC\\_ENT\\_ID=7](http://vyre-legacy-access.cambridge.org/servlet/file/Flightpath+Glossary+of+Aviation+Terms.pdf?ITEM_ENT_ID=6607662&ITEM_VERSION=1&COLLSPEC_ENT_ID=7)

Knowledge of vocabulary may be gained from the textbook Aviation English (Picture 3) and from dictionary: The Aviation Dictionary for Pilots and Aviation Maintenance Technicians. [27]



Picture 3: Aviation English book [26]

## 5 TIME BUILDING – PART I

During whole training student has to build minimum 100 hours as PIC. First block of time building after PPL(A) contains minimum 40 hours PIC (as indicated in Chart 4).

Chart 4: Time building [43]

Exercise	Content	Dual		Solo	
		T/O	Time	T/O	Time
	<p><b>Cross-country navigation</b></p> <ul style="list-style-type: none"> <li>- Minimum 50% of flights with use of radio navigation, 50% with flight plan, 25% of flying in flight levels</li> <li>- Flight log must contain mass and balance and is kept with filled flight plan in student's logbook</li> <li>- One flight during this block at minimum duration of 1:00 has to be performed with Flight instructor as a progress check</li> </ul>	-	-	N/A	40:00

### 5.1 ABROAD FLIGHTS

Time building should be mainly concentrated on flying abroad, because I think that it might be interesting for students and good for gaining experience. During abroad flights students also train communication with foreign ATS, flying in flight levels and in controlled airspaces. For the first flights to foreign airports or to some difficult areas (like mountain area) it is suitable to fly with an instructor from F AIR.

I mentioned important measures which are necessary to be taken before planning the flight abroad:

- 1) check if you have the ICAO English in the licence, General Radiotelephony Certificate, check if the aeroplane has all the necessities required by the foreign country
- 2) do not forget to arrange for the customs services necessary for flight, for example when flying to Croatia. Arranging for this service at Benešov airport, the pilot has to fill in this form in advance: <https://rscpapli.policie.cz/Home/Input?lang=en>
- 3) do not forget to take local currency, ID card, personal insurance
- 4) go through nationality differences in requirements, airspace, regulations, etc.
- 5) do not forget mooring device (possibilities of aircraft hangaring), aircraft oil
- 6) call to the destination airport in advance, take care of available fuel at the destinations or surrounding airports

- 7) do not forget to consider weight and balance and performance limitations
- 8) monitor weather trend during few days before the flight
- 9) paper charts of foreign countries are available at F AIR dispatching
- 10) ask F AIR instructors for their experience with your destination

Useful link: AIP of foreign countries

<https://www.ead.eurocontrol.int/publicuser/public/pu/login.jsp>

## **5.2 PLANNING AND NAVIGATION SOFTWARE**

I would like to mention the planning and navigation software which I had the possibility to try and I would like to recommend. The application is called SkyDemon and offers the following functions: Possibility to create Flight log (printable) with minimum safe altitudes, headings, frequencies, etc. During the flight the application warn us when we are approaching any restrictive airspaces, or significant landmarks and show us also vertical profile of the flight. During briefing we can use it for NOTAM and meteo information and for performance, weight and balance calculation and flight plan filling. The price of the application is 2 584 CZK per year, the first year is for 4 036 CZK. [10]

## **5.3 SUITABLE DESTINATIONS FOR TIME BUILDING**

Germany: EDQM Hof-Plauen, EDMV Vilshofen

Austria: LOWS Salzburg, LOWL Linz, LOAG Krems-Langenlois, LOWI Innsbruck

Slovakia: LZTT Poprad Tatry, LZIB Bratislava, LZSL Sliac

Slovenia: LJPZ Portoroz, LJLJ Ljubljana

Italy: LIPV Venezia

Croatia: LDSB Brac, LDLO Mali Losinj



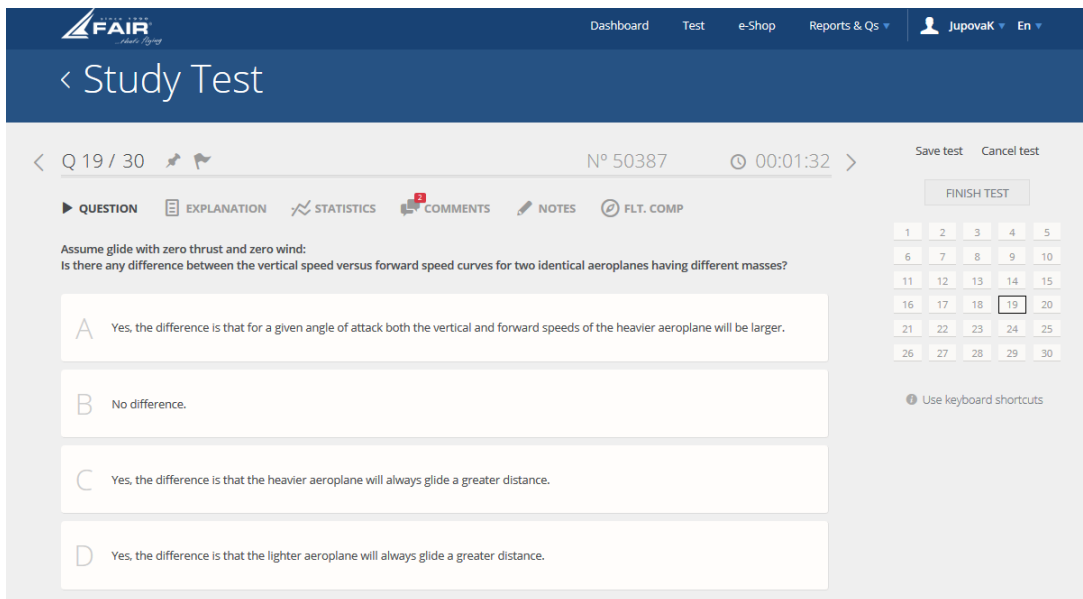
## 6 ATPL(A) THEORY 650

ATPL(A) theory 650 course is aimed for PPL(A) holders and includes all learning objectives for IR(A), CPL(A) and ATPL(A) theoretical knowledge. Student needs to attend the theoretical course in F AIR, which consists of self-study and 65 hours of consultations (the student needs to have 100 % attendance, no absence is allowed) for the 14 subjects: Air Law, Airframe and Systems, Instruments, Mass and Balance, Performance, Flight Planning and Monitoring, Human Performance, Meteorology, General and Radio Navigation, Operational Procedures, Principles of Flight and VFR+IFR Communication. When student finishes the course he/she gets certificate which enables him/her to register for the exams at CAA. This certificate is valid 12 months. Exams are in the form of computer tests and could be taken only in English language. The price of all the exams is 5 000 CZK. [8] [11]

In case the student does not manage to finish all 14 exams in 18 months or uses all 6 blocks or 4 attempts per 1 subjects, then he/she fails in all 14 subjects and has to attend additional theory consultations in ATO to get a new certificate. [8]

Student has to finish all theoretical exams at CAA to be allowed to undergo practical exam IR(A) and CPL(A).

Useful study materials for self-study part of the course are the ATPL books Oxford Aviation Academy and for training of obtained knowledge is test portal Aviationexam (Picture 4). There are more than thousand questions for each of the 14 subjects and for every question there is an explanation. There are also a lot of comments from other students, which can help during studies. It is possible to get there access for 1 (25 €), 3 (65 €), 6 (110 €) or 12 (170 €) months. The Aviationexam offers also an application for Android and iOS, where students can train without access to the internet. [12]



Picture 4: Test portal Aviationexam [12]

## 6.1 STUDY MATERIALS USED BY OTHER FLIGHT SCHOOLS

I contacted 17 flight schools from Europe and the USA to find out which study materials they use for ATPL(A) theoretical course. Below are mentioned flight schools from which I received a reply:

Superior Air (Greece): They use study materials from company CATS

Skies Aviation Academy (Greece): They use Oxford Aviation ATPL books

Aviation Career center (Slovenia): They use Oxford Aviation CBT

Air Alliance Flight center (Germany), Civil aviation training (Germany): CAT-Europe books

BAA Training aviation academy (Lithuania): They use Bristol's Literature

European flight training (Florida): They use study materials from author Trevor Thom

Bartolini-air (Poland): They use FAA materials

As can be seen from the answers of the flight schools, the most popular in Europe are Oxford Aviation books and CBT, then CAT company books and finally materials freely available by FAA.

## **7 NIGHT TRAINING**

For obtaining Night Rating student has to pass minimum 1 hour of theoretical instruction and minimum 5 hours of practical training including dual instruction, solo traffic patterns and cross-country flight. The training is usually performed during two nights at airports LKTB or LKMT. For the safety reasons it is suitable to plan this training rather to summer period, but note that LKTB airport has limited operational hours and training probably will have to be done at LKMT. [2]

Do not forget the following:

- 1) inform the airport where the training will take place in advance, ask for the refueling possibilities
- 2) arrange an accommodation at this airport (flight back to LKBE will be performed the next day in the morning)
- 3) to pack also at least one torch with you

After completion of training, Night Rating will be logged into the PPL(A), this rating is valid permanently.

### **7.1 THEORETICAL TRAINING**

Theory instruction familiarizes student with Physiological aspects of night flying:

Jeppesen private pilot: chapter 10-2 [5]

Instrument flying handbook: chapter 1 [13]

Chapter 10 Night operation [14]

### **7.2 PRACTICAL TRAINING**

Syllabus is indicated at Chart 5.

Chart 5: Syllabus of Night Training [44]

Task No.	Contents	Dual/Solo		Recommended study materials
		flights	hours	
1	<b>Ground preparation</b> - night flight preparation, terrain configuration, minimum safe altitudes, flight plan filling, flight log filling, meteo analysing, NOTAMs		1:00	ENR 1.2/1.2.4. Night VFR Flights: <a href="http://lis.rlp.cz/ais_data/www_main_control_frm_cz_aip.htm">http://lis.rlp.cz/ais_data/www_main_control_frm_cz_aip.htm</a> Chapter 10 Night operation [14] OA JAA/EASA PPL Meteorology: Weather Briefing [25]
	- orientation loss procedures			See Tasks from PPL(A)
	- RWY marking			Jeppesen private pilot: chapter 4-22 [5]
	- taxi, take-off, traffic pattern, landing			Chapter 10 Night operation [14]
	- use of lights			Chapter 10 Night operation [14]
	- piloting technique – steep turns, unusual attitudes			Chapter 9 Performance maneuvers [49]
	- cross-country navigation at night			Chapter 10 Night operation [14]
	- emergency procedures			Chapter 10 Night operation [14]
2	<b>Piloting technique</b> - level flight, climb, descent	1	0:45	See Tasks from PPL(A)
	- turns up to 30°, up to 45°, into intended heading			See Tasks from PPL(A)
	- steep turns and spiral recovery			Chapter 9 Performance maneuvers [49]
	- initial and full overpitching identification, initial and full overpitching recovery			See Tasks from PPL(A)
3	<b>Traffic pattern – normal and emergency procedures</b>	10	1:20	
	- faulty landing correction			See Tasks from PPL(A)

	- lights off during take-off, landing without lights, cabin and instrument lights failure			
4 P	<b>Examination before first solo flight</b>	2	0:10	See Tasks above
5	<b>Solo traffic pattern</b>	<b>5</b>	<b>0:30</b>	See Tasks above
	<b>Cross-country navigation</b>			
6	- theoretically: communication loss procedures, flight to alternate, orientation loss procedures, power supply loss, instruments failure, engine shut down in flight, meteo deterioration	2	1:00	CAE Oxford Aviation Academy Radiotelephony: Chapter 8 [47] See Tasks from PPL(A)
7	<b>Repetition of exercises 2,3 and 6</b>	1	1:15	See Tasks above
TOTAL PHASE		16/5	4:30/0: 30	

## **8 IR(A) TRAINING**

Instrument Training is a significant step in pilot training, because the student will be taught to fly with reference solely to instruments, what is completely different from previous trainings. There are two options how to undergo this training. The first one and the one which will be further described in this thesis is that the training consists of 30 hours on simulator FNPT II and 20 hours on single-engine aeroplane. The second option is that the training consists of 40 hours on FNPT II and then just 15 hours on multi-engine aeroplane, but before this training student needs to have finished MEP(A) VFR training. [40]

Student may choose if he/she wants to take the training part (SEP) on Cessna 172, Piper PA-28, Tecnam P2010.

### **8.1 REQUIREMENTS**

The requirement to start the IR(A) training is to at least commence the ATPL(A)/IR(A) theory course, but the applicant for IR(A) needs to fulfill the following:

- 1) at least PPL(A)
- 2) Medical Certificate Class I., or II. with audiometry
- 3) the Night Rating - if the IR(A) will be used at night
- 4) completed IR(A)/ATPL(A) theoretical exams at CAA
- 5) at least 50 hours as PIC of cross-country flight time [2]

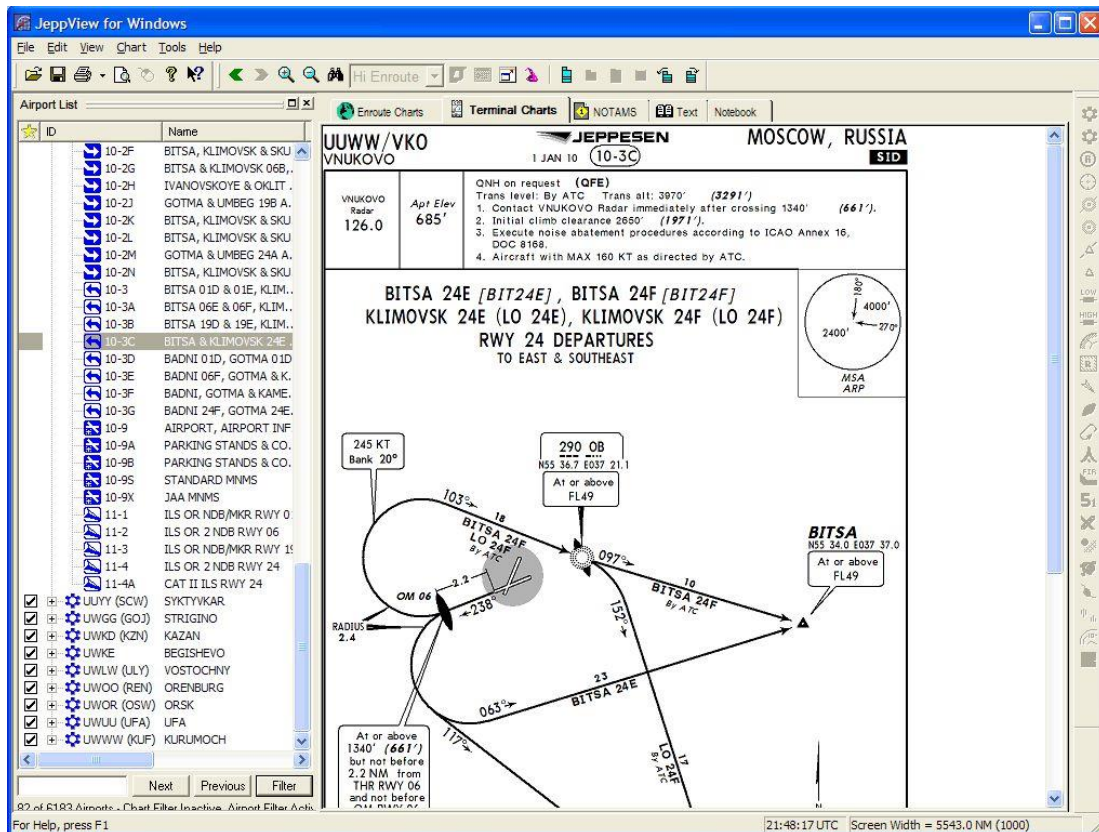
The student also have to pass another examination in English, called IFR English examination which is performed at approved organisations – F AIR. This exam has two parts - written test and then oral exam. This English proficiency has unlimited validity and is logged into the licence at CAA. [9]

### **8.2 BEFORE THE FIRST LESSON**

#### **8.2.1 Knowledge of IFR Charts**

Students need to have the knowledge of IFR charts, which will be used in the training. I have concentrated on description of the charts from Jeppesen company, because these charts are used by many flight schools and airline companies worldwide. Other type of charts commonly used by airlines are for example Lido maps by Lufthansa. Pilots should be always aware that the only official maps are those from AIP of the particular country.

In F AIR flight school students have unlimited access to computer application JeppView (Picture 5), where they can print the charts, and flight planning software FliteStar, both by Jeppesen company.



Picture 5: JeppView - Application for Jeppesen charts [15]

As a support it is also suitable to use application for iOS called JeppFD, which offers not only showing charts, but also Jeppesen manuals, flight planner and in charts which are in scale - like airport charts you can see a spot moving according to the aircraft/iPad position. However, this application is quite expensive and according to F AIR standards students are obliged to use as a primary source paper charts. But using these charts prepare students for their future in airlines because a lot of airlines use iPads with this application. [16]

Here are study materials which can help students to understand the philosophy of Jeppesen charts:

Introduction to Jeppesen navigation charts:

<http://ww1.jeppesen.com/documents/aviation/business/ifr-paper-services/glossary-legends.pdf>

Video: Understanding Jeppesen charts part I. and II.:

<https://www.youtube.com/watch?v=4rkkgm4vua8>

<https://www.youtube.com/watch?v=0u0fN3FEOvQ>

## 8.2.2 Knowledge of Instruments

The second essential knowledge which students need to have to start Instrument Rating is operating the following instruments: ADF, HSI, CDI, RMI. I would recommend students to use the following online simulator to model indication of these instruments.

We can use this simulator to visualize for example entries into holding pattern:

In the left menu (Picture 6) we choose type of instrument we want to visualize (in our case HSI).



Picture 6: Luizmonteiro – menu [17]

By the cursor we can move the aircraft position and its heading (Picture 7).





Picture 7: Luizmonteiro – Aircraft movement [17]

By the menu below the simulator “Other settings” we can with use of button “Show template” activate the visualization of holding pattern and in column “Inbound course” we can determine the orientation of the holding pattern. And finally by green button “START” we start the simulator (Picture 8).



Picture 8: Luizmonteiro - other settings [17]

And then we can see the visualization: Direct entry into holding pattern (Picture 9).



Picture 9: Luizmonteiro - Holding pattern entry [17]

For knowledge of avionics installed in FNPT II/aeroplane see Avionics manual (F AIR e-learning).

### 8.3 PRACTICAL TRAINING

#### 8.3.1 Phase II. Basics of Instrument Flying (SIM)

Syllabus of Phase II. is indicated at Chart 6.

Chart 6: Syllabus of IR(A) SEP Training – Basics of Instrument Flying (SIM) [45]

Task no.	Contents	Dual		
		flights	hours	Recommended study materials
				Czech speaking students may use also textbook: Letové postupy a provoz letadel [29]
1	<p><b>Ground preparation</b></p> <ul style="list-style-type: none"> <li>- basic procedures for instrument flying – use of Check lists</li> <li>- instrument monitoring in flight, controlling during instruments failure</li> </ul>		2:30	<p>SOP (F AIR e-learning)</p> <p>Instrument flying handbook: chapter 4 [13]</p>

	<p>- unusual attitudes recovery</p> <hr/> <p>- operation of SSR, ADF, VOR, DME, combined navigation instrument</p> <hr/> <p>- procedure turn 45°/180°, 80°/260° speed limit</p> <hr/> <p>- entering holding pattern, speed limit</p>			<p>Instrument flying handbook: chapter 5-30 [13]</p> <p>RMI:  <a href="http://krepelka.com/fsweb/learningcenter/navigation/thermi.htm">http://krepelka.com/fsweb/learningcenter/navigation/thermi.htm</a></p> <p>Never get lost: page 11 [19]</p> <p>Never get lost: page 21 [19]</p> <p>Instrument flying handbook: chapter 7-3, 7-8, 7-14 [13]</p> <p>Doc 8168, Procedures for Air Navigation Services [18]</p> <p>Doc 8168, Procedures for Air Navigation Services [18]</p> <p>Never get lost: page 149 [19]</p>
2	<p><b>Familiarization flight on simulator</b></p> <p>- taxi, take-off, level flight, climbing, descending, turns 15° and 25°, landing</p>	1	0:30	Instrument flying handbook: chapter 5-1, 5-16, 5-22 [13]
3	<p><b>Aeroplane instrument handling</b></p> <p>- aeroplane overpitching recognition, recovery from overpitching, recovery from overpitching in turn, recovery from extreme bank angles</p> <hr/> <p>- artificial horizon, turn indicator, directional gyro, ASI, variometer failure</p>	1	2:00	Instrument flying handbook: chapter 5-31 [13]
4	<p><b>Practice of arrivals and departures to</b></p> <p>1) <b>VOR/DME:</b> flight to VOR-demonstration of tuning and wiretapping, overflying-indication TO/FROM, flight from VOR, intercepting required radial, procedure turn</p>	1	2:30	Never get lost: page 31 [19]

	- VOR/DME arc			<a href="http://krepelka.com/fsweb/learningcenter/navigation/thermi.htm">http://krepelka.com/fsweb/learningcenter/navigation/thermi.htm</a> , Never get lost: page 111 [19]
	<b>2) NDB:</b> flight to NDB-demonstration of tuning and wiretapping, overflight of NDB, flight from NDB, position identification according to ADF, intercepting of specified QDM and QDR, procedure turn			Never get lost: page 110, 130, 133, 173 [19]
TOTAL PHASE II.		3	5:00	

### 8.3.2 Phase III. Basics of Instrument Flying (SEP)

Syllabus of Phase III. is indicated at Chart 7.

Chart 7: Syllabus of IR(A) SEP Training – Basics of Instrument Flying (SEP) [45]

Task no.	Contents	Dual		
		flights	hours	Recommended study materials
5	<b>Holding procedures:</b> - joining holding pattern, flying holding, wind elimination	1	2:30	Never get lost: page 136 [19] Instrument flying handbook: chapter 10-10 [13] Oxford Aviation Academy – Air Law: Chapter 10 [34]
	- R/T communication			Oxford Aviation Academy – Communications: Chapter 6 [35]
6	<b>Repetition of exercises 2 – 5:</b>	1	2:30	See Tasks above
TOTAL PHASE III.		2	5:00	
TOTAL PHASE II. – III.		5	10:00	

### 8.3.3 Phase IV. Procedural Instrument Flight - On Approach (SIM)

Syllabus of Phase IV. is indicated at Chart 8.

Chart 8: Syllabus of IR(A) SEP Training – Procedural instrument flight - On Approach (SIM) [45]

Task no.	Contents	Dual		
		flights	hours	Recommended study materials
7	<b>Ground preparation</b> - approach briefing - missed approach procedures - maintaining of published altitudes - approach with tail wind - use of chcek lists		2:30	SOP (F AIR e-learning)
	- R/T communication			Oxford Aviation Academy – Communications: Chapter 6 [35]
8	<b>Precision approach</b> - intercepting FAP, ILS approach, maintaining altitudes, heading, speed, missed approach	3	5:00	Never get lost: page 68 [19] Instrument flying handbook: chapter 7-27 [13] Oxford Aviation Academy – Air Law: Chapter 8 [34] SOP (F AIR e-learning)
	- LOC only approach			ILS Approcach: <a href="https://www.youtube.com/watch?v=QzZY6q5TChQ">https://www.youtube.com/watch?v=QzZY6q5TChQ</a> , <a href="https://www.youtube.com/watch?v=ucZYcun22eM">https://www.youtube.com/watch?v=ucZYcun22eM</a>
	- BC LOC approach			Never get lost: page 17, 25, 74 [19]

	- R/T procedures			Oxford Aviation Academy – Communications: Chapter 6 [35]
9	<b>Non-precision approach</b>	3	6:00	Oxford Aviation Academy – Air Law: Chapter 8 [34] SOP (F AIR e-learning)
10	<b>Circling approach</b>	3	2:00	Instrument flying handbook: 10-20 [13] Doc 8168, Procedures for Air Navigation Services [18] Oxford Aviation Academy – Air Law: Chapter 9 [34] SOP (F AIR e-learning)
TOTAL PHASE IV.		9	13:00	
TOTAL PHASE II. – IV.		14	23:00	

### 8.3.4 Phase V. Procedural Instrument Flight - On Route (SIM)

Syllabus of Phase V. is indicated at Chart 8.

Chart 8: Syllabus of IR(A) SEP Training – Procedural instrument flight - On Route (SIM) [45]

Task no.	Contents	Dual		
		flights	hours	Recommended study materials
11	<b>Ground preparation</b> - planning of IFR flight, flight log filling		2:00	Annex to ED Decision 2012/018/R, Page 115 [20] Flight planning software for IFR flights: see chapter 8.4 of this thesis
	- use of SID and STAR charts, en-route charts			Knowledge of IFR charts: see chapter 8.2.1 of this thesis
	- alternate airport selection			
	- communication loss procedures			L4444 Hlava 15.3 [21]
	- icing occurrence procedures			Instrument flying handbook: chapter 2-9 [13] <a href="https://www.youtube.com/watch?v=eb2II9uA9So">https://www.youtube.com/watch?v=eb2II9uA9So</a>
12	<b>Navigation flights</b> - en-route flight - standard arrivals and departures - emergency procedures	8	9:00	See Tasks above
13	<b>Repetition of exercises 8, 9, 10, 12</b>	2	3:00	See Tasks above
TOTAL PHASE V.		10	12:00	
TOTAL PHASE II. – V.		24	35:00	

### 8.3.5 Phase VI. Procedural Instrument Flight On Route and On Approach (SEP)

Navigation flights and approaches are mostly performed at following airports: LKVO, LKTB, LKKV, LKMT. It is necessary to take notice of operational hours of these airports, for this information see AIP CR part AD: [http://lis.rlp.cz/ais\\_data/www\\_main\\_control/fm\\_cz\\_aip.htm](http://lis.rlp.cz/ais_data/www_main_control/fm_cz_aip.htm)

For airports LKKV, LKTB and LKMT it is necessary to make a time slot for training of approaches in advance in reservation system called LARS: <https://lis.rlp.cz/lars/home>.

Reservations in this system need to be done only for local flight activity, **not** for: one arrival, one departure, one touch and go, one traffic circuit or one IFR approach (full stop or low pass) to the particular airport. [22]

Syllabus of Phase VI. is indicated at Chart 9.

Chart 9: Syllabus of IR(A) SEP Training – Procedural instrument flight on route and on approach (SEP) [45]

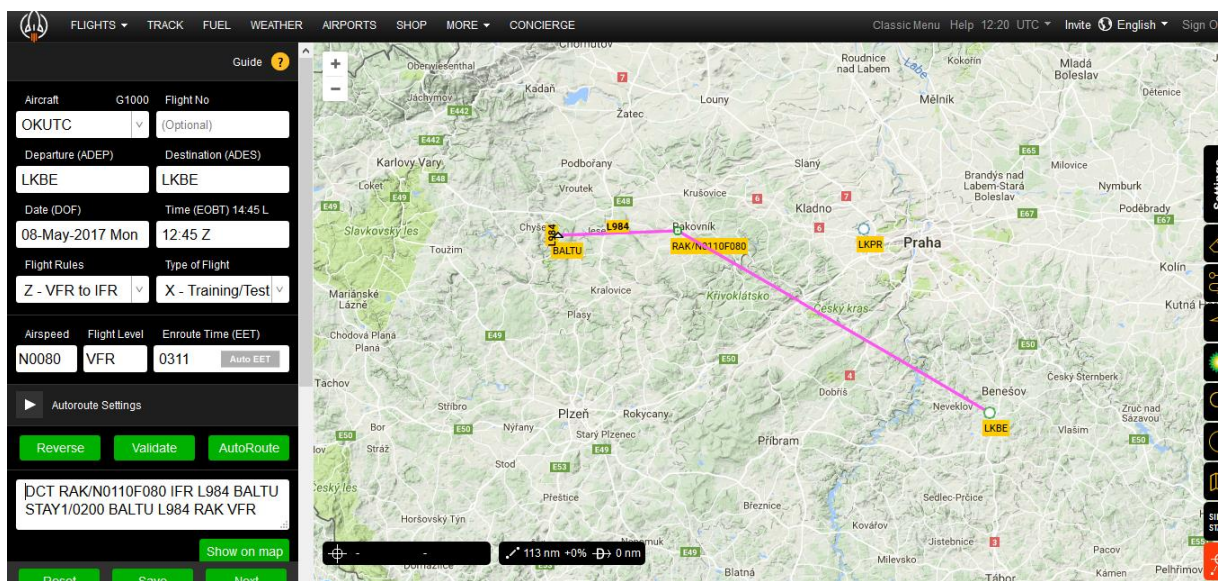
Task no.	Contents	Dual		
		flights	hours	Recommended study materials
14	<b>Ground preparation</b>		1:00	See Tasks above PPL/IR RNAV Training Manual [36] Weight and balance calculator (F AIR e-learning)
15	<b>Navigation flights</b> - transfer from VFR to IFR flight - en-route flight, holding procedures - standard arrivals and departures - transfer from IFR to VFR flight - emergency procedures	4	7:00	See Tasks above
16	<b>Approach</b> - non-precision - precision - circling	2	8:00	See Tasks above
TOTAL PHASE VI.		6	15:00	
TOTAL PHASE II. – VI.		30	50:00	

After completion of IR(A) SEP training student has to undergo skill test with CAA examiner, detailed information are mentioned in chapter 13 Final exams of this thesis.



## 8.4 FLIGHT PLANNING SOFTWARE FOR IFR FLIGHTS

I would recommend for planning of IFR flights software RocketRoute. This software is really intuitive and provides complete briefing package. In the picture 10 there is a preparation of a new flight in the application (IFR flight from LKBE to LKBE with IFR approaches at LKKV). First we define the parameters of the aircraft we want to fly in the main upper menu after marking by cursor the column MORE and then AIRCRAFT. Then we fill all columns like in the flight plan: departure airport, destination, flight rules, air speed, etc. To find the correct IFR route we can buy also access providing AutoRoute function which finds usually more than one route between departure airport and destination. Then we can save the flight and proceed to Mass and balance and Performance calculation and finally it is possible to fill in and send the flight plan. The column DOWNLOAD enables us to get the briefing package including flight log, NOTAMS, meteo information, icing profile, wind profile, weather charts, flight plan form, etc.



Picture 10: RocketRoute [23]

The price of the 12 months access in the basic version is 99.99 € ex VAT, the version which allows autorouting costs 279.99 € ex VAT for 12 months. It is possible to try a free version for a few days. [23]

## 9 TIME BUILDING – PART II

Another block of time building contains 20 hours as indicated in Chart 10.

Chart 10: Timebuilding [43]

Exercise	Content	Dual		Solo	
		T/O	Time	T/O	Time
	<p><b>Cross-country navigation</b></p> <ul style="list-style-type: none"> <li>- Minimum 50% of flights with use of radio navigation, 50% with flight plan, 25% of flying in flight levels</li> <li>- Flight log must contain mass and balance and is kept with filled flight plan in student's logbook</li> <li>- One flight at minimum duration of 1:00 has to be performed with Flight instructor as a progress check</li> <li>- Use destinations from Time Building – Part I</li> </ul>	-	-	N/A	20:00

## 10 MEP(A) + IR MEP(A) TRAINING

The syllabus for class rating on a multi-engine aeroplane is in extent of minimum 7 hours of theoretical training and minimum 6 hours of flight training.

### 10.1 REQUIREMENTS

The applicant for the class rating needs to have at least 70 hours as PIC on aeroplanes and pass theoretical test at ATO focused on knowledge of the aeroplane type. [2]

### 10.2 THEORETICAL TRAINING

7 hours of theoretical instruction.

### 10.3 PRACTICAL TRAINING

F AIR offers to students two types of aeroplanes for this training, students may choose Tecnam P2006T or Piper PA-34 Seneca V. Skill test is performed on the same aeroplane type as the training.

#### 10.3.1 Phase II. Piloting Technique

Syllabus of Phase II. is indicated at Chart 11.

Chart 11: Syllabus of MEP(A) Training - Piloting Technique [46]

Task No.	Contents	Dual		Recommended study materials
		flights	hours	
1	<p><b>Ground preparation</b></p> <p>- aeroplane description, limitations, pre-flight actions, mass and balance, aeroplane inspection, normal procedures, emergency procedures including asymmetrical flight</p>		0:15	<p>POH</p> <p>SSR Transponder, Radio Manual and Avionics manual (F AIR e-learning)</p> <p>Chapter 12: Transition to multiengine airplanes [24]</p>

2	<b>Flight for training of basic piloting technique</b> - level flight, climb and descent, turns up to 15-45°	1	1:00	Chapter 12: Transition to multiengine airplanes: 12-14 [24]
	- flight at minimum and maximum air speed with various flaps and gear position - aeroplane recovery from initial and full overpitching			Chapter 12: Transition to multiengine airplanes: 12-26 [24]
3	<b>Traffic pattern</b> - take-off, traffic pattern, landing	10	1:30	Chapter 12: Transition to multiengine airplanes: 12-13 [24]
	- go-around, correction of faulty landings, landing over obstacle and at short RWY			Chapter 12: Transition to multiengine airplanes: 12-17, 18 [24]
4	<b>Flight in area to practice emergency procedures</b> - engine shut down identification and reaction, cause of shut down - controlling with asymmetrical thrust, in unusual attitudes (initial and full overpitching, stall precautions)	2	2:00	Chapter 12: Transition to multiengine airplanes: 12-23 [24]
5	<b>Traffic pattern for training of emergency procedures</b> - engine shut down in take-off run, after take-off, in traffic pattern - landing and go-around with asymmetrical thrust	10	1:30	Chapter 12: Transition to multiengine airplanes: 12-19 [24]
TOTAL PHASE II.		23	6:00	

Conversion from IR(A) SEP to IR(A) MEP is a short training consisting just from minimum 2,5 hours on FNPT II and 2,5 hours on multi-engine aeroplane. It is possible to start the training when student is a IR(A) SEP holder and MEP(A) qualification holder or when he/she has finished MEP(A) training. [39]

In this training student will use and build on skills from previous trainings IR SEP(A) and MEP(A). Student will practice navigation flight, precision, non-precision and circling approaches with emphasise on emergency procedures and asymmetrical flight in various phases of flight.

After completion of MEP(A) and IR(A) SEP - MEP training syllabus student has to undergo skill test with CAA examiner, detailed information are mentioned in chapter 13 Final exams of this thesis. Note that MEP(A) skill test has to be passed within 6 months from commencing of the MEP(A) training. [2]

## 11 TIME BUILDING – PART III

Another block of time building contains 20 hours as indicated in Chart 12.

Chart 12: Time Building [43]

Exercise	Content	Dual		Solo	
		T/O	Time	T/O	Time
	<p><b>Cross-country navigation</b></p> <ul style="list-style-type: none"> <li>- Minimum 50% of flights with use of radio navigation, 50% with flight plan, 25% of flying in flight levels</li> <li>- Flight log must contain mass and balance and is kept with filled flight plan in student's logbook</li> <li>- One flight has to be at the distance of at least 540 km (300 NM), with full stops landings at two airports different from the departure airport</li> <li>- One flight at minimum duration of 1:00 has to be performed with Flight instructor as a progress check</li> <li>- Use destinations from Time Building – Part I</li> </ul>	-	-	N/A	30:00

## **12 CPL(A) TRAINING**

This training consists of minimum 30 hours flight time, but it might be shortened up to minimum 15 flight hours. There is credit for IR holders in extent of 10 hours and for night holders in extent of 5 hours. Anyway 5 hours in the training has to be carried out on a complex aeroplane. [38]

### **12.1 REQUIREMENTS**

The entry requirement into the training is total flight time of 150 hours and completed class rating if multi-engine aeroplane will be used as complex aeroplane. [38]

The applicant for CPL(A) has to additionally fulfill 200 hours total time which includes 100 hours as PIC, 20 hours as PIC of cross-country flight including VFR cross-country flight 540 km and medical certificate 1st class. [38]

### **12.2 PRACTICAL TRAINING**

Students who have followed training sequence according to this thesis will get the credit, so the training will consist only from 15 hours, it means he/she will perform only Phase II. Piloting technique and Phase IV. Training of VFR flights – cross-country flights. The exercises are very similar to PPL(A) training, but shall be performed more precisely and at a higher level. Additionally in Phase II. there are exercised take-offs and landing to short and soft RWY, slippery RWY, simulation of landing and take-off above obstacle and crosswind take-off and landing – crab and sideslip method. [37]

After completion of CPL(A) training student has to undergo skill test with CAA examiner, detailed information are mentioned in chapter 13 Final exams of this thesis.

## 13 FINAL EXAMS

Following trainings are completed with skill tests with CAA examiner: IR SEP(A), MEP(A), IR MEP(A) and CPL(A). Usually skill test MEP(A) and IR MEP(A) is done as one exam. The application procedure for each exam is similar to PPL(A) training. When student finishes his/her training, then his/her student's logbook and pilot logbook is checked by F AIR staff and by CAA and then the examination day is arranged directly with CAA examiner via F AIR dispatching. The skill tests are mostly performed from LKVO airport so if the student is not allowed to carry the aeroplane (for example transport to MEP(A) exam) the F AIR dispatcher will arrange a transfer pilot.

For the examination day student has to bring the examiner a revenue stamp in the value of 500 CZK.

Requirements for the skill test:

IR(A) skill test: Appendix 7 of PART- FCL [2]

MEP(A) skill test: Appendix 9 of PART- FCL [2]

CPL(A) skill test: Appendix 4 of PART- FCL [2]

CPL(A) skill test has to be performed on complex aeroplane



## 14 FIND EMPLOYMENT

When the student finishes all the steps which were described in this thesis, he/she is holder of EASA CPL/MEP/IR licence and has at least 200 hours flight time, which are usually the basic requirement for assessment in some airline company. Some companies require additionally MCC and JOC course, which might be also performed in F AIR or the company arranges it for their cadets on their own.

As a preparation for assessment I would recommend textbook ACE The technical pilot interview:<https://www.amazon.com/Ace-Technical-Pilot-Interview-Aviation-ebook/dp/B00828KES0>

In case that student decides to proceed in obtaining another skills in general aviation it is possible to complete FI(A) training in F AIR and then become a part of the F AIR flight school instructors team and teaches new students.

## 15 CONCLUSION

The aim of this thesis was to summarize available information about training modules which every student has to undergo on his/her way to become an airline pilot. During preparation of this thesis I convinced myself that this type of document is necessary in such a flight school where is a large number of students from various countries and it is not possible to discuss every detail of each student's training. Because as a part of F AIR staff I was asked for many times by F AIR students to recommend them the best sequence of the training modules, advise them what are the requirements for particular trainings and what is the structure of theoretical exams and skill tests and also what are the most useful study materials for particular trainings. I think that I managed to mention for every training the reply to frequently asked questions.

The sources of information I used to write up this thesis was mostly from the materials I have had experience with from my pilot training and the rest of them was recommended by Instructors' team of F AIR flight school. I also contacted several different flight schools to know which study materials do they prefer, but as I supposed the standard in these training organisations is very similar to F AIR and they use similar textbooks and other materials.

This thesis will be put into the processes of flight school F AIR by converting to same design as the other training manuals and regulations. Whole document will be also divided into particular modules of ATPL(A) training, because a lot of students are attending only some of modules at flight school F AIR. At the beginning of any pilot training module each student at F AIR will obtain guidance material for the particular training which he/she will undergo. Anyway the best option is to choose whole Controlled modular training, which is in many ways similar to Integrated training, but still give students the possibility to interrupt or stop the training from any reasons and alternatively proceed in other flight school without any difficult paperwork.

In the future it will be suitable to add also description of other flight trainings into this guide like Aerobatic training, Flight instructor training and Ultralight training which is becoming popular also for applicants from foreign countries, etc.

It will be also necessary to update particular information in this guide to follow changes in EASA regulations and F AIR standards. I would recommend a period of 6 months for reviewing of changes in regulations and possible updates of this manual. In case of any essential change within this period the guide will be updated immediately.

## REFERENCES

- [1] MPL finance. *Czech Aviation Training Centre* [online]. 2014 [cit. 2017-08-22]. Available from: <http://www.catc.cz/cz/jak-se-stat-pilotem/vycvik-multi-crew-pilot-licence/caste-dotazy-1/mpl-finance/#odpoved74>
- [2] Commission Regulation (EU) No 1178/2011: PART-FCL. In: *EUR-Lex* [online]. 2011 [cit. 2017-08-21]. Available from: <http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32011R1178>
- [3] Get professional competence certificate on the basis of the test. *Czech Telecommunication Office* [online]. 2016 [cit. 2017-08-22]. Available from: <https://www.ctu.eu/get-professional-competence-certificate-basis-test>
- [4] PPL Books: 7 Book Set. *CAE Oxford Interactive Learning* [online]. [cit. 2017-08-22]. Available from: [http://www.caeoxfordinteractive.com/index.php?route=product/product&path=61\\_72&product\\_id=142](http://www.caeoxfordinteractive.com/index.php?route=product/product&path=61_72&product_id=142)
- [5] *Private pilot: guided flight discovery*. Englewood, CO: Jeppesen Sanderson, 2007. ISBN 088487429X.
- [6] Jeppesen Garmin G1000 Mobile Training. iTunes Preview [online]. [cit. 2017-08-19]. Available from: <https://itunes.apple.com/us/app/jeppesen-garmin-g1000-mobile-training/id647453437?mt=8>
- [7] Jeppesen Garmin G1000 Mobile Training. In: *AppAdvice* [online]. [cit. 2017-08-19]. Available from: <http://is1.mzstatic.com/image/thumb/Purple6/v4/00/45/a6/0045a611-98e3-27e0-8000-2aa18cedee9f/source/750x750bb.jpeg>
- [8] ZKUŠEBNÍ ŘÁD ÚCL PRO TEORETICKÉ ZKOUŠKY. In: *Úřad pro civilní letectví* [online]. [cit. 2017-08-18]. Available from: <http://www.caa.cz/file/5613>
- [9] Zkoušky pilotů z angličtiny. *Úřad pro civilní letectví* [online]. 2011 [cit. 2017-08-22]. Available from: <http://www.caa.cz/personal/icao-language-proficiency>
- [10] SkyDemon Flight-Planning Features. *SkyDemon* [online]. 2016 [cit. 2017-08-22]. Available from: <https://www.skydemon.aero/plan/>

- [11] Theory ATPL(A) 650. *F AIR* [online]. 2008 [cit. 2017-08-22]. Available from:  
[http://www.f-air.cz/en/theory\\_atpl\\_650/](http://www.f-air.cz/en/theory_atpl_650/)
- [12] EASA Question Bank. *Aviationexam* [online]. [cit. 2017-08-22]. Available from:  
<https://www.aviationexam.com/products/20/easa-in-english.aspx>
- [13] *Instrument flying handbook* [2001]. U.S. Dept. of Transportation, Federal Aviation Administration, Flight Standards Service, 2003. ISBN 1560273801.
- [14] Chapter 10 Night Operations. *Ascent Ground School* [online]. [cit. 2017-08-22]. Available from:  
[http://www.ascentgroundschool.com/~ascentgr/index.php?option=com\\_content&view=article&id=191%3Aprivate-pilot-lesson-14&catid=1%3Aprivate-pilot-ground-school&Itemid=17&limitstart=3](http://www.ascentgroundschool.com/~ascentgr/index.php?option=com_content&view=article&id=191%3Aprivate-pilot-lesson-14&catid=1%3Aprivate-pilot-ground-school&Itemid=17&limitstart=3)
- [15] In: *NoNaMe* [online]. 2010 [cit. 2017-08-19]. Available from:  
<http://img15.nnm.me/e/3/4/1/c/f13f0736633e57078a2505481fe.jpg>
- [16] Jeppesen Mobile FliteDeck. *Jeppesen* [online]. 2017 [cit. 2017-08-22]. Available from:  
<http://ww1.jeppesen.com/aviation/products/mobile-flitedeck/index.jsp>
- [17] Online Simulators. *Luizmonteiro* [online]. 2005 [cit. 2017-08-22]. Available from:  
<http://www.luizmonteiro.com/>
- [18] Procedures for Air Navigation Services Aircraft Operations: Volume 1 Flight Procedures. In: *CHC* [online]. 2006 [cit. 2017-08-24]. Available from:  
[http://www.chcheli.com/sites/default/files/icao\\_doc\\_8168\\_vol\\_1.pdf](http://www.chcheli.com/sites/default/files/icao_doc_8168_vol_1.pdf)
- [19] THALLER], [Wilhelm. *Never get lost: interpretation of radionavigation*. Mondsee: Wilhelm Thaller, 2001. ISBN 3000086439.
- [20] Acceptable Means of Compliance (AMC) and Guidance Material (GM) to Part - CAT. In: *European Aviation Safety Agency* [online]. 2012 [cit. 2017-08-20]. Available from:  
<https://www.easa.europa.eu/system/files/dfu/Annex%20to%20ED%20Decision%202012-018-R.pdf>
- [21] L 4444. *Letecká Informační Služba* [online]. [cit. 2017-08-19]. Available from:  
<http://lis.rlp.cz/predpisy/predpisy/index.htm>
- [22] *LARS* [online]. In: . Jeneč, 2017 [cit. 2017-08-18]. Available from:  
<https://www.google.cz/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&cad=rja&uact=>

8&ved=0ahUKEwj6qYmUqLTVAhVJ2hoKHbBtCagQFggxMAI&url=http%3A%2F%2Fis.rlp.cz%2Fcz%2FprezentaceGA2017%2F4\_LARS.pptm&usg=AFQjCNEy0vIvgw64R-J80v\_w4tl9SZImPQ

- [23] Flight Planning Shop For Pilots. *RocketRoute* [online]. 2017 [cit. 2017-08-22]. Available from: <https://www.rocketroute.com/shop>
- [24] Airplane Flying Handbook: Chapter 12. *Federal Aviation Administration* [online]. [cit. 2017-08-17]. Available from: [https://www.faa.gov/regulations\\_policies/handbooks\\_manuals/aviation/airplane\\_handbook/media/14\\_afh\\_ch12.pdf](https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/airplane_handbook/media/14_afh_ch12.pdf)
- [25] PPL. *CAE Oxford Interactive Learning* [online]. [cit. 2017-08-22]. Available from: [http://www.caeoxfordinteractive.com/index.php?route=product/category&path=65\\_64](http://www.caeoxfordinteractive.com/index.php?route=product/category&path=65_64)
- [26] *Macmillan English* [online]. [cit. 2017-08-18]. Available from: <http://www.macmillanenglish.com/uploadedImages/wwwmacmillanenglishcom/Content/Jackets/9780230027572.jpg>
- [27] *Aviation dictionary, The: for pilots and aviation maintenance technicians*. Englewood, CO: Jeppesen Sanderson, 2003. ISBN 0884873188.
- [28] *Učebnice pilota 2016: pro žáky a piloty všech druhů letounů a sportovních létajících zařízení, provozujících létání jako svou zájmovou činnost*. Cheb: Svět křidel, 2016. ISBN 978-80-87567-89-0.
- [29] SOLDÁN, Vladimír. *Letové postupy a provoz letadel*. Jeneč: Letecká informační služba Řízení letového provozu České republiky, 2007. ISBN 978-80-239-8595-5.
- [30] ZITKO, Karel a Milan VACÍK. *Učebnice létání: příručka pro výcvik soukromého pilota letounů - PPL(A)*. 6. aktualizované vydání. Praha: Vintage Aviation, 2016. ISBN 978-80-260-9395-4.
- [31] Airplane Flying Handbook: Chapter 7. *Federal Aviation Administration* [online]. [cit. 2017-08-17]. Available from: [https://www.faa.gov/regulations\\_policies/handbooks\\_manuals/aviation/airplane\\_handbook/media/09\\_afh\\_ch7.pdf](https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/airplane_handbook/media/09_afh_ch7.pdf)
- [32] Airplane Flying Handbook: Chapter 2. *Federal Aviation Administration* [online]. [cit. 2017-08-17]. Available from:

- [https://www.faa.gov/regulations\\_policies/handbooks\\_manuals/aviation/airplane\\_handbook/media/04\\_afh\\_ch2.pdf](https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/airplane_handbook/media/04_afh_ch2.pdf)
- [33] Airplane Flying Handbook: Chapter 4. *Federal Aviation Administration* [online]. [cit. 2017-08-17]. Available from: [https://www.faa.gov/regulations\\_policies/handbooks\\_manuals/aviation/airplane\\_handbook/media/06\\_afh\\_ch4.pdf](https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/airplane_handbook/media/06_afh_ch4.pdf)
- [34] OXFORD AVIATION ACADEMY. *Air law*. Revised ed. Oxford: Oxford Aviation Training, 2004. ISBN 9781904935001.
- [35] OXFORD AVIATION TRAINING. *Communications*. Revised ed. Oxford: Oxford Aviation Training, 2004. ISBN 1904935133.
- [36] PPL/IR Europe RNAV Training Manual. In: *PPL/IR Europe* [online]. 2008 [cit. 2017-08-21]. Available from: <http://www.pplir.org/component/joomdoc/public-files/rnav-training-manual-v1-8/detail>
- [37] F AIR. *Training Syllabus Modular Course CPL(A)*. 2014.
- [38] Licensing requirements - quick reference. In: *European Aviation Safety Agency* [online]. 2015 [cit. 2017-08-21]. Available from: <https://www.easa.europa.eu/newsroom-and-events/news/easa-publishes-consolidated-version-aircrew-regulation-and-quick-reference>
- [39] F AIR. *Training Syllabus Modular Course IR(A) SEP-MEP*. 2014.
- [40] F AIR. *Training Syllabus Modular Course IR(A) SIM MEP*. 2014.
- [41] F AIR. *Training Syllabus Training Course PPL(A)*. 2014.
- [42] F AIR. *Student's Logbook Training Course PPL(A)*. 2014.
- [43] F AIR. *Training Syllabus Time building*. 2014.
- [44] F AIR. *Student's Logbook Night Rating*. 2014.
- [45] F AIR. *Student's Logbook Modular Course IR(A) SIM-SEP*. 2014.
- [46] F AIR. *Student's Logbook Training course for obtaining qualification MEP*. 2014.
- [47] [CREATED AND COMPILED BY JAMES KENNY]. *Radiotelephony: ICAO procedures, VFR RT communications, UK procedures*. 2nd ed. Oxford: Oxford Aviation Training, 2007. ISBN 9780955517761.

- [48] Chapter 8 Approaches and Landings. In: *Federal Aviation Administration* [online]. [cit. 2017-08-23]. Available from:  
[https://www.faa.gov/regulations\\_policies/handbooks\\_manuals/aviation/airplane\\_handbook/media/10\\_afh\\_ch8.pdf](https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/airplane_handbook/media/10_afh_ch8.pdf)
- [49] *Airplane Flying Handbook* [online]. In: . 2004 [cit. 2017-08-24]. Available from:  
<http://large.stanford.edu/courses/2013/ph240/eller1/docs/FAA-H-8083-3B.pdf>