



Appendix to ED Decision 2018/001/R **Subject 040 — HUMAN PERFORMANCE AND LIMITATIONS**

RELATED NPA: 2016-03(F) — RMT.0595 — 6.2.2018

Table of contents

1. Summary of the outcome of the consultation (Subject 040)	2
2. Individual comments and responses (Subject 040)	3
Appendix A — Attachments (Subject 040)	51
3. Summary of the outcome of the consultation (Subject 100)	53
4. Individual comments and responses (Subject 100)	54
Appendix A — Attachments (Subject 100)	97



1. Summary of the outcome of the consultation

Please refer to the Explanatory Note to Decision 2018/001/R.



2. Individual comments and responses

In responding to comments, a standard terminology has been applied to attest EASA's position. This terminology is as follows:

- (a) **Accepted** — EASA agrees with the comment and any proposed amendment is wholly transferred to the revised text.
- (b) **Partially accepted** — EASA either agrees partially with the comment, or agrees with it but the proposed amendment is only partially transferred to the revised text.
- (c) **Noted** — EASA acknowledges the comment but no change to the existing text is considered necessary.
- (d) **Not accepted** — The comment or proposed amendment is not shared by EASA.

(General Comments)

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comment

63-F

comment by: *Orbit Groundschool*

This comment reflects page 56-64:

This belongs to a type-rating course such as i.e. B737 or A320 (or similar).

It is already implemented even in a MCC or JOC, as where things are reflected during ground school as well during simulator training.

At the point proposed, not being later than by the latest ATPL theoretical knowledge exam, trainees would not even have seen a basic training aircraft up real close, i.e. during an Integrated ATP course or even have just around 45 hours more or less whilst having completed a PPL training course (most of the time on a basic analogue equipped trainer).

It make no sense to lecture/teach these items at the time proposed! Period! The added value is none! It creates in our opinion even negative training which can result in flight safety issues even during foundation flight training. The confusement will be complete for a trainee during foundation flight training. It should be taught at the point where needed and that is already taken care of during MCC/JOC and even more important, during type rating training.

response

Noted.

Thank you for providing your comment referring to pp. 56-64 of NPA 2016-03(F).

EASA acknowledges your opinion.

comment

72-F

comment by: *CAA-NL*

Enclosed the comments of the Netherlands on the **Notice of Proposed Amendment 2016-03 (F)**



040 Human Performance and Limitations

040 02 02 01 09 do not delete, important for understanding the threat Habituation

040 02 03 02 05 do not delete, important for understanding influence circadian rhythm of body temp for sleep cycle

040 02 03 03 19 do not delete, important for understanding of back pain due to long during same body attitude

040 03 04 02 09 Delete this new LO, as this threat of SOP's is trivial and LO is not detailed enough.

040 03 04 04 17 This LO is too general stated, which ones are meant?

040 03 05 03 01 Change summarise into explain as that is the right level of the LO.

100 KSA

In general it is remarkable that items from the practical training are proposed to become a part of the theoretical training as well. That means that Theoretical Knowledge Instructors will get tasks in which they will have no experience. An education for flight instructor or parts of their job will become necessary. It would be better to oblige the ATO's to make the courses integrated by a mix of theoretical and practical instruction.

100 01 00 00 .. As all items are new and not for testing by the ECQB it is not relevant to mark LO's in the BK column.

100 02 00 00 .. Management of the flight path. This item is done in the practical training in simulator exercises. It is relevant not for the theory course as it is a typical item for the flight instructors.

100 04 00 00 .. Problem solving and decision making. This item is done in the practical training in simulator exercises. It is relevant not for the theory course as it is a typical item for the flight instructors.

100 05 00 01 01/02/03 Not relevant for theory instruction

100 05 00 01 04 Delete as covered in 040

100 05 02 00 01 Transfer this LO to 040

100 05 02 00 02/03/04 This is relevant for practical training

100 06 00 00 Workload management. This is only to be judged in practical training exercises

100 07 00 00 Knowledge. This is part of the practical training.

100 08 00 00 UPRT is part of the syllabus of the practical training.

response

Thank you for providing your multiple comments referring to Subject 040 'Human performance and limitations' and to Subject Area 100 KSA.

Subject 040 'Human performance and limitations'

Regarding your comment referring to LO 040 02 02 01 (09): Accepted.

EASA agrees that this LO is important for understanding the threat 'habituation' poses. This LO will be retained.

In comment 15-F and 26-F, the same issue was raised regarding this LO (09).

Regarding your comment referring to LO 040 02 03 02 (05): Accepted.

EASA agrees that this LO is important for understanding the influence of circadian rhythm of body temperature on sleep cycle.

This LO will be retained.



In comments 2-F, 27-F and 78-F, the same issue was raised regarding this LO (05).

Regarding your comment referring to LO 040 02 03 03 (19): Accepted.

EASA agrees that this LO is important for the understanding of back pain due to long duration of same body attitude.

This LO will be retained.

In comments 28-F and 78-F, the same issue was raised regarding this LO (19).

Regarding your comment referring to LO 040 03 04 02 (09): Not accepted.

EASA would like to highlight that this threat is important as the SOPs learned by heart have to be replaced and confusion is a possible threat.

Regarding your comment referring to LO 040 03 04 04 (17) new: Accepted.

EASA acknowledges this problem and will rewrite the LO.

The text will be amended as follows:

Describe the limitations of communication in situations of high workload in the flight crew compartment in view of listening, verbal, non-verbal and visual effects.

In comments 30-F and 78-F, the same issue was raised regarding this LO (17).

Regarding your comment referring to LO 040 03 05 03 (01): Accepted.

EASA agrees that the LO taxonomy level has to be changed to 'Explain' instead of 'Summarise'. EASA also agrees to replace the wording 'careless' and reword the adjectives and nouns (comment 76-F).

The text will be amended as follows:

Explain dangerous attitudes in aviation:

- anti-authority;
- macho;
- impulsivity;
- invulnerability;
- complacency;
- resignation.

In comment 31-F, the same issue was raised regarding this LO (01).

comment

89-F

comment by: *Rogério Pinheiro*

Dear Sirs,

APTTA – Associação Portuguesa de Transporte e Trabalho Aéreo is pleased to submit its comments regarding NPA 2016-03 (F).

1) 040 HUMAN PERFORMANCE AND LIMITATIONS

APTTA welcomes the amendments suggested.

2) AREA 100 LEARNING OBJECTIVES ON KNOWLEDGE, SKILLS AND ATTITUDES (KSA)



	<p><i>APTTA considers beneficial the inclusion of this issue on the pilot's training material. Some of the principles now defined were already used on classes, on briefings and debriefings and during flights.</i></p> <p><i>These inclusions will have to be included in the training materials (The use of synthetic training systems entails costs difficult to account for the time being and there is no information on the acceptable type(s) and model(s)). Some of the issued introduced are likely to be duplicated bearing in mind the Syllabus of Course Multi Crew Coordination and or Instructor Course . The inclusion of new themes / LO's will incur in additional hours either theoretical or (also) practice. Adapting methods of presentation and evaluation of some of the thematic is made in ways still not very clear, which may generate situations of difficulty in implementation.</i></p> <p><i>Kind regards,</i> <i>APTTA</i></p>
response	<p>Thank you for providing your multiple comments regarding Subject 040 'Human performance and limitations' and Area 100 KSA.</p> <p>Regarding your comment to Subject 040: Noted</p> <p>EASA acknowledges your positive feedback.</p>

Notice of Proposed Amendment 2016-03(F) — General comments

p. 1

comment	<p>81-F</p> <p>comment by: <i>Aero-Club of Switzerland</i></p> <p>General comment</p> <p>Thank your for deleting many topic not relevant for flight crews in Subject 040, the subject is much leaner now.</p> <p>We added a few elements in the "stress" chapter, otherwise we gladly accept your proposals for the (future) CB-IR/EIR community.</p>
response	<p>Noted.</p> <p>Thank you for providing your general comment referring to Subject 040.</p> <p>EASA acknowledges your opinion.</p>

Overview of the proposed amendments to Subject 040 'Human performance and limitations'

p. 2

comment	<p>83-F</p> <p>comment by: <i>DGAC FRANCE</i></p> <p>Doc F</p>
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response	<p><u>Subject:</u> SUBJECT 040 – HUMAN PERFORMANCE</p> <p><u>Content of comment:</u> No comment</p>
	<p>Noted.</p> <p>Thank you for providing your general comment referring to Subject 040.</p> <p>EASA acknowledges the fact that you do not have any comment.</p>

SUBJECT 040 — HUMAN PERFORMANCE AND LIMITATIONS

p. 3-55

comment	<p>1-F</p> <p>comment by: <i>Nick Mylne</i></p> <p>040 03 06 02 Stress LO (01) "Explain the term 'homeostasis, For some reason this important term has been deleted. The term homeostatis is most important for the students to understand as it is fundamental in many of both the physical and mental areas studied in the subject.</p>
response	<p>Not accepted.</p> <p>Thank you for providing your comment referring to LO 040 03 06 02 (01).</p> <p>Although it is fundamental, EASA is of the opinion that homeostasis is too deep background knowledge and has no practical application for pilots.</p>
comment	<p>2-F</p> <p>comment by: <i>Nick Mylne</i></p> <p>040 02 03 02 LO(5) The following has been deleted : State the effect of the circadian rhythm of body temperature on an individual's performance and the effect on an individual's sleep pattern.</p> <p>I earnestly request that this learning object is not deleted. Body temperature has a marked effect on sleep and has ramifications on jet lag. One of the tricks of insomniacs is that they go into a very hot bath, thereby raising the body temperature before lying down for sleep. As the body temperature decreases it helps to induce sleep.</p>
response	<p>Accepted.</p> <p>Thank you for providing your comment referring to LO 040 02 03 02 (05): Accepted.</p> <p>EASA agrees that this LO is important for understanding the influence of circadian rhythm of body temperature on sleep cycle. This LO will be retained.</p> <p>In comments 27-F and 78-F, the same issue was raised regarding this LO (05).</p>



comment

15-F

comment by: LFT

EASA	LO	Title	Comment
040 01 03 00	7	Explain and give examples of procedural error.	<i>I see the problem that the concept of human error is addressed at several parts in this syllabus, i.e. here under the topic "Flight safety concepts" and later under the topic "Theory and model of human error"</i> <i>This makes it difficult to check whether all important aspects are covered. Here I miss for example "communication error" and "A/C "handling error"</i>
040 01 03 00	9	Describe and compare the elements of the SHELL model.	delete - from my point the SHELL model is more of historical interest. The main conceptual ideas are today covered by aspects of TEM (i.e. software & hardware failures are kind of latent threats, environmental influences are environmental or organisational threats, L-L interactions are part of error management etc. Therefore I propose to handle the SHELL model only short or to delete it as LO and to emphasize these aspects while discussing TEM
040 01 03 00	10	Summarise the relevance of the SHELL model to the work in the cockpit.	delete - see above
040 01 03 00	11	Analyse the interaction between the various components of the SHELL model.	delete - see above
040 01 03 00	12	Identify and explain examples of liveware and liveware (L-L) interactions and their effects on flight safety.	delete - see above
040 01 03 00	13	Identify and explain the interaction between flight crew and management as a factor in flight safety.	<i>if one delete the LO about SHELL, this LO should be shifted into "Safety Culture" as aspect of the LO 5 "State the important factors that promote a good safety culture."</i>
040 02 01 01	4	State the physiological significance of the following laws: — Boyle's Law; — Dalton's Law; — Henry's Laws; — the General Gas Law.	<i>include - could be a good repetition with respect to pilot's environment Boyle / Ideal Gas Law = to explain Barotrauma Dalton = to explain Hypoxia at high altitudes</i>



			<i>Henry = to describe gas exchange in the lung and decompression sickness</i>
040 02 01 01	6	State at what approximate altitudes in the standard atmosphere the atmospheric pressure will be $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$ of mean sea level (MSL) pressure.	<i>delete - intensively covered in Meteorology</i>
040 02 01 01	7	State the effects of increasing altitude on the overall pressure and partial pressures of the various gases in the atmosphere.	<i>delete - intensively covered in Meteorology</i>
040 02 01 02	2	Identify the different volumes of air in the lungs and state the normal respiratory rate.	<i>delete - too detailed for pilot' tasks</i>
040 02 01 02	3	State how oxygen and carbon dioxide are transported throughout the body.	<i>delete - includes in LO 6</i>
040 02 01 02	4	Explain the process by which oxygen is transferred to the tissues and carbon dioxide is eliminated from the body and the oxygen requirement of tissues.	<i>delete - includes in LO 6</i>
040 02 01 02	6	Describe the basic processes of external respiration and internal respiration.	<i>from my point this LO already include sufficiently the aspects of LO 3 and 4</i>
040 02 01 02	10	Name the four chambers of the heart and state the function of the individual chambers.	<i>delete - too detailed for pilot' tasks</i>
040 02 01 02	11	Differentiate between arteries, veins and capillaries in their structure and function.	<i>delete - includes sufficiently in LO 8</i>
040 02 01 02	12	State the functions of the coronary arteries and veins.	<i>delete - too detailed for pilot' tasks</i>
040 02 01 02	15	State that in an average pilot blood pressure will rise slightly with age as the arteries lose their elasticity.	<i>delete - too detailed for pilot' tasks or move to Hypertension</i>
040 02 01 02	17	Stress the function of haemoglobin in the circulatory system.	<i>intergrate this LO to Carbon Monoxide</i>
040 02 01 02	18	Define 'anaemia' and state its common causes.	<i>integrate this LO to Hypoxia</i>
040 02 01	19	Indicate the effect of increasing altitude on haemoglobin oxygen	<i>integrate this LO to Hypoxia</i>

02		saturation.	
040 02 01 02	34	State the altitude at which short-term memory begins to be affected by hypoxia.	<i>delete - included in LO 33</i>
040 02 01 02	37	Explain the dangers of flying above 10 000 ft without using additional oxygen or being in a pressurised cabin.	<i>delete - included in LO 33</i>
040 02 01 02	47	List the measures which may be taken to counteract hyperventilation.	<i>Include or delete all LOs about Hyperventilation: If the decision is to describe Hyperventilation, possible countermeasures must be included! Otherwise we teach sth without consequences!</i>
040 02 01 02	55	List the vital actions the crew has to perform when cabin pressurisation is lost (oxygen mask on, emergency descent, land as soon as possible and no further flight for the next minimum 24 hours). State that decompression sickness symptoms can occur up to 24 hours later.	<i>This should be the 2nd LO within "Decompression Sickness" (after LO 48) It should also be mentioned statistical data on how often rapid decompression occurs worldwide in transport aviation.</i>
040 02 01 02	57	Define 'linear', 'angular' and 'radial acceleration'.	<i>In Physics we only distinguish between linear and angular acceleration</i>
040 02 01 02	58	Describe the effects of acceleration on the circulation and blood volume distribution.	<i>more specific "Describe the effects of z-accelerations on...."</i>
040 02 01 02	59	List the factors determining the effects of acceleration on the human body.	<i>more specific "List magnitude, duration and onset as factors determining the effect...."</i>
040 02 01 02	60	Describe the measures which may be taken to increase tolerance to positive acceleration.	<i>delete - only important to military and artistic pilots</i>
040 02 01 02	65	Indicate how carbon-monoxide poisoning can be treated and countermeasures that can be adopted.	<i>more precise because it's safety relevant: Explain immediate countermeasures in suspicion of carbon monoxide and how poisoning can be treated later on ground</i>
040 02 01 03	1	State how an increase in altitude may change the proportion of ozone in the atmosphere.	<i>include because all airlines are equipped with special ozone removers...pilots should know why!</i>
040 02 01	6	List the harmful effects that may result from the extra radiation	<i>State how additional radiation exposure for pilots is determined</i>



03		that may be generated as the result of a sun storm (solar flares).	
040 02 01 03	7	List the methods of reducing the effects of extra radiation that may be generated as the result of a sun storm (solar flares).	<i>State the allowed additional radiation dose for pilots and compare with statistical data</i>
040 02 01 03	8	Define the terms 'humidity' and 'relative humidity'.	<i>delete - done by MET</i>
040 02 01 03	11	List the physiological effects of dry cabin air on the human body and indicate measures to diminish these effects. Stress the effects that low humidity can have on the efficient functioning of the eye.	<i>very detailed, i propose to delete the special aspects on the eyes...</i>
040 02 02 01	1	Name the main parts of the central nervous system.	<i>Proposal: Name the main parts of the central and the peripheral nervous system</i>
040 02 02 01	2	State the basic functions of the central nervous system (CNS), the peripheral nervous system (PNS), and the autonomic (vegetative) nervous system (ANS).	<i>Proposal: Name the main functions of the somatic and the autonomic nervous system</i>
040 02 02 01	3	Discuss broadly how information is processed by the nervous system and the role of reflexes.	<i>What is meant by "broadly"? - Proposal: Describe the mechanism of the nervous system to react in reflexes</i>
040 02 02 01	4	Define the division of the peripheral nerves into sensory and motor nerves.	<i>include in LO 1</i>
040 02 02 01	5	State that a nerve impulse is an electrochemical phenomenon.	<i>Proposal: State that nerve impulse is an electrochemical phenomenon and therefore pilots must show special care against dehydration and use of medication during flight</i>
040 02 02 01	9	Define the term 'habituation' and state its implication for flight safety.	<i>include, it's safety relevant! (and it is a completely different process than adaptation)</i>
040 02 02 01	10	Define the biological control systems as neurohormonal processes that are highly self-regulated in the normal environment.	<i>delete - too general and without consequences for pilots</i>
040 02 02 02	9	Explain the adaptation mechanism in vision to cater for reduced and increased levels of illumination.	<i>delete - too detailed for pilots and without consequences (no action/countermeasure)</i>



040 02 02 02	12	Explain the nature of colour blindness and the significance of the 'blind spot' on the retina in detecting other traffic in flight.	<i>To my knowledge: there is no significance of the blind spot in detecting other traffic</i>
040 02 02 02	16	State the problems of vision associated with higher energy blue light and ultraviolet rays.	<i>integrate this LO into LO 19 (sunglasses)</i>
040 02 02 02	22	State the current rules/regulations governing the wearing of corrective spectacles and contact lenses when operating as a pilot.	<i>Suggestion for improvement: ..., and laser surgery when operating as a pilot</i>
040 02 02 03	1	State the audible range of the human ear.	<i>I think this is necessary knowledge to discuss Hearing Loss ?!? => move to "Hearing Loss"</i>
040 02 02 03	2	State the unit of measure for the intensity of sound.	<i>Move to "Hearing Loss"</i>
040 02 02 03	3	Name the most important parts of the ear and the associated neural pathway.	<i>delete - included in my proposal for LO 4</i>
040 02 02 03	4	State the basic functions of the different parts of the auditory system.	<i>Proposal: State the basic parts and functions of the outer, the middle and the inner ear</i>
040 02 02 03	6	State the role of the Eustachian tube in equalising pressure between the middle ear and the environment.	<i>delete here - is included in 040 02 03 03 Problem Area for Pilots LO 1, "State the role of the Eustachian tube in equalising pressure between the middle ear and the environment."</i>
040 02 02 03	7	Indicate the effects of colds, flu and hay fever on the ability to equalise pressure in the above.	<i>delete here - is included in 040 02 03 03 Problem Area for Pilots LO 4, "Indicate the effects of colds or flu on the ability to equalise pressure between the middle ear and the environment."</i>
040 02 02 03	10	State the decibel level of received noise that will cause NIHL.	<i>Proposal: State how db-level and exposure time may influence shortterm NIHL and longterm presbycusis</i>
040 02 02 04	6	Indicate that vibration can cause undesirable human responses because of the resonance of the skull and the eyeballs.	<i>delete - too detailed vibration in general is included in LO 7</i>
040 02 02 05	5	State the conditions which cause the 'black-hole' effect and 'empty-field myopia'.	<i>delete - To my knowledge both effects describe completely different situations, therefore I propose to delete this LO and to split its content to Black hole approach is a special example</i>

			<p><i>for an approach illusion at night => include in LO 6</i></p> <p><i>empty field myopia is an illusion typical for the flight phase at day => move into LO 3</i></p>
040 02 02 05	6	Give examples of approach and landing illusions, state the danger involved and give recommendations to avoid or counteract these problems.	<p><i>Since the ICAO competencies differentiate between the approach and the landing phase, I propose to to the same with this LO</i></p> <p><i>Give examples for approach illusions leading to a too high or too low approach.</i></p> <p><i>Give examples for landing illusions, leading to a flare at the wrong time</i></p>
040 02 02 05	7	State the problems associated with flickering lights (strobe lights, anti-collision lights, propellers and rotors under certain light conditions, etc.).	<i>I propose to place this LO between LO 3 and LO 4</i>
040 02 02 05	8	Give examples of vestibular illusions such as somatogyral (the Leans), Coriolis, somatogravic and G-effect illusions.	<p><i>more precise -</i></p> <p><i>Give examples of vestibular illusions caused by the angular accelerations (the Leans, Coriolis) and linear accelerations (somatogravic, G-effect)</i></p>
040 02 02 05	9	Relate the above-mentioned vestibular illusions to problems encountered in flight and state the dangers involved.	<i>good - because it relates the knowledge to the practice</i>
040 02 02 05	10	List and describe the function of the proprioceptive senses ('seat-of-the-pants' sense).	<i>include or move to LO 1</i>
040 02 02 05	14	Explain the flicker effect (stroboscopic effect) and discuss the countermeasures.	<i>delete - included in LO 7</i>
040 02 02 05	15	Explain how spatial disorientation can result from a mismatch in sensory input and information processing.	<i>delete - included in LO 2</i>
040 02 03 03	4	Indicate the effects of colds or flu on the ability to equalise pressure between the middle ear and the environment.	<i>delete - included in the above LO 3</i>
040 02 03 03	14	State the cause of obesity.	<i>delete - too detailed for pilots</i>
040	16	State the relationship between	<i>delete - too detailed for pilots</i>



02 03 03		obesity and body mass index (BMI).	
040 02 03 03	17	Calculate the BMI of an individual (given weight in kilograms and height in metres) and state whether this BMI indicates that the individual is underweight, overweight, obese or within the normal range of body weight.	<i>delete - too detailed for pilots</i>
040 02 03 03		1.1.1.1.2 Tropical climates	<i>what is this number for ?</i>
040 03 01 04	2	Find pilot-related examples for each of these learning forms.	<i>if we delete this LO, why should we teach the LO 1 ? Delete both or keep both?</i>
040 03 01 04	12	Explain the influences of different levels of motivation on performance taking into consideration task difficulty.	<i>good reduction!</i>
040 03 01 04	13	Explain the 'Model of human needs' (Maslow) and relate this to aviation.	<i>good reduction!</i>
040 03 02 03	d	Theory and model of human error	<i>I see the problem that the concept of human error is addressed at several parts in this syllabus, i.e. here under the topic "Flight safety concepts" and later under the topic "Theory and model of human error"</i> <i>This makes it difficult to check whether all important aspects are covered or if several aspect are covered twice.</i>
040 03 02 03	1	Define the term 'error'.	<i>it's quite the same as LO Explain and give a definition of 'error' according to the TEM model of ICAO Doc 9683 (Part II, Chapter 2).</i>
040 03 02 03	2	Explain the concept of the 'error chain'.	<i>It's closely related to Explain the three components of the threat and error management (TEM) model.</i>
040 03 02 03	4	Distinguish between the main forms/types of errors (i.e. slips, faults, omissions and violations).	<i>wrong order: it is bad to describe these error types AFTER the LO Give examples of different countermeasures which may be used in order to manage threats, errors and undesired aircraft states.</i>
040	6	Distinguish between an active and	<i>it's quite the same as LO</i>



03 02 03		a latent error and give examples.	<i>Explain and give examples of latent threats.</i>
040 03 02 04	1	Distinguish between internal and external factors in error generation.	<i>it's quite the same as LO Explain and give examples of latent threats. Explain and give examples of environmental threats. Explain and give examples of organisational threats.</i>
040 03 02 04	2	Identify possible sources of internal error generation.	<i>it's quite the same as LO Explain and give examples of procedural error.....</i>
040 03 02 04	4	List the three main sources of external error generation in the cockpit.	<i>combine with LO 5 below</i>
040 03 02 04	5	Give examples to illustrate the following factors in external error generation in the cockpit: — ergonomics, — economics, — social environment.	<i>it is quite similar to LO Describe and compare the elements of the SHELL model.</i>
040 03 04 02	9	Explain potential threats of SOPs, for example during company and/or type conversion (e.g. motor programmes, company culture, hazardous attitudes, developed habits).	<i>The aspect of "developed habits" seems to me to be a doubling of Define and discuss the two errors associated with motor programmes (action slip and environmental capture).</i>
040 03 04 04	2	Explain the advantages of two-way communication as opposed to one-way communication.	<i>clarification: there exist several definitions of "two-way-communication", which one is meant here?</i>
040 03 04 04	7	Name the functions of non-verbal communication.	<i>Name the importance of non-verbal communication</i>
040 03 05 00	c	Human behaviour	<i>From my (didactical) viewpoint, the topic "Human behaviour" is mainly related to "one person" and should be handled before the discussion aspect of the "two person cockpit"</i>
040 03 06 02	5	Explain the biological reaction to stress by means of the 'general adaptation syndrome' (GAS).	<i>include into LO 22 (it's not so important)</i>
040 03 06 02	19	Name the three phases of GAS (alarm, resistance and exhaustion).	<i>include into LO 22 (it's not so important)</i>
040 03 06 02	20	Name the symptoms of stress relating to the different phases of GAS.	<i>include into LO 22 (it's not so important)</i>



040 03 06 02	22	State the general effect of chronic stress on the human system.	<i>State the general effect of chronic stress and the biological reaction by means of the 3 phases of the GAS</i>
040 03 06 05	d	Fatigue and stress management	<i>The aspect of Fatigue and Hypovigilance is discussed twice in the syllabus: Attention and Vigilance + Fatigue and stress management several aspects are therefore double, a red line is hardly to see</i> <i>My suggestion is to combine all aspects of fatigue under "Attention and Vigilance"... and to rename this topic to "Stress management"</i>
040 03 06 05	1	Explain the term 'fatigue' and differentiate between the two types of fatigue.	<i>move to "Attention and Vigilance"</i>
040 03 06 05	3	Identify the symptoms and describe the effects of fatigue.	<i>move to "Attention and Vigilance"</i>
040 03 06 05	4	List the strategies which prevent or delay the onset of fatigue and hypovigilance.	<i>move to "Attention and Vigilance"</i>
040 03 07 00	c	Advanced cockpit automation	<i>Compared to the fundamental role and importance of automation in modern cockpit environment, these LO are not sufficient and too general. Several important and basic safety relevant aspects are missing! (See my previous suggestions) Some of the aspect I mentioned earlier are now to be found in Section 100 Knowledge Skill and Attitudes :-)</i>
100 01 00 00	7	Identify and describe the effects of communication related to the Parent-Adult-Child (PAC) Model (from Transactional Analysis) when reviewing aircraft accidents and incidents and in everyday situations.	<i>It is positive to include the aspect, how a person's behaviour should depend on the kind of behaviour by the communication partner!</i> <i>I doubt, whether the transactional model is the most appropriate, because to my knowledge its main application is in the clinical area.</i> <i>As alternative I suggest to think about the model of "situational leadership" according to Hersey & Blanchard</i>
100 01 00 00	8	Show the effective use of communication related to the 'adult' mode.	<i>see above</i>



100 05 02 00	c	Resilience	<i>Several aspects of this topic are also covered in</i> - Personality, attitude and behaviour and - Stress
100 05 02 00	1	Define resilience as ‘the ability to recognise, absorb and adapt to disruptions’, and describe that it is supported by the pilot’s core competencies and improved by experience which can be gained by training for unexpected events or situations.	<i>similar to LO</i> <i>List and describe coping strategies for dealing with stress factors and stress reactions.</i>

response

Thank you for providing your multiple comments.

EASA has carefully assessed all the comments received. Each comment has been dealt with on a one-by-one basis.

040 ‘Human performance and limitations’

Regarding your comment referring to LO 040 01 03 00 (07): Partially accepted.

EASA agrees that important information is missing and will amend this LO.

The text will be amended as follows:

Explain and give examples of procedural error, communication errors and aircraft handling errors.

EASA does not recognise the problem of human error in separate parts of the syllabus as in Subject 040 01 03 00 the TEM and the SHELL are mentioned as concepts. In the other part of the syllabus under Subject 040 03 00 00, the basic aviation psychology, the causes and appearances of human errors are subjects of the LOs.

Regarding your comment referring to LO 040 01 03 00 (09): Accepted.

EASA agrees that the current text is too detailed and the taxonomy will be amended.

The text will be amended as follows:

~~Describe and compare~~ State the elements components of the SHELL model.

Regarding your comment referring to LO 040 01 03 00 (10): Partially accepted.

EASA is of the opinion that the SHELL model is still relevant for aviation. The taxonomy indicator will be amended from ‘Summarise’ to ‘State’.

The text will be amended as follows:

~~Summarise~~ State the relevance of the SHELL model to the work in the cockpit.

Regarding your comment referring to LOs 040 01 03 00 (11) and (12): Accepted.

EASA agrees that the current text in the LOs (11) and (12) about the SHELL model is not very important any more and will be deleted.

Regarding your comment referring to LO 040 01 03 00 (13): Not accepted.

EASA is of the opinion that the content of this LO remains deleted and the content will not be moved to LO (05).



Regarding your comment referring to LO 040 02 01 01 (04): Not accepted.

EASA is of the opinion that in this environment the pilot does not need to know the names of scientific laws.

In comment 78-F, the same issue was raised regarding this LO (04).

Regarding your comment referring to LO 040 02 01 01 (06) and (07): Accepted.

EASA agrees to delete these LOs due to duplication in Subject 050.

In comment 21-F, the same issue was raised regarding these LOs.

Regarding your comment referring to LO 040 02 01 02 (02): Not accepted.

EASA does not agree that this LO is too detailed and will not delete the LO as proposed.

Regarding your comment referring to LOs 040 02 01 02 (03) and (04): Accepted.

EASA agrees to delete these LOs due to the fact that the content is already covered by LO 040 02 01 02 (06).

In comment 21-F, the same issue was raised regarding these LOs.

Regarding your comment referring to LOs 040 02 01 02 (10), (11), (12) and (15): Accepted.

EASA agrees that these LOs are too detailed and will be deleted.

Regarding your comment referring to LOs 040 02 01 02 (17) to (19): Not accepted.

EASA does not agree to move these LOs to another part of the syllabus as this part is well related to the circulatory system LOs.

Regarding your comment referring to LO 040 02 01 02 (34): Not accepted.

EASA likes to state that in LO 040 02 01 02 (33) there is a detailed description of corresponding altitudes only. The content of LO (34) is not included in LO (33) and therefore will not be deleted as proposed.

Regarding your comment referring to LO 040 02 01 02 (37): Accepted.

EASA agrees that this LO is already covered by LO 040 02 01 02 (33) and will delete this LO.

Regarding your comment referring to LO 040 02 01 02 (47): Accepted.

EASA agrees that possible countermeasures regarding hyperventilation must be included somewhere. EASA will retain LO (47) and make this LO more precise by adding: 'and mention the countermeasures: breath slowly, close one opening of the nose, speak loud, paper bag over nose and mouth.'

The text will be amended as follows:

List the measures which may be taken to counteract hyperventilation: breath slowly, close one opening of the nose, speak loudly, place a paper bag over nose and mouth.

In comments 74-F and 78-F, the same issue was raised regarding this LO (47).

Regarding your comment referring to LO 040 02 01 02 (55): Partially accepted.

EASA agrees that this LO has to be moved up within 'Decompression sickness' and be placed after LO 040 02 01 02 (48). Regarding your comment on statistical data, EASA would like to state that this is not available for ATOs, so it will not be added.

Regarding your comment referring to LO 040 02 01 02 (57): Accepted.

EASA agrees that the wording 'linear' and 'radial' is the same, so 'radial' will be deleted in this LO.

The text will be amended as follows:

Define 'linear acceleration' and 'angular acceleration' and 'radial acceleration'.

Regarding your comment referring to LO 040 02 01 02 (58): Accepted.

EASA agrees to a more specific description of the LO as suggested.

The text will be amended as follows:

Describe the effects of z-acceleration on the circulation and blood volume distribution.

Regarding your comment referring to LO 040 02 01 02 (59): Accepted.

EASA agrees to a more specific description of the LO as suggested.

The text will be amended as follows:

List magnitude, duration and onset as the factors that determining the effects of acceleration on the human body.

Regarding your comment referring to LO 040 02 01 02 (60): Accepted.

EASA agrees that this LO is of more importance for military pilots and will be deleted.

Regarding your comment referring to LO 040 02 01 02 (65): Accepted.

EASA agrees that this LO should be more precise because it's safety-relevant.

The text will be amended as follows:

~~Indicate how~~ Explain immediate countermeasures on suspicion of carbon-monoxide poisoning and how poisoning can be treated later on the ground and countermeasures that can be adopted.

Regarding your comment referring to LO 040 02 01 03 (01): Accepted.

EASA agrees that this LO should not be deleted and that it is important to add the remark about ozone removers to this LO as suggested.

The LO text will be completed with the following text at the end: 'because all airlines are equipped with special ozone removers.'

The text will be amended as follows:

State how an increase in altitude may change the proportion of ozone in the atmosphere and that aircraft can be equipped with special ozone removers.

Regarding your comment referring to LOs 040 02 01 03 (06) and (07): Not accepted.

EASA wants to limit the LOs about radiation to the outlines and is not convinced of the knowledge of the proposed details for pilots. These LOs will remain deleted.

Regarding your comment referring to LO 040 02 01 03 (08): Accepted.

EASA agrees that this LO should be deleted as indeed it is a duplication of 050 'Meteorology'.

Regarding your comment referring to LO 040 02 01 03 (11): Partially accepted.

EASA agrees that this LO is very detailed and will be reworded, but slightly differently from your proposal.

The text will be amended as follows:

~~List the physiological effects of dry cabin air on the human body and indicate measures to diminish these effects. Stress the effects that low humidity can have on the efficient functioning of the eye.~~ List the effects of low humidity on the human body to be spurious thirst, dry eyes, skin and mucous membranes and indicate measures that can be taken: drinking water, using eye drops and aqueous creams.

Regarding your comment referring to LO 040 02 02 01 (01) to (05): Not accepted.

EASA came to the conclusion that there is actually no practical use of the information in these five LOs, and will therefore not take over your proposed amendment but will delete all five LOs instead.

Regarding your comment referring to LO 040 02 02 01 (09): Accepted.

EASA agrees that this LO is important for understanding the threat ‘habituation’ poses. This LO will be retained.

In comments 26-F and 72-F, the same issue was raised regarding this LO (09).

Regarding your comment referring to LO 040 02 02 01 (10): Accepted.

EASA agrees that the requested knowledge in this is too detailed for pilots and will be deleted.

Regarding your comment referring to LO 040 02 02 02 (09): Accepted.

EASA agrees that the requested knowledge in this is too detailed for pilots and will be deleted.

Regarding your comment referring to LO 040 02 02 02 (12): Noted.

EASA would like to state that at night the blind spot can be significant for detection of traffic in case vision with the other eye is obscured.

Regarding your comment referring to LO 040 02 02 02 (16): Partially accepted.

EASA concludes that the LO is not specific enough, but will not integrate this LO in LO (19) as proposed, but will redraft the LO.

The text will be amended as follows:

~~State the problems of vision associated with higher energy blue light and ultraviolet rays.~~ State that for high energy blue light and UV rays sunglasses can prevent damage to the retina.

Regarding your comment referring to LO 040 02 02 02 (22): Not accepted.

EASA is of the opinion that the LO is correct like it is and doesn’t see the need to add your suggestion regarding laser surgery.

Regarding your comment referring to LOs 040 02 02 03 (01) and (02): Partially accepted.

EASA agrees that these two LOs should be covered in the section regarding ‘Hearing loss’. Instead of moving these two LOs to that section, EASA will delete LO (02) (LO (01) was already deleted in the NPA text) because the content is covered already in LO 040 02 02 03 (09).

Regarding your comment referring to LOs 040 02 02 03 (03) and (04): Accepted.

EASA agrees that LOs (03) and (04) could be combined and reworded.

The text will be amended as follows:

~~(03) Name the most important parts of the ear and the associated neural pathway.~~

State the basic parts and functions of the outer, the middle and the inner ear. ~~different parts of the auditory system.~~

Regarding your comment referring to LOs 040 02 02 03 (06) and (07): Accepted.

Both LOs will be deleted as EASA agrees that these LOs can be combined and are now covered in the amended LO (04).

Regarding your comment referring to LO 040 02 02 03 (10): Not accepted.

EASA would like to state that the general wording is good as the only thing a pilot needs to know is that too much noise will damage hearing.

Regarding your comment referring to LO 040 02 02 04 (06): Accepted.

EASA agrees that this LO is too detailed and that vibration in general is included in LO (07) and will delete this LO.

Regarding your comment referring to LO 040 02 02 05 (05): Partially accepted.

EASA agrees that the content of LO (05) is covered in LOs (03) and (06), and LO (05) will be deleted. To be more precise, the text of these two LOs will be amended.

The text will be amended as follows:

Give examples of visual illusions based on shape constancy, size constancy, aerial perspective, atmospheric perspective, the absence of focal or ambient cues, autokinesis, vectional false horizons, field myopia and surface planes.

[...]

~~(05) State the conditions which cause the 'black-hole' effect and 'empty-field myopia'.~~

~~Give examples of approach and landing illusions, state the danger involved and give recommendations to avoid or counteract these problems.~~

List approach and landing illusions for slope of the runway, black hole approach, terrain around runway and state the danger involved with recommendations to avoid or counteract the problems with high or low approach or flare at the wrong time.

Regarding your comment referring to LO 040 02 02 05 (06): Partially accepted.

EASA agrees that the content of LO (05) is covered in LOs (03) and (06), and LO (05) will be deleted. To be more precise, the text of these two LOs will be amended. See EASA's response above.

Regarding your comment referring to LO 040 02 02 05 (07): Not accepted.

EASA is not in favour to move this LO, so the original text will be remained at the same place.

Regarding your comment referring to LO 040 02 02 05 (08): Partially accepted.

EASA agrees that it is good to have a more detailed description and will amend this LO.

The text will be amended as follows:

~~Give examples of vestibular illusions such as somatogyral (the Leans), Coriolis,~~

~~somatogravic and G-effect illusions.~~ Describe vestibular illusions caused by the angular accelerations (the Leans, Coriolis) and linear accelerations (somatogravic, G-effect).

Regarding your comment referring to LO 040 02 02 05 (09): Noted.

EASA acknowledges your positive comment.

Regarding your comment referring to LO 040 02 02 05 (10): Partially accepted.

EASA agrees that this LO is duplicated in LO (01) and this LO (10) will be deleted.

Regarding your comment referring to LO 040 02 02 05 (14): Accepted.

EASA agrees to delete this LO (14) as the content is already included in LO (07).

Regarding your comment referring to LO 040 02 02 05 (15): Accepted.

EASA agrees to delete this LO (15) as the content is already included in LO (02).

Regarding your comment referring to LO 040 02 03 03 (04): Accepted.

EASA agrees to delete this LO (04) as the content is already included in LO (03).

Regarding your comment referring to LO 040 02 03 03 (14): Accepted.

EASA agrees to delete this LO (14) because it is not important for flight execution.

Regarding your comment referring to LO 040 02 03 03 (16) and (17): Accepted.

EASA agrees to delete these LOs (16) and (17) as they are not important for flight execution.

In comment 78-F, a similar issue was raised regarding these LOs (16) and (17).

Regarding your comment referring to Subject 040 03 02 03: Accepted.

EASA agrees that these reference numbers are not relevant and will delete number 1.1.1. and number 1.1.1.1.1.12.

The text will be deleted as follows:

~~1.1.1. 1.1.1.1.1.1.2~~ **Tropical climates**

Regarding your comment referring to LO 040 03 01 04 (02): Accepted.

EASA agrees that LOs (01) and (02) are connected. EASA will not delete LO (01) and therefore will retain LO (02), but with a slightly different wording.

The retained LO (02) will be amended as follows:

~~Find~~ Recognise pilot-related examples as behaviouristic, cognitive or modelling forms of for each of these learning forms.

Regarding your comment referring to LOs 040 03 01 04 (12) and (13): Noted.

EASA acknowledges your positive comment.

Regarding your comment referring to Subject 040 03 02 03: Noted.

EASA sees no reason to amend the syllabus. SHELL and TEM models have been reduced to just models.

Regarding your comment referring to LO 040 03 02 03 (01): Accepted.

EASA will delete this LO (01) as it is duplicated in LO 040 01 03 00 (05).

Regarding your comment referring to LO 040 03 02 03 (02): Noted.

EASA would like to state that the error chain is not closely related to

the three components of the TEM model.

Regarding your comment referring to LO 040 03 02 03 (04): Noted.

EASA agrees that the order is not optimum, but each ATO can change the order in their training manual.

Regarding your comment referring to LO 040 03 02 03 (06): Noted.

EASA is not in favour to merge SHELL with TEM, so the LOs will not be changed.

Regarding your comment referring to LOs 040 03 02 04 (01), (02), (04) and (05): Noted.

EASA is not in favour to merge SHELL with TEM, so the LOs will not be changed.

Regarding your comment referring to LO 040 03 02 04 (09): Noted.

EASA agrees that developed habits are associated with motor programmes, but sees no reason to make a change in this LO.

Regarding your comment referring to LO 040 03 04 04 (02): Accepted.

EASA agrees that several definitions of 'two-way-communication' exist, and will make more clear which one is meant; EASA will amend LO (04).

The text will be amended as follows:

Explain the advantages of **in-person** two-way communication as opposed to one-way communication.

Regarding your comment referring to LO 040 03 04 04 (07): Accepted.

EASA agrees to amend the LO as proposed.

The text will be amended as follows:

Name the ~~functions~~ **importance** of non-verbal communication.

Regarding your comment referring to Subject 040 03 05 00: Noted.

EASA states that the order of the LOs is not that important.

Regarding your comment referring to LOs 040 03 06 02 (05), (19), (20) and (22): Accepted.

EASA agrees that these LOs can be combined with LO 040 03 06 02 (22).

EASA will delete LOs (05), (19) and (20), and will reword LO (22).

LO (22) will be amended as follows:

State the general effect of chronic stress ~~on the human system~~ and the biological reaction by means of the three phases of the general adaption syndrome (Selye): alarm, resistance and exhaustion.

Regarding your comment referring to LO 040 03 06 05: Not accepted.

EASA does not agree to combine all aspects of fatigue under 'attention and vigilance' and to rename this topic to 'stress management' as proposed. The LOs will not be amended.

Regarding your comment referring to LOs 040 03 06 05 (01), (03) and (05): Not accepted.

EASA will not move these LOs to Subject 'attention and vigilance' as fatigue and stress are not the same.

Regarding your comment referring to Subject 040 03 07 00: Accepted.

EASA agrees that some LOs have to be rewritten.

Regarding your comment referring to LO 040 03 07 01 (01): Accepted.

EASA agrees to rewrite the LO.

The text will be amended as follows:

~~Define and explain the basic concept of automation.~~

Compare the two basic concepts of automation:

as per Boeing, where the pilot remains the last operator;

and as per Airbus, where automated systems can correct erroneous pilot action.

Regarding your comment referring to LO 040 03 07 01 (new): Not accepted.

EASA will not implement this new LO proposed as this is more a subject for Subject 022.

Regarding your comment referring to LO 040 03 07 01 (02): Accepted.

EASA agrees that this LO (02) is too general and will be reworded.

The text will be amended as follows:

~~List the advantages/disadvantages of automation in the cockpit in respect of level of vigilance, attention, workload, situation awareness and crew coordination. Explain the fundamental restrictions of autoflight systems to be lack of creativity in unknown situations, lack of personal motivation with regard to safety.~~

Regarding your comment referring to LO 040 03 07 01 (03): Accepted.

EASA agrees that this LO (03) is too general and will be reworded.

The text will be amended as follows:

~~State the advantages and disadvantages of the two components of the man-machine system with regard to information input and processing, decision making and output activities. List the principal strengths and weaknesses of pilot versus autopilot systems to be creativity, decision-making, prioritisation of tasks, safety attitude versus precision, reliability.~~

Regarding your comment referring to LO 040 03 07 01 (04): Accepted.

EASA agrees that this LO (04) is too general and will be reworded.

The text will be amended as follows:

Explain the 'ironies of automation' to be designer errors due to wrong interpretation of the data, leaving tasks to the pilot that are too complex to automate, loss of manual and cognitive skills by the pilot. State the necessity for regular training flights as one possible countermeasure.

Regarding your comment referring to LO 040 03 07 01 (05): Accepted.

EASA agrees that this LO (05) is too general and will be reworded.

The text will be amended as follows:

~~Give examples of methods to overcome the disadvantages of automation. Describe methods to overcome the drawbacks of autoflight systems to be loss of manual flying capabilities, additional workload through programming, risk of slips during programming and hypovigilance during cruise.~~

Regarding your comment referring to LO 040 03 07 02 (01): Accepted.

EASA agrees that this LO is too general and will be reworded.

The text will be amended as follows:

State the main weaknesses in the monitoring of automatic systems to be hypovigilance during flight, loss of flying skills.

Regarding your comment referring to LO 040 03 07 02 (02): Accepted.

EASA agrees that this LO is too general and will be reworded.

The text will be amended as follows:

Explain some basic flight crew errors and terms that arise with the introduction of automation: the following terms in connection with automatic systems:

- passive monitoring;
- blinkered concentration;
- confusion;
- mode awareness.

Regarding your comment referring to LO 040 03 07 02 (03): Accepted.

EASA agrees that this LO is too general and will be reworded.

The text will be amended as follows:

~~Give examples of actions which may be taken to counteract~~ Explain how the method of call-outs counteracts ineffective monitoring of automatic systems.

Regarding your comment referring to LOs 040 03 07 02 (05) and (06) (new): Not accepted.

EASA does not agree to add these proposed new LOs.

Regarding your comment referring to LO 040 03 07 03 (01): Accepted.

EASA agrees that this LO is too general and will be reworded.

The text will be amended as follows:

~~Analyse the influence of automation on crew communication and describe the potential disadvantages.~~

Explain that the potential disadvantages of automation on crew communication are loss of awareness of input errors, flight modes, failure detection, failure comprehension, status of the aircraft and aircraft position.

Regarding your comment referring to LO 040 03 07 03 (02): Accepted.

EASA agrees that this LO is too general and will be reworded.

The text will be amended as follows:

~~Summarise how the negative effects of automation on pilots may be alleviated.~~ Explain how the negative effects of automation on pilots may be alleviated by degrading to a lower level of automation to recover comprehension of the flight status from VNAV/LNAV to ALT/HDG or even to manual flying.

Regarding your comment referring to LO 040 03 07 03 (03): Accepted.

EASA agrees that this LO is too general and will be reworded.

The text will be amended as follows:

Interpret the role of automation with respect to flight safety regarding the basic principle of the use of manual versus autoflight in normal operation, frequent changes in the flight profile and in abnormal situations.

comment

17-F

comment by: LFT

In my opinion the term "Coriolis Illusion" is misleading.

To my knowledge, Coriolis is important for the Inertial Reference System IRS or for Meteorology,

but plays no role for human perception

Coriolis acceleration is due to movement in a rotating system, but the coriolis accelerations

(coriolis acceleration = 2 times angular speed multiplied with linear speed = $2 \omega v$)

in typical flight situations (movements during turns) is far too small and below the human threshold of perception.

If with "Coriolis" is meant, that a pilot should avoid abrupt head down or head up movements during a turn the explanation is not based on Coriolis but on the functioning of the 3 semi circular canals of the vestibular organ in such a situation.

Suggestion:

Remove the term "Coriolis" in LO08 and LO13

response

Not accepted.

Thank you for providing your comment referring to LOs 040 02 02 05 (08) and (13).

EASA would like to state that Coriolis is a usual term in this context and does not agree to remove it from the LOs.

comment

18-F

comment by: LFT

I see the problem that the concept of human error is addressed at several parts in this syllabus, i.e. here under the topic "Flight safety concepts" and later under the topic "Theory and model of human error"

This makes it difficult to check whether all important aspects are covered. Here I miss for example "communication error" and "A/C handling error"

response

Noted.

Thank you for providing your comment referring to the concept of 'human error'.

EASA acknowledges your comment.



comment	<div data-bbox="355 219 411 246">19-F</div> <div data-bbox="1230 219 1441 246">comment by: LFT</div> <p>delete LO09 to LO 11</p> <p>from my point the SHELL model is more of historical interest. The main conceptual ideas are today covered by aspects of TEM (i.e. software & hardware failures are kind of latent threats, environmental influences are environmental or organisational threats, L-L interactions are part of error management etc. Therefore I propose to handle the SHELL model only short or to delete it as LO and to emphasize these aspects while discussing TEM</p> <p>if one delete the LOs about SHELL, this content should be shifted into "Safety Culture" as aspect of the LO 5 "State the important factors that promote a good safety culture.":</p> <p>Not accepted.</p> <p>Thank you for providing your comment referring to LOs 040 01 03 00 (09) and (11).</p> <p>EASA would like to state that the SHELL model is still in use and relevant.</p> <p>See also EASA's response to comment 15-F regarding these LOs.</p>
comment	<div data-bbox="355 985 411 1012">20-F</div> <div data-bbox="1230 985 1441 1012">comment by: LFT</div> <p>include -</p> <p>The LO 3 could be a good repetition with respect to pilot's environment</p> <ul style="list-style-type: none"> Boyle / Ideal Gas Law = to explain Barotrauma Dalton = to explain Hypoxia at high altitudes Henry = to describe gas exchange in the lung and decompression sickness
response	<p>Not accepted.</p> <p>Thank you for providing your comment referring to LOs 040 02 01 01 (03) and (04).</p> <p>EASA decided to delete 040 02 01 01 (04).</p> <p>See also EASA's response to comment 15-F regarding this LO.</p>
comment	<div data-bbox="355 1650 411 1677">21-F</div> <div data-bbox="1230 1650 1441 1677">comment by: LFT</div> <p>delete LO 6 and 7 - intensively discussed in Meteorology</p> <p>delete LO 02 (lung volumes) - too detailed for pilot's tasks</p> <p>delete LO 3 and 4 - covered sufficiently in LO 6 of this topic</p>
response	<p>Thank you for your multiple comments.</p> <p>Regarding your comment referring to LOs 040 02 01 01 (06) and (07): Accepted.</p>

	<p>EASA agrees to delete these LOs due to duplication in Subject 050.</p> <p>In comment 15-F, the same issue was raised regarding these LOs.</p> <p>Regarding your comment referring to LO 040 02 01 02 (02): Not accepted.</p> <p>EASA does not agree that this LO is too detailed and will not delete the LO as proposed. This LO is applicable for medical checks and insight in respiratory problems.</p> <p>In comment 15-F, the same issue was raised regarding this LO.</p> <p>Regarding your comment referring to LOs 040 02 01 02 (03) and (04): Accepted.</p> <p>EASA agrees to delete these LOs due to the fact that the content is already covered by LO 040 02 01 02 (06).</p> <p>In comment 15-F, the same issue was raised regarding these LOs.</p>	
comment	26-F	comment by: KLM Flight Academy
	HPL 040 02 02 01 (09). Do not delete. Habituation is an important threat, which has to be recognised and understood.	
response	<p>Accepted.</p> <p>Thank you for providing your comment referring to LO 040 02 02 01 (09).</p> <p>EASA agrees that this LO is important for understanding the threat ‘habituation’ poses. This LO will be retained.</p> <p>In comments 15-F and 72-F, the same issue was raised regarding this LO (09).</p>	
comment	27-F	comment by: KLM Flight Academy
	HPL 040 02 03 02 (05) Do not delete, important for understanding the influence of circadian rhythm of the body temperature for the sleep cycle.	
response	<p>Accepted.</p> <p>Thank you for providing your comment referring to LO 040 02 03 02 (05).</p> <p>EASA agrees that this LO is important for understanding the influence of circadian rhythm of body temperature on sleep cycle. This LO will be retained.</p> <p>In comments 2-F and 72-F, the same issue was raised regarding this LO (05).</p>	
comment	28-F	comment by: KLM Flight Academy
	HPL 040 02 03 03 (19) Do not delete, important for understanding back pain due to long duration of same body attitude.	
response	<p>Accepted.</p> <p>Thank you for providing your comment referring to LO 040 02 03 03 (19).</p> <p>EASA agrees that this LO important for the understanding of back pain due to long</p>	



duration of same body attitude.

This LO will be retained.

In comments 72-F and 78-F, the same issue was raised regarding this LO (19).

comment

29-F

comment by: KLM Flight Academy

HPL 040 03 04 02 (09) new. Delete this new LO as this threat of SOP's is trivial and the LO is not detailed enough. There are a lot more difference between types of aircraft that can give confusion e.g. when an Airbus pilot is transferred to Boeing aircraft.

response

Not accepted.

Thank you for providing your comment referring to LO 040 03 04 02 (09).

EASA does not agree to delete this LO. There is a realistic threat when pilots go from one aircraft type to another of from one company to another.

comment

30-F

comment by: KLM Flight Academy

(17) This LO is too general. The advantages and limitations have to be listed.

response

Partially accepted.

Thank you for providing your comment referring to LO 040 03 04 04 (17).

EASA sees no reason to list the advantages and disadvantages, but decided that is realistic to amend the LO.

The text will be amended as follows:

Describe the limitations of communication in situations of high workload in the flight crew compartment in view of listening, verbal, non-verbal and visual effects.

In comments 72-F and 78-F, the same issue was raised regarding this LO (17).

comment

31-F

comment by: KLM Flight Academy

HPL 040 03 05 03 (01) Propose to change summarise into explain as that is the right level of this LO.

response

Accepted.

Thank you for providing your comment referring to LO 040 03 05 03 (01).

EASA agrees that the LO taxonomy level has to be changed to 'Explain' instead of 'Summarise'. EASA also agrees to replace the word 'careless' and reword the adjectives and nouns (comment 76-F).

The text will be amended as follows:

Explain dangerous attitudes in aviation:

— anti-authority;



- macho;
- impulsivity;
- invulnerability;
- complacency;
- resignation.

In comment 72-F, the same issue was raised regarding this LO (01).

comment

47-F

comment by: Bristol Groundschool

40 01 01 01 (01). Why not just list the eight core competencies here? Why make ATOs and students chase their tails further?

response

Accepted.

Thank you for providing your comment referring to LO 040 01 01 01 (01).

EASA agrees to list the eight core competencies in this LO, and to align with Area KSA 100 to change 'abilities' to 'attitude'.

The text will be amended as follows:

State that competency is based on knowledge, skills and abilities attitudes of the individual pilot and list the ICAO eight core competencies:

- application of procedures;
- communication;
- aircraft flight path management, automation;
- aircraft flight path management, manual control;
- leadership and teamwork;
- problem-solving and decision-making;
- situation awareness;
- workload management.

In comment 78-F, the same issue was raised regarding this LO (09).

comment

48-F

comment by: Bristol Groundschool

040 01 01 01 (02). Too subjective. If you want to examine something as loose as 'factors' then you should list them.

response

Accepted.

Thank you for providing your comment referring to LO 040 01 01 01 (02).

EASA agrees that this LO is complementary to the previous one amended with the addition of the listing; see comment 47-F.



comment	49-F	comment by: <i>Bristol Groundschool</i>
	040 01 02 00 (01) to (04). Whose estimate? What 'general terms'? Whose trend? Cite sources, be they ICAO/EASA/whatever.	
response	<p>Accepted.</p> <p>Thank you for providing your comment referring to Subject 040 01 02 00.</p> <p>EASA agrees that all the LOs under Subject 040 01 02 00 regarding 'accident statistics' are not clear and therefore this Subject will be deleted entirely.</p>	
comment	50-F	comment by: <i>Bristol Groundschool</i>
	040 01 04 00 (05). According to who/what?	
response	<p>Noted.</p> <p>Thank you for providing your comment referring to LO 040 01 04 00 (05).</p> <p>EASA acknowledges your comment.</p>	
comment	51-F	comment by: <i>Bristol Groundschool</i>
	040 02 02 02 (12). These two unrelated topics ought to be in separate LOs.	
response	<p>Accepted.</p> <p>Thank you for providing your comment referring to LO 040 02 02 02 (12).</p> <p>EASA agrees to split this LO in two separate LOs, namely LO (12) and new LO (23).</p> <p>The text will be amended as follows:</p> <p>Explain the nature of colour blindness. and the significance of the 'blind spot' on the retina in detecting other traffic in flight.</p> <p>Explain the significance of the 'blind spot' on the retina in detecting other traffic in flight.</p>	
comment	52-F	comment by: <i>Bristol Groundschool</i>
	040 02 03 01 (01). I would like to see this LO retained, as would anyone who has ever shared a cockpit/flight deck with a crew member with less than scrupulous attention to personal hygiene.	
response	<p>Not accepted.</p> <p>Thank you for providing your comment referring to LO 040 02 03 01 (01).</p> <p>EASA is of the opinion that this LO is not specific for aviation and will remain deleted.</p>	



comment	53-F	comment by: <i>Bristol Groundschool</i>
	040 03 01 01 (07). 'List' would be more appropriate than 'Name'.	
response	<p>Accepted.</p> <p>Thank you for providing your comment referring to LO 040 03 01 01 (07).</p> <p>EASA agrees to amend the taxonomy and to change the term 'Name' into 'List'.</p> <p>The text will be amended as follows:</p> <p>Name List the factors that affect a person's level of attention.</p>	
comment	54-F	comment by: <i>Bristol Groundschool</i>
	040 03 01 04 (01). '...classicand...' should be '...classic and...'	
response	<p>Accepted.</p> <p>Thank you for providing your comment referring to LO 040 03 01 04 (01).</p> <p>EASA will correct this typographical error in the LO.</p>	
comment	55-F	comment by: <i>Bristol Groundschool</i>
	040 03 01 04 (03). Subjective. List the factors that you believe are necessary and we will teach/train them.	
response	<p>Accepted.</p> <p>Thank you for providing your comment referring to LO 040 03 01 04 (03).</p> <p>EASA agrees that his LO is subjective and will add the following factors: intrinsic motivation, good mental health, rehearsals for improvement of memory, consciousness, vigilance, application in practical exercises.</p> <p>The text will be amended as follows:</p> <p>State the factors which are necessary for and promote the quality of learning:</p> <ul style="list-style-type: none"> — intrinsic motivation; — good mental health; — rehearsals for improvement of memory; — consciousness; — vigilance; — application in practical exercises. 	
comment	56-F	comment by: <i>Bristol Groundschool</i>
	040 03 06 05 (01) and (02). The definitions in parentheses on (02) should properly be in	



response

(01).

Accepted.

Thank you for providing your comment referring to LOs 040 03 06 05 (01) and (02).

EASA agrees to reword both LOs.

The text will be amended as follows:

Explain the term 'fatigue' and differentiate between the two types of fatigue (short-term and chronic fatigue).

(02) Name the causes of both types short-term and chronic fatigue.

In comment 78-F, the same issue was raised regarding LO (01).

comment

68-F

comment by: Lu

Here are my comments for document 022 - instruments. Unfortunately the system doesn't allow me to enter my comments in the correct document, so I have to do it here, hoping that you take the 022 comments and shift them to the correct place.

022 09 00 00

LO 01-10:Auto Throttle was erased and replaced by Autothrust only. My proposal is, that also Auto Throttle should be mentioned in the LO's, because in the typical pilots handbook Boeing calls this system Auto Throttle, and Airbus calls it autothrust.

022 13 03 01

In this LO the operating times of the different standby systems are not included. I propose to add an LO like:

'Describe the different types of standby instruments which can either work electronically (Integrated Standby Instrument System, ISIS) or mechanically, and state how long each of them can read a useful indication in case of emergency.'

022 02 07 08

'Describe typical indications of MMO and VMO on analogue and digital instruments.'

In this LO I propose to delete MMO, because it is not indicated on a cockpit indicator

022 02 06 02

This LO only ask for definition of IAS, CAS and TAS, but no longer EAS. My proposal is to keep the definition for EAS like it was before, because there are some effects in the aircraft which relate to the air compressibility effect.

022 03 01 05

'Demonstrate the use of variation values given as E/W or +/- to calculate....'

My propose is to shift this LO to NAV items.

022 03 03 05

The reworded LO is: 'Explain how the use of timed turns eliminates the problem of the turning errors of a direct reading magnetic compass and calculate duration of a rate 1 turn for a given change of heading.'

My propose is to keep the LO like it was written before: 'Explain how to use and interpret



	<p>the direct reading compass indications during a turn.' I think it is easier to understand the meaning of it.</p> <p>022 04 04 07 Explain how the directional gyroscope will drift over time due to the following:.... My propose is to delete: '-aircraft manoeuvring' due to minor effect.</p> <p>022 05 00 00 (INS/IRS) Inertial Navigation and Reference Systems (INS and IRS) The whole chapter was shifted to 061, General Navigation. My propose is to keep this chapter in 022, because there are some important relations between the classic gyros and the INS/IRS. For my point of view I think it is better to keep INS/IRS in 022. For my point of view the function and description of INS/IRS is nearer to gyro and accelerometer effects than to General Navigation.</p> <p>e 022 11 00 00 (FMS) In this chapter we have a lot of items which belong to NAV, so my proposal is to shift INS/IRS to 022, and FMS (022 11 00 00) to NAV items.</p>
response	<p>Noted.</p> <p>Thank you for providing your multiple comments referring to Subject 022. This is the CRD for Subject 040 and the comments on Subject 022 will be responded to in the CRD to Subject 022 (CRD to NPA 2016-03(B)).</p>

comment	<p>73-F</p> <p style="text-align: right;">comment by: LFT</p>
response	<p>040 02 01 02 (39): I am wondering, why "menstruation" is mentioned as a factor that influences the risk of hypoxia. During menstruation, women lose approximately 50-100ml blood. This is not enough to influence the likelihood to suffer from hypoxia.</p> <p>Accepted.</p> <p>Thank you for providing your comment referring to LO 040 02 01 02 (39). EASA agrees that this LO regarding hypoxia is not correct and will delete it.</p>

comment	<p>74-F</p> <p style="text-align: right;">comment by: LFT</p>
response	<p>040 02 01 02 (47): Do not delete. LO is of practical relevance.</p> <p>Accepted.</p> <p>Thank you for providing your comment referring to LO 040 02 01 02 (47). EASA agrees that possible countermeasures regarding hyperventilation must be included somewhere. EASA will retain LO (47) and make this LO more precise by adding: 'and mention the countermeasures: breath slowly, close one opening of the nose, speak loud,</p>



paper bag over nose and mouth.'

The text will be amended as follows:

List the measures which may be taken to counteract hyperventilation: **breath slowly, close one opening of the nose, speak loudly, place a paper bag over nose and mouth.**

In comments 15-F and 78-F, a similar issue was raised regarding this LO (47).

comment

75-F

comment by: LFT

040 03 01 04 (05)

The three stages Anderson speaks of are:

- 1) "cognitive (verbal)",
- 2) "associative" and
- 3) "autonomous (motor)"

response

Accepted.

Thank you for providing your comment referring to LO 040 03 01 04 (05).

EASA agrees that this LO should be reworded.

The text will be amended as follows:

Describe the advantage of planning and the anticipation of future actions:

- define the term 'skills';
- state the three phases of learning a skill (Anderson: **cognitive, associative and autonomous phases**).

comment

76-F

comment by: LFT

040 03 05 03 (01):

Please replace "carelessness" by "complacency" and don't mix adjectives and nouns.

My suggestion:

- anti-authority
- macho
- impulsivity
- invulnerability
- complacency
- resignation

response

Accepted.

Thank you for providing your comment referring to LO 040 03 05 03 (01).

EASA agrees to replace the word 'careless' and reword the adjectives and nouns. Also EASA will change the LO taxonomy level: 'Explain' instead of 'Summarise' (refer also to EASA's response to comments 72-F and 31-F).



The text will be amended as follows:

Summarise Explain dangerous attitudes in aviation:

- anti-authority;
- macho;
- impulsivity;
- invulnerability;
- complacency;
- resignation.

comment

78-F

comment by: *European Cockpit Association*Attachment [#1](#)

NPA 2016_03 (F)		European Cockpit Association – Comments:
Subject 040 — Human performance and limitations	Page nb	Add new Learning Objective: <u>State the existence of Peer support programs, FRMS, just culture principles, and explain their importance for the safety-culture of an operator.</u> Knowledge useful for ATPL and CPL.
040 01 01 01 (1) Becoming competent pilot	3	It must be clarified which ICAO core competencies are referred to in this LO? DOC 9995 or Doc 9869?
040 01 03 00 (13) - Flight safety concepts	5	Add LO: " <i>Explain the main concepts and of CRM and HF and it's relationship with flight safety.</i> " More details on tis subject to be included in 040 03 LO's
040 01 04 00 - Safety culture	6	Add LO: " <i>Name basic concepts of SMS (including hazard identification and risk management) and it's relationship with safety culture.</i> "
040 02 01 01 (04)	6	We suggest to keep Boyles law in the Los. It has practical implications for example in barotrauma and trapped gas. The physiological significance is important in daily working environment.
040 02 01 01 (08),(09), (10) Basics of flight physiology	7	Do not remove these Learning Objectives.
040 02 01 02 (47) Respiratory and circulatory system	12	Do not delete 040 02 01 02 (47). The content on how to counteract hyperventilation can be crucially important in difficult situations and is not covered anywhere else in the Syllabus. Furthermore, we find it illogical not to talk about the prevention and "treatment" of hyperventilation. Even though "paperbag" ventilation is not recommended, an efficient way is to calm down the breathing. In addition, this is the only way to be used if one was hyperventilated when using the OXY mask, which is the most common situation



		when a pilot hyperventilates.
040 02 01 02 (51), (52)	12	Do not remove these Learning Objectives. For what concerns LO 040 02 01 02 (52) - pilots should be aware of the approximate altitude of DCS, e.g. there is no risk below 10 000 ft and usually hypoxia is the issue to come first and secondary DCS.
040 02 01 03 (01)(02)(05) and (07) High altitude environment	14	Do not delete 040 02 01 03 (01) and (02). The content is not covered anywhere else, ozone filters are not even mandatory on all commercial aircrafts and the pilot needs to know about the harmful effects of ozone exposure for the benefit of the passengers and the crews health. Also, do not delete 040 02 01 03 (05) and (07), as the effect of solar flares on the amount of radiation is not covered anywhere else. For the benefit of the passengers and the crew's health, a pilot needs to know the countermeasures that can reduce the dose. It is irresponsible to deny any effect of solar flares on radiation and its effects on passenger and crew health, through deleting these LO's. Also, for what concerns LO 040 02 01 02 (05) - There are pilots that are afraid of solar storms and therefore there should be proper information on the radiation doses that may be encountered.
040 02 01 03 (05),(06), (10)	14	Do not remove these Learning Objectives.
040 02 02 03	19	Do not remove this Learning Objective. (clarification is needed as the crosses X are out for all licenses types)
040 02 02 05 (11) Integration of sensory inputs	22	Do not remove this Learning Objective. The somatogravic and proprioceptive illusions reinforce each other and e.g. the illusion of nose up during acceleration is a real risk during all-engine go around.
040 02 03 02 (05) Body rhythm and sleep	24	Personal temperature sensation can actually, for many individuals, be quite a good warning signal for potential problems with body rhythm. We therefore believe the LO 040 02 03 02 (05) should remain in the Syllabus.
040 02 03 02 Body rhythm and sleep	24	The whole chapter is relevant also for CPL and Helicopters.
040 02 03 02 (17) (New!)	25	Add new LO 040 02 03 02 (17): <u>Describe the health effects of inadequate amount of sleep and disruptions of circadian rhythm.</u> Reasoning: There is a solid evidence on the negative health effects of inadequate sleep to obesity, cardiac and vascular diseases, type 2 diabetes, infections, some cancers and even mortality. Also circadian disruption plays a role in these issues. Pilot profession often includes sleep and circadian disruptions and therefore these should be taught to the candidates.
040 02 03 03 (05)	26	Amend the LO 040 02 03 03 (05): <u>State when a pilot should seek medical advice from an aeromedical examiner (AME)</u>

		or Aeromedical Center (AeMC). Delete the second part of the sentence: (...) and when the aeromedical section of an authority should be informed. Reasoning: In the current EASA Part MED there is no obligation to inform the authority, but the AME or AeMC, which in turn inform the authority.
040 02 03 03 (15) Problem areas for pilots	27	Add to the list <u>"State the harmful effects of obesity on the following: -sleep apnea."</u> Reasoning: The prevalence (or diagnostics) of sleep apnea has increased and more and more pilots are diagnosed with it. Obesity is an important risk factors and should be included to the list.
040 02 03 03 (16) Problem areas for pilots	28	The issue of BMI and it's effects has been discussed in the former JAA SET (Subject Expert Team), which amended the LOs last time. It is not the best way to measure obesity, as very muscular people may have high BMI without obesity. But BMI is still used very widely in medicine and also in the EASA Part MED. Therefore, we would like to point out that while it might still be appropriate to have it as LO, the LO should also elaborate on the limitations of using BMI. If there is a need to get rid of BMI, this should first be removed from part MED, and only after that from the LOs.
040 02 03 03 (17) Problem areas for pilots	28	ECA would like to request clarification of the purpose of the LO 040 02 03 03 (17).
040 02 03 03 (19) Problem areas for pilots; back pains	25	LO 040 02 03 03 (19) must remain in the Syllabus. Many pilots experience back problems, as they spend a large amount of time sitting (often less than optimum conditions from an ergonomics perspective). Due to this fact - solid background knowledge on prevention and treatment is vital. According to the association of AME's in Germany, backpain is a major factor of pilots reporting sick. The mentioned countermeasures are effective to reduce possible health problems. Finally, this LO is not covered anywhere else. We suggest the following, modified wording: Heading title: <u>Back pain and prolonged sitting.</u> Text of LO: <u>Describe the typical back problems (unspecific back pain, slipped disc) that pilots have and the health effects of prolonged sitting. Explain also the ways of preventing and treating these problems:</u> <u>- good sitting posture;</u> <u>- lumbar support;</u> <u>- good physical condition;</u> <u>- in-flight exercise, if possible;</u> <u>- physiotherapy.</u> Additional reasoning: Back problems are extremely common among pilots. There are ways of preventing the problems and this way reduce the risk of "occupational" problems. In addition, with last ten years a growing amount of evidence of the negative health effects on prolonged



		sitting has been obtained. It seems that not even a moderate physical exercise can compensate for prolonged sitting. Therefore a short stretching brake once in 1 to 2 hours should be performed. It is enough to stand up and most of the flight decks are big enough for this. This LO could be only for ATPL and CPL levels when most likely longer flights will be flown.
040 02 03 03 (28)	30	Comment: „Tropical Climate“ and it's associated problems do occur in our region as well.
040 02 03 03 (27) till (29)	29	040 02 03 03 (27) till (29) are relevant also for CPL and Helicopters.
040 02 03 03 (31)	30	Keep the LO 040 02 03 03 (31): <u>State which preventative hygienic measures, vaccinations, drugs and other measures reduce the chances of catching these diseases.</u> Reasoning: It is important for crews to know which vaccinations are needed in travel work (e.g. Hepatitis A&B, Yellow fever, Tetanus) and the prevention of different common diseases that travelers come across (e.g. malaria, dengue fever, Zika virus)
040 02 03 03 (33) (New) Arctic climate	30	<u>Add LO 040 02 03 03 (33) Arctic climate.</u> Reasoning: This LO should address the effects of extreme low temperatures and how to handle them, e.g dry air, chill factor etc... Rational: A quite significant area of the EASA world belongs to that climatic zone. It should be addressed in ATPL and CPL, both fixed wing and particularly helicopter.
040 02 03 04 (12)	32	Comment: This new LO should be removed. <u>It constitutes an unjustified accusation of aviation professionals and is highly judgemental.</u> At minimum - it must be re-phrased e.g <u>what factors can lead to excessive use of alcohol?</u> (Include CPL)
040 02 03 04 (19) (New!) Fume event	33	Add a new LO: <u>Describe a fume event and the possible incapacitating effects of it.</u> Reasoning: Fume events have been discussed with passion in the media and aviation community. There are different believes concerning them and there is a need for proper objective information. ICAO has published a circular on the issue in 2015: ICAO Circular 344 - GUIDELINES ON EDUCATION, TRAINING AND REPORTING OF FUME EVENTS. This could be used as a reference for the issue.
040 03 01 03 (04) Memory	35	Comment: Recent research (e.g. Loukopoulos, Dismukes, Barshi 2009) indicates that the <u>7±2 postulated by Miller in the 1950s is too optimistic</u> and in reality the <u>human short-term memory is more on the order of 5±2</u> – on that note, it <u>may be appropriate to include an LO on “multi-tasking” and if/how humans are capable of this.</u>
040 03 02 04 (06)	41	Expand this LO to include some information on the history

		of the man-machine interface, including background on “human-centered” philosophy.
040 03 04 01 (02)	43	Do not remove this Learning Objective. What is the reasoning for deletion?
040 03 04 02 (03) and (05)	43	040 03 04 02 (03) and (05) are relevant also for CPL and Helicopters.
040 03 04 03 (01) till (15)	44	Subject 040 03 04 02 is relevant also for CPL and Helicopters. Reasoning: While CPL is targeting Single Pilot concepts operating under these rules still is not a „one man show“. All of these subjects do also affect single pilot operation.
040 03 04 04 (05)&(06) Communication	46	If this particular LO is deleted, the importance of the various aspects of communication (linguistics theory of “speech acts”) must nevertheless be included somewhere. The mere distinction between “verbal” and “non-verbal” communication does not suffice. At least some background knowledge of the four elements of a speech act should be included in the LOs
040 03 04 04 (12)	46	Do not remove this Learning Objective. It is useful knowledge, and practical example allows the student to retain the knowledge better.
040 03 04 04 (17)	47	This LO is formulated very generic. ECA believes a more precise breakdown of the elements of communication, including some background information on linguistic “speech act” theory (see also my comment above) is required
040 03 05 01 (05) Personality, attitude and behaviour	47	Comment: What about “environmentalist theory”? This states that personality is also a product of the environment to which one was exposed at significant moments (e.g. childhood, schooling, training).
040 03 05 01 (06)	48	This LO is formulated very generic. More specific details should be included , as the LO as it stands now leaves way too much room for misinterpretation and/or inadequate coverage of this very important area .
040 03 05 03 (01) till (03)	49	040 03 05 03 (01) till (03) is relevant also for CPL and CPL Helicopters
040 03 06 02 (15)	51	LO 040 03 06 02 (15) should be kept, e.g.: <u>Explain a simple model of stress</u> . Reasoning: This model has been very useful in explaining e.g. why the same demand may produce stress to one individual, whereas not to another. Stress is a result of perceived demands and perceived ability and sometimes does not have anything to do with reality.
040 03 06 05 (01)	52	Modify the existing text of LO: Explain the term ‘fatigue’ and differentiate between the two types of fatigue (<u>short term and cumulative</u>). Comment: Add clarification of



response

040 03 06 05 (09) (New, important!) FRMS	53	<p>what two types of fatigue are meant.</p> <p>Add new LO 040 03 06 05 (09): <u>Describe FRMS and explain the main components of it.</u> Reasoning: FRMS has been in ICAO regulation for 5 years and is now also an option in the in the EASA FTL regulation. More and more airlines are using it and therefore the candidates should have some kind of knowledge on it. Finally, ECA is surprised not to find a new Learning Objective demanding explanation of the components of FRMS, given the emphasis put on this subject in the foreword.</p>
		<p>Thank you for providing your multiple comments.</p> <p>EASA has carefully assessed all the comments received. Each comment has been dealt with on a one-by-one basis.</p> <p>Regarding your comment referring to LO 040 01 01 01 (01): Accepted.</p> <p>EASA agrees to list the eight core competencies in this LO.</p> <p>The text will be amended as follows:</p> <p>State that competency is based on knowledge, skills and abilities attitudes of the individual pilot and list the ICAO eight core competencies:</p> <ul style="list-style-type: none"> — application of procedures; — communication; — aircraft flight path management, automation; — aircraft flight path management, manual control; — leadership and teamwork; — problem-solving and decision-making; — situation awareness; — workload management. <p>In comment 47-F, the same issue was raised regarding this LO (09).</p> <p>Regarding your comment referring to LO 040 01 03 00 13: Not accepted.</p> <p>EASA does not agree to add your proposed new LO. This new LO would state trivial information.</p> <p>Regarding your comment referring to Subject 040 01 04 00: Accepted.</p> <p>EASA agrees to add a new LO regarding basic concepts of SMS.</p> <p>The new LO will be inserted as follows:</p> <p>Name the basic concepts of safety management system (SMS) (including hazard identification and risk management) and its relationship with safety culture in order to:</p> <ul style="list-style-type: none"> — define how the organisation is set up to manage risk; — identify workplace risk and implement suitable controls; — implement effective communications across all levels of the organisation.



Regarding your comment referring to LO 040 02 01 01 (04): Not accepted.

EASA is of the opinion that in this environment the pilot does not need to know the names of scientific laws.

In comment 15-F, the same issue was raised regarding this LO (04).

Regarding your comment referring to LOs 040 02 01 01 (08) to (10): Not accepted.

EASA is not convinced of the relevance for practical flying. These LOs will remain deleted.

Regarding your comment referring to LO 040 02 01 02 (47): Accepted.

EASA agrees that possible countermeasures regarding hyperventilation must be included somewhere. EASA will retain LO (47) and make this LO more precise by adding: 'and mention the countermeasures: breath slowly, close one opening of the nose, speak loud, paper bag over nose and mouth.'

The text will be amended as follows:

List the measures which may be taken to counteract hyperventilation: **breath slowly, close one opening of the nose, speak loudly, place a paper bag over nose and mouth.**

In comments 15-F and 74-F, the same issue was raised regarding this LO (47).

Regarding your comment referring to LOs 040 02 01 02 (51) and (52): Not accepted.

EASA does not find it necessary to include too many details in the LOs about DCS as this will rarely be experienced in flight.

Regarding your comment referring to LOs 040 02 01 03 (01), (02), (05) and (07): Partially accepted.

EASA is not convinced of the importance of ozone. It is not measured in aeroplanes. LOs (02), (05) and (07) will remain deleted.

Regarding LO (01), EASA agrees that this LO should not be deleted and that it is important to add the remark about ozone removers to this LO as suggested in comment 15-F.

The LO (01) text will be completed with the following text at the end: 'because all airlines are equipped with special ozone removers.'

The text will be amended as follows:

State how an increase in altitude may change the proportion of ozone in the atmosphere **and that aircraft can be equipped with special ozone removers.**

Regarding your comment referring to LOs 040 02 01 03 (05), (06) and (10): Not accepted.

EASA would like to state that these LOs contain too detailed knowledge and are not practical for civil aviation. These LOs will remain deleted.

Regarding your comment referring to LO 040 02 02 03 (01): Not accepted.

EASA does not find it necessary to include too much detailed information. Important thing is that too much noise can cause deafness. See also EASA's responses to comment 15-F on this subject.

Regarding your comment referring to LO 040 02 02 05 (11): Not accepted.

This LO (11) remains deleted. EASA is convinced that it is already sufficiently mentioned in LO 040 02 02 05 (12).

Regarding your comment referring to LO 040 02 03 02 (05): Accepted.

EASA agrees that this LO is important for understanding the influence of circadian rhythm



of body temperature on sleep cycle. This LO will be retained.

In comments 2-F and 27-F, the same issue was raised regarding this LO (05).

Regarding your comment referring to Subject 040 02 03 02: Accepted.

EASA agrees that this entire subject 'Body rhythm and sleep' is also relevant for CPL and helicopters. EASA will mark an 'X' in those columns.

Regarding your comment referring to Subject 040 02 03 02: Not accepted.

EASA does not consider it necessary to add the proposed new LO (17), because the content is already sufficiently covered in existing LOs 040 02 03 02 (08), (12) and (15).

Regarding your comment referring to LO 040 02 03 03 (05): Accepted.

EASA agrees that in the current Part-MED there is no obligation to inform the authority, but the AME or AeMC, which in turn inform the authority. The second part of the LO will be deleted.

The text will be amended as follows:

State when a pilot should seek medical advice from an **aeromedical examiner (AME)** or **aeromedical centre (AeMC)**, ~~and when the aeromedical section of an authority should be informed.~~

Regarding your comment referring to LO 040 02 03 03 (15): Accepted.

EASA agrees that prevalence (or diagnostics) of sleep apnoea has increased and more and more pilots are diagnosed with it. Obesity is an important risk factor and should be included in the list.

The text will be amended as follows:

State the **following** harmful effects of obesity ~~on the following~~ **can cause**:

- possibility of developing coronary problems;
- increased chances of developing diabetes;
- **reduced** ability to withstand G forces;
- ~~the~~ development of problems with the joints of the limbs;
- general circulatory problems;
- **reduced** ability to cope with hypoxia ~~and/or~~ decompression sickness
- **sleep apnoea.**

Regarding your comment referring to LOs 040 02 03 03 (16) and (17): Partially accepted.

EASA would like to state that BMI is a common term not especially for aviators. See comment 15-F: EASA agrees with comment 15-F to delete the LOs (16) and (17) as they are not important for flight execution.

Regarding your comment referring to LO 040 02 03 03 (19): Accepted.

EASA agrees that this LO is important for the understanding of back pain due to long duration of same body attitude. This LO will be retained.

In comments 28-F and 72-F, the same issue was raised regarding this LO (19).

Regarding your comment referring to LO 040 02 03 03 (28): Accepted.



EASA agrees that this LO is not clear and will delete the wording 'or poorly developed' in this LO.

The text will be amended as follows:

State the possible causes/sources of incapacitation in tropical ~~or poorly developed~~ countries with reference to:

[...]

Regarding your comment referring to LOs 040 02 03 03 (27) to (29): Accepted.

EASA agrees that these LOs are also relevant for CPL and helicopters. Helicopters are already covered. EASA will mark an 'X' in those columns for CPL.

Regarding your comment referring to LO 040 02 03 03 31: Not accepted.

EASA is of the opinion that it is not important for crews to know which vaccinations are needed in travel work. The knowledge is important for medical services. Therefore the LO remains deleted.

Regarding your comment referring to LO subject 040 02 03 03: Not accepted.

EASA does not specify the effects of cold or hot climates in the LOs and therefore does not see the need to add a new LO (33) as proposed. The effects of cold or hot climates can be a subject of route training for pilots.

Regarding your comment referring to LO 040 02 03 04 (12): Accepted.

EASA agrees that this LO is judgemental towards aviation professionals and will be deleted.

Regarding your comment referring to Subject 040 02 03 04: Accepted.

EASA agrees that a new LO (19) should be added regarding fume events. They are indeed discussed intensively in the media and aviation community and there are different beliefs concerning them, so there is a need for proper objective information.

A new LO will be inserted as follows:

Describe a fume event and the possible incapacitating effects on those exposed to it.

Regarding your comment referring to LO 040 03 01 03 (04): Accepted.

EASA acknowledges that recent research (e.g. Loukopoulos, Dismukes, Barshi 2009) indicates that the 7 ± 2 postulated by Miller in the 1950s is too optimistic and in reality the human short-term memory is more on the order of 5 ± 2 . EASA agrees to amend the LO to read ' 5 ± 2 ' instead of ' 7 ± 2 '.

The text will be amended as follows:

State the average maximum number of separate items that may be held in working memory (5 ± 2).

Regarding your comment referring to LO 040 03 02 04 (06): Not accepted.

EASA does not agree to add text relevant for the history as it is not relevant for current aviation.

Regarding your comment referring to LO 040 03 04 01 (02): Not accepted.

EASA is of the opinion that the content of this deleted LO is important for practical flying

instruction, but not suitable for theory exams. The LO remains deleted.

Regarding your comment referring to LOs 040 03 04 02 (03) and (05): Accepted.

EASA agrees that these LOs are also relevant for CPL and helicopters. EASA will mark an 'X' in those columns for CPL and helicopters.

Regarding your comment referring to Subject 040 03 04 03: Accepted.

EASA agrees that all the LOs in subject 'Cooperation' are also relevant for CPL and helicopters. EASA will mark an 'X' in those columns for CPL and helicopters.

Regarding your comment referring to LOs 040 03 04 04 (05) and (06): Accepted.

EASA agrees that the importance of the various aspects of communication (linguistics theory of 'speech acts') must be included in an LO. The mere distinction between 'verbal' and 'non-verbal' communication does not suffice.

EASA will reword LO (06).

The text will be amended as follows:

~~Distinguish between verbal and non-verbal communication.~~ Explain the four elements of a great speech:

- a great person;
- a noteworthy event;
- a compelling message;
- a masterful delivery.

Regarding your comment referring to LO 040 03 04 04 (12): Not accepted.

EASA is of the opinion that the content of this deleted LO is important for theoretical instruction, but not suitable for theory exams. This LO remains deleted.

Regarding your comment referring to LO 040 03 04 04 (17): Accepted.

EASA sees no reason to list the advantages and disadvantages, but decided that is realistic to amend the LO.

The text will be amended as follows:

Describe the limitations of communication in situations of high workload in the flight crew compartment in view of listening, verbal, non-verbal and visual effects.

In comments 30-F and 72-F, the same comment regarding this LO (17) was raised.

Regarding your comment referring to LO 040 03 05 01 (05): Accepted.

EASA agrees that a better description of the LO is needed.

The text will be amended as follows:

Explain how behaviour is generally a product of personality, ~~and attitude~~ and the environment to which one was exposed at significant moments (childhood, schooling and training).

Regarding your comment referring to LO 040 03 05 01 (06): Accepted.

EASA agrees that the current LO is too generic and will be reworded.

The text will be amended as follows:

~~Discuss some State effects~~ that personality differences and selfish attitudes may have effect on flight crew performance.

Regarding your comment referring to LO 040 03 05 03 (01) to (03): Accepted.

EASA agrees that all the LOs in subject 'Identification of hazardous attitudes (error proneness)' are also relevant for CPL and helicopters. EASA will mark an 'X' in those columns for CPL and helicopters.

Regarding your comment referring to LO 040 03 06 02 (15): Accepted.

EASA agrees to retain this LO and that this LO can be more specific and useful.

The retained LO will be amended as follows:

State that stress is a result of perceived demands and perceived ability.

Regarding your comment referring to LO 040 03 06 05 (01): Accepted.

EASA agrees to reword both this LO and also LO (02) based on comment 56-F.

The text will be amended as follows:

Explain the term 'fatigue' and differentiate between the two types of fatigue (short-term and chronic fatigue).

Name the causes for both types short-term and chronic fatigue.

Regarding your comment referring to Subject 040 03 06 05: Partially accepted.

EASA agrees to add a new LO (09) regarding fatigue risk management system (FRMS), but with a different wording from that proposed.

The new LO will be inserted as follows:

Describe the fatigue risk management system (FRMS) as follows: A data-driven means of continuously monitoring and managing fatigue-related safety risks, based upon scientific principles and knowledge as well as operational experience that aims to ensure relevant personnel are performing at adequate levels of alertness.

comment

84-F

comment by: Aero-Club of Switzerland

Page 5ff/64

040 01 04 00 (01)...(07)

All safety culture elements could be deleted from the CB-IR and EIR column.

Rationale:

In our view in our environment these topics are not important on the one hand, also are part of basic knowledge on the other. How could we deal e.g. with (02) in our courses without opening the door to endless discussions bringing nothing in the end?

And as regards (06): It is not up to us to distinguish, it is up to the one's who immediately after an accident or an incident open criminal proceedings, even hindering AAIB doing their work. That is where such a training element urgently is required.



response	<p>Not accepted.</p> <p>Thank you for providing your comment referring to LOs 040 01 04 00 (01) to (07).</p> <p>EASA is convinced that for every pilot it is important to have knowledge about the mentioned items as they have narrow relationship with pilot behaviour in a club and/or company.</p>
comment	<p>85-F</p> <p>comment by: <i>Aero-Club of Switzerland</i></p> <p>Page 50ff/64 Stress 040 03 06 02 From experience we would add to the CB-IR/EIR syllabus (07) (08) (09) (10) (13) (16) (17) (18)</p> <p>Rationale: With a bit more of theoretical background finding out about the individual limitations could be helpful, two special topics being anxiety and personal unrest before a complex flight.</p>
response	<p>Accepted.</p> <p>Thank you for providing your comment referring to LOs 040 03 06 02 (07) to (10), (13) and (16) to (18).</p> <p>EASA agrees that these LOs are relevant for CB-IR and EIR as well. EASA will mark an 'X' in those columns for CB-IR and EIR.</p>



Additional comments received by email:

comment

Per email

comment by: SAT: Blatter Patrick

040 01 03 00 (13) As this can be a factor to stress and motivation it is important to explain (do not delete)

040 02 01 01 (04) Laws of Boyle, Dalton, Henry and general gas law should be kept and adjusted to be relevant to pilots (as mentioned in the overview). Just with the minimum basics of these laws symptoms like hypoxia can be understood

040 02 01 02 (47) Hyperventilation can occur during situation of stress (e.g. under the oxygen mask). It is important to know how to counteract

040 02 03 02 (05) To understand the phenomena of jetlag and the effect on an individual sleep pattern the circadian rhythm of body temperature is essential

040 02 03 03 (25) Vitamins and trace elements are essential for e.g. hypoxia, blood building etc. We do not understand that this LO should be deleted.

response

Thank you for your multiple comments.

Regarding your comment referring to LO 040 01 03 00 (13): Not accepted.

EASA agrees that it can be of influence, but the LO would state trivial information. Therefore the LO remains deleted.

Regarding your comment referring to LO 040 02 01 01 04 (04): Not accepted.

EASA is of the opinion that in this environment the pilot does not need to know the names of scientific laws. See also EASA's response to a similar comment in 15-F.

Regarding your comment referring to LO 040 02 01 02 (47): Accepted.

EASA agrees that possible countermeasures regarding hyperventilation must be included somewhere. EASA will retain LO (47) and make this LO more precise by adding: 'and mention the countermeasures: breath slowly, close one opening of the nose, speak loud, paper bag over nose and mouth.'

The text will be amended as follows:

List the measures which may be taken to counteract hyperventilation: breath slowly, close one opening of the nose, speak loudly, place a paper bag over nose and mouth.

In comments 15-F, 74-F and 78-F, the same issue was raised regarding this LO (47).

Regarding your comment referring to LO 040 02 03 02 (05): Accepted.

EASA agrees that this LO is important for understanding the influence of circadian rhythm of body temperature on sleep cycle.

This LO will be retained.

In comments 2-F, 27-F and 78-F, the same issue was raised regarding this LO (05).

Regarding your comment referring to LO 040 02 03 03 (25): Not accepted.

EASA agrees that indeed vitamins and trace elements are essential but it is too deep medical knowledge for practical flying and normal consumption of meals.

comment

Per email

comment by: Alexander Metzendorf



I think I found an error in your syllabus, learning objectives for human performance and limitations. It is an old error, appears in the old syllabus and has not been recognized in the new NPA Notice of Proposed Amendment 2016-03(F)). I attached a screenshot, it refers to the following LOs:

040 03 01 04 Response selection

...

Describe the advantage of planning and anticipation of future actions:

- define the term 'skills';
- state the three phases of learning a skill (Anderson).

The title "Describe the advantage of planning and anticipation of future actions:" does not relate to both subitems:

- define the term 'skills';
- state the three phases of learning a skill (Anderson).

Title and subitems do not really associate to each other but maybe I misunderstand something.

The title could be moved to

040 03 04 00 Avoiding and managing errors: cockpit management or

040 03 03 00 Decision making

...whereas both subitems could be converted to their own LOs... but this is only an idea. Hope I could help you.

response

Accepted.

Thank you for providing your comment referring to LO 040 03 01 04 (05).

EASA agrees that the title is not relevant for the two bullet points and agrees that this LO should be reworded.

The text will be amended as follows:

Describe the advantage of planning and the anticipation of future actions:

- define the term 'skills';
- state the three phases of learning a skill (Anderson: cognitive, associative and autonomous phases).

In comment 75-F, a similar issue was raised regarding this LO (05).

Next to that, EASA will add a new LO (09) under Subject 040 02 02 04 'Error generation'.

The new LO will be inserted as follows:

Describe the advantage of planning and the anticipation of future actions.

comment

AMC1 ARA.FCL.300(b)

comment by: Roger Henshaw

Ref page 54 040 - Human Performance - for the CBIR/EIR. I fundamentally disagree with limiting the number of examination questions to 12 with each question worth approximately 8%. I suggest 18 or 20 would be a fairer number of questions to more fully examine knowledge whilst allowing an improved margin for errors.



response

Accepted.

Thank you for providing your comment referring to AMC1 ARA.FCL.300(b).

Thank you for this positive comment. EASA agrees that the amount of questions for CB-IR and EIR should be amended from 12 to 20 per exam.



Appendix A — Attachments



Attachment #1 to comment [#78](#)



Attachment #2 to comment [#79](#)





Appendix

to ED Decision 2018/001/R

SUBJECT AREA 100 — KNOWLEDGE, SKILLS AND ATTITUDES (KSA)

RELATED NPA: 2016-03(F) — RMT.0595 — 6.2.2018

Table of contents

3. Summary of the outcome of the consultation	53
4. Individual comments and responses	54
Appendix A — Attachments	97



3. Summary of the outcome of the consultation

Please refer to the Explanatory Note to Decision 2018/001/R.



4. Individual comments and responses

In responding to comments, a standard terminology has been applied to attest EASA's position. This terminology is as follows:

- (a) **Accepted** — EASA agrees with the comment and any proposed amendment is wholly transferred to the revised text.
- (b) **Partially accepted** — EASA either agrees partially with the comment, or agrees with it but the proposed amendment is only partially transferred to the revised text.
- (c) **Noted** — EASA acknowledges the comment but no change to the existing text is considered necessary.
- (d) **Not accepted** — The comment or proposed amendment is not shared by EASA.

(General Comments)

-

comment

25-F

comment by: UK CAA

Page No: General Comment**Paragraph No:** n/a

Comment: The change to the AMC & GM for the introduction of 100 KSA seems to have been written for large ATOs carrying out integrated ATPL courses with in-house students and does not adequately address how smaller ATOs providing distant learning courses can achieve the required outcome or standard. The classroom requirement for ATOs providing modular distance learning courses is:

ORA.ATO.305 Classroom instruction

(a) An element of classroom instruction shall be included in all subjects of modular distance learning courses.

(b) The amount of time spent in actual classroom instruction shall not be less than 10% of the total duration of the course.

(c) To this effect, classroom accommodation shall be available either at the principal place of business of the ATO or within a suitable facility elsewhere.

Justification:

Therefore, with the student spending only 10% of the course hours in a classroom, there is insufficient time for an instructor to satisfactorily assess their KSA against the proposed requirements in this NPA. Currently, ATOs providing distant learning use the classroom time to address any shortfalls in a student's knowledge or understanding of a subject(s). If additional classroom time is required for 100 KSA it will substantially increase the costs of the course for the student as they will need to travel more frequently to the ATO, extra accommodation charges and loss of wages with added time off work.

This will greatly disadvantage students who do not have the financial backing to attend a



response

full time integrated course of training and realise their ambition of attaining a commercial pilot's licence.

The introduction of 100 KSA for distance learning students has not been adequately addressed and has not been sufficiently thought through; it will create 2 tiers of potential pilots with employers undoubtedly favouring integrated student.

The NPA for 100 KSA does not provide any guidance on the requirements if a student fails to achieve the standards set by the ATO. Is there a period of further training, how many attempts is a student allowed or are they suspended from further training and for how long? There is also the issue of the legal rights of a student to contest his grading and the entitlement to appeal to a higher court of law.

Proposed Text: n/a – review content

Partially accepted.

Thank you for providing this general comment referring to Subject Area 100 KSA and AMC3 ORA.ATO.230(a).

EASA considers that the modernisation of the training system, to continuously develop pilot competencies utilising industry and educational best practice, is essential for all ATPL, MPL, and CPL training courses, both integrated and modular. This requirement is based primarily on safety considerations, but also on the needs of industry, and the educational demands of the next generation of professional flight crew.

EASA considered integrated and modular, both residential and distance learning, theoretical knowledge training courses and ATOs of differing sizes when drafting the proposals. The use of an effective ISD utilising a range of learning styles will enable ATOs to integrate the development and assessment of Area 100 KSA into their course(s). For non-residential modular training, the classroom phase of the distance-learning course will be a natural environment for Area 100 KSA development and assessment; however, the majority of the Area 100 KSA should be integrated throughout the entire course of training and be developed and assessed remotely. EASA considers that through the use of carefully constructed exercises and available technology, many of the competencies can be developed, and some assessed, during distance-learning training. The development and assessment of competencies during the required classroom instruction remains an option.

EASA considers that it is necessary that course modernisation including Area 100 KSA be introduced to all ATPL, MPL, and CPL theoretical knowledge training courses irrespective of whether they are full time, residential, or distance learning. This is in order to ensure that there is no actual or perceived difference in the level of attainment of competencies in the different training courses.

The procedure to be followed for students that initially do not reach an acceptable level of performance in an Area KSA 100 summative assessment is to be described by the ATO in the training manual. The provisions for the training manual, as set out in AMC1 ORA.ATO.230(a) subparagraphs (a)(10) and (a)(11), and in AMC3 ORA.ATO.230(a), should be followed. GM2 ORA.ATO.230(a) provides further guidance: 'In order to satisfactorily complete an Area KSA 100 summative assessment, the student should reach at least the minimum satisfactory level in each competence covered by that assessment.'



In case the student fails to reach the minimum satisfactory level in each competence, the student should repeat the summative assessment or another summative assessment that covers the competence(ies) where performance was previously assessed as unsatisfactory.' The purpose of the assessments is to ensure that at least the minimum level of competence is attained.

AMC3 ORA.ATO.230(a) paragraph (d) is amended as follows:

- (6) for a student who performs below the satisfactory standard in a summative assessment(s), the method to further develop the student's competencies and the point of reassessment.

The ATO should have a documented review procedure in place in accordance with AMC1 ORA.ATO.230(a), (d)(6).

comment

63-F

comment by: *Orbit Groundschool*

This comment reflects page 56-64:

This belongs to a type rating course such as i.e. B737 or A320 (or similar).

It is already implemented even in a MCC or JOC, as where things are reflected during ground school as well during simulator training.

At the point proposed, not being later than by the latest ATPL theoretical knowledge exam, trainees would not even have seen a basic training aircraft up real close, i.e. during an Integrated ATP course or even have just around 45 hours more or less whilst having completed a PPL training course (most of the time on a basic analogue equipped trainer).

It make no sense to lecture/teach these items at he time proposed! Period! The added value is none! It creates in our opinion even negative training which can result in flight safety issues even during foundation flight training. The confusement will be complete for a trainee during foundation flight training. It should be taught at the point where needed and that is already taken care of during MCC/JOC and even more important, during type rating training.

response

Partially accepted.

Thank you for providing this general comment referring to Subject Area 100 KSA.

EASA is actively modernising the professional pilot training system to enable the progressive development of the competencies from the beginning of a student's training, in line with ICAO direction. EASA has reviewed the LOs in Area 100 KSA and the LOs on the management of flight path and automation have been deleted.

comment

69-F

comment by: *AIRBUS*

General comment on NPA 2016-03 (F) :

Airbus welcomes the creation of the "area 100" but did not find any guidance material



response

on how to reach the learning objectives referenced in NPA 2016-03 (F) from 100 00 00 00 to 100 07 00 00.

Noted.

Thank you for providing this general comment referring to Subject Area 100 KSA.

EASA proposes to run a workshop to facilitate consistent application and standardisation of the Area 100 KSA summative assessments, together with guidance on the ATO requirements.

comment

70-F

comment by: *Bristol Groundschool International Ltd*

1. This comment only applies to the KSA100 module and its proposed implementation. We consider the introduction of the KSA module LOs to be a potentially valuable addition to the EASA licensing process. Unfortunately the proposed positioning of the module into the theoretical knowledge syllabus with completion required before the ATO approves the final examination will almost completely negate any training value it might have had.

The effect of the proposed positioning of the KSA 100 Module

2. To understand this comment one must appreciate that different approvals allow the theory exams to be completed at different points. Using the most common ATPL(A) type courses as an example students training under modular approval may not start the ATPL theory before the issue of a PPL and must complete it before the start of the CPL flying module. Students training under MPL and integrated approvals, however, can start the ATPL theory right at the start of the course.

3. In practice, most ATOs offering MPL and Integrated training take this option and complete all the ATPL theory before the students have ever flown an aircraft. Modular candidates usually complete the ATPL theory with 120 to 150 hours flying time. We estimate that substantially more than half the students currently in the training system are on integrated and MPL courses. This means that the probable effect of the proposed requirement to complete KSA100 before ATO authorisation of the final theory exam will be that the majority of student pilots will be conducting this training module **before they have ever flown an aircraft**, and the efficacy of the KSA100 learning objectives has to be seen in that context.

4. In reality the effect of this restriction is likely to be even greater. It is normal for theory candidates to sit exams in groups, or modules. This has to be done because of the EASA limit of only six sittings for the theory exams, it cannot be any other way. There are usually two or three modules, meaning each module, and therefore each main sitting, may have 3 to 7 exams in it. If the KSA100 module is to be completed before the final exam authorisation this means it is likely that it will have to be completed before as many as 3 to 7 exams in the final module are attempted and, one may assume, before the training for those subjects is completed. This is particularly relevant because many of the KSA100 LOs specifically require knowledge from the theory subjects to be applied. For instance, LOs in 100 07 00 00 require prior knowledge from 9 named subjects. Is the



proposal really that these subjects should have been previously taught (and presumably examined) and the KSA100 training is therefore to be sandwiched in between attempting the first 9 subjects and the last 5? Are the last 5 theoretical subjects not also relevant?

5. If this is the proposal, the additional effect is that it will force ATOs to complete specific subjects (at least the 9 above) in early modules when they might consider a different training sequence is preferable. In other words it will interfere with the ATOs' discretion to teach the theoretical knowledge subjects in the most effective sequence.

6. Finally, some Authorities will not allow exams to be sat in modules, they must initially **all be attempted at once**. In these States the effect of the proposal is that the KSA100 module will have to be completed before any theoretical exams are attempted. Because of this it will be impossible in these States to comply with the requirements of the 100 07 00 00 LO sequence, for the preliminary training required by the LOs **cannot** have been completed within the timescale unless the extraordinary decision is taken to complete all other theoretical training then put off the exams until the KSA100 module is trained and assessed.

The suitability of the KSA module for early stages of training

7. It is our opinion that the training effectiveness of the proposed KSA100 module will be unnecessarily and artificially restricted by positioning it, as proposed, so early in the student pilot's training. In particular:

- In some LOs the requirements would be much more relevant to a student that had completed at least basic flying training and, in some cases, IFR flight training. We refer particularly here to the sequences 100 02 00 00 'Management of flight path' and 100 05 00 00 "Situation awareness and resilience".
- LOs such as 100 06 00 00 "Workload management" require students to demonstrate workload management and teamwork skills when under pressure. When training students who have never flown it is impractical/impossible to put them under pressure in a simulator environment, where the training would be most effective. This element should be conducted in a simulator and later in training.
- LOs such as the sequence 100 07 00 00 "Knowledge" require the student to demonstrate the general preparation of an aircraft for flight (including FMS initialisation) and KSA and TEM relating to a full flight including taxi, take-off, climb, cruise, descent (including energy management) landing and taxiing. Laudable objectives, but remember most students at this point will have never seen an aircraft and **do not know how to fly**, this would be much better included in a later course, perhaps MCC/JOC.
- If theoretical knowledge instructors are to teach students how to operate a simulator before they have been properly taught to fly attitudes there is considerable potential for negative training, which would have to be unlearned in the flying phases.
- The LO sequences 100 03 00 00 "Leadership and teamwork", 100 04 00 00 "problem solving and decision making" refer to group or crew situations and therefore should be presented when the student is introduced to the multi-pilot concept, in other words during or after the MCC.



- The sequence 100 07 00 00 "Knowledge" will be much more effectively applied if training is conducted in a two-pilot environment with both PM and PF (or captain and co-pilot) roles being filled. This does not naturally occur until late in the training, on the MCC course.
- Finally the sequence 100 08 00 00 "Upset prevention and recovery training" requires students to recognise upset 'threats' and 'errors', to suggest 'threat management' and 'error management' solutions in given scenarios and to identify a 'developing upset' and describe the required actions to recover. Really? for students who have never flown? This LO sequence is most inappropriately placed, it should be part of a dedicated UPRT module with theory and practical - ie in-aircraft - lessons combined.

8. The general behavioural markers in these KSA LOs should in fact be observed and assessed throughout flight training and should form an integral part of assessment of all training details as they are in type rating training and airline operations. While it will be appropriate to introduce some of the concepts in a theoretical manner during pre-flight theoretical knowledge training it is impractical to try and turn practical skills into theory skills, undesirable to separate them from practical flight training, and of limited training value to attempt to deal with this entire range of subjects during the theoretical knowledge phase of a pilot's licence training.

The terminology used

9. On a minor point, the title 'Knowledge, Skills and Attitudes' is not in-line with current training practice, although it was current 20 years ago. The issue is that 'attitudes' cannot be observed, whereas 'behaviours' or possibly 'abilities' can. Behaviours are an external indicator of attitudes. The title 'Knowledge, Skills and Behaviours' is most often used these days.

Recommendations

10. And therefore we recommend:

- That the KSA100 Module should not be included in the theoretical knowledge syllabi as suggested
- That the LO sequence 100 01 00 00 "Communication" should be specified as a general training requirement on all courses, perhaps with some light editing to the LOs at the working group's discretion to make them generally applicable
- That the LO sequences 100 02 00 00 "Management of flight path", 100 03 00 00 "Leadership and teamwork", 100 04 00 00 "Problem solving and decision making", 100 05 00 00 "Situation awareness and resilience", 100 06 00 00 "Workload management", 100 07 00 00 "Knowledge" and 100 09 00 00 "Mental maths" be added to the MCC syllabus, as far as they are not already included. This will have the effect of extending the MCC course beyond a very basic introduction to multi-crew flying to create a much more effective course that is very similar to some of the better existing MCC/JOC courses, perhaps extending the course time to 36 hours. You will note that the JOC element in existing courses, although often required by airlines, is not currently subject to approval. This would make it so. We recommend consultation with airlines, particularly Ryanair, who we believe are working on similar proposals.



response

- That the LO sequence 100 08 00 00 "Upset prevention and recovery training" become part of a separate UPRT course syllabus, in so far as it is not already included, and that the UPRT course requires approval either as a separate module or as part of either MPL or integrated approval, NPA 2015-13 refers.
- That existing flying course syllabi be reviewed with the intention of adding in relevant objectives such as 100 06 00 00 "Workload management"
- That the KSA100 Module be retitled KSB100, with "Behaviour" replacing "Attitudes" throughout.

Partially accepted.

Thank you for providing multiple general comments referring to Subject Area 100 KSA.

EASA is actively modernising the professional pilot training system to enable the progressive development of the competencies from the beginning of a student's training, in line with ICAO direction. Integral to this process is the commencement of the development and assessment of KSA within the theoretical knowledge training course. The Area 100 KSA training and assessments must therefore be successfully completed within the theoretical knowledge training course. As they are considered to be an element of the theoretical knowledge training course, FCL.025(a)(2) applies:

'Applicants shall only take the theoretical knowledge examination when recommended by the approved training organisation (ATO) responsible for their training, once they have completed the appropriate elements of the training course of theoretical knowledge instruction to a satisfactory standard.'

Area 100 KSA is to be fully integrated into the applicable theoretical knowledge training course and is therefore not considered to be a module.

As above, the Area 100 KSA LOs are to be integrated throughout the applicable theoretical knowledge training course, therefore EASA considers that the number of modules that an ATO elects to use to be part of their course design, which when based on ISD methodology will ensure progressive and appropriate development and assessment of the Area 100 KSA. EASA considers that the development and assessment of problem-solving and decision-making, and leadership and teamwork, for example, to be critical competencies for most, if not all, professionals and as pilot core competencies these are safety-critical. Therefore, it is EASA's opinion that the further development of these competencies should not be delayed to a multi-crew simulator environment. Understanding the application of knowledge is considered to be an essential competence and as such should be developed and assessed in the theoretical knowledge phase of training.

EASA has amended the Area 100 KSA LOs to ensure that they are suitable for those with and without flight experience and for all applicable training paths.

The LOs in Area 100 KSA have been reviewed to ensure that they are appropriate to the theoretical knowledge phase of a student's training. A separate rulemaking task (RMT.0581) will examine other phases of a student's training and testing. The Area 100 KSA LOs on 'Management of flight path — automation' have been deleted. The LOs in Area 100 KSA have been modified to give greater flexibility to the ATOs in determining how to deliver the training. There is now no requirement to use training devices. Regarding instructor competencies, no simulators are required to be used.



With respect to UPRT, EASA considers the understanding and the application of knowledge relating to UPRT to be an essential component of the applicable theoretical knowledge training courses. UPRT was recommended to be included in the theoretical knowledge training for the ATPL, MPL, and CPL by the UPRT Working Group. The LOs in the theoretical knowledge subjects have been amended to ensure that UPRT is considered across all the applicable subjects. Additionally, UPRT LOs have also been established in Area 100 KSA.

Knowledge, skills and attitudes are terms in line with current ICAO definitions; ICAO Doc 9995 defines 'competency' as 'a combination of knowledge, skills and attitudes required to perform a task to the prescribed standard'.

comment

72-F

comment by: CAA-NL

Enclosed the comments of the Netherlands on the **Notice of Proposed Amendment 2016-03 (F)**

040 Human Performance and Limitations

040 02 02 01 09 do not delete, important for understanding the threat Habituation

040 02 03 02 05 do not delete, important for understanding influence circadian rhythm of body temp for sleep cycle

040 02 03 03 19 do not delete, important for understanding of back pain due to long during same body attitude

040 03 04 02 09 Delete this new LO, as this threat of SOP's is trivial and LO is not detailed enough.

040 03 04 04 17 This LO is too general stated, which ones are meant?

040 03 05 03 01 Change summarise into explain as that is the right level of the LO.

100 KSA

In general it is remarkable that items from the practical training are proposed to become a part of the theoretical training as well. That means that Theoretical Knowledge Instructors will get tasks in which they will have no experience. An education for flight instructor or parts of their job will become necessary. It would be better to oblige the ATO's to make the courses integrated by a mix of theoretical and practical instruction.

100 01 00 00 .. As all items are new and not for testing by the ECQB it is not relevant to mark LO's in the BK column.

100 02 00 00 .. Management of the flight path. This item is done in the practical training in simulator exercises. It is relevant not for the theory course as it is a typical item for the flight instructors.

100 04 00 00 .. Problem solving and decision making. This item is done in the practical training in simulator exercises. It is relevant not for the theory course as it is a typical item for the flight instructors.

100 05 00 01 01/02/03 Not relevant for theory instruction

100 05 00 01 04 Delete as covered in 040

100 05 02 00 01 Transfer this LO to 040

100 05 02 00 02/03/04 This is relevant for practical training

100 06 00 00 Workload management. This is only to be judged in practical training



response

exercises
100 07 00 00 Knowledge. This is part of the practical training.
100 08 00 00 UPRT is part of the syllabus of the practical training.

Partially accepted.

Thank you for providing your multiple comments referring to Subject 040 'Human performance and limitations' and Subject Area 100 KSA.

Subject 040 Human Performance and Limitations

Regarding your comment referring to LO 040 02 02 01 (09): Accepted.

EASA agrees that this LO is important for understanding the threat 'habituation' poses. This LO will be retained.

In comments 15-F and 26-F, the same issue was raised regarding this LO (09).

Regarding your comment referring to LO 040 02 03 02 (05): Accepted.

EASA agrees that this LO is important for understanding the influence of circadian rhythm of body temperature on sleep cycle.

This LO will be retained.

In comments 2-F, 27-F and 78-F, the same issue was raised regarding this LO (05).

Regarding your comment referring to LO 040 02 03 03 (19): Accepted.

EASA agrees that this LO is important for the understanding of back pain due to long duration of same body attitude.

This LO will be retained.

In comments 28-F and 78-F, the same issue was raised regarding this LO (19).

Regarding your comment referring to LO 040 03 04 02 (09): Not accepted.

EASA would like to highlight that this threat is important as the SOPs learned by heart have to be replaced and confusion is a possible threat.

Regarding your comment referring to LO 040 03 04 04 (17) new: Accepted.

EASA acknowledges this problem and will rewrite the LO.

The text will be amended as follows:

Describe the limitations of communication in situations of high workload in the flight crew compartment in view of listening, verbal, non-verbal and visual effects.

In comments 30-F and 78-F, the same issue was raised regarding this LO (17).

Regarding your comment referring to LO 040 03 05 03 (01): Accepted.

EASA agrees that the LO taxonomy level has to be changed to 'Explain' instead of 'Summarise'. EASA also agrees to replace the wording 'careless', and reword the adjectives and nouns (comment 76-F).

The text will be amended as follows:

Explain dangerous attitudes in aviation:

- anti-authority;
- macho;
- impulsivity;
- invulnerability;



- complacency;
- resignation.

In comment 31-F, the same issue was raised regarding this LO (01).

Subject 100: Area 100 KSA

Please, see response to comment 70-F.

The BK column has been deleted from the Area 100 KSA.

The LOs on management of flight path have been deleted.

EASA considers that the development and assessment of problem-solving and decision-making, and leadership and teamwork, for example, to be critical competencies for most, if not all, professionals and as pilot core competencies these are safety-critical. Therefore, it is EASA's opinion that the further development of these competencies should not be delayed to a multi-crew simulator environment. Understanding the application of knowledge is considered to be an essential competence and as such should be developed and assessed in the theoretical knowledge phase of training.

EASA is promoting the philosophy of developing the competencies from the beginning of a student's training towards a professional licence.

The LOs in Area 100 KSA have been modified to give greater flexibility to the ATOs to determine how to deliver the training. There is no requirement to use training devices.

With respect to UPRT, the LOs in the theoretical knowledge subjects have been amended to ensure that UPRT is considered across all the applicable subjects. Additionally, UPRT LOs have also been established in Area 100 KSA. The LOs in Area 100 KSA have been reviewed to ensure that they are appropriate to the theoretical knowledge phase of a student's training. A separate rulemaking task (RMT.0581) will examine other phases of a student's training and testing. EASA considers the understanding and the application of knowledge relating to UPRT to be an essential component of the applicable theoretical knowledge training courses. UPRT was recommended to be included in the theoretical knowledge training for the ATPL, MPL, and CPL by the UPRT Working Group.

comment

77-F

comment by: *Luftfahrt-Bundesamt*

The LBA has no comments on NPA 2016-03 (F).

response

Noted.

Thank you very much for this feedback.

comment

80-F

comment by: *European Cockpit Association*

- Overall, ECA acknowledges there has been reorganization of the way some Learning Objectives (LOs) are presented. The splits / moves are visible, and it seems to add clarity and make logical sense.
- At the same time, the review shows a **misunderstanding of the concept of Competency-based-training (CBT)**, and therefore puts an almost exclusive focus on checking/assessment provision, **with very few**, if not no, provision on area 100



KSA training. In particular, no provision is proposed to develop the trainee's relevant *Core Competencies* through the relevant de-briefings.

- Moreover, as CBT is to be the new standard for training and licensing purposes, it is essential that there is a **common and coordinated logic sustaining the relevant EASA Rulemaking activities** to avoid duplication, overlaps, and conflicting provisions. In that respect, there should be only one basis for the definition and implementation of Competencies Frameworks throughout the whole Part FCL, and potentially all Aviation Personnel Licensing and Training provisions.
- Furthermore, with the introduction of CBT, Learning Objectives should emphasize - with regard to e.g. operational procedures - on the importance of the policy update of certain documents and procedures. New students should be able to keep up with the continuous development of new documents or updates of old ones. Therefore, it is not only necessary to know certain information (e.g. which documents to keep on board) but also to know the sources of amendments and future developments. Especially concerning long-range operations, pilots are usually further down the career path and the time of flight school is much in the past.
- We agree with the need to establish the **minimum amount/percentage of classroom instruction**. However, it is not clear how we can define *the minimum* percentage of classroom instruction. This issue is of particular importance as the classroom instruction, in general, is necessary to check the competencies of the student.
- We further fear that the lack of **consistency between the Competencies developed by an ATO and an airline** will create not only extra cost, but also a potential mismatch between the pilot profile required by the airline and the one provided by the ATO. This may cause some pilots being hired and subsequently dismissed by the airline due to their competency level being inappropriate. This will create not only an extra financial burden, but also a significant social cost for pilots-to-be.
- We **welcome the improvements in certain fields**, e.g. **subject Instrumentation (022)** where we see a good update of the learning objectives, removing irrelevant topics and adding useful new ones. In particular addition of FMA's, Fly by Wire, general **improved automation knowledge** and unreliable airspeed are a positive change. At the same time, we are missing knowledge requirements on the implementation of HUD displays on more next-gen aircraft as the B787/737Max/A350/etc.
- The introduction of **Threat and Error Management (TEM) is welcomed**. It does add a physical/operational dimension to a subject that some find not very practical. If performed properly it helps the student to think in terms of *understanding => recognition => prevention/recovery*, as per UPRT.
- We further **welcome the introduction of the Fatigue and stress management chapter**. However, ECA is surprised not to find a new Learning Objective demanding explanation of the **components of FRMS**, given the emphasis put on this subject in the foreword. The student should be able to describe FRMS and explain the main components of it.
- Similar refers to the **Peer Support Programs (PSP)**. It is for the benefit of both ATPL and CPL holder to know of the existence of PSP programs and their importance for the safety-culture of an operator.
- Finally, there seems to be a global search for clarification of theoretical notions, which can only be welcomed if it is in addition to the explanation of the notion itself (and not just vulgarization with less resulting knowledge / understanding).

response Noted.



Thank you for providing multiple comments referring to Subject Area 100 KSA.
Please, see response to comment 131-A.

comment

89-F

comment by: *Rogério Pinheiro*

Dear Sirs,

APTTA – Associação Portuguesa de Transporte e Trabalho Aéreo is pleased to submit its comments regarding NPA 2016-03 (F).

1) 040 HUMAN PERFORMANCE AND LIMITATIONS

APTTA welcomes the amendments suggested.

2) AREA 100 LEARNING OBJECTIVES ON KNOWLEDGE, SKILLS AND ATTITUDES (KSA)

APTTA considers beneficial the inclusion of this issue on the pilot's training material. Some of the principles now defined were already used on classes, on briefings and debriefings and during flights.

These inclusions will have to be included in the training materials (The use of synthetic training systems entails costs difficult to account for the time being and there is no information on the acceptable type(s) and model(s)). Some of the issued introduced are likely to be duplicated bearing in mind the Syllabus of Course Multi Crew Coordination and or Instructor Course . The inclusion of new themes / LO's will incur in additional hours either theoretical or (also) practice. Adapting methods of presentation and evaluation of some of the thematic is made in ways still not very clear, which may generate situations of difficulty in implementation.

Kind regards,

APTTA

response

Partially accepted.

Thank you for providing your comment referring to Subject Area 100 KSA.

By introducing Area 100 KSA into the theoretical knowledge training, EASA is promoting the philosophy of developing the competencies from the beginning of a student's training towards a professional licence.

The LOs in Area 100 KSA have been modified to give greater flexibility to the ATOs to determine how to deliver the training. There is no requirement to use training devices. If an ATO elects to use a training device, this tool must be considered within the ATO's instructional systems design.

EASA proposes to run a workshop to facilitate consistent application and standardisation of the Area 100 KSA summative assessments, together with guidance on the ATO requirements.



Notice of Proposed Amendment 2016-03(F) — General comments

p. 1

comment

46-F

comment by: *Bristol Groundschool*

KSA sets out with lofty ideals, and they are to be generally applauded. However, the terminology is not in step with training science elsewhere. Knowledge, skills and **abilities** is the more commonly used term. The logic is that attitudes cannot easily be discerned or examined, whereas abilities can. Suggest changing the term to 'abilities'.

It seems rather an odd way to go about the KSA assessment. EASA will set the LOs, but the ATOs will decide what is assessed, and how? There is surely potential here for the ATOs to carry out EASA's wishes to the complete satisfaction of the ATO with no further reference to EASA? It is too open ended.

As to the timing of the assessment; potentially you are expecting students from integrated schools to perform quite advanced flight deck procedures before they have even sat in an aircraft. Further specific comments will be made on individual LOs, but it seems to me that KSA is largely an amalgam of CRM/MCC/JOC, and it is most definitely in the right place in the flying training syllabus.

As KSA draws on skills from across the rest of the syllabus, how do you expect students to complete their assessment *before* their final TK exams? Is any one subject less important such that it may be sat *after* the completion of the KSA assessment?

response

Noted.

Thank you for providing multiple comments referring to Subject Area 100 KSA.

Please, see response to comment 70-F.

comment

66-F

comment by: *Wings Alliance*

The Wings Alliance applauds the aims of the new subject, 100 KSA. The behavioural markers should be observed and assessed throughout flight training and form an integral part of assessment of all training details in flight training as they are in type rating training and airline operations and have been for many years. It has always been ridiculous that best practice developed in the airline industry, for example decision making and workload management models, have not been adopted in General Aviation and the flight training industry.

However, there is a problem with the wording of the NPA which is causing much consternation amongst our members.

The comments that follow assume that it is not the intention of the NPA to make KSA a merely academic subject to be dealt with in isolation from flight training. If, however, this is intended, we have alternative comments which follow on below.

The way TK training requirements are presented in Part-FCL assumes that TK and practical



training are delivered by one ATO. While this is true for Integrated CPL, MPL and ATPL courses, it is not true in practice for modular CPL and IR courses, where the TK training is generally delivered by a specialist ATO before the practical flight training.

Furthermore, for Integrated CPL, MPL and ATPL courses it is common practice for TK to be delivered separately from the flight training, often being completed before any practical flight training is commenced.

Thus there is a problem with the 'practical' LOs included in these TK LOs, in that the specialist ATOs are not equipped to deliver training in STDs. Nor is it appropriate to train and test some of these skills before flight training has even commenced, as is common in integrated courses.

The phraseology which causes all these problems is at the end of paragraph 3 of the Executive Summary of the NPA: "...but will be assessed by the ATOs to ensure that trainee pilots have an adequate level of competency before they are allowed to sit their final TK examinations."

We believe that this should be changed to read "...but will be assessed by the ATOs to ensure that trainee pilots have an adequate level of competency before they complete their approved flight training courses."

This would allow integration of the KSA area across the whole of flight training, rather than being relegated to 'groundschool' as an academic subject to be ticked off before flight training commences. It would overcome the practical issues that many see the NPA poses and would be a major step forward in flight training practice.

With this change, the majority of our objections disappear. Those that would remain are:

100 02 01 00 - MANAGEMENT OF FLIGHT PATH

While all these LOs are laudable in their aim, the only logical place for them is on an MCC course or within an integrated MPL. The problem they pose as written in the NPA is that they would have to be dealt with by a specialist TK ATO delivering ATPL TK. Yet these are practical requirements, intended only for relatively advanced stages of practical training where the trainee pilot has been trained in and has access to aircraft and/or STDs with advanced automation. Therefore we believe they should be removed from the TK LOs and placed within the requirements for MCC and integrated MPL training courses.

An alternative approach would be to add within the LO document a column headed MCC and MPL and remove these requirements from the ATPL columns. An applicant for an ATPL must have completed or be exempted from an MCC course or must have held an MPL, thus this move would ensure that all future applicants would be trained and assessed in these skills.

100 08 00 00 – Upset prevention and recovery training (UPRT)

Until UPRT becomes a practical requirement, it does not make sense introducing TK LOs for the training and therefore we believe these LOs should not be introduced until a requirement for flight training is introduced.

Finally, we believe the subject has the wrong title. 'Knowledge, Skills and Attitudes' was a



title widely used in education theory decades ago. However, it has fallen into disuse, as Attitudes cannot be observed. Behaviours are an external indicator of internal attitudes, so the modern equivalent of KSA is 'Knowledge, Skills and Behaviour'. It would be a shame to introduce an outdated title to a new subject and undermines the credibility of the excellent work that has gone into this project to date.

Our alternative comments, if it is intended that KSA is dealt with separately from flight training, are:

The treatment of this subject as a theoretical knowledge subject, to be assessed "by the ATOs to ensure that trainee pilots have an adequate level of competency before they are allowed to sit their final TK examinations" is wholly inappropriate and impracticable.

The behavioural markers should be observed and assessed throughout flight training and form an integral part of assessment of all training details in flight training as they are in type rating training and airline operations. While it will be appropriate to introduce some of the concepts in a theoretical manner during pre-flight training theoretical knowledge training, it is impractical to try and turn practical skills into theory skills, undesirable to separate them from practical flight training, and impractical to attempt to deal with this entire subject as presented in the NPA during the theoretical knowledge phase of a pilot's licence training. The "final TK examinations" are often completed before a trainee pilot has even had their first flying lesson.

Training in this area should be integrated with every aspect of flight training. The appropriate place to examine whether the lessons have been absorbed is by the examiner on the CPL or MPL licence skills test. If EASA wishes to absolve itself from any responsibility for examining this subject and place the burden entirely on industry's shoulders, then Part-FCL should be amended to place a burden on ATOs to teach and assess these skills during and by the completion of approved CPL, ATPL, MPL, MCC and IR courses.

Thus the practical LOs should be removed from the TK LOs and included instead in the appropriate parts of Part-FCL as a mandatory requirement for CPL, MPL, ATPL, MCC and IR flight training courses and other TK LOs amended to make them TK rather than practical LOs.

In detail, we would like to see these changes to the proposed TK LOs:

100 01 00 00 COMMUNICATION LOs (01) – (06) and (08) – (10)

Replace 'Show the ability...' with 'Explain the need to...' or "Explain how to..." as appropriate

100 01 00 00 COMMUNICATION LOs (08) and (09)

Replace 'Show the ...' with 'Explain the ...'

100 01 00 00 COMMUNICATION LO (10)

Replace 'Demonstrate the ...' with 'Explain the ...'

100 02 01 00 Management of flight path – automation

Delete the comment "To be conducted on a suitable training device(s) as specified ..."



100 02 01 00 Management of flight path – automation LO (01) and (08)
100 02 01 00 Situational awareness LOs (01) – (03)
100 05 01 00 Resilience LOs (03) and (04)
100 07 00 00 KNOWLEDGE in toto
100 08 00 00 Upset prevention and recovery training (UPRT) in toto
Delete

100 02 01 00 Management of flight path – automation LOs (03)
Replace ‘Demonstrate the ability...’ with ‘Explain the need to...’

100 02 01 00 Management of flight path – automation LOs (06) and (07)
Delete the phrase “...and/or demonstrate...”

100 03 00 00 LEADERSHIP AND TEAMWORK LOs (01) – (04), (06) and (07)
100 04 00 00 PROBLEM SOLVING AND DECISION MAKING LOs (02) – (04)
Replace ‘Show the ability...’ with ‘Explain the need...’

100 03 00 00 LEADERSHIP AND TEAMWORK LO (05)
Replace ‘Show...’ with ‘Explain the need for...’

100 05 01 00 Situational awareness LO (04)
Replace ‘Identify...’ with ‘Describe...’

100 06 00 00 WORKLOAD MANAGEMENT LO (01)
Replace ‘Show the ability to...’ with ‘Explain how to...’

100 06 00 00 WORKLOAD MANAGEMENT LO (02)
Replace ‘Demonstrate the management of...’ with ‘Explain the need to manage...’

100 06 00 00 WORKLOAD MANAGEMENT LO (03)
Replace ‘Show the ability to ask for help, accept assistance, and offer appropriate assistance.’ with ‘Describe how asking for help, accepting assistance and offering appropriate assistance can positively affect workload management.’

response

Partially accepted.

Thank you for providing multiple comments referring to Subject Area 100 KSA.

Please, see response to comment 70-F.

EASA is promoting the philosophy of developing the competencies from the beginning of a student’s training towards a professional licence, therefore Area 100 KSA is to be introduced into the theoretical knowledge training course. Other rulemaking tasks will examine other phases of a student’s training and testing.

The Area 100 KSA LOs on ‘Management of flight path — automation’ have been deleted.

The remaining LOs have been modified; however, the word ‘show’ has been retained as it was considered that this best communicated the intention of the LO with respect to the training necessary prior to the formative and summative assessments.



comment	<p data-bbox="355 219 411 246">82-F</p> <p data-bbox="1098 219 1437 246">comment by: DGAC FRANCE</p> <p data-bbox="355 302 576 329"><u>General comment</u></p> <p data-bbox="355 336 1445 510">First DGAC France would like to thank EASA for the update of the learning objectives, the theoretical knowledge syllabi and ground school exams. We congratulate EASA on the comprehensive overhaul of the learning objectives which will lead to more simplicity. We notice in particular that the subject 022 in particular is well done, the learning objectives are clearer and the curriculum is both more precise and less redundant.</p> <p data-bbox="355 517 1445 651">Secondly DGAC France supports the introduction of the TEM concept and application in the training programs. Nevertheless, without entering too much into details DGAC France wants to develop only two points among those that caught our attention and arose questions.</p> <p data-bbox="355 658 1445 757">§ One of the goals of the area 100 KSA is to teach the future pilots the need for developing these core competencies so that they could manage the threats and errors in the TEM model.</p> <p data-bbox="355 763 1445 862">We would like to emphasize that there is no need to assess future pilots on that knowledge, the only need is that the trainees understand the use of competencies in a TEM model, and the way they can rely on them.</p> <p data-bbox="355 869 1445 967">The ICAO-defined competencies should be all introduced (and not only a selection of them) with their ICAO definitions, in order to prepare students to use them during practical training and need not to be assessed during the theoretical part of the training.</p> <p data-bbox="355 974 1445 1041">We suggest ensuring an identical level of use within the ATOs, that the observable indicators for these learning objectives should be in compliance with the ICAO principles.</p> <p data-bbox="355 1048 1445 1115">DGAC France also considers that it is necessary to ensure consistency between the different EASA working groups on the EBT core competencies before implementing them.</p> <p data-bbox="355 1122 1445 1296">§ We are surprised by the important focus on mental maths developed in this NPA. Mental maths should only be exercised to develop the situation awareness competency. Therefore, the assessment should be as less pervasive as possible since we do not see a significant safety or competency concern nowadays with the evolution of the cockpits.</p>
response	<p data-bbox="355 1323 576 1350">Partially accepted.</p> <p data-bbox="355 1368 1294 1395">Thank you for providing multiple comments referring to Subject Area 100 KSA.</p> <p data-bbox="355 1413 1445 1525">EASA has revised the Area 100 KSA LOs to include the knowledge of all the ICAO pilot core competencies; the main KSA LOs are a subset of the present ICAO competencies amended to align with the applicable phase of training.</p> <p data-bbox="355 1541 1445 1639">European industry strongly supports the active development of the student's understanding as well as knowledge, skills and attitudes from day one of theoretical knowledge training and throughout all training.</p> <p data-bbox="355 1664 1445 1731">The LOs used in Area 100 KSA include the ICAO core competencies that can be effectively developed at this stage of training. The following LO is added under Subject 100 01 00 00</p> <p data-bbox="355 1742 699 1769">ICAO CORE COMPETENCIES:</p> <p data-bbox="355 1783 1445 1841">Recognise the ICAO Core Competencies listed below and the associated competency descriptions (ICAO Doc 9995 'Manual of Evidence-based Training'):</p> <ul data-bbox="355 1848 1018 2002" style="list-style-type: none"> — Application of Procedures; — Communication; — Aircraft Flight Path Management, automation; — Aircraft Flight Path Management, manual control;



- Leadership and Teamwork;
- Problem Solving and Decision Making;
- Situation Awareness;
- Workload Management.

EASA considers that the modernisation of the training system, to continuously develop pilot competencies utilising industry and educational best practice, is essential for all ATPL, MPL, and CPL training courses, both integrated and modular. This requirement is based primarily on safety considerations, but also on the needs of industry, and the educational demands of the next generation of professional flight crew.

Regarding mental maths, this view is not shared by the RMT.0595 Working Group and is not supported in evidence considering the responses to the training needs analysis (TNA). The additions which include mental maths and some individual specific LOs placed in the Area 100 KSA topics were in response to the industry-wide TNA. It is proposed that an abridged version of the findings of the 2015 TNA be published.

AREA 100 LEARNING OBJECTIVES ON KNOWLEDGE, SKILLS AND ATTITUDES (KSA)

p. 56-64

comment

3-F

comment by: Michel Lacombe AF Training department and AF ATO

These competencies definitions come from DOC 9995 Manual of Evidence Based Training, are referred to in GM1 ORO FC 230 and seem to have been modified for these learning objectives.

Are you aware that they are already used as incited by the Agency and as described in ICAO documents by many operators, how are you going to explain the additions or subtractions of any behavioural indicators ?

Others EASA groups work with these international definitions, if everything change that will be difficult to harmonize between NAA and operators and to decide which version is valid, the first published, the industrial used or the next version to be produced by any group ??

response

Partially accepted.

Thank you for providing your comment referring to Subject Area 100 KSA.

There will be a standing rulemaking task for the regular update of the LOs, syllabi and examination procedures which will consider input from other relevant rulemaking activities.

The LOs used in Area 100 KSA include the ICAO core competencies that can be effectively developed at this stage of training. The following LO is added under Subject **100 01 00 00 ICAO CORE COMPETENCIES:**

Recognise the ICAO Core Competencies listed below and the associated competency descriptions (ICAO Doc 9995 'Manual of Evidence-based Training'):

- Application of Procedures;
- Communication;



- Aircraft Flight Path Management, automation;
- Aircraft Flight Path Management, manual control;
- Leadership and Teamwork;
- Problem Solving and Decision Making;
- Situation Awareness;
- Workload Management.

comment

4-F

comment by: *Tore Jopperud*

100 09 00 00 XX - A reduced level of accuracy should be specified as this should be practical and encourage rough estimates for increased awareness around the various factors.

100 09 00 00 01 - Limited relevance as this is performed on the ground where calculators or other aids are available. No air to air refuelling available to civilian aircraft thus far. Once the aircraft is refuelled the unit provided by the gauges is used.

100 09 00 00 06 - Should be fuel on board as flights are conducted with no extra fuel but still time available. Important point is relating fuel on board with time available.

100 09 00 00 07 - Is this the "3 x distance" rule?

100 09 00 00 09 - Should be deleted. Duplication of 100 09 00 00 07 as same principle.

response

Partially accepted.

Thank you for providing multiple comments referring to Subject Area 100 KSA.

It is foreseen that sensible approximations be considered when developing the acceptable range for correct answers in the mental maths test. This should be evaluated by ATOs as they develop an effective test. The 'Note' under the topic heading in the Area 100 KSA LOs states: 'Demonstrate, in non-calculator test scenarios or scenario exercises, the ability in a time-efficient manner to make correct mental calculation approximations for the following.'

Regarding your comment referring to LO 100 09 00 00 (01), the text will be amended as follows:

Convert between volumes and masses of fuel using range of units.

EASA is of the opinion that the ability to make correct mental calculation approximations regarding fuel is considered to have some merit in the context of a gross error check.

Regarding your comment referring to LO 100 09 00 00 (06), the text will be amended as follows:

Calculate the time available (for decision-making) given relevant fuel information.'

Regarding your comment referring to LOs 100 09 00 00 (07) and 100 09 00 00 (09): both LOs are retained as they address different situations/phases of flight.



comment	<p>5-F comment by: <i>Michel Lacombe AF Training department and AF ATO</i></p> <p>Main point of mental math in new aircraft families is to develop only situation awareness, so several items could be withdraw with no damage or risks . We should only maintain the ones usable in flight operations :</p> <ul style="list-style-type: none"> - For applied questions relating to time, distance and speed - For applied questions relating to rate of climb or rate of descent, distance and time - To add or subtract time, distance, and fuel mass in practical situations - To calculate fuel burn given time and fuel flow in practical situations - To calculate time available (for decision making) given extra fuel - To determine top of descent using a given simple method - To estimate heights at distances on a 3-degree glideslope
response	<p>Noted.</p> <p>Thank you for providing your comment referring to Subject Area 100 KSA.</p> <p>Please, see response to comment 4-F.</p> <p>The LOs are considered to be applicable when considering the range of current flight operations.</p>

comment	<p>6-F comment by: <i>Michel Lacombe AF Training department and AF ATO</i></p> <p>Use all the ICAO defined competencies and their defined KSA</p>
response	<p>Partially accepted.</p> <p>Thank you for providing your comment referring to LO 100 01 00 00 (01).</p> <p>EASA has revised the Area 100 KSA LOs to include the knowledge of all the ICAO pilot core competencies; the main KSA LOs are a subset of the present ICAO core competencies amended to align with the applicable phase of training, with the addition of those raised by industry in the training needs analysis (TNA). The Area 100 KSA competencies have been amended to include the knowledge of all the competencies more closely aligned with those of Doc 9995.</p> <p>All the ICAO core competencies were considered. Those competencies that could be included in the theoretical knowledge course, have been; however, their descriptions and behavioural indicators have been modified for this environment. ICAO Doc 9995 (3.2, p. I-3-2) notes that ‘operators are encouraged to develop their own competency system, which should list observable behavioural indicators, meeting their specific needs and including a comprehensive set of technical and non-technical knowledge, skills and attitudes.’ EASA has followed the spirit of this approach in Area 100 KSA.</p> <p>The following LO is added under Subject 100 01 00 00 ICAO CORE COMPETENCIES:</p> <p>Recognise the ICAO Core Competencies listed below and the associated competency descriptions (ICAO Doc 9995 ‘Manual of Evidence-based Training’):</p> <ul style="list-style-type: none"> — Application of Procedures; — Communication; — Aircraft Flight Path Management, automation;

- Aircraft Flight Path Management, manual control;
- Leadership and Teamwork;
- Problem Solving and Decision Making;
- Situation Awareness;
- Workload Management.

comment

7-F

comment by: Michel Lacombe AF Training department and AF ATO

KSA should be the ICAO defined ones :

- Ensures the recipient is ready and able to receive the information
- Selects appropriately what, when, how and with whom to communicate
- Conveys messages clearly, accurately, and concisely
- Confirms that the recipient correctly understands important information
- Listens actively and demonstrates understanding when receiving information
- Asks relevant and effective questions
- Adheres to standard radiotelephony phraseology procedures.
- Accurately reads and interprets required company and flight documentation
- Accurately reads, interprets, constructs and responds to data link messages in English
- Completes accurate reports as required by operating procedures
- Correctly interprets non-verbal communication
- Uses eye contact, body movement and gestures that are consistent with and support verbal message

response

Partially accepted.

Thank you for providing your comment referring to LO 100 01 00 00 (01).

Please, see response to comment 6-F.

comment

8-F

comment by: Michel Lacombe AF Training department and AF ATO

Used KSA should be the ones defined by ICAO :

- Controls the aircraft using automation with accuracy and smoothness as appropriate to the situation
- Detects deviations from the desired aircraft trajectory and takes appropriate action
- Contains the aircraft within the normal flight envelope
- Manages the flight path to achieve optimum operational performance
- Maintains the flight path during flight using automation whilst managing other tasks and distractions
- Selects appropriate level and mode of automation in a timely manner considering phase of flight and workload
- Effectively monitors automation, including engagement and automatic mode transitions.

response

Partially accepted.



Thank you for providing your comment referring to LO 100 01 00 00 (01).
Please, see response to comment 6-F.

comment

9-F

comment by: Michel Lacombe AF Training department and AF ATO

Used KSA should be consistent with the ICAO defined KSA for this competency

- Understands and agrees with the crew's roles and objectives
- Creates an atmosphere of open communication and encourages team participation
- Uses initiative and gives directions when required
- Anticipates and responds appropriately to other crew members' needs
- Carries out instructions when directed
- Communicates relevant concerns and intentions
- Gives and receives feedbacks constructively
- Confidently intervenes when important for safety
- Demonstrates empathy and shows respect and tolerance for other people
- Engages others in planning and allocates activities fairly and appropriately according to abilities
- Addresses and resolves conflicts and disagreements in a constructive manner
- Projects self-control in all situations

response

Partially accepted.
Thank you for providing your comment referring to LO 100 01 00 00 (01).
Please, see response to comment 6-F.

comment

10-F

comment by: Michel Lacombe AF Training department and AF ATO

Used KSA should be the same as defined by ICAO :

- Seeks accurate and adequate information from appropriate resources
- Perseveres in working through a problem
- Identifies and verifies why things have gone wrong
- Employ(s) proper problem-solving strategies
- Perseveres in working through problems without reducing safety
- Uses appropriate and timely decision-making processes
- Sets priorities appropriately
- Identifies and considers option effectively
- Monitors, reviews, and adapts decisions as required
- Identifies and manages risks effectively
- Improvises when faced with unforeseeable circumstances to achieve the safest outcome

response

Partially accepted.
Thank you for providing your comment referring to LO 100 01 00 00 (01).



Please, see response to comment 6-F.

comment

11-F

comment by: *Michel Lacombe AF Training department and AF ATO***Described KSA should be same as the ICAO defined ones :**

- Identifies and assesses accurately the state of the aircraft and its systems.
- Identifies and assesses accurately the aircraft's vertical and lateral position, and its anticipated flight path.
- Identifies and assesses accurately the general environment as it may affect the operation
- Keeps track of time and fuel
- Maintain awareness of the people involved in or affected by the operation and their capacity to perform as expected
- Anticipates accurately what could happen, plans and stays ahead of the situation
- Develops effective contingency plans based upon potential threats
- Identifies and manages threats to the safety of the aircraft and people
- Recognizes and affectively responds to indications of reduced situation awareness.

response

Partially accepted.

Thank you for providing your comment referring to LO 100 01 00 00 (01).

Please, see response to comment 6-F.

comment

12-F

comment by: *Michel Lacombe AF Training department and AF ATO***Proposed KSA should be the same as the ICAO defined ones :**

- Maintain self-control in all situations
- Plans, prioritises and schedules tasks effectively
- Manages time efficiently when carrying out tasks
- Offers and accepts assistance, delegates when necessary and asks for help early
- Reviews, monitors and cross-checks actions conscientiously
- Verifies that tasks are completed to the expected outcome
- Manages and recovers from interruptions, distractions, variations and failures effectively

response

Partially accepted.

Thank you for providing your comment referring to LO 100 01 00 00 (01).

Please, see response to comment 6-F.

comment

13-F

comment by: *Michel Lacombe AF Training department and AF ATO***Presented KSA should the ones as defined by EAS in preceding workshops :**

- Demonstrates practical and applicable knowledge of limitations and systems and their interaction



response	<ul style="list-style-type: none"> • Demonstrates required knowledge of published operating instructions • Demonstrates knowledge of the physical environment, the air traffic environment including routings, weather, airports and the operational infrastructure • Knows where to source required information • Demonstrates a positive interest in acquiring knowledge • Is able to apply knowledge effectively <p>Partially accepted.</p> <p>Thank you for providing your comment referring to LO 100 01 00 00 (01).</p> <p>Please, see response to comment 6-F.</p>
comment	<p>14-F comment by: Michel Lacombe AF Training department and AF ATO</p> <p>Two defined ICAO competencies are missing, they should be developed and explained in these LO</p> <p>Application of procedures & knowledge : Identifies and applies procedures in accordance with published operating instructions and applicable regulations, using the appropriate knowledge</p> <ul style="list-style-type: none"> • Identifies the source of operating instructions • Follows SOP's unless a higher degree of safety dictates an appropriate deviation • Identifies and follows all operating instructions in a timely manner • Correctly operates aircraft systems and associated equipment • Complies with applicable regulations • Applies relevant procedural knowledge <p>Aircraft Flight Path Management manual control Controls the aircraft flight path through manual flight, including appropriate use of flight management system(s) and flight guidance systems</p> <ul style="list-style-type: none"> • Controls the aircraft manually with accuracy and smoothness as appropriate to the situation • Detects deviations from the desired aircraft trajectory and takes appropriate action • Contains the aircraft within the normal flight envelope • Controls the aircraft safely using only the relationship between aircraft attitude, speed and thrust • Manages the flight path to achieve optimum operational performance • Maintains the flight path during manual flight whilst managing other tasks and distractions • Selects appropriate level and mode of flight guidance systems in a timely manner considering phase of flight and workload • Effectively monitors flight guidance system including engagement and automatic mode transitions <p>response</p> <p>Partially accepted.</p>



Thank you for providing your comment referring to LO 100 01 00 00 (01).
Please, see response to comment 6-F.

comment

23-F

comment by: *pe*

KSA 100

Most of the KSA objectives are content of the examination subject 040 as well. Not with the exact terminology, but from the content point of view. Others (e.g. communication) are already assessed with the BZF and AZF.

For an effective assessment of the behavior FNPT/simulator lessons are necessary. These lessons are held at the end of the training, normally after the final TK examination.

So as a conclusion:

Do we really need a new subject 100 for these - without any doubt - important objectives. A lot of them refer to (already existing) content of 040.

There is no reason that these LOs must be assessed **before** the final TK examination.

An effective assessment should and can only be done at the end of the training (FNPT/simulator lesson) –**after the last theoretical examinations**.

Flight instructors are perfect and well trained assessors for these KSA 100 LOs.

Below you find a table showing the LO, a column where the content already belongs to and the media/methods where these LO are already assessed.

EASA	LO	Title	Belongs to Subject	Media,Method/Comment
100 00 00 00	a	KNOWLEDGE, SKILLS AND ATTITUDES (KSA)		
100 01 00 00	b	COMMUNICATION	040	See 040 03 04 04
	1	Show the ability to communicate clearly, accurately and concisely.	HPL, ATC	Video Debriefing/FNPT, BZF & AZF R/T license examination
	2	Show the ability to listen actively and use appropriate non-verbal language when receiving information.	HPL	Video Debriefing/FNPT
	3	Show the ability to ask relevant and effective questions.	HPL , ATC	Video Debriefing/FNPT, BZF & AZF R/T license examination
	4	Show the ability to communicate relevant concerns and intentions.	HPL , ATC	Video Debriefing/FNPT, BZF & AZF R/T license examination
	5	Show the ability to correctly interpret non-verbal communication.	HPL	Video Debriefing/FNPT
	6	Show the ability to use appropriate eye	HPL	Video Debriefing/FNPT



		contact, body movement, body position and gestures that are consistent with and support verbal messages.		
	7	Identify and describe the effects of communication related to the Parent-Adult-Child (PAC) Model (from Transactional Analysis) when reviewing aircraft accidents and incidents and in everyday situations.		
	8	Show the effective use of communication related to the 'adult' mode.		
	9	Show the appropriate level of confidence in group and assessment situations.	HPL	Video Debriefing/FNPT
	10	Demonstrate the correct and appropriate use of instrument flight rules (IFR) and visual flight rules (VFR) phraseology in scenario exercises.	ATC	BZF & AZF R/T license examination
100 02 00 00	b	MANAGEMENT OF FLIGHT PATH		
100 02 01 00	c	Management of flight path — automation To be conducted on suitable training device(s) as specified in AMC1 to Appendix 3 and in GM1 to Appendix 5.		See 040 03 07 00
	1	Demonstrate flight management system (FMS) initialisation from a given flight plan.	FMS	FNPT
	2	Describe the threats of erroneous data inputted into the control display unit.	HPL	FNPT
	3	Demonstrate the ability to cross check data inputted into the FMS and identify and correct any error(s).	HPL	FNPT
	4	Explain the advantages, hazards and limitations of automation.	HPL	Video Debriefing/FNPT
	5	Describe typical autopilot modes and the levels of automation.	HPL	FNPT
	6	Describe and/or demonstrate how to control a simulated aircraft's vertical and horizontal flight using automation.		FNPT
	7	Describe and/or demonstrate mode awareness of the auto-flight system(s) including engagement, automatic transitions and mode reversion.	HPL	FNPT
	8	Show the selection of appropriate		FNPT



		displays, range and information on a navigation display.		
100 03 00 00	b	LEADERSHIP AND TEAMWORK		See 040 03 04 03
	1	Show the ability to create an atmosphere of open communication and to encourage participation.	HPL	Video Debriefing/FNPT
	2	Show the ability to use initiative and give instructions and/or assistance when appropriate.	HPL	Video Debriefing/FNPT
	3	Show the ability to anticipate and respond appropriately to other's needs.	HPL	Video Debriefing/FNPT
	4	Show the ability to give and receive feedback constructively.	HPL	Video Debriefing/FNPT
	5	Show empathy, respect and tolerance for others.	HPL	Video Debriefing/FNPT
	6	Show the ability to address and resolve conflicts and disagreement in a constructive manner.	HPL	
	7	Show the ability to project self-control in all situations.		Video Debriefing/FNPT
		PROBLEM-SOLVING AND DECISION-MAKING	040	See 040 03 03 00
100 04 00 00	1	Describe an effective decision-making process.	HPL	
	2	Show the ability to seek relevant information from appropriate sources.	HPL	Video Debriefing/FNPT
	3	Show the ability to identify and consider options effectively in a group or crew situation.	HPL	Video Debriefing/FNPT
	4	Show the ability to monitor, review and adapt decisions as necessary in a group or crew situation.	HPL	Video Debriefing/FNPT
	5	Identify the factors affecting the availability of time in operational situations and describe appropriate use of this time for decision-making in reviewed situations and/or practical exercises.	HPL	Video Debriefing/FNPT
100 05 00 00	b	SITUATION AWARENESS AND RESILIENCE	040	
		Situation awareness		See



				040 03 02 02
	1	Demonstrate the ability to identify threats, errors and undesirable aircraft states in theoretical and/or practical exercises.	HPL	Video Debriefing/FNPT
	2	Demonstrate the ability to identify positive and negative situations and manage them for best safety and/or commercial outcomes in practical and/or scenario exercises.	HPL	Video Debriefing/FNPT
	3	Demonstrate situation awareness using the navigation display and/or instruments and aeronautical charts.	HPL, 062	Video Debriefing/FNPT
	4	Identify the signs and discuss the effects of stress, fatigue and aviation lifestyle on situation awareness.	HPL	Video Debriefing/FNPT
100 05 02 00	c	Resilience		
	1	Define resilience as 'the ability to recognise, absorb and adapt to disruptions', and describe that it is supported by the pilot's core competencies and improved by experience which can be gained by training for unexpected events or situations.		
	2	Describe resilience in relation to upset and recovery situations.		
	3	Review situation(s) in which a pilot or the flight crew use(s) resilience to counter an upset situation or a situation not covered by standard operating procedures (SOPs).		Video Debriefing/FNPT
	4	Demonstrate resilience during scenario and/or other exercises.		
100 06 00 00	b	WORKLOAD MANAGEMENT	040	Spread over 040
	1	Show the ability to plan, prioritise and schedule tasks effectively.	HPL	Video Debriefing/FNPT
	2	Demonstrate the management of interruptions, distractions, variations, commercial requirements, threats, and failures.	HPL	Video Debriefing/FNPT
	3	Show the ability to ask for help, accept assistance, and offer appropriate	HPL	Video Debriefing/FNPT



		assistance.		
	4	Describe how teamwork and leadership can positively or negatively affect workload management.	HPL	Video Debriefing/FNPT
100 07 00 00	b	KNOWLEDGE		
	1	Demonstrate the ability to complete pre-flight planning in practical exercises. (Include the ability to apply and relate knowledge from relevant subjects such as but not limited to air law, meteorology, operational procedures, performance, flight planning, load and balance, demonstrating the relevant core competencies and effective threat and error management (TEM).)		FNPT
	2	Demonstrate in a practical exercise(s) the general preparation of an aircraft for flight, including FMS initialisation. (Include the ability to apply and relate knowledge from relevant subjects such as but not limited to aircraft general knowledge (AGK), performance, flight planning, mass and balance, AGK navigation and operational procedures, and demonstrating the relevant core competencies and effective TEM.)	033	FNPT
	3	Demonstrate the KSA and TEM relating to taxiing and take-off scenario and/or other exercises. (Include the ability to apply and relate knowledge from relevant subjects such as but not limited to AGK, performance, principles of flight, meteorology, and air law.)		FNPT
	4	Demonstrate in practical and other exercises the KSA and TEM applicable to climb and cruise scenarios in practical systems exercises and other exercises. (Include the ability to apply and relate knowledge from relevant subjects such as but not limited to AGK, performance, principles of flight, flight planning, navigation, and meteorology.)		FNPT
	5	Demonstrate in practical exercises the KSA and TEM applicable to descent including energy management, and landing and taxiing phases. (Include the		FNPT



		ability to apply and relate knowledge from relevant subjects such as but not limited to AGK, performance, principles of flight, flight planning, navigation, air law, and operational procedures.)		
100 08 00 00	b	Upset prevention and recovery training (UPRT)	Subject 080 & 032	
	1	Define 'aeroplane upset'.	Subject 080 & 032	
	2	Recognise potential upset 'threats' and suggest effective 'threat management' in scenario situations.	Subject 080 & 032	
	3	Recognise potential upset 'errors' and suggest effective 'error management' in scenario situations.	Subject 080 & 032	
	4	Identify a 'developing upset' and describe the required actions to recover in scenario situations.	Subject 080 & 032	
	5	Explain causes of and contributing factors to upsets.	Subject 080 & 032	
	6	Review accidents and incidents relating to aeroplane upsets.	Subject 080 & 032	
100 09 00 00	b	MENTAL MATHS		
		Show, in non-calculator tests and/or exercises, the ability in a time-efficient manner to make correct mental calculation approximations:		
	1	To convert between volumes and masses of fuel using range of units.	033	
	2	For applied questions relating to time, distance and speed.	062, 033	
	3	For applied questions relating to rate of climb or rate of descent, distance and time.	062,	
	4	To add or subtract time, distance, and fuel mass in practical situations.	033	
	5	To calculate fuel burn given time and fuel flow in practical situations.	033	
	6	To calculate time available (for decision-		



4. Individual comments and responses

		making) given extra fuel.		
	7	To determine top of descent using a given simple method.	033	
	8	To determine values that vary by a percentage, e.g. dry-to-wet landing distance and fuel burn.		
	9	To estimate heights at distances on a 3-degree glideslope.	062	
	10	To estimate headings using the 1-in-60 rule.	061	
	11	To estimate headwind and crosswind components given wind speed and direction and runway in use.	061	

response Not accepted.

Thank you for providing multiple comments referring to Subject Area 100 KSA.

Please, see responses to comments 70-F, 23-A, 46-A, and 109-A.

comment 24-F

comment by: AECA helicopters.

COMMENTS TO AREA 100 LEARNING OBJECTIVES ON KNOWLEDGE, SKILLS AND ATTITUDES (KSA)

PROPOSAL:

ü - Delete Area 100 00 00 00

ü - Include in the first page of LOs the following sentence (or similar): 'Knowledge, skills and attitudes' (KSA) should be considered by approved training organizations (ATOs) when designing their CPL/ATPL theoretical knowledge course(s), addressed so that the individual student's are developed and assessed throughout their theoretical knowledge training.

REASONS:

- 1.- The Area content is similar to the subject 040 and CRM courses;
- 2.- According to the NPA proposal, the Area KSA include practical exercises subject to evaluation, when we are establishing content for theoretical knowledge examination;
- 3.- The 'Area' is not included in Regulation 1178/2011.
- 4.- From pedagogical side the KSA are not a matter to develop independently of other knowledge. Really is the consequence of a very good training during all other syllabus subjects. This means that we are speaking about an element deducted from other knowledge not induced in the mind through direct techniques.

response Not accepted.



Thank you for providing multiple comments referring to Subject Area 100 KSA.
Please, see responses to comments 70-F, 23-A, 46-A, and 109-A.

comment

32-F

comment by: KLM Flight Academy

KSA 100 In general it is remarkable that items from the practical training are proposed to become a part of the theoretical training as well. That means that Theoretical Knowledge Instructors will get tasks in which they will have no experience. An education for flight instructor or parts of their job will become necessary. It would be better to oblige the ATO's to make the courses integrated by a mix of theoretical and practical instruction.

response

Not accepted.

Thank you for providing multiple comments referring to Subject Area 100 KSA.
Please, see responses to comments 70-F and 72-F.

EASA considers that the modernisation of the training system, to continuously develop pilot competencies utilising industry and educational best practice, is essential for all ATPL, MPL, and CPL training courses, both integrated and modular. This requirement is based primarily on safety considerations, but also on the needs of industry, and the educational demands of the next generation of professional flight crew.

The LOs in Area 100 KSA have been modified to give greater flexibility to the ATOs to determine how to deliver the training. There is no requirement to use training devices. If an ATO elects to use a training device, this tool must be considered within the ATO's instructional systems design. The nominated postholders must comply with present regulations to ensure that each TKI has sufficient knowledge and expertise to teach the LOs of their subject(s) and have adequate aviation knowledge to prevent negative training.

comment

33-F

comment by: KLM Flight Academy

KSA 100 As all items are new and not for testing by the ECQB it is not relevant to mark LO's in the BK column.

response

Accepted.

Thank you for providing your comment referring to the BK column of Subject Area 100 KSA.

The BK column is removed from the table of LOs for Area 100 KSA.

comment

34-F

comment by: KLM Flight Academy

KSA 100 As all items are new and not for testing by the ECQB it is not relevant to mark LO's in the BK column.



response Accepted.
Thank you for providing your comment referring to the BK column of Subject Area 100 KSA.
Please, see response to comment 33-F.

comment 35-F comment by: KLM Flight Academy
KSA 100 05 02 00 01/02 As all items are new and not for testing by the ECQB it is not relevant to mark LO's in the BK column.

response Accepted.
Thank you for providing your comment referring to the BK column of Subject Area 100 KSA.
Please, see response to comment 33-F.

comment 36-F comment by: KLM Flight Academy
KSA 100 04 00 10/05 As all items are new and not for testing by the ECQB it is not relevant to mark LO's in the BK column.

response Accepted.
Thank you for providing your comment referring to the BK column of Subject Area 100 KSA.
Please, see response to comment 33-F.

comment 37-F comment by: KLM Flight Academy
KSA 100 02 01 00 .. Management of the flight path. This item is done in the practical training in simulator exercises. It is relevant not for the theory course as it is a typical item for the flight instructors.

response Accepted.
Thank you for providing your comment referring to Subject 100 02 01 00
The Area 100 KSA LOs on the 'management of flight path — automation' have been deleted.

comment 38-F comment by: KLM Flight Academy
KSA 100 04 00 00 .. Problem solving and decision making. This item is done in the practical training in simulator exercises. It is relevant not for the theory course as it is a typical item for the flight instructors.



response	<p>Not accepted.</p> <p>Thank you for providing your comment referring to Subject 100 04 00 00.</p> <p>EASA considers the development and assessment of problem-solving and decision-making to be a critical competency and that it should therefore be interwoven into the theoretical knowledge course design.</p>
comment	<p>39-F comment by: KLM Flight Academy</p> <p>KSA 100 05 00 01 01/02/03 Not relevant for theory instruction</p>
response	<p>Noted.</p> <p>Thank you for providing your comment referring to LOs 100 05 00 01 (01), (02) and (03).</p> <p>The LOs in this section have been modified. EASA considers that TEM is an integral and safety-related aspect of the application of knowledge.</p>
comment	<p>40-F comment by: KLM Flight Academy</p> <p>100 05 01 00 04 is already covered in 040 HPL</p>
response	<p>Noted.</p> <p>Thank you for providing your comment referring to LO 100 05 01 00 (04).</p> <p>The LOs in this section have been modified with this LO more appropriately placed under the UPRT and resilience section of Area 100 KSA.</p>
comment	<p>41-F comment by: KLM Flight Academy</p> <p>KSA 100 05 02 00 01 Transfer this LO to 040</p>
response	<p>Not accepted.</p> <p>Thank you for providing your comment referring to LO 100 05 02 00 (01).</p> <p>The LOs in this section have been modified with this LO more appropriately placed under the UPRT and resilience section of Area 100 KSA.</p>
comment	<p>42-F comment by: KLM Flight Academy</p> <p>KSA 100 05 02 00 02/03/04 This is relevant for practical training</p>
response	<p>Not accepted.</p> <p>Thank you for providing your comment referring to LOs 100 05 02 00 (02), (03) and (04).</p>



Please, see response to comment 41-F.

comment

43-F

comment by: KLM Flight Academy

KSA 100 06 00 00 Workload management. This is only to be judged in practical training exercises

response

Not accepted.

Thank you for providing your comment referring to Subject 100 06 00 00.

Workload management is integral within the theoretical knowledge course for student success, both within exercises and for course progression. Where a student demonstrates weak workload management, this weakness should be highlighted and discussed with the student and aims and enabling strategies for future development and improvement put in place.

comment

44-F

comment by: KLM Flight Academy

KSA 100 07 00 00 Knowledge. This is part of the practical training.

response

Not accepted.

Thank you for providing your comment referring to Subject 100 07 00 00.

The application of knowledge is considered essential throughout training and during the pilot's career. The TNA showed that one limitation of current theoretical knowledge training is the emphasis on the learning of facts, rather than understanding and application.

EASA has amended the LOs and there is now no requirement to use training devices.

Please, also see response to comment 37-F.

comment

45-F

comment by: KLM Flight Academy

KSA 100 08 00 00 UPRT is part of the syllabus of the practical training

response

Not accepted.

Thank you for providing your comment referring to Subject 100 08 00 00.

The LOs in Area 100 KSA have been reviewed to ensure that they are appropriate to the theoretical knowledge phase of a student's training. A separate rulemaking task (RMT.0581) will examine other phases of a student's training and testing. EASA considers the understanding and the application of knowledge relating to UPRT to be an essential component of the applicable theoretical knowledge training courses. UPRT was recommended to be included in the theoretical knowledge training for the ATPL, MPL, and



CPL by the UPRT Working Group.

comment

57-F

comment by: Bristol Groundschool

Para 1 - there is an awful lot of 'should' (x3) in this paragraph. Do you mean 'shall' or 'will'?

Para 2 has 'could', where 'may' would be better.

response

Noted.

Thank you for providing your comment referring to paragraphs 1 and 2 of Subject Area 100 KSA.

EASA has removed these paragraphs as the requirement is specified in the AMCs.

comment

58-F

comment by: Bristol Groundschool

100 02 01 00. It is *presumed* that you mean 'AMC1 to Appendix 3' and 'GM1 to Appendix 5' of AMC and GM to Part-FCL. So please say so!

It is also presumed that you intend us to use the proposed amendments in NPA 2016-03(A) as guidance, so that the list of devices would read **'laptop/desktop with applications or adaptive learning programmes, systems trainers, flat panel trainers (FPTs), part-task trainers (PTTs), flight navigation and procedures trainers (FNPTs), flight training devices (FTDs) and/or full flight simulators (FFSs).'**

This LO header is particularly poorly worded, leaving the ATOs in a difficult position regarding comment. If you intend for us to shell out on any forms of FSTD, then the financial figures in the headline document (A) for this NPA will be woefully inadequate.

response

Accepted.

Thank you for providing your comment referring to Subject 100 02 01 00.

The text has been modified to give the appropriate AMC and GM references.

Additionally, the LOs in Area 100 KSA have been modified to remove any requirement for training devices.

comment

59-F

comment by: Bristol Groundschool

100 02 01 00 (01) to (08). Do you seriously expect a student who may yet to even sit in the cockpit of a non-complex single-engine piston aircraft to be capable of these LOs, which are more akin to a type rating ground course?

response

Accepted.

Thank you for providing your comment referring to Subject 100 02 01 00.



The LOs in this area that required the use of training devices have been deleted.

comment

60-F

comment by: *Bristol Groundschool*

100 03 00 00 (01) to (07). There is a fundamental difficulty in assessing these personality traits for modular distance learning ATOs, as we see the students for just three separate weeks during their training. This is barely long enough to form a relationship with individuals, let alone assess this LO. Integrated schools are far better placed to assess these topics in groundschool as they are in personal contact with the students for much longer. This creates a disparity in the assessment between modular and integrated ATOs, and may be seen by potential employers as a dilution in standards from the modular output. Or is that the intention of Area 100 KSA? Just a thought.

Furthermore, this group of LOs all expect the student to 'show the ability'. So where do they get the training to be able to show that ability?

response

Not accepted.

Thank you for providing your comment referring to Subject 100 03 00 00.

EASA considers that the modernisation of the training system, to continuously develop pilot competencies utilising industry and educational best practice, is essential for all ATPL, MPL, and CPL training courses, both integrated and modular. This requirement is based primarily on safety considerations, but also on the needs of industry, and the educational demands of the next generation of professional flight crew.

EASA considered integrated and modular, both residential and distance learning, theoretical knowledge training courses and ATOs of differing sizes when drafting the proposals. The use of an effective ISD utilising a range of learning styles will enable ATOs to integrate the development and assessment of Area 100 KSA into their course(s). For non-residential modular training, the classroom phase of the distance-learning course will be a natural environment for Area 100 KSA development and assessment; however, the majority of the Area 100 KSA should be integrated throughout the entire course of training and be developed and assessed remotely. EASA considers that through the use of carefully constructed exercises and available technology, many of the competencies can be developed, and some assessed, during distance-learning training. The development and assessment of competencies during the required classroom instruction remains an option.

EASA considers that it is necessary that course modernisation including Area 100 KSA be introduced into all ATPL, (MPL), and CPL theoretical knowledge training courses irrespective of whether they are full time, residential, or distance learning. This is in order to ensure that there is no actual or perceived difference in the level of attainment of competencies in the different training courses.

For clarification, the LOs in this section do not require ATOs delivering theoretical knowledge training courses to assess personality traits.



comment	<p>61-F comment by: Bristol Groundschool</p> <p>100 07 00 00 (02) to (05). Whose FMS or aircraft? Boeing? Airbus? See also the earlier comment regarding type rating. This is all far too type specific for a general groundschool topic. It also expects the student to display the KSA and TEM of a much more experienced student than they would be at this stage of their training. It is ludicrous to expect a student to be able to perform to these standards before the end of groundschool. I would be delighted to see a student able to perform to these LOs on an MCC/JOC course, a year or so on from the end of the theoretical knowledge phase.</p>
response	<p>Partially accepted.</p> <p>Thank you for providing your comment referring to Subject 100 07 00 00.</p> <p>Please, see response to comment 59-F.</p> <p>The LOs in Area 100 KSA have been modified to give greater flexibility to the ATOs to determine how to deliver the training. There is no requirement to use training devices. If an ATO elects to use a training device, this tool must be considered within the ATO's instructional systems design. The nominated postholders must comply with present regulations to ensure that each TKI has sufficient knowledge and expertise to teach the LOs of their subject(s) and have adequate aviation knowledge to prevent negative training.</p> <p>EASA's direction is to progressively develop the student pilot's competencies toward the 'satisfactory' minimum grade requirement (only at least 35 % of the indicators) this being lower than would be recommended in subsequent phases.</p>
comment	<p>62-F comment by: Bristol Groundschool</p> <p>100 09 00 00 (01) to (11). Some guidance is needed in this LO as to the accuracy range of these mental calculations and estimates. Is exact calculation required, or a 'ball park' estimate. If the latter, is it to within 10% of the calculated value? 20%? The aim of the LO is valuable and praiseworthy, but needs an injection of reality for the 'Play Station generation'.</p>
response	<p>Noted.</p> <p>Thank you for providing your comment referring to Subject 100 09 00 00.</p> <p>It is foreseen that sensible approximations be considered when developing the acceptable range for correct answers in the mental maths test. This should be evaluated by ATOs as they develop an effective test. The 'Note' under the topic heading in the Area 100 KSA LOs states: 'Demonstrate, in non-calculator test scenarios and/or scenario exercises, the ability in a time-efficient manner to make correct mental calculation approximations for the following (...).'</p>
comment	<p>64-F comment by: Bristol Groundschool</p> <p>100 08 00 00. UPRT should be a separate module for the theory as it is for the practical -</p>



in fact the two should be taken together. How do you expect a student to (04) 'Identify a developing upset...' if he has never flown an aircraft? Totally unsatisfactory at this stage of flying training.

response Not accepted.

Thank you for providing your comment referring to Subject 100 08 00 00.

EASA considers the understanding and the application of knowledge relating to UPRT to be an essential component of the applicable theoretical knowledge training courses. UPRT was recommended to be included in the theoretical knowledge training for the ATPL, MPL, and CPL by the UPRT Working Group.

comment 65-F comment by: Bristol Groundschool

Nowhere is there any guidance given on how much time is to be expended on this topic, whereas topics 010 to 090 are legislated for. Request that a breakdown - total hours for Area 100, and % hours per topic at the very least - be provided.

response Not accepted.

Thank you for providing your general comment referring to Subject Area 100 KSA.

The use of an effective ISD utilising a range of learning styles will enable ATOs to integrate the development and assessment of Area 100 KSA into their course(s). The ATO is responsible for their own course design considering the applicable syllabi and LOs. Oversight of the application of Area 100 KSA is intended to be evidence-based rather than prescriptive (hour-based).

comment 79-F comment by: European Cockpit Association

Attachment [#2](#)

Area 100 KSA — Knowledge, skills and attitudes	Page nb	
Preamble	56	Remove the reference to Airbus core competencies (there shouldn't be a reference to Airbus or any other OEM)
100 01 00 00 COMMUNICATION	57	<p>This chapter is very specific and reflects the KSA's developed and described in PANS TRG.</p> <p>Whilst it's effectiveness has been proven to a certain extent in conjunction with MPL Cadet training, a specific prove of this new regulation has not been shown with the traditional licenses.</p> <p><u>A timely review (like the "proof of concept for the MPL" developed by ICAO) of this regulation must be planned within a certain timeframe.</u> (for example two years from</p>



		now) to ensure the concepts effectiveness through a proper review process.
100 01 00 00 (05)	57	Delete 100 01 00 00 (05). To interpret body language is not an observable, objective behaviour and will always be subject to subjective assessment
100 05 00 00 SITUATION AWARENESS AND RESILIENCE	59	As more emphasis is being placed on Situation Awareness and Resilience, perhaps an <u>LO concerning Cognitive Readiness</u> should also be added. Proper techniques (e.g. breathing and/or relaxation) can be taught; to enable the pilot to attain the necessary physical state first, enabling the pilot to then make rational/cognitive decisions and /or apply pre-scripted actions to handle stressful situations. "Chair Flying" is often mentioned during training, but often actual instruction on how to do this is lacking.
100 01 00 00 (01) till (04), 100 02 01 00 (08), 100 03 00 00 (01) till (07), 100 04 00 00 (02) till (04), 100 06 00 00 (01) till (03), and All Subject 100 0900 00		Replace "show" with " <u>demonstrate</u> ".

response Partially accepted.

Thank you for providing your multiple comments referring to Subject Area 100 KSA.

EASA has introduced the latest ICAO principles, including relevant core competencies. There will be a standing rulemaking task for the regular update of the LOs, syllabi and examination procedures which will consider input from other relevant rulemaking activities. Existing competencies have been taken into consideration; EASA is centrally involved in the ICAO works and any future revisions to these will be considered by the standing rulemaking task.

The LOs have been revised and amended — the reference to body language has been removed.

In the Area 100 KSA LOs 'show' is used as related to single competence indicator, whereas 'demonstrate' is related to a higher taxonomy level. The word 'show' has been retained as it was considered that this best communicated the intention of the LO with respect to the training necessary prior to the formative and summative assessments.



comment	<p>86-F</p> <p>comment by: <i>Finnish Transport Safety Agency</i></p> <p>Please check the references, for example 'GM to AMC ORA.ATO.230' and 'GM1 to AMC1 to ORA.ATO.225' do not exist.</p>
response	<p>Accepted.</p> <p>Thank you for providing your comment referring to the references in Subject Area 100 KSA.</p> <p>The references have been corrected.</p>
comment	<p>87-F</p> <p>comment by: <i>Aero-Club of Switzerland</i></p> <p>Area 100 KSA do not contain topics for the (future) CB-IR/EIR rating holders. From experience we would welcome adapted</p> <p>100 04 00 00 Problem-solving and decision-making</p> <p>100 05 00 00 Situation awareness and resilience</p> <p>100 09 00 00 Mental maths</p> <p>Rationale:</p> <p>Personally managing these three parts contribute greatly to safe flight operations by GA pilots who are in need of problem-solving and decision-making trainings, who must be aware of the actual situation and of the risk of resilience. And mental maths are a valuable help during all phases of a flight when quick reactions are required.</p>
response	<p>Noted.</p> <p>Thank you for providing your comment referring to (future) CB-IR/EIR rating holders in Subject Area 100 KSA.</p> <p>This request will be passed on to the standing rulemaking task.</p>
comment	<p>88-F</p> <p>comment by: <i>GNSS Centre of Excellence</i></p> <p>Subject 100 - KNOWLEDGE, SKILLS AND ATTITUDES (KSA)</p> <p>Several chapters of this subject are already used in ATO 010 CVUT. We already used scenarios based training for communication and mental math during theoretical training, and we believe that outcomes are better than from classic theoretical knowledge training. We would like also introduce several aspects of KSA chapter 100 02 00 00 MANAGEMENT OF FLIGHT PATH and 100 07 00 00 Knowledge. These practical exercises aimed for improvement of automation by FMS usage seems very important for PBN training and familiarization with usage of GNSS. But during our work on this issue we identify problem that there are several types of FMS/GNSS system used. During our discussion with several ATO their mentioned that they don't use same interface of FMS/GNSS on their planes, and there is no generic type of GNSS/FMS usable for these exercises. Theoretical instructors expressed their fears about theoretical training of other operation procedures that the procedures which are actually used on specific type. They believe that this is part of aircraft familiarization which shall be provided by FI.</p>



response

This would lead to duplication of the practical training and theoretical training in subject 100. For optimal usage there shall be some generic type of GNSS/FMS equipment to use, and there should be some research if any such device is available.

We also believe that many parts of KSA training are involved in MC/CRM training and these trainings shall change accordingly to remove duplication.

Summary:

We are in favour of subject 100KSA incorporation in theoretical training. But we believe that there are several technical issues, which shall be addressed before subject becomes mandatory.

Also we find that there may be problem for one TKI to cover whole subject 100 because such various topics.

Noted.

Thank you for providing your comment referring to Subject Area 100 KSA.

Thank you for your input regarding the present integration of scenarios in your theoretical knowledge course. The LOs in Area 100 KSA have been modified to give greater flexibility to the ATOs to determine how to deliver the training. There is no requirement to use training devices. If an ATO elects to use a training device, this tool must be considered within the ATO's instructional systems design.

With regard to duplication of training in other phases, it is EASA's intention to enable a training system that continuously develops and assesses the pilot's competencies.

Thank you for your positive support of Area 100 KSA, some amendment for clarification has been actioned and EASA intends to develop further guidance information and hold a workshop.

The requirement is for Area 100 KSA to be integrated into the course, as opposed to being taught as a stand-alone subject, so it is envisaged that it might be delivered by more than one instructor.



Additional comments received by email:

comment

Per email

comment by: SAT: Blatter Patrick

I do absolutely agree with the fact that with the actual use of a ECQB and his "possibilities" with multiple choice - single answer the student is pushed towards the tendency of learning "facts by heart". I do also absolutely agree the "transportation" of theoretical knowledge into practice flying ist (particularly in modular courses) not easy to implement or failed for a follow up.

If we have a look into a flight school, where an assessment of the capacity of the student pilot is done before he enters the school the mathematical skills are already tested.

1) Communication: It is already now learned in theory und used in practice (real flights, flights in the simulator und used in voice-exercises)

2) Management of flight path: This one is part of the flying practice.

3) Leadership & Teamwork: The theory about this point is held in HPL. The practice part is done during MCC. It should rather be a "assessment" point to look whether a student is able to work in a group and how his leadership competences are developed.

4) Problem solving & decision making: Once more: theory in already in TK, practice during flight training in simulator (abnormal and emergency cases9 and in real flying.

5) Situation awareness & resilience: Same as in point 4)

6) Workload management: A lot of theory put into practical work during flight training.

7) Knowledge: Once again: close connection is needed between theory and flight training.

8) UPRT: Already part of syllabus in flight training.

9) Mental maths: Mentioned above.

As a summary all of the Area 100 KSA should already now implemented in a pilot school.

Starting with a good assessment about the capability of student to become a professional pilot, continuing during the theoretical and practical training with a close follow-up between.

If EASA really wants to implement the KSA in all ATO's over Europe a lot of smaller ATO (already using all of the above "LO" described in KSA 100) will have financial difficulties or less students able to pay for the school. I would prefer a smoother approach by asking the ATO's how they assure the transfer from theoretical knowledge into practical flying. Where the responsible authorities find a lack of this transfer they should become active and asking a kind of "Area 100 KSA". If the responsible authority is satisfied by training then it should not be a "must" to add the area 100 (it will just create more costs to an already good working training organisation).

Thank you for taking in consideration our remarks.

response

Not accepted.

Thank you for providing your comment referring to Subject Area 100 KSA.

EASA considers that the modernisation of the training system, to continuously develop pilot competencies utilising industry and educational best practice, is essential for all ATPL, MPL, and CPL training courses, both integrated and modular. This requirement is based primarily on safety considerations, but also on the needs of industry, and the educational demands of the next generation of professional flight crew. This is a move away from the legacy system which focuses on separated elements of theoretical and practical training.

Please, also see responses to comments 70-F, 23-A, 46-A, and 109-A.



Appendix A — Attachments



Attachment #1 to comment [#78](#)



Attachment #2 to comment [#79](#)

