European Aviation Safety Agency

Opinion No 06/2017

Loss of control prevention and recovery training

RELATED NPA/CRD 2015-13 — RMT.0581

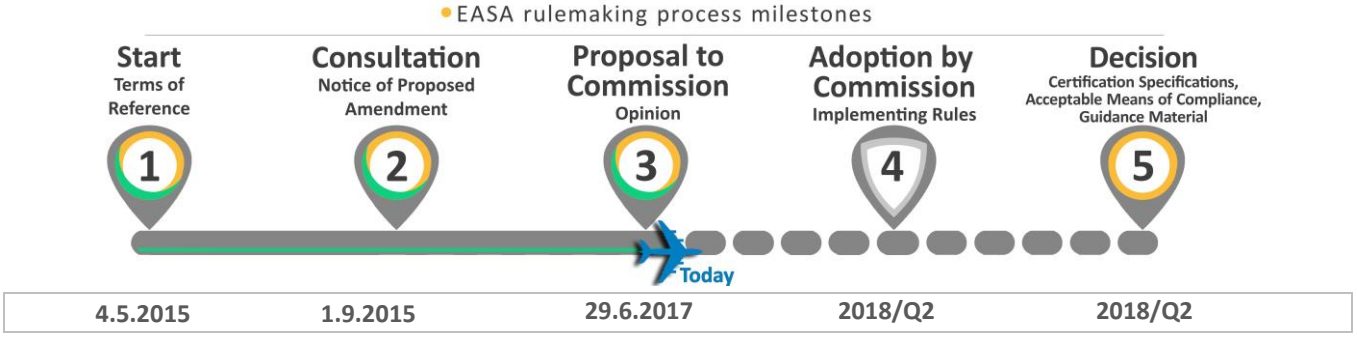
EXECUTIVE SUMMARY

This Opinion addresses a safety issue related to aeroplane loss of control in-flight (LOC-I). The following initiatives are linked to this Opinion: various accident Safety Recommendations (SRs); European Aviation Safety Plan (EASp) safety actions; and amended International Civil Aviation Organization (ICAO) Standards and Recommended Practices (SARPs).

This Opinion proposes to integrate upset prevention and recovery training (UPRT) requirements and provisions into the EU pilot training regulatory framework. The proposed training requirements aim to provide pilots with competencies to prevent upsets or to recover from developed upsets. The main focus of the new training standards is on pilots who intend to pursue a pilot career with a commercial airline. Such pilots would likely complete either an aeroplane airline transport pilot licence(ATPL) or a multi-crew pilot licence (MPL) integrated training course, followed by training to act as a pilot in a multi-crew environment on respective aircraft. The proposed pilot training aims to deliver enhanced pilot competencies through additional upset-prevention- and upset-recovery-related theoretical knowledge (TK) and flight instruction for the commercial aeroplane licences. The newly developed advanced UPRT course, which is to be mandated as an addendum to ATP and MPL training courses and also to serve as a prerequisite prior to commencing the first type rating course in multi-pilot operations, is seen as an important step towards enhancing a commercial pilot's resilience to the psychological and physiological aspects often associated with upset conditions. In support of the new standards, the proposals place greater emphasis on the training of instructors involved in the flight and synthetic training who are foreseen to deliver the various UPRT elements. For training towards non-commercial licences (light aircraft pilot licence (LAPL), private pilot licence (PPL)), the existing training syllabi in AMC will be slightly revised to introduce UPRT elements, taking into account already existing training syllabi.

The proposal is expected to increase safety and ensure harmonisation with ICAO. The entry into force date of the proposed requirements and provisions is envisaged for April 2018, followed by an 1-year transition period until April 2019.

Action area:	Aircraft upset in flight (LOC-I)		
Affected rules:	Commission Regulation (EC) No 1178/2011 (Cover Regulation); Annex I (Part-FCL) and Annex VI (Part-ARA) to said Regulation		
Affected stakeholders:	Pilots, instructors, examiners, ATOs, operators and competent authorities		
Driver:	Safety	**Rulemaking group:**	Yes
Impact assessment:	Full	**Rulemaking Procedure:**	Standard



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1. About this Opinion

1.1. How this Opinion was developed

The European Aviation Safety EASA (EASA) developed this Opinion in line with Regulation (EC) No 216/2008[1] (hereinafter referred to as the 'Basic Regulation') and the Rulemaking Procedure[2].

This rulemaking activity is included in the EASA 5-year Rulemaking Programme[3] under RMT.0581. The scope and timescales of the task were defined in the related ToR[4].

The *draft* text of this Opinion has been developed by EASA based on the input of Rulemaking Group (RMG) RMT.0581. All interested parties were consulted through Notice of Proposed Amendment (NPA) 2015-13[5]. In total, 405 comments were received from interested parties, including industry and competent authorities.

EASA has addressed and responded to the comments received on the NPA. Said comments are presented in Comment-Response Document (CRD) 2015-13[6]. Comments regarding the rule text have been considered for the proposed draft rule published together with this Opinion. Comments regarding the acceptable means of compliance (AMC)/guidance material (GM) will be considered in the context of the development of the final AMC/GM which will be published with an EASA ED decision at a later stage.

The *final* text of this Opinion has been developed by EASA based on the input of Review Group (RG) RMT.0581.

The major milestones of this rulemaking activity are presented on the title page.

1.2. The next steps

This Opinion contains the proposed changes to Commission Regulation (EU) No 1178/2011[7] (hereinafter referred to as the 'Aircrew Regulation') and their potential impacts. It is submitted to the European Commission to be used as a technical basis to prepare an EU regulation.

The decision amending the related AMC/GM will be published by EASA when the associated regulation is adopted by the European Commission.

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1 Regulation (EC) No 216/2008 of the European Parliament and of the Council of 20 February 2008 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency, and repealing Council Directive 91/670/EEC, Regulation (EC) No 1592/2002 and Directive 2004/36/EC (OJ L 79, 19.3.2008, p. 1) (http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1479123914789&uri=CELEX:32008R0216).

2 EASA is bound to follow a structured rulemaking process as required by Article 52(1) of Regulation (EC) No 216/2008. Such a process has been adopted by the EASA Management Board (MB) and is referred to as the 'Rulemaking Procedure'. See MB Decision No 18-2015 of 15 December 2015 replacing Decision 01/2012 concerning the procedure to be applied by EASA for the issuing of opinions, certification specifications and guidance material (http://www.easa.europa.eu/the-agency/management-board/decisions/easa-mb-decision-18-2015-rulemaking-procedure).

3 http://www.easa.europa.eu/document-library/rulemaking-programmes

4 https://www.easa.europa.eu/system/files/dfu/ToR%20RMT.0581%20%26%20RMT.0582%20%20Issue%202_0.pdf

5 In accordance with Article 52 of the Basic Regulation and Articles 6(3) and 7 of the Rulemaking Procedure.

6 http://www.easa.europa.eu/document-library/comment-response-documents

7 Commission Regulation (EU) No 1178/2011 of 3 November 2011 laying down technical requirements and administrative procedures related to civil aviation aircrew pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council (OJ L 311, 25.11.2011, p. 1) (http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1479211577681&uri=CELEX:32011R1178).

2. In summary — why and what

2.1. Why we need to change the rules — issue/rationale

Background

Two Working Groups (WGs), the Loss of Control Avoidance and Recovery Training (LOCART) and the International Committee for Aviation Training in Extended Envelopes (ICATEE), have reviewed various means and solutions to mitigate LOC-I.

The Federal Aviation Administration (FAA) launched the 'LOCART' initiative, with EASA's participation, in March 2012 and was supported by ICAO. The LOCART WG consisted of technical experts, including experts of the FAA Aviation Rulemaking Committee (FAA ARC 208). The ARC is a committee established by the FAA Administrator with intent to provide the FAA with recommendations to address the LOC-I issue. The LOCART WG provided recommendations to ICAO and the FAA.

The ICATEE was initiated by the Royal Aeronautical Society (RAeS) Flight Simulation Group in June 2009 with the task to deliver a long-term strategy to reduce the rate of LOC-I accidents and incidents through enhanced UPRT. EASA participated in the ICATEE WG as well. The outcome of the work completed by both WGs was shared with the aviation community, notably with ICAO, the FAA and EASA. In general, both WGs recommend an integrated approach reinforced throughout a pilot's career. The recommendations cover initial licensing and operator training requirements.

ICAO published amendments to Annexes 1 and 6 in 2014, detailing SARPs aimed at mitigating LOC-I, by introducing the concept of UPRT. The amendments to ICAO Annex 1 mandate UPRT for the MPL and multi-pilot type rating training course. In addition, ICAO recommends UPRT in an aeroplane for the CPL training course. Furthermore, the amendments to ICAO Annex 6 contain requirements for UPRT programmes for all Commercial Air Transport (CAT) aeroplane operators. ICAO also provided further supporting guidance on UPRT in ICAO Doc 9868 'Procedures for Air Navigation Services – Training (PANS-TRG)' and ICAO Doc 10011 'Manual on Aeroplane Upset Prevention and Recovery Training'. Moreover, ICAO published amendments to ICAO Doc 9625 'Manual of Criteria for the Qualification of Flight Simulation Training Devices' containing provisions on flight simulation training device (FSTD) aerodynamic modelling, instructor operating station (IOS) and on what manoeuvres should and should not be trained in an FSTD to avoid negative transfer of training, in support of UPRT.

In parallel to the LOCART, ICATEE and ICAO activities, EASA planned RMT.0581 on 'Loss of control prevention and recovery training' in its 2016–2020 Rulemaking Programme. In addition, EASA published various Safety Information Bulletins (SIBs) related to LOC-I to bridge the gap until the requirements and provisions developed by RMT.0581 are in place.

Moreover, EASA held workshops in 2009 and 2013 with selected leading industry experts to discuss the LOC-I issue and the corresponding draft recommendations developed by ICATEE and LOCART. The outcome of the discussions served as a basis for the launch of RMT.0581 in the course of the 4th quarter of 2013.

In the context of LOC-I, a significant amount of SRs were addressed to EASA in aircraft accident investigation reports published by the designated safety investigation authorities[8], stressing the importance of this issue. After having been part of NPA 2015-13 for public consultation, these SRs have been considered by EASA in consultation with the RMG RMT.0581 during the course of the task. The outcome of the SRs assessment is provided in Section 2.4.

Furthermore, LOC-I has also been a recurring issue in the EASA Annual Safety Review. In addition, the 2014–2017 EASp contains the following safety actions related to LOC-I:

— AER4.8 Response to upset conditions in order to prevent LOC-I;

— AER4.10 Response to unusual attitudes in order to prevent LOC-I; and

— AER4.16 Flight crew are not adequately trained to respond to loss of control.

During the ongoing RMT.0581 drafting activities, following an agreement between EASA, the Commission, and the EASA Committee, the Commission published Regulation (EU) 2015/445[9]. Through said Regulation, UPRT requirements, based on the ICAO Annex 1 amendments published in 2014, were introduced under the Part-FCL[10] licensing rules.

Moreover, in the aftermath of recent LOC-I-related accidents, in January 2015 EASA decided to apply an accelerated procedure to develop UPRT provisions for CAT operators. Consequently, EASA, in consultation with the RMG RMT.0581 experts, amended the AMC/GM to Part-ORO[11] in order to introduce new provisions pertaining to CAT operator flight crew training[12] in May 2015 with a date of entry into force in May 2016, thereby already partially addressing many of the SRs and EASp action items.

Overview of the content of this Opinion

Based on the aforementioned developments and activities, this Opinion addresses the remaining parts of the SRs and the EASp action items, where relevant. These parts relate to the licensing requirements of Part-FCL and the authority requirements of Part-ARA[13] of the Aircrew Regulation. To ensure consistent oversight in both the aircrew and air operations domains, guidance material is planned for the authority requirements for aircrew in Part-ARA of the Aircrew Regulation and for the authority requirements for air operations in Part-ARO[14] of Commission Regulation (EU) No 965/2012[15]

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8 Civil aviation safety investigation authorities as per Regulation (EU) No 996/2010 of the European Parliament and of the Council of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation and repealing Directive 94/56/EC (OJ L 295, 12.11.2010, p. 35) (http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1479212032445&uri=CELEX:32010R0996).

9 Commission Regulation (EU) 2015/445 of 17 March 2015 amending Commission Regulation (EU) No 1178/2011 as regards technical requirements and administrative procedures related to civil aviation aircrew (OJ L 74, 18.3.2015, p. 1) (http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1479212389096&uri=CELEX:32015R0445).

10 Annex I to the Aircrew Regulation

11 Annex III to Commission Regulation (EU) No 965/2012

12 Decision 2015/012/R of the Executive Director amending the Acceptable Means of Compliance and Guidance Material to Part-Definitions and Part-ORO of Regulation (EU) No 965/2012 (https://www.easa.europa.eu/document-library/agency-decisions/ed-decision-2015012r).

13 Annex VI to the Aircrew Regulation

14 Annex II to Commission Regulation (EU) No 965/2012

15 Commission Regulation (EU) No 965/2012 of 5 October 2012 laying down technical requirements and administrative procedures related to air operations pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council (OJ L 296, 25.10.2012, p. 1) (http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1479222081326&uri=CELEX:32012R0965).

(hereinafter referred to as the 'Air OPS Regulation') with regard to competent authority inspectors to be published with the AMC/GM upon adoption of the proposed rules.

This Opinion does not, however, address other aircraft categories (such as helicopters) as the main focus of the aforementioned international WGs and the ICAO SARPs has been primarily on aeroplanes. For a more detailed analysis of the issues addressed by this proposal, please refer to the RIA chapter.

Interfaces with related RMTs

Considering the issue from a broader perspective, RMT.0581 was preceded by RMT.0411 (OPS.094) 'Crew Resource Management (CRM) training'[16], which was also driven by some of the aforementioned SRs. The produced by RMT.0411 Decisions (2015/022/R[17] and 2015/023/R[18]) on CRM training contain provisions on UPRT-related issues, such as the surprise and startle effects as well as pilot resilience development. These CRM provisions mainly support UPRT for CAT operators.

Moreover, EASA requested the introduction of UPRT learning objectives (LOs) for the theoretical knowledge (TK) instruction and examinations for the ATPL(A), MPL and CPL(A) through the industry-led RMT.0595 'Technical review of theoretical knowledge syllabi, learning objectives, and examination procedures for the Air Transport Pilot Licence (ATPL(A)), Multi-Crew Pilot Licence (MPL), Commercial Pilot Licence (CPL), and Instrument Rating (IR)'.

RMT.0196 'Update of flight simulation training devices requirements' was commenced in June 2016 with one objective being to assess whether the existing FSTDs appropriately facilitate the new UPRT requirements originating from RMT.0581. In particular, EASA identified the need to consider introducing adequate criteria and/or guidance for the IOS in support of UPRT. Furthermore, the RMG RMT.0196 have considered the FAA Part 60 Change 2 provisions related to FSTD qualification criteria. Consequently, EASA and the RMG propose that these Part 60 provisions should be included in an amendment to CS-FSTD, providing:

— criteria for IOS to facilitate UPRT;

— increased fidelity for approach to stall at high altitude; and

— better simulation of the effects of airframe/engine ice accretion.

In addition to the above, said Part 60 provisions will, on a voluntary basis, allow a full-flight simulator (FFS) to be qualified for simulating the post stall. This approach will also ensure minimal impact on FSTD operators having devices with two qualifications (both EASA and FAA), and any future FSTD-related Bilateral Aviation Safety Agreement (BASA) between the EU and the Unites States.

RMT.0596 'Review of provisions for examiners and instructors (Subparts J and K of Part-FCL)' was commenced in June 2016 with one objective being to determine whether any further provisions are needed in support of instructors who deliver UPRT.

[16] http://www.easa.europa.eu/system/files/dfu/ToR%20RMT.0411%20(OPS.094)%20Issue%202.pdf
http://www.easa.europa.eu/document-library/notices-of-proposed-amendment/npa-2014-17

[17] https://www.easa.europa.eu/document-library/agency-decisions/ed-decision-2015022r

[18] https://www.easa.europa.eu/document-library/agency-decisions/ed-decision-2015023r

2.2. What we want to achieve — objectives

The overall objectives of the EASA system are defined in Article 2 of the Basic Regulation. This proposal will contribute to the achievement of the overall objectives by addressing the issues outlined in Chapter 2.

The specific objective of this task is to ensure that initial and operator training and checking is adequate to provide pilots with the knowledge, skills and attitude to be competent in preventing and, if necessary, recovering from an upset event. To this end, this Opinion, proposes amendments to the Aircrew Regulation in order to ensure adequate transposition of the amendments to the ICAO SARPs into the European Union requirements by requiring;

— basic UPRT in an aeroplane for the MPL(A), CPL(A) and ATP(A) training courses;

— advanced UPRT in an aeroplane for the ATP(A) integrated training course and as a prerequisite for the first (multi-pilot) type rating;

— 'type-specific' UPRT for (multi-pilot) type rating training courses.

The related ED Decision, containing the AMC/GM, to be published upon adoption of the final rules should include the UPRT elements for;

— the MPL(A), CPL(A), ATP(A) training syllabi;

— (multi-pilot) type ratings, such as:

- training in flight mechanics;
- training in all applicable flight control laws of the aeroplane type and the operational consequences resulting from law degradations;
- training in all the relevant specificities of a certain aeroplane type;
- recovery exercises from (impending) stall situations during the take-off and the approach phase;
- manual aeroplane handling exercises and techniques during stall prevention and stall recovery scenarios, including exercises at high altitude;
- realistic training scenarios that contain surprise and startle effects;
- more emphasis on manual aeroplane handling skills and, for initial type rating training, a requirement to conduct a go-around in the aeroplane with all engines operating;
- training on the conduct of a go-around at low speed with pitch trim in an unusual nose-up position, and consider including this exercise in the skill test or proficiency check; and
- more emphasis on the potential degradation of situational awareness (basic pilot skills) and flight path management due to the increased flight crew reliance on aircraft automation; and

— the LAPL(A) and PPL(A) training syllabi, adapted to the safety risks identified during the Agency's safety review in GA.

Moreover, the ED Decision should also include guidance material for competent authority inspectors to facilitate the oversight of the respective UPRT courses.

The ED Decision to be published as a result of RMT.0595 'Technical review of theoretical knowledge syllabi, learning objectives, and examination procedures for the Air Transport Pilot Licence (ATPL(A)), Multi-Crew Pilot Licence (MPL), Commercial Pilot Licence (CPL), and Instrument Rating (IR)' is planned to be published in the course of the third quarter of 2017, and includes learning objectives related to UPRT.

In this context, it should be noted that the provisions for operator conversion and recurrent training were already published in May 2015, and have become applicable from May 2016.

With regard to theoretical knowledge for CPL, ATPL and IR, the merging of the two existing subjects 'VFR communications' and 'IFR communications' into the new subject 'Communications' (as developed by RMT.0595) requires some amendments to both the provisions on theoretical knowledge requirements for the said licences in Part-FCL and also the provisions in Appendix 1 to Part-FCL on crediting of theoretical knowledge. Finally, the European Central Question Bank (ECQB) is being revised in order to not only contain multiple-choice questions but also open questions. For these reasons, the term 'multiple-choice' in Annex VI (Part-ARA) to the Aircrew Regulation needs to be deleted.

2.3. What are the stakeholders' views — outcome of the consultation

As mentioned, the comments related to the proposed rule changes with the NPA have been taken into account. Most of the comments related to the proposed AMC and GM will be responded to only with the ED Decision anticipated to be issued in the course of the 2nd quarter of 2018 upon the adoption of the final rules. EASA anticipates some further discussions based on the comments received with the RMG RMT.0581 and the General Aviation (GA) task force as mentioned under Section 2.3.1 to finalise the AMC and GM.

2.3.1 General Aviation and LOC-I

At least 20 % of the comments came from General Aviation (GA) stakeholders. A significant proportion raised their concern on the proposed UPRT provisions for light aircraft pilot licence for aeroplane (LAPL(A)) and PPL(A) training course provisions and questioned the prescriptive nature and the actual need for them as well as the related financial burden in terms of additional training costs. There were also calls for a different approach to mitigating LOC-I within GA and that ICAO does not require UPRT for PPL. On the other hand, some comments supported the idea of introducing UPRT at the PPL level, asking for even more in-depth UPRT. EASA also acknowledges that some elements within UPRT are already covered by today's LAPL and PPL training syllabi. In this context, EASA would like to emphasise that the advanced UPRT course in accordance with FCL.745.A will not be mandated for LAPL and PPL training. Additionally, amendments suggested by one comment for FCL.800 to make the aerobatic rating more accessible for GA are outside the scope of this task.

A more in-depth safety review showed that LOC-I in GA remains a major risk in areas such as take-off and landing and flights in poor weather conditions. Further internal discussions and discussions with EASA's GA Road Map initiative and other external GA stakeholders were held. As a result, EASA decided that some theoretical and practical training elements are to be mandated for the LAPL(A) and PPL(A) mainly focused on preventing upsets, but less demanding than the ones for commercial aviation and therefore more proportionate to GA. These revised UPRT elements will be introduced through amendments to the AMC pertaining to the LAPL and PPL syllabi, based on the comments received and in consultation with a dedicated GA task force.

Moreover, EASA intends to launch safety promotion activities to complement the rulemaking action.

In this context, EASA believes that the newly proposed basic instrument rating (BIR) proposed by the RMG RMT.0677 is likely to provide a more accessible instrument rating for GA pilots which in turn could potentially reduce GA-related LOC-I events associated with poor weather conditions.

2.3.2 Safety promotion rather than a regulatory solution

A few comments questioned whether EASA should introduce new rules at all or it would be more appropriate to mitigate LOC-I through only safety promotion or a combination thereof.

To ensure compliance with the latest ICAO Annex 1 SARPs and associated documents, amendments to the ATP, MPL and type rating training courses were inevitable. EASA acknowledges that these new requirements may lead to an extension of the existing training courses in the same way as for the introduction of new technologies. Nevertheless, as mentioned in 2.3.1, for GA no change to the overall course requirements will be made. Instead of this, some UPRT elements will be added to the LAPL and PPL syllabi, as given in AMC, based on existing exercises already covering the subject matter to a certain extent.

EASA reiterates that it intends to complement these rulemaking actions with safety promotion activities.

2.3.3 Harmonisation with ICAO SARPs and associated documents, and alignment with the FAA FARs

Some comments questioned whether the proposed provisions were compliant with ICAO SARPs. EASA emphasises that the proposal is in line the latest ICAO Annex 1 SARPs and associated documents. Moreover, the provisions — published in May 2015 with ED Decision 2015/12/R — require all CAT operators approved in accordance with the Air OPS Regulation to provide UPRT to their flight crews. These requirements are fully harmonised with the UPRT requirements in ICAO Annex 6.

More specifically, in relation to initial training, EASA highlights that the MPL training course has already included UPRT since 2012. EASA envisages that from April 2019 (after entry into force in 2018 and with a subsequent one-year transitional period), ATP, CPL and type rating training courses also include UPRT.

Some comments also expressed concerns that some requirements are not fully aligned with the FAA FARs. In this context, EASA reiterates that the proposed requirements are in line with ICAO and that alignment with the FAA has been achieved for the largest part, albeit some differences remain.

As mentioned, EASA anticipates the new rules for initial licencing and type rating training to be applicable from April 2019 at the latest, which is in accordance with the required ICAO timeframe, and also the case for the FAA FARs applicability dates. EASA provisions for CAT operators have already entered into force in May 2016.

In this context, it needs to be highlighted that ‘grandfathering’ is envisaged for holders of existing licences and ratings. This means that pilots already holding licences or ratings for which the new rules will require UPRT will not be forced to undergo additional training. However, pilots involved in commercial air transport will undergo UPRT as part of the operator training in accordance with Part-ORO Subpart FC.

2.3.4 Clarification on the terms 'upset prevention', 'upset recovery', and 'stall event'

Approximately 10 % of the comments expressed concern on the use of the terms 'upset prevention', 'upset recovery', and 'stall event'. EASA acknowledges the concerns and has further clarified the proposed rule text where possible by referring to both 'upset prevention and recovery', and the AMC and GM will be also revised accordingly in due course.

Additionally, EASA reiterates that the term 'stall event' means both 'approach-to-stall' and 'stall'. While an 'approach-to-stall' exercise must be conducted in an FFS qualified in accordance with CS-FSTD(A), this is not possible for a 'stall' exercise as currently no certification criteria for simulating a 'stall' exist. The ongoing RMT.0196 will propose such criteria to be established for optional qualification of an FFS to facilitate optional stall training exercises. By using the term 'stall event', training providers may decide, in addition to the mandatory approach to stall exercise, to deliver stall exercises on the basis of a careful evaluation in consultation with the competent authority to ensure that negative transfer of training is avoided. Conversely, in the context of basic UPRT during the ATP, CPL, and MPL training courses, and during the advanced UPRT course in accordance with FCL.745.A in an aeroplane, both approach-to-stall and stall exercises shall be conducted.

A few comments queried why the term 'unusual attitude' was replaced by 'upset'. EASA clarifies that this new terminology is taken from ICAO Doc 10011 to ensure industry-wide consistency. The term 'unusual attitude', however, will be kept to describe unintended flight path deviations during aerobatic flight and aerobatic flight training.

Some comments suggested that the term 'impending stall' should not have been used. EASA agrees and clarifies that 'recovery from stall event', as defined, was meant instead.

2.3.5 UPRT delivered during the ATP, MPL, and CPL training courses

Some comments expressed concern over the prescriptive complex nature of the proposal and its readability for the ATP, MPL, and CPL training courses in the context of delivering UPRT. EASA agrees that a certain amount of flexibility is needed to account for external factors and allow appropriate course design, but notes that this flexibility is already provided to approved training organisations (ATOs) under the current rules. As mentioned in 2.3.4, EASA has further clarified the use of the terms 'upset prevention' and 'upset recovery' with the aim of also improving readability and reducing complexity.

In general, the proposed set of new rules has been, and with regard to AMC and GM will be, revised to foresee the provision of UPRT elements at different levels in order to ensure an integrated approach towards UPRT being reinforced throughout a pilot's career, as recommended by the expert WGs:

(a) New AMC to Part-FCL Appendix 3 will be developed to complement the existing flight and synthetic training syllabi for all CPL and ATP courses with basic UPRT elements which should be integrated in existing relevant exercises (e.g. stall recovery, spin avoidance) including briefing and de-briefing. The new AMC will also be linked to Appendix 5 on MPL.

(b) The advanced UPRT course according to FCL.745.A is designed to amplify knowledge and skills in upset prevention and, especially, upset recovery, with the final objective of exposing students and making them more resilient to psychological and physiological aspects usually experienced with a dynamic upset, which is difficult to be done in an FSTD. Students of an ATP integrated or

an MPL training course will need to undergo this UPRT course as an integral part of the course. Additionally, this UPRT course will be a prerequisite for the first class or type rating for:

— single-pilot aeroplanes operated in multi-pilot operation;

— single-pilot high-performance complex aeroplanes; and

— multi-pilot aeroplanes (new FCL.720.A(h)).

(c) Finally, training courses for class or type ratings for aeroplanes referred to at the end of point (b) will need to contain UPRT elements and exercises related to the specificities of the relevant class or type (revised FCL.725.A(c)). In this context, please refer also to Section 2.3.10 of this Opinion.

All UPRT elements, either as new parts of existing courses (as indicated above in points (a) and (c)) or as a new training course (as mentioned in point (b)) will need to be undertaken at an ATO. This is in line with the requirement of ICAO to deliver this type of training within an ATO. However, the advanced UPRT course in accordance with FCL.745.A could also be subject to contracted activities in accordance with ORA.GEN.205.

Some comments suggested that pilots failing to complete to a satisfactory standard the advanced UPRT course according to FCL.745.A — as part of the ATP integrated course — should not be able to progress through the CPL modular route. EASA highlights that pilots who have not completed this training course as part of an ATP integrated course, but who intend to pursue an airline career by following the CPL modular route instead would still be required to undertake the advanced UPRT course prior to commencing their first class or type rating course for aeroplanes specified in point (b). In such cases, the advanced UPRT course according to FCL.745.A is a prerequisite, similar to the multi-crew cooperation (MCC) course.

Some comments called for recurrent training on the FCL.745 course in order to maintain knowledge and skills with regard to UPRT. The RMG for the time being does not believe that this is necessary, as neither evidence indicates such need nor does ICAO require such recurrent UPRT. However, this idea will be part of the ex post evaluation of this rule change.

Some comments called for an exclusion of the CPL from the UPRT requirements, as this may pose a burden to the lower end of commercial activities. In this context, it has to be highlighted that the FCL.745.A course is not required for both modular and integrated CPL training courses. For these courses, only basic UPRT exercises will be integrated into the syllabi (see above Section 2.3.5 (a)). When continuing the career at a CAT operator or in general either in a multi-crew environment or in single-pilot high-performance complex aeroplanes, the advanced UPRT course in accordance with FCL.745.A will still need to be completed. EASA believes that this solution is appropriate (similar to the approach used for MCC).

In one comment, it was proposed to credit holders of an aerobatic rating towards the FCL.745.A course. EASA in this context highlights that the FCL.745.A course and the aerobatic training course in accordance with FCL.800 are aiming at different training objectives. Therefore, such credit cannot be granted.

Some comments called for mandating aerobatic aircraft to be used. As aerobatic aircraft is not required for all exercises in the syllabus, EASA decided not to specifically mandate aerobatic aircraft to be used for the entire course. It will be up to the ATO to evaluate which aircraft will be used for which

part of the training. However, EASA considers further developing the AMC material on the training syllabus to indicate whether normal or aerobatic categories could be used.

2.3.6 Flight instructor privileges for delivering basic UPRT during the ATP and CPL training courses, and for delivering the advanced UPRT course in FCL.745.A

5 % of the comments expressed concerns over the privileges of flight instructors (FIs(A)) delivering basic UPRT during the ATP and CPL training courses, and delivering the newly proposed advanced UPRT course in FCL.745.A. Furthermore, concerns were expressed over the required extension of privileges needed for FIs(A) wishing to deliver the advanced UPRT course.

Due to the different risk profiles, EASA would like to emphasise that existing FIs(A) on ATP and CPL training courses already today have the privileges to teach existing exercises containing UPRT elements (stall recovery, spin avoidance, steep turns and recovery from unusual attitudes); however, it is recommended for these instructors to do so only within the proposed 'recommended training envelope' as to be defined in AMC (intended limitations: maximum bank angle of 45°, maximum positive pitch attitude of 25°, maximum negative pitch attitude of -10°). The ATO is in any case responsible for ensuring that these instructors are competent to teach these basic UPRT elements by establishing appropriate procedures in the relevant ATO documentation (Part D of the operations manual (OM-D)).

On the contrary, only flight instructors having completed the new UPRT instructor course (new FCL.915(e)) should conduct the advanced UPRT course in accordance with FCL.745.A, containing exercises outside the recommended training envelope. Nevertheless, as some comments suggested that this division may not be appropriate, EASA will further assess this issue in the context of the activities under RMT.0596 on instructors and examiners.

As regards some comments that queried ways to design the course, EASA highlights that this is for the ATO to decide. In any case, GM will be developed to clarify that the 3hour flight training must be in place as a minimum to ensure effective flight training covering the training programme.

2.3.7 Training course in FCL.915(e) for flight instructors delivering the advanced UPRT course in accordance with FCL.745.A

10 % of the comments related to the newly proposed FCL.915(e) training course at an ATO for flight instructors delivering the advanced UPRT course in FCL.745.A.

Some comments questioned the need for having an aerobatic rating as a prerequisite for commencing the course. EASA reiterates that:

— the ATO is responsible for determining the training needs of a new applicant on a case-by-case basis;

— the safety management system (SMS) of the ATO should ensure that the increased risks are appropriately mitigated;

— it is the responsibility of the ATO to ensure instructors providing the advanced UPRT course are competent (including the ability to recover the aircraft from any situation triggered by poor handling by the student, e.g. a flat spin); and

— the aeroplanes used are qualified for the training task and provide an adequate margin for safety.

As any instructor, not only an FI, may follow this type of training, EASA proposed minimum regulatory prerequisites, including having a certain amount of prior instructing and flight experience, for consistency with other instructor prerequisites in Part-FCL Subpart J. It should be emphasised that the advanced UPRT course should not be confused with aerobatics in this context. However, EASA and the RMG experts indeed believe that some past aerobatic experience is useful for new instructors to be able to better cope with unexpected and incorrect recoveries by the student pilot after a dynamic upset exercise. Consequently, after further consultation with the RG experts, EASA decided to move the aerobatic rating requirement from the rule to the AMC level to provide more flexibility. This AMC will also contain the possibility to recognise equivalent experience acceptable to the competent authority in lieu of an aerobatic rating, such as past military flight experience.

One comment suggested that all instructors (meaning both flight and synthetic instructors), including those that only deliver training in FSTD, undergo the new training course according to FCL.915(e). Another comment called for requiring at least all instructors teaching on instructor training courses to undergo this training course. Due to the limited capacity of this type of training, EASA does not believe that requiring all instructors to undergo this training is feasible in the short term, or simply not possible as it is the case with some synthetic fight instructors (SFIs) who might not even be able to undergo such training in an aircraft due to medical reasons. However, in the medium/long term, many FSTD instructors will have completed the advanced UPRT course as part of the initial licensing training through the course in accordance with FCL.745.A. Finally, as already explained in Section 2.3.6, while during ATP and CPL training courses instructors should conduct air exercises solely within the 'recommended training envelope', only instructors having completed the UPRT instructor training course in accordance with FCL.915(e) may conduct air exercises outside this envelope (all bank and pitch angels) whilst delivering the FCL.745.A training course. In this context, and taking into account the above, EASA concludes that not all instructors should be required to undergo the UPRT instructor training course, irrespective of whether or not they intend to instruct on UPRT courses in accordance with FCL.745.A.

Many comments requested the 3-month recency requirement to be increased or deleted in its entirety. After further discussion, EASA and RG experts strongly believe that a certain amount of recency should be kept, but that the period could be increased to 12 months instead. The revised FCL.915(e)(2) now requires the UPRT instructional privileges to be maintained by acting as an instructor at least for one UPRT course in accordance with FCL.745.A during the last 12 months or, if compliance with this requirement is not possible, by acting as an instructor on the course under the supervision of an instructor qualified to instruct on the course in accordance with FCL.915(e).

Some comments questioned the additional requirements to be able to train the trainer. EASA and the RG believe a certain standard is needed and consequently the rule was kept. EASA and the RG believe this ensures consistency with other instructor requirements in Part-FCL Subpart J and that 25 hours is a reasonable minimum amount of experience.

Many comments were received querying whether the additional privilege is to be endorsed in the licence or in the logbook or both. EASA and RMG experts discussed the issues and agreed that only the logbook should be endorsed. For instructors undergoing the training course, a continuous assessment takes place under the responsibility of the ATO. Upon completion of the course, the instructor obtains the endorsement in the logbook by the ATO's head of training in addition to a course completion certificate issued by the ATO. AMC will be developed in support of endorsing the logbook.

One comment suggested that a flight instructor examiner (FIE) would not be the appropriate examiner to complete the assessment of competence and that this requirement would pose a burden to the system. EASA and the RMG experts emphasise that the FIE holding the underlying privilege to instruct on the advanced UPRT course would only need to assess the instructor training the trainer. This also allows the competent authority to perform its oversight duties.

Finally, EASA highlights that FCL.900(b) is amended in order to allow Member States to qualify the first instructors for delivering training in accordance with the new point FCL.915(e).

2.3.8 UPRT training in FSTDs including 'stall events'

Many commentators expressed concerns over whether or not post-stall training would be mandated in an FFS. One comment suggested to require existing FSTDs to undergo a special evaluation before being used for UPRT. With this Opinion, EASA does not propose post-stall training to be required in an FFS (see above Section 2.3.4), and reiterates that existing FSTDs may be used to facilitate UPRT. As mentioned in 2.1. above, the ongoing RMT.0196 will propose additional qualification requirements for facilitating approach-to-stall exercises at high altitude and for better simulation of the adverse aerodynamic effects of airframe/engine ice accretion. In addition, RMT.0196 will propose new criteria for the IOS to provide better feedback to the instructor in support of UPRT. Further to this, it should be highlighted that currently the IOS is not certified at all. In this context, some commentators queried on the definition of the validated training envelope (VTE) which will now be included in the definitions list provided by GM to FCL.010. All UPRT exercises should remain within the VTE. Whilst unintended excursions outside the VTE are to be anticipated during training, it is up to instructor judgment to determine whether such excursion is acceptable in the context of preventing negative transfer of training.

As mentioned in Section 2.3.4, the ongoing RMT.0196 will propose additional criteria to be established for optional qualification of an FFS to facilitate post-stall training exercises. It should be emphasised that the revised exercise 3.7 in Part-FCL Appendix 9 Section B paragraph 6 (test profile for multi-pilot aeroplanes and single-pilot high-performance complex aeroplanes) only mandates approach-to-stall exercises. The objective of these exercises is to provide flight crews with the correct type-specific recovery procedures and familiarise them with the type-specific characteristics of such an event.

Moreover, some commentators posed questions on whether the recovery exercises from excessive bank angles are included in Section B paragraph 6 exercise 3.7.1 of Part-FCL Appendix 9. These exercises should not be confused with steep turns (exercise 3.1.2.) which typically are completed with a 45-degree angle of bank turns with the objective of improving scanning. Moreover, EASA and the RMG experts do not believe that it is needed to be too prescriptive on the maximum bank angles, as this very much depends on the aeroplane type. It is recommended that training exercises should be developed in close consultation with the respective aeroplane's original equipment manufacturers (OEMs).

One commentator suggested the introduction of AMC to define a classification of UPRT exercises in two categories, namely generic UPRT and type-specific UPRT, and that a similar approach could be applied for training of simulator instructors. EASA would like to highlight that it is important that both generic and type-specific UPRT are reinforced throughout a pilot's career (see also Section 2.3.5), and therefore does not believe that there is a need to develop two categories of UPRT exercises.

Some commentators requested EASA to provide realistic training manoeuvres that could contain take-off and approach stall situations, and/or surprise and startle effects. EASA believes that ATOs have the competence to develop such training in consultation with the OEMs who should validate the appropriateness in terms of realism and avoiding negative transfer of training. EASA will consider developing further GM in this context, where possible.

EASA also acknowledges that developing surprise and startle effects in an FSTD is challenging. Nevertheless, future pilots will be exposed to surprise and startle effects, and corresponding coping strategies during the FCL.745.A advanced UPRT course, thereby somewhat negating the need to develop such scenarios in an FSTD. In addition, EASA would like to highlight that approach-to-stall exercises should be delivered as manoeuvre-based exercises led by the instructor, rather than scenario-based, to avoid negative transfer of training.

EASA has also amended Section 3 of Part-FCL Appendix 9 Section B paragraph 6, by replacing 'possible' by 'applicable' in the context of flight control laws, based on one comment received.

2.3.9 Instructors delivering UPRT in FSTDs

Several comments questioned the additional transitional requirements for FSTD instructors for delivering UPRT in an FSTD. In this context EASA highlights that existing FSTD instructors already today have the privilege to deliver type-specific UPRT in an FSTD within the FSTD VTE, and that the ATO is responsible for ensuring that any new training elements and methods are appropriately addressed through additional training such as an additional theoretical knowledge training, in accordance with the ATO procedures (OM-D). As regards training in terms of the Air OPS Regulation (operator training), air operators should have the same obligation for their instructors. Some comments also suggested that simulator instructors should also undergo either the advanced UPRT course in FCL.745.A or the respective instructor course in FLC.915. As mentioned already in Section 2.3.7, EASA highlights that in the medium to long term, all new pilots having completed an ATP or MPL training course and/or having completed an initial class or type rating training course will have undergone the training course according to FCL.745.A. This also implies that future SFI(A) and TRI(A) will have undergone this type of training. In the short term however, EASA recommends SFI(A) and TRI(A) to undergo such course on a voluntary basis, as it may be beneficial to a certain extent to gain more in-depth knowledge of the psychological and physiological factors often experienced during dynamic aeroplane upsets in support of delivering UPRT in FSTDs.

2.3.10 UPRT during type ratings

Several comments asked for clarification in regard to which type ratings require integration of UPRT. EASA closely follows the ICAO requirement for UPRT in multi-pilot operations, albeit the fact that due to the structure of Part-FCL Appendix 9, also single-pilot high-performance complex aeroplanes will need to integrate UPRT into the type rating. In other words, type-specific UPRT will be required for training courses for both multi-pilot aeroplane (MPA) and single-pilot high-performance complex aeroplane type ratings, as well as, for type rating training for any single-pilot aeroplane used in multi-pilot operations (see also Section 2.3.5 (b)).

Some commentators considered allowing only FFS to be used to facilitate the recovery exercises during UPRT overly restrictive, citing that in some cases other FSTDs instead of the FFS could be utilised, especially for those aeroplanes for which an FFS does not exist. EASA acknowledges that for a limited

number of aeroplanes the proposed FFS requirements (contained in the provisions for the UPRT-related exercises in the revised Part-FCL Appendix 9) may be problematic. As a result, EASA has tasked RMT.0196 to determine whether (combinations of) other FSTDs could be capable of being used instead of an FFS to facilitate UPRT.

2.3.11 Duplication of UPRT: Mixed fleet flying and crediting between aircrew and air operations training requirements

Several comments expressed concerns over the potential duplication of UPRT when an operator utilises mixed fleet flying. EASA believes that the operational suitability data (OSD) process could be used to avoid duplication. OEMs may apply for credits for type-specific UPRT through an operational evaluation in accordance with Part-21 provisions and CS-FCD. Any credits will be reflected in the applicable OSD reports. Concerns were also expressed over potential overlap between initial type rating and the operator conversion training. EASA believes that such overlap is minimal especially considering the added safety benefits. Furthermore, the operator conversion training requires only a minimum of two prevention items to be included, whereas the initial type rating course requires the inclusion of all UPRT-related items.

2.3.12 Crediting provisions in Appendix 1 to Part-FCL

One comment indicated that some crediting provisions that should have also been addressed, were omitted from the NPA. EASA agrees that an applicant for IR(A) theory having passed the relevant examination for CPL(A) theory is credited towards theoretical knowledge requirement in subject 'Communications' (reflected in a revised point 4.1 of Appendix 1 to Part-FCL), and an applicant for a CPL(A) theory having passed the relevant examination for IR(A) theory is credited towards theoretical knowledge requirement in subject 'Communications' (reflected in a new point 2.4 of Appendix 1 to Part-FCL).

2.3.13 Cover regulation provisions and transitional measures

Several comments requested clarification on the intended entry into force and applicability dates of the amendments proposed with this Opinion. EASA suggests that the Commission should aim to have the proposed amendments enter into force the latest by 8 April 2018. As there will however be a need to provide a transition period, EASA recommends to the Commission to grant pilot training organisations a transitional period until 8 April 2019 for adapting their training programmes to comply with the new UPRT requirements. With regard to training courses starting before this day, transitional provisions for the issue of licences (ATPL, MPL) and the class and type ratings affected by the new UPRT requirements (see Section 2.3.13) should be put in place, considering the possible duration and time arrangements of these training courses. Up to 8 April 2018, new UPRT elements may be integrated into the ATP, MPL, as well as class and type rating training courses on a voluntary basis.

EASA also recommends to the Commission to allow Member States to credit UPRT received prior to 8 April 2019 towards the ATP, CPL and MPL as well as towards class and type rating courses, as applicable. From 8 April 2019, all applicable training courses should have been adapted to include UPRT and all affected instructors should have received the required training prior to delivering UPRT.

With regard to the existing provisions of the Aircrew Regulation, not yet applicable due to an opt-out provision (see Article 3(2) of Regulation (EU) 2015/445[19]), EASA recommends to the Commission to extend this opt-out provision for the time being (until April 2019) and to finally put these UPRT provisions out of force when the new UPRT requirements proposed with this Opinion will come into effect.

2.3.14 Other items

Several comments related to the proposed definitions/abbreviations. Also, some commentators asked all the UPRT definitions to be listed at rule level rather than in GM. EASA highlights that the definitions are in accordance with ICAO Doc 10011 and that they are considered to be too technical for the high-level rule and are therefore kept in GM. However, EASA acknowledges that the lists of definitions and abbreviations need to be revised as follows:

— Additional abbreviations are introduced for:

- instructor operating stations (IOS);
- OEM (original equipment manufacturer);
- CL (coefficient of lift) and CD (coefficient of drag);
- validated training envelope (VTE); and
- aeroplane upset recovery training aid (AURTA).

— References and notes related to the spin are deleted.

— Definition of 'manual flight' may be added pending a further review by the RMG.

Other proposals for amending the definitions such as for 'energy state' and 'loss of control in-flight (LOC-I)' are not accepted to ensure that consistency with the applicable ICAO Doc 10011 definitions is kept.

One comment suggested to add 4 NM from touchdown as an alternative to the outer marker checkpoint. EASA agrees that not every airport has an outer marker and has amended the respective exercise in Appendix 9 (Exercises 3.8.3.5). In this context, an exercise in Appendix 9 has been inserted (exercise 3.8.3.5), requiring a manually flown approach, with an engine malfunction to be simulated whilst on final approach after being fully established on the localiser and glide slope and having passed either the OM or 4 NM to touchdown. This exercise would aim to develop competence in managing such situations to a safe flight and should include consideration for continuing to land or for completing the missed approach procedure. As there is also an SR on this issue, EASA decided to include this new training exercise in Appendix 9.

Finally, there was a proposal that all CRM aspects are systematically covered at each instructor revalidation. EASA intends to address the CRM aspects through other tasks, as appropriate, as this issue is deemed to be out of the scope of this task.

[19] Commission Regulation (EU) 2015/445 of 17 March 2015 amending Regulation (EU) No 1178/2011 as regards technical requirements and administrative procedures related to civil aviation aircrew (OJ L 74, 18.3.2015, p. 1) (http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1498465659548&uri=CELEX:32015R0445).

One comment suggested to be more specific on the content of briefing and debriefing tools to support UPRT. EASA believes that this is best left to the ATO which can develop its respective tools tailored to their needs and based on the ICAO Doc 10011 and the guidance contained therein in order to grant flexibility.

One comment asked for AURTA revision 3 to be referenced. EASA agrees and will ensure that the respective AMC/GM material contain the correct reference.

Several comments showed appreciation for the go-around exercises in the context of somatogravic illusion during the type rating landing training. However, AMC will be further reworded to indicate that somatogravic illusion is not the only training objective of this exercise.

Several comments also suggested that the take-off and landings between the type rating and the type rating training as part of the MPL training course should be aligned at the same level of legislation. EASA acknowledges this consistency issue and will address this with a future RMT, as it is outside the scope of this RMT.

2.4. Safety Recommendations — outcome of the EASA safety assessment

FRAN-2012-039	*The French Accident Investigation Board (BEA) recommends that European Aviation Safety Agency ensure the integration, in type rating and recurrent training programmes, of exercises that take into account all of the reconfiguration laws. The objective sought is to make its recognition and understanding easier for crews especially when dealing with the level of protection available and the possible differences in handling characteristics, including at the limits of the flight envelope.*
	Reference: Final Report on the accident on 1st June 2009 to the Airbus A330-203 registered F-GZCP, Rio de Janeiro – Paris, published by the BEA in July 2012
Outcome of the EASA safety assessment	The SR has been evaluated and is addressed through: — Proposals to introduce mandatory UPRT, testing and checking at various stages throughout a pilot's career: • advanced UPRT course (new FCL.745.A) as a prerequisite for training courses for single-pilot aeroplanes operated in multi-pilot operation, single-pilot high-performance complex aeroplanes and multi-pilot aeroplanes (amendments to FCL.720.A); • Inclusion of UPRT elements considering the specificities of the particular class or type during the relevant class or type rating training course (amendments to FCL.725.A); • Amendments to Appendix 9, paragraphs 5 and 6 in Annex I (Part-FCL) to the Aircrew Regulation for including upset prevention and recovery exercises into training courses, skill test and proficiency checks related to single-pilot aeroplanes operated in multi-pilot operations, single-pilot high-performance complex aeroplanes and multi-pilot type rating training courses; and — New AMC and GM to ORO.FC.220&230 in ED Decision 2015/012/R related to operator recurrent and conversion training, in force from 4 May 2016.
FRAN-2012-040	*The BEA recommends that more generally, EASA ensure that type rating and recurrent training programmes take into account the specificities of the aircraft for which they are designed.*
	Reference: Final Report on the accident on 1st June 2009 to the Airbus A330-203 registered F-GZCP, Rio de Janeiro – Paris, published by the BEA in July 2012
Outcome the EASA	The SR has been evaluated and is addressed through the activities specified

safety assessment	above on the outcome of the assessment of SR 'FRAN-2012-039'. Additionally, it has to be highlighted that in general the OSD process aims at ensuring that training programmes are developed to cater for the specificities of the particular aircraft.
NETH-2010-007	*The French Civil Aviation Authority (DGAC), International Civil Aviation Organization (ICAO), Federal Aviation Administration (FAA) and EASA should change their regulations in such a way that airlines and flying training organisations see to it that their recurrent training programmes include practising recovery from stall situations on approach.*
	Reference: Final Report on the accident on 25 February 2009 to the Boeing 737-800 flight nr TK1951 near Amsterdam Schiphol Airport (project number M2009LV0225_01), published by the Dutch Safety Board on 06 May 2010
Outcome the EASA safety assessment	The SR has been evaluated and is addressed through new AMC and GM to ORO.FC.220&230 in ED Decision 2015/012/R related to operator recurrent and conversion training, in force from 4 May 2016.
FRAN-2010-004	*The BEA recommends that EASA undertake a safety study with a view to improving the certification standards of warning systems for crews during reconfigurations of flight control systems or the training of crews in identifying these reconfigurations and determining the immediate operational consequences.*
	Reference: Final Report on the accident on 27 November 2008 off the coast of Canet-Plage (66) to the Airbus A320-232 registered D-AXLA, published by the BEA in September 2010
Outcome the EASA safety assessment	In relation to 'the training of crews in identifying reconfigurations of flight control systems and determining the immediate operational consequences', this has been evaluated and is (proposed to be) addressed through the changes of: — FCL.720.A, FCL.725.A, Appendix 9, paragraphs 5 and 6 in Annex I (Part-FCL) to the Aircrew Regulation, and related AMC and GM, related to single-pilot aeroplanes in multi-pilot operations and multi-pilot type rating training courses; and — New AMC and GM to ORO.FC.220&230 in ED Decision 2015/012/R related to operator recurrent and conversion training, in force from 4 May 2016.
FRAN-2010-005	*The BEA recommends that EASA, in cooperation with manufacturers, improve training exercises and techniques relating to approach-to-stall to ensure control of the aeroplane in the pitch axis.*

	Reference: Final Report on the accident on 27 November 2008 off the coast of Canet-Plage (66) to the Airbus A320-232 registered D-AXLA, published by the BEA in September 2010
Outcome the EASA safety assessment	The SR has been evaluated and is (proposed to be) addressed through the activities specified above on the outcome of the assessment of SR 'FRAN-2012-039'.
FRAN-2011-009	*The BEA recommends that EASA review the content of check and training programmes and make mandatory, in particular, the setting up of specific and regular exercises dedicated to manual aircraft handling of approach-to-stall and stall recovery, including at high altitude.*
	Reference: Final Report on the accident on 1st June 2009 to the Airbus A330-203 registered F-GZCP, Rio de Janeiro – Paris, published by the BEA in July 2012
Outcome the EASA safety assessment	The SR has been evaluated and is (proposed to be) addressed through the activities specified above on the outcome of the assessment of SR 'FRAN-2012-039'.
SPAN-2011-018	*It is recommended that the FAA and EASA require take-off stall recovery as part of initial and recurring training programmes of airline transport pilots.*
	Reference: Report A-032/2008 - Accident involving a McDonnell Douglas DC-9-82 (MD-82) aircraft, registration EC-HFP, at Madrid-Barajas Airport, on 20 August 2008, published by the Spanish Accident Investigation Authority (CIAIAC) on 01 August 2011.
Outcome the EASA safety assessment	The SR has been evaluated and is (proposed to be) addressed through the activities specified above on the outcome of the assessment of SR 'FRAN-2012-039'. It should be noted that the exercise to be conducted includes recovery from a stall event in the take-off configuration at a safe altitude. Moreover, EASA and the RMG are of the opinion that this issue relates more to non-compliance with procedures. Additionally, EASA and the RMG do not believe that requiring a stall event recovery during the take-off phase can be realistically accomplished without the risk of significant negative training as well as negative transfer of training.
SOUF-2010-009	*It is recommended that the regulatory and certifying authorities of all States of Design and States of Manufacture should introduce requirements to operators that they should provide flight crews with more basic hand flying and simulator flight training on new generation aircraft to address the technological developments in aviation, inclusive of effective stall training.*

	Reference: Serious incident investigation report final report Boeing B747-400 G-BYGA Group 'A' L/E Flaps retraced on Takeoff from O.R. Tambo Airport, South Africa. Published on 11 May 2009 by the Accident Incident Investigation Division (AIID) of the South African Civil Aviation Authority (SACAA).
Outcome the EASA safety assessment	The SR has been evaluated and is addressed through the new AMC and GM to ORO.FC.220&230 in ED Decision 2015/012/R related to operator recurrent and conversion training, in force from 4 May 2016.
FRAN-2012-021	*The BEA recommends that EASA introduce the surprise effect in training scenarios in order to train pilots to react to these phenomena and work under stress.*
	Reference: Final Report Serious incident on 22 July 2011 in cruise at FL350, North Atlantic Ocean, to the Airbus A340-313 registered F-GLZU, published by the BEA in May 2012
Outcome the EASA safety assessment	The SR has been evaluated and is (proposed to be) addressed through the activities specified above on the outcome of the assessment of SR 'FRAN-2012-039'.
FRAN-2012-041	*The BEA recommends that EASA define recurrent training programme requirements to make sure, through practical exercises, that the theoretical knowledge, particularly on flight mechanics, is well understood.*
	Reference: Final Report on the accident on 1st June 2009 to the Airbus A330-203 registered F-GZCP, Rio de Janeiro – Paris, published by the BEA in July 2012
Outcome the EASA safety assessment	The SR has been agreed and addressed through the new AMC and GM to ORO.FC.220&230 in ED Decision 2015/012/R related to operator recurrent and conversion training, in force from 4 May 2016.
FRAN-2012-046	*The BEA recommends that EASA ensure the introduction into the training scenarios of the effects of surprise in order to train pilots to face these phenomena and to work in situations with a highly charged emotional factor.*
	Reference: Final Report on the accident on 1st June 2009 to the Airbus A330-203 registered F-GZCP, Rio de Janeiro – Paris, published by the BEA in July 2012
Outcome the EASA assessment	The SR has been evaluated and is (proposed to be) addressed through the activities specified above on the outcome of the assessment of SR 'FRAN-2012-039'.
FRAN-2013-023	*The BEA recommends that EASA review the regulatory requirements for the first CS-25 type rating in order to make mandatory the performance of a*

	go-around in the aeroplane with all engines operating.
	Reference: Study on Aeroplane State Awareness during Go-Around, published by the BEA in August 2013
Outcome the EASA safety assessment	The SR has been evaluated and is (proposed to be) addressed through the changes of: — Appendix 9, paragraph 6 in Annex I (Part-FCL) to the Aircrew Regulation, and related AMC and GM, related to multi-pilot type rating training courses; and — AMC to ORA.ATO.125 in ED Decision 2011/016/R related to multi-pilot aeroplane type rating training courses, in force from 4 May 2016.
FRAN-2013-041	*The BEA recommends that EASA, in cooperation with the national civil aviation authorities, major non-European certification authorities and manufacturers ensure that pilots have practical knowledge of the conduct required during a go-around at low speed with pitch trim in an unusual nose-up position, and that they make a competence assessment.*
	Reference: Study on Aeroplane State Awareness during Go-Around, published by the BEA in August 2013
Outcome the EASA safety assessment	The SR has been agreed and addressed through the activities specified above on the outcome of the assessment of SR 'FRAN-2012-039'. It should be noted, that EASA and the RMG experts believe that the pilots should be trained to proficiency, rather than being tested or checked on their ability to conduct such a go-around.
NETH-2014-005	*EASA should review the applicable regulations on initial and recurrent flight crew training to assess whether they adequately address the potential degradation of situational awareness (basic pilot skills) and flight path management due to increased reliance on aircraft automation by flight crews.*
	Reference: Report on Pitch-up Upsets due to ILS False Glide Slope, published by the Dutch Safety Board in June 2014
Outcome the EASA safety assessment	The SR has been agreed and addressed through the activities specified above on the outcome of the assessment of SR 'FRAN-2012-039'.

FINL-2014-002	*EASA should consider the translation, provide more detailed comments on the purpose of this exercise, and clarify it with practical examples. In addition, it is recommended that the possible new translation and the practical examples would be mandated to be incorporated in the training programmes of the training organisations.*
	Reference: Report L2012-04 on the accident on 08 May 2012 to the Cessna A152 registered OH-CKB, at Alastaro Circuit Motorsport Center, Loimaa, published by the Safety Investigation Authority of Finland (SIAF) on 28.01.2014
Outcome the EASA safety assessment	EASA and the RG have assessed the SR and EASA, also taking into account the comments received, has decided to address this issue through a dedicated GA task force. This is also explained in Section 2.3.1 above.
FINL-2014-003	*The PPL(A) syllabus stipulates flying a minimum of two hours of stall and spin avoidance training flights. It does not determine the number of successfully completed manoeuvres, variations thereof, or the focus between different types of manoeuvres in training. Safety Investigation Authority Finland recommends that the European Aviation Safety Agency (EASA) include a minimum number for both stall and spin avoidance manoeuvres in the PPL(A) flight training syllabus. As regards spin avoidance in particular, i.e. incipient spins, this is regarded as important.*
	Reference: Report L2012-04 on the accident on 08 May 2012 to the Cessna A152 registered OH-CKB, at Alastaro Circuit Motorsport Center, Loimaa, published by the Safety Investigation Authority of Finland (SIAF) on 28.01.2014
Outcome the EASA safety assessment	EASA and the RG have assessed the SR, and EASA, also taking into account the comments received, has decided to address this issue through a dedicated GA task force. This is also explained in Section 2.3.1 above.
ARGT-2015-001	*It is recommended to the Aviation Authorities to consider implementing changes to the compliance requirements with regard to the crew's instruction and training, related to flight manoeuvre that are carried out during operations with a large angle of attack or with abnormal flight attitudes. Consider making the following manoeuvres obligatory during the training and the licensing inspection (in flight simulators), in accordance with the aircraft:* *a) Recognising when a stall commences and how to prevent it from happening.* *b) Recognising and recovering from an artificial stall warning* *c) Recognising and recovering from a total aerodynamic stall*

	d) Practising how to recover from typical abnormal flight attitudes.
	Reference: Technical Report 096/2011 on the accident that occurred on 18 May 2011 to the Saab 340 A registered LV-CEJ, Caltrauna, between Los Menucos and Prahuaniyeu, province of Río Negro, published by the Argentinian Civil Aviation Accident Investigation Board (JIAAC) on 11 March 2015.
Outcome the EASA safety assessment	The SR has been agreed and is proposed to be addressed through the activities specified above on the outcome of the assessment of SR 'FRAN-2012-039'. With reference to Section 2.3.4 of this Opinion, in relation to type-specific recovery from a 'total aerodynamic stall', the assessment and comments received indicated concerns over potential negative transfer of training when using an FFS. Nevertheless, this issue has been forwarded to RMT.0196[20] for further consideration.
FRAN-2012-045	*The BEA recommends that EASA modify the basis of the regulations in order to ensure better fidelity for simulators in reproducing realistic scenarios of abnormal situations.*
	Reference: Final Report on the accident on 1st June 2009 to the Airbus A330-203 registered F-GZCP, between Rio de Janeiro and Paris, published by the BEA in July 2012.
Outcome the EASA safety assessment	This SR is being considered within the context of the activities of RMT.0196.
FRAN-2014-002	*The BEA recommends that EASA reinforce initial and recurrent training programmes in "low speed" flying situations by improving:* *• monitoring of primary flight parameters;* *• identification and understanding of high angle of attack protection, in particular in a mixed flying situation (AP ON A/THR OFF).*

[20] RMT.0196 'Update of flight simulation training devices requirements' (http://www.easa.europa.eu/document-library/terms-of-reference-and-group-compositions/tor-rmt0196).

	Reference: Final Report on the incident on 20 July 2012 to the Airbus A321 registered F-GTAN, at Paris Charles de Gaulle (95) Airport, published by the BEA in February 2014.
Outcome the EASA safety assessment	The SR has been agreed and is (proposed to be) addressed through the activities specified above on the outcome of the assessment of SR 'FRAN-2012-039'.
FRAN-2016-007	*EASA reinforce the content of training programmes related to complex high performance single-pilot aeroplanes by integrating exercises on management of asymmetrical during final approaches.*
	Reference: Final Report on the accident on 28 October 2011 to the Piper PA31T registered OE-FKG, at Toulouse Blagnac Airport (31), published by the BEA in April 2016.
Outcome the EASA safety assessment	Based also on the comments received, EASA has decided to propose inclusion of this as a training exercise in Appendix 9.
INDO-2015-002	*The KNKT recommend expediting the implementation of mandatory for upset recovery training earlier than2019.*
	Reference: Report number KNKT.14.12.29.04 on the accident on 28 December 2014 to the Airbus A320 registered PK-AXC, at Karimata Strait Indonesia, between Surabaya-Juanda Airport (SUB/WARR), Indonesia and Singapore-Changi International Airport (SIN/WSSS), Singapore, published by the KNKT on 01 December 2015
Outcome the EASA safety assessment	The SR has been agreed and addressed through the new AMC to ORO.FC.220&230 in ED Decision 2015/012/R related to operator recurrent and conversion training, in force from 4 May 2016.
RUSF-2013-002	*IAC recommends EASA and other simulator certification authorities to consider the possibility to add into the simulator data-package the capability to simulate an unexpected or sudden aircraft stall at any stage of flight.*
	Reference: Final Report on results of investigation of accident on 02.04.2012 to ATR72-201 registered VP-BYZ, near Tyumen-Roschino International Airport, Russia, published by the Interstate Aviation Committee of the Accident Investigation Commission, Federal Aviation Authorities of Russia on 16 July 2013

Outcome the EASA safety assessment	EASA and the RMG would like to highlight that from a training perspective it is not possible to simulate 'unexpected' or 'sudden' stalls. Such dynamic stall simulations are not realistic and are likely lead to negative training and negative transfer of training. With reference to Section 2.3.4 of this Opinion, in relation to (type-specific) recovery from a stall, the assessment and comments received also indicated concerns over potential negative transfer of training when using an FFS. Nevertheless, this issue has been forwarded to RMT.0196 for further consideration.
SPAN-2011-020	*It is recommended that the European Aviation Safety Agency (EASA) establish requirements for flight simulators so as to allow simulator training to cover sustained takeoff stalls that reproduce situations that could exceed the flight envelope limits. (REC 20/11)*
	Reference: Report A-032/2008 - Accident involving a McDonnell Douglas DC-9-82 (MD-82) aircraft, registration EC-HFP, at Madrid-Barajas Airport, on 20 August 2008, published by the Spanish Accident Investigation Authority (CIAIAC) on 01 August 2011
Outcome the EASA safety assessment	EASA and the RMG would like to highlight that from a training perspective it is not possible to simulate 'sustained take-off' stalls. Such dynamic stall simulations are not realistic and are likely lead to negative training and negative transfer of training. With reference to Section 2.3.4 of this Opinion, in relation to (type-specific) recovery from a stall, the assessment and comments received also indicated concerns over potential negative transfer of training when using an FFS. Nevertheless, this issue has been forwarded to RMT.0196 for further consideration. An approach-to-stall in take-off configuration is mandated within an FFS. The procedure to recover from an approach to stall is the same as for stall (Part-FCL Appendix 9, Section B, Paragraph 6, Exercise 3.7).
MALI-2016-005	*The Commission d'Enquête sur les Accidents et Incidents d'Aviation Civile du Mali and the BEA recommend that the FAA and EASA require that these specific features of MD 80 type aeroplanes be taught during type rating and recurrent crew training.*
	Reference: Final Report on the accident involving a McDonnell Douglas DC-9-83 (MD-83) aircraft, registration EC-LTV, near Gossi (MALI), on 24 July 2014, published by the Ministere de l'equipement, des transports et du desenclavement, Commission d'enquete sur les accidents et incidents d'aviation civile, Republique du Mali, on 22 April 2016

Outcome the EASA safety assessment	EASA and the RMG consider that training on these MD 80 specific features should be part of the 'area of special emphasis' under the OSD, or alternatively, by the safety risk management system of the ATO or operator delivering type-specific training. Consequently, this recommendation is not addressed with this Opinion, which aims to cater for all types of aeroplanes.

2.5. Regulatory impact assessment (RIA)

2.5.1 Issues to be addressed

Safety issue

The safety analysis in NPA 2015-13, based on a worldwide analysis covering 10 years (2006–2015), concluded that 30 % of the fatal accidents worldwide in CAT operations with aeroplanes can be attributed to LOC-I. This Opinion provides an updated information for the EASA MS scope: over the period 2012–2016, 50 % of the total fatal accidents involving an EASA CAT aeroplane operator (2 out of 4) were attributed to LOC-I. For worldwide CAT aeroplane operations, this represents 25 % of the total number of fatal accidents in the same time frame (17 out of 67 fatal accidents).

The analysis of LOC-I between 2009 and 2014 on Commercial Air Transport — Fixed Wing showed that the most catastrophic scenarios are related to the encounter of icing conditions in flight and to the inadequate execution of go around during the final approach**.** Within these two scenarios, the most frequent contributor was the inadequate monitoring of equipment and instrument by the flight crew, followed by the non-adherence to or the lack of operator's policy (icing) and by the job-related distractions such as spatial disorientation, inadequate trimming of the horizontal stabiliser, and errors in flight mode management (go-around).

The analysis was done on 65 LOC-I occurrences worldwide. This is an average of 11 per annum; however, the true figure is likely to be higher as complete data was not available for 2013 and 2014.

The number of LOC-I accidents and serious incidents involving EASA MS operators each year is fairly consistent over the period considered. There are approximately 3 serious incidents and 1 accident annually.

The analysis showed as well that the top five safety issues[21] identified, having a direct contribution to the fatal outcome of a LOC-I occurrence, were the inadequate:

— functioning of management system and oversight;

— CRM[22], communication and decision-making;

— knowledge of aircraft system and associated procedures;

— Crew awareness; and

— management of adverse weather conditions.

[21] The analysis has particularised the list of safety issues compiled from safety recommendations in the context of LOC-I analysis. The top five safety issues are the ones contributing most frequently to LOC-I fatal accidents.

[22] Further reference on CRM: RMT.0411 (OPS.094) on 'Crew Resource Management (CRM) Training' started on 12 November 2012 and concluded with the publication of two ED Decisions in 2015. The task proposed to incorporate new items in the present applicable framework on CRM training. Such items are provisions for CRM trainers and examiners, competency-based CRM training, surprise and startle effects, single flight crew CRM training, overview of operators by the competent authority, etc. The changes are considered to establish a more practicable and more effective framework for CRM training. These changes will provide operators with more reliable tools to mitigate further CRM-related risks and hazards and, therefore, are expected to increase safety during all phases of flight.

Safety Recommendations

A detailed presentation of the SRs that were taken into consideration for this RMT, as well as the outcome of their assessment, can be found in Section 2.4.

European Plan for Aviation Safety (EPAS)

In addition, the importance of the safety issue is also emphasised in the EPAS through the following LOC-I-related action items:

— AER4.8 Response to upset conditions in order to prevent LOC-I;

— AER4.10 Response to unusual attitudes in order to prevent LOC-I; and

— AER4.16 Flight crew are not adequately trained to respond to loss of control.

EASA Annual Safety Review

LOC-I is also a recurring safety issue highlighted in the EASA annual safety reviews, emphasising further the importance of this issue.

Regulatory harmonisation issue

The safety issue is also acknowledged by ICAO and other international aviation regulatory bodies, such as the FAA. In 2014, ICAO published amendments to Annex 1 and 6 detailing SARPs related to LOCART. The amendments to ICAO Annex 1 mandate UPRT for MPL and multi-pilot aeroplane type rating training courses, and recommend UPRT in an aeroplane for CPL training courses. In addition, the amendments to ICAO Annex 6 contain requirements on UPRT programmes for CAT operators using aeroplanes. The ICAO Doc 9868 'Procedures for Air Navigation Services — Training (PANS-TRG)' also includes UPRT provisions for MPL, CPL, initial multi-pilot type rating, recurrent, as well as instructor and inspector qualifications. In addition, ICAO published Doc 10011 'Manual on Aeroplane Upset Prevention and Recovery Training' which contains further Guidance Material.

In 2013, the FAA published Code of Federal Regulations (CFR) 121.423 'Pilot: Extended Envelope Training' and Advisory Circular (AC) 120-109 'Stall and Stick Pusher training', and in 2015 the AC 120-111 'Upset Prevention and Recovery Training'.

2.5.1.1 Safety risk assessment

Globally, there is a rate of 1 fatal accident per year as a result of LOC-I and there is a substantial number of SRs as well as EASA analyses indicating the existence of significant safety risks related to LOC-I. The safety risks that have been identified by the LOCART and ICATEE WGs, and have been confirmed by the RMG experts, are the following:

— Existing licensing training requirements do not provide:

  - adequate in-depth theoretical knowledge instruction to ensure awareness/recognition of developing or developed upsets, and to ensure knowledge of appropriate strategies to return an aeroplane to safe flight; and
  - adequate in-depth flight training aimed at providing pilots with all the necessary skills to prevent an upset from developing or to recover from developed upsets.

— Existing initial type rating training courses do not provide:

- adequate in-depth type-specific theoretical knowledge instruction needed to ensure that pilots are aware of/recognise developing or developed upsets and to ensure knowledge of appropriate strategies to return an aeroplane to safe flight; and
- adequate in-depth FSTD flight training aimed at providing pilots with all the necessary skills to prevent an upset from developing or to recover from developed upsets.

Therefore, the probability of occurrence is assessed as 'improbable' and the severity of occurrence as 'catastrophic'.

Table 1: Safety risk matrix

Probability of occurrence		**Severity of occurrence**				
		Negligible	**Minor**	**Major**	**Hazardous**	**Catastrophic**
		0.5	2	3	5	8
Extremely improbable	1					
Improbable	2					**16**
Remote	3					
Occasional	4					
Frequent	5					

As regards the GA, according to the EASA safety assessment, there are 1 067 fatal accidents and 8 047 non-fatal accidents linked to LOC-I (2007–2016). Out of these accidents:

— 50 % (534) of the fatal accidents; and

— 24 % (1 931) of the non-fatal accidents

resulted in aircraft upset in flight.

There are 28 fatal accidents where human factors have been directly identified in the last five years and could be mitigated with further training. When looking at the operational safety issues there are 171 fatal accidents in the last five years that could be mitigated with further training. Thereof are 87 directly linked to Aircraft upset and 29 to various aircraft handling issues including Handling of Technical Failures, Approach Path Management and Control of Manual Flight Path.

The most recurrent issues that should be addressed by UPRT for the GA according to the area and ranged by number of fatal accidents are:

Operational issues

(1) intentional low flying;

(2) flight planning and preparation;

(3) handling of technical failures;

(4) turbulence;

(5) approach path management;

(6) control of manual flight path;

(7) crosswind;

(8) baggage and cargo loading; and

(9) icing on ground.

Human issues

(1) perception and situational awareness;

(2) decision-making and planning;

(3) experience, training and competence of individuals;

(4) human performance;

(5) personal pressure and arousal;

(6) CRM and operational communication;

(7) navigation; and

(8) knowledge of aircraft systems and procedures.

2.5.1.2 Who is affected?

This proposal will affect pilots, instructors, examiners, ATOs, operators and competent authorities.

2.5.1.3 How could the issue/problem evolve?

If no action is taken, the high risk of LOC-I events will remain as also highlighted in EPAS and the EASA Annual Safety Review. Furthermore, the aforementioned SRs addressed to EASA will not be dealt with. Moreover, the EU aviation regulations will not be harmonised with the ICAO SARPs and aligned with other aviation authorities' regulations, such as those of the FAA.

2.5.2 Objectives

Refer to Section 2.2.

2.5.3 Overview of the comments received in the public consultation phase on the RIA

The stakeholders welcomed the introduction of UPRT. There were no comments as regards the policy options. The major comments related to underestimated impacts of policy Option 2 on the GA community. The stakeholders argued that the introduction of the UPRT for LAPL(A) and PPL(A) would create a substantial administrative burden and considerable additional cost which would be faced by

many registered facilities (RFs)/ATOs. Therefore, the RIA was revised to review the impact on the GA community.

2.5.4 Policy options

Table 2 shows the options against the SRs.

Table 2: Selected policy options

	Option 1			**Option 2 (= Option 1 + LAPL(A), PPL(A))**	
Objectives	**CPL(A) and ATP (A) training courses**	**MPL training courses**	**Single-pilot aeroplanes operated in multi-pilot operation, single-pilot high-performance complex aeroplanes and multi-pilot type rating courses**	**LAPL(A)**	**PPL(A)**
To ensure adequate transposition of the ICAO amendments into the European Union requirements including:					
— UPRT in an aeroplane for CPL and MPL and FSTD UPRT for type rating training.	— TK LOs and examination of upset prevention and recovery are included in RMT.0595. — Basic UPRT elements integrated into existing flight training. — Advanced UPRT course in an aeroplane mandated for the ATP and MPL training courses, and is optional for CPL(A) training courses.		— Class- or type-specific UPRT integrated into respective class and type rating courses. — The advanced UPRT course in an aeroplane is a prerequisite for the respective type rating courses.	N/A	
— Requirements for flight and FSTD instructors.	— Existing flight instructors have the privileges to deliver basic UPRT elements. — ATOs will need to ensure instructor standardisation in the context of delivering basic UPRT. — New instructor privilege in case of delivering the advanced UPRT course in an aeroplane.		— Existing CRIs/TRIs/SFIs have the privilege to deliver class- or type-specific UPRT. — ATO will need to ensure instructor standardisation in the context of delivering basic UPRT.	— Existing flight instructors have the privileges to deliver basic UPRT elements. — ATOs will need to ensure instructor standardisation in the context of delivering basic UPRT.	
To consider whether type rating and/or operator training programmes should consist of theoretical and practical training that includes:					
Training in flight mechanics.	Aerodynamics TK and flight training.	Aerodynamics TK and flight training.	Class- or type-specific UPRT including emphasis on type-specific aerodynamics.	N/A	
Training in all applicable flight control laws of the aeroplane type and the operational consequences resulting from law degradations.	N/A	N/A	If applicable, class- or type-specific UPRT including emphasis on mode degradations and immediate handling of operational consequences.	N/A	
Training in all the relevant specificities of the specific aeroplane type.	N/A	N/A	Class- or type-specific UPRT including emphasis on type-specific aerodynamics.	N/A	
Recovery exercises from (impending) stall situations during the take-off and the approach phase.	N/A	N/A	The RMG experts indicated that stall events during the take-off phase are difficult, if not impossible, to develop. A stall event during take-off in the clean configuration is unrealistic, and would lead to negative training. Consequently, stall events in the take-off, approach and cruise configuration are proposed.	N/A	

Manual aeroplane handling exercises and techniques during stall prevention and stall recovery scenarios including exercises at high altitude.	N/A	N/A	Class- or type-specific UPRT	N/A
Realistic training scenarios that contain startle/surprise effects.	The startle and surprise effects are likely to be experienced by pilots undergoing the recovery training in an aeroplane.		Class- or type-specific UPRT including training scenarios that attempt to expose students to the startle/surprise effect.	N/A
More emphasis on manual aeroplane handling skills and, for initial type rating training, a requirement to conduct a go-around in the aeroplane with all engines operating.	N/A	N/A	Class- or type-specific UPRT with increased emphasis on manual handling exercises. During the flight training, a go-around is mandated with all engines operating with the intent to expose pilots to somatogravic illusion.	N/A
Training on the conduct of a go-around at low speed with pitch trim in an unusual nose-up position, and a consideration for including this exercise in the skill test or proficiency check.	N/A	N/A	EASA and the RMG experts do not believe that this exercise should be checked. Only training-to-proficiency should be conducted. This exercise is conducted as a stall event during the approach in the landing configuration.	N/A
More emphasis on the potential degradation of situational awareness (basic pilot skills) and flight path management due to the increased flight crew reliance on aircraft automation.	N/A	N/A	Class- or type-specific UPRT with increased emphasis on flight path management and manual handling skills whilst using threat and error management (TEM) and CRM.	N/A
For the PPL(A) flight instruction syllabus, clarification of the intent using practical exercise examples of exercise 11 'Spin Avoidance' training, and a consideration for mandating these sample exercises for inclusion in the training programme.	N/A	N/A	N/A	To be further considered by the dedicated GA task force when updating the AMC/GM related to the LAPL and PPL training syllabi.
To assess whether UPRT provisions should be extended to other licences, and to develop additional requirements accordingly.	ATP(A) and CPL(A) training course to include UPRT TK and upset prevention flight instruction. In addition, ATP(A) training course requires upset recovery training in an aeroplane. Upset recovery training is optional for CPL(A)	N/A	N/A	The RMG group experts believe that focus on upset prevention at an early stage will benefit a pilot later in life. EASA, based on the safety risk assessment, identified the need to also introduce further LOC-I mitigating measures in the LAPL and PPL syllabi. This will be done by a dedicated GA task force which will update the relevant AMC/GM on the LAPL and the PPL training syllabi. However, the advanced UPRT course in accordance with FCL.745.A is optional for PPL(A) (or LAPL(A)) and will be credited towards the ATP(A) training course.

	training course graduates.			
To ensure that inspectors of competent authorities are able to perform adequate oversight of UPRT including the aeroplane and FFS upset recovery training exercises.	Guidance Material developed by EASA to ensure that inspectors have knowledge and understanding of UPRT in an aeroplane, in particular the upset recovery training.		Guidance Material developed by EASA to ensure that inspectors have knowledge and understanding of UPRT in an FSTD, in particular the upset recovery training. **Note:** Also similar Guidance Material included for flight operations inspectors.	N/A

2.5.5 Methodology and data

2.5.5.1 Applied methodology

The methodology applied for this RIA in order to assess the impacts is the multi-criteria analysis (MCA), which allows comparing all options by scoring them against a set of criteria.

MCA covers a wide range of techniques that aim to combine a range of positive and negative impacts into a single framework to allow easier comparison of the scenarios. Essentially, it applies cost–benefit thinking to cases where there is a need to present impacts that are a mixture of qualitative, quantitative and monetary data, and where there are varying degrees of certainty. The MCA key steps generally include the following:

— establishing the criteria to be used to compare the options (these criteria must be measurable, at least in qualitative terms);

— attributing weight to each criterion to reflect its relative importance to the decision;

— scoring how well each option meets the criteria; the scoring needs to be relative to the baseline scenario;

— ranking the options by combining their respective weights and scores; and

— performing sensitivity analysis on the scoring to test the robustness of the ranking.

The criteria used to compare the options were derived from the Basic Regulation and the guidelines for Regulatory Impact Assessment developed by the European Commission. The principal objective of EASA is to 'establish and maintain a high uniform level of safety' (Article 2(1) of the Basic Regulation). As additional objectives, the Basic Regulation identifies environmental, economic, proportionality and harmonisation aspects which are reflected below (apart from environmental aspects which are not relevant for this RIA).

The scoring of the impacts uses a simple scale with '+' and '–' to indicate the positive and negative impacts. This was found to be a proportionate way to assess the impacts, instead of analysing impacts with a scale from, e.g., – 5 to + 5 (very negative to very positive). As shown in detail in **Table 3** the scoring of the impacts uses a scale of – 5 to + 5 to indicate the negative and positive impacts of each option (i.e. from 'very low' to 'very high' negative/positive impacts). Intermediate levels of benefits are termed 'low, 'medium' and 'high' to provide for a total of five levels in each one of the negative and positive directions, with also a 'no impact' score possible.

Table 3: Scale with scoring of the impacts

Negative impact	Score	Positive impact	Score
-5	Very high negative impact	+5	Very high positive impact
-4	High negative impact	+4	High positive impact
-3	Medium negative impact	+3	Medium positive impact
-2	Low negative impact	+2	Low positive impact

-1	Very low negative impact	+1	Very low positive impact
0	Neutral/Insignificant		

2.5.5.2 Data collection

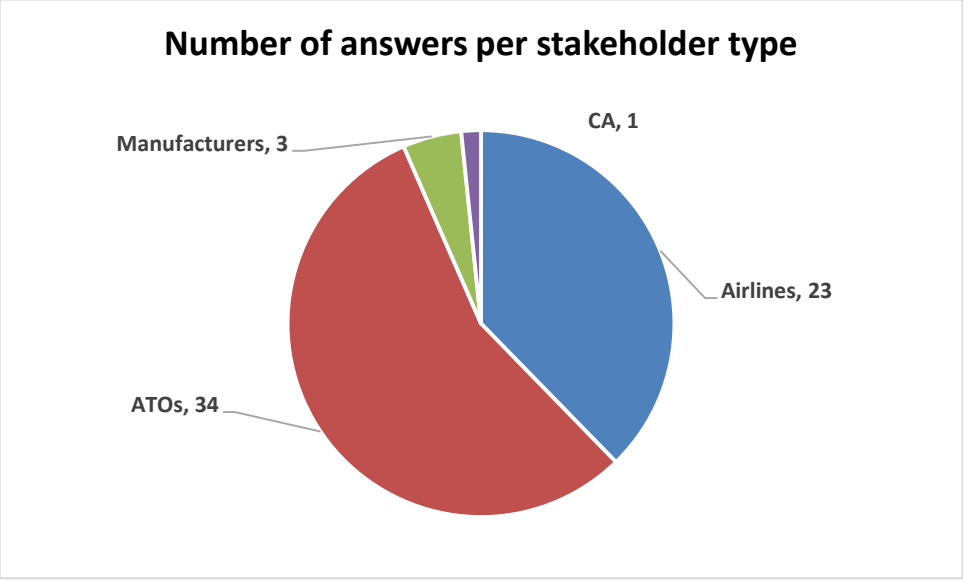
The data requested for the analysis is based on expert judgement and estimates gathered through a survey addressed to stakeholders.

Expert judgement

The RMG consisted of 15 members, including the (co-)chairs of the ICATEE and LOCART WGs, with a variety of expertise in initial licensing and type rating training courses, as well as operator training. In addition, the RMG meetings included experts from the original equipment manufacturers and competent authorities, and were observed by the FAA and several EASA experts. All members contributed actively by providing the necessary expertise.

RMT.0581: UPRT survey

The survey was published on 26 January 2015 for a period of 2,5 months, and expired on 17 April 2015. It was addressed to the Rulemaking Advisory Group (RAG) and to the Flight Crew Licensing & Air Operations (FCL&OPS) Thematic Advisory Group (TAG) members and observers. A total of 61 responses were received from operators, competent authorities and pilot unions (including third-country parties).



The feedback received provided limited data; it gave, however, some insight into the current developments in relation to the extent of implementation of UPRT based on the ICAO SARPs.

10 % of the ATOs which have answered have already developed UPRT on a voluntary basis. 65 % of the ATOs not having developed UPRT are not yet in the process of developing UPRT elements.

2.5.6 Analysis of impacts

2.5.6.1 Safety impact

Option 0	The high risk of LOC-I events/occurrences remains.	
Option 1	**CPL(A) and ATP(A) training courses**	The safety level is expected to increase by improving existing training standards for the CPL(A) and ATP(A) training courses, based on the ICAO SARPs and on the ICATEE and LOCART WG recommendations.
	MPL training courses	The safety level is expected to increase by improving existing training standards for the MPL training courses, based on the ICAO SARPs and on the ICATEE and LOCART WG recommendations. It should be highlighted that upset recovery training was already mandated for the MPL; however, the additional UPRT requirements and harmonisation with the future CPL(A) and ATP(A) training course requirements are foreseen to increase the safety level.
	Training courses for type ratings for single-pilot aeroplanes operated in multi-pilot operation, single-pilot high-performance complex aeroplanes and multi-pilot aeroplanes	The safety level is expected to increase by improving existing training standards for said type rating training course, based on the ICAO SARPs and on the ICATEE and LOCART WG recommendations.
	Instructors	The safety level is expected to increase by improving existing standards for flight instructors and FSTD instructors delivering said type rating training courses, based on the ICAO SARPs and on the ICATEE and LOCART WG recommendations.
	CA inspectors	Enhanced knowledge and understanding should contribute to an increased safety level through better oversight.
Option 2 **(= Option 1 + LAPL(A), PPL(A) training courses)**	**LAPL(A) and PPL(A) training courses**	The safety level is expected to further increase by improving existing training standards, mainly focused on upset prevention, for the LAPL(A) and PPL(A) training courses, based on the GA task force recommendations.

According to the EASA safety analysis, the potential safety benefit brought by Option 1 could lead to a reduction of the current safety issues by approximately 40 %, as the task is dealing with training covering several aspects, affecting many stakeholders and therefore concerning several safety issues.

Assuming that 40 %[23] of the safety issues leading to accidents could be mitigated with Option 1, the final outcome might lead to a reduction of up to:

— 40 % of the 11 fatal accidents registered (4 fatal accidents);

— 40 % of the 86 non-fatal accidents registered (34 non-fatal accidents); and

— 40 % of the 201 serious incidents registered (80 serious incidents).

As regards Option 2, EASA and the RMG experts believe that the safety level will markedly increase by the proposed amendments in Option 2. The amendments are based on the ICAO SARPs and on the ICATEE and LOCART WG recommendations. Moreover, EASA decided to also revise the AMC/GM containing the training syllabi for the LAPL(A) and the PPL(A), based on the recommendations of a dedicated GA task force, as explained in Section 2.3.1.

In terms of human factors, according to the EASA safety analysis, the potential safety benefit brought by Option 2 could contribute to mitigating 28 fatal accidents. As regards operational safety issues, 87 fatal accidents directly linked to aircraft upset were identified.

Option 2 is, therefore, considered the most appropriate one as it further improves safety both for commercial and non-commercial GA pilots. Furthermore, It will improve the existing training standards for the LAPL(A), the PPL(A), the CPL(A), the ATP(A), the MPL, single-pilot class and type ratings used in multi-pilot operations, single pilot high-performance complex aeroplane and multi-pilot aeroplane type rating training courses, and for the respective instructors.

The safety impact is assessed as follows:

Type of impact	**Option 0**	**Option 1**	**Option 2**
	No policy change	**Commercial pilots**	**Option 1 + GA pilots**
Safety impact	Safety risks remain unchange.	Positive safety benefits due to the improved existing training standards which may contribute to mitigating 4 fatal accidents, 34 non-fatal accidents and 80 serious incidents	Further increased by improving existing training standards, which may contribute to mitigating 28 fatal accidents related to human factors and 87 fatal accidents related to operational safety issues.
	-2	+1	+2

2.5.6.2 Social impact

Option 0	No impact

[23] According to experts' judgement.

Option 1	**CPL(A) and ATP(A) training courses**	Mandated only for the ATP(A) training course, advanced UPRT in an aeroplane is believed to provide a majority of student pilots with increased resilience against the psychological and physiological effects often associated with dynamic aeroplane upset conditions.
	MPL training courses	Negligible impact as UPRT in an aeroplane was already partially mandated for the MPL.
	Training courses for type ratings for single-pilot aeroplanes operated in multi-pilot operation, single-pilot high-performance complex aeroplanes and multi-pilot aeroplanes	The advanced UPRT course in an aeroplane is a prerequisite for the type rating concerned. Therefore, PPL(A) holders and CPL(A) training course graduates will have to complete this training prior to commencing the said type rating. As mentioned already, advanced UPRT is believed to provide a majority of student pilots with increased resilience against the psychological and physiological effects often associated with aeroplane upset conditions.
	Instructors	The instructors' scope of competence will increase for a small percentage of existing instructors with the newly introduced advanced UPRT course in an aeroplane. A positive side effect is an increased interest for the instructors themselves and a higher appeal for potential new instructors.
	CA inspectors	No impact.
Option 2 **(= Option 1 + LAPL(A), PPL(A) training courses)**	**LAPL(A) and PPL(A) training courses**	No further impact, apart from those identified in Option 1

The requirement in FCL.745.A for the advanced UPRT course in an aeroplane, which includes potential manoeuvres with more than 90 degrees bank is believed to provide student pilots with increased resilience against the psychological and physiological effects often associated with aeroplane upset conditions, thereby enabling pilots to better apply effective strategies and standard operating procedures (SOPs) to recover from actual developed upsets. Hence, the overall social impact in both Options 1 and 2 is positive.

The table below summarises the social impact per option:

Type of impact	**Option 0**	**Option 1**	**Option 2**
	No policy change	**Commercial pilots**	**Option 1 + GA pilots**
Social impact	No impact	Increased resilience of the pilots and improvement of their competency	Same as Option 1

Type of impact	Option 0	Option 1	Option 2
	No policy change	**Commercial pilots**	**Option 1 + GA pilots**
	0	+2	+2

2.5.6.3 Economic impact

Implementation costs

Table 4 — Unit cost and assumption per option item

Option 0	No impact	
Option 1	**CPL(A) and ATP(A) training courses**	— Additional TK training and examination cost estimated at EUR 750 per student pilot due to the introduction of additional UPRT TK LOs. — Minimal additional training cost related to the integration of basic UPRT elements into the practical flight training. — ATP(A) training course only, additional flight training cost related to the advanced UPRT in an aeroplane estimated at EUR 3 500 per student pilot (this includes also aerobatic category aeroplanes directly purchased by the ATO or subcontracting this activity to a third party by the ATO, as appropriate).
	MPL training courses	— Additional TK training and examination cost estimated at EUR 750 per student pilot due to the introduction of additional UPRT TK LOs. — Minimal additional training cost related to the integration of basic UPRT elements into the practical flight training. **Note:** the advanced UPRT in an aeroplane was already mandated for the MPL, therefore the impact is likely to be minimal.
	Training courses for type ratings for single-pilot aeroplanes operated in multi-pilot operation, single-pilot high-performance complex aeroplanes and multi-pilot aeroplanes	— ATOs providing type rating courses will have to amend their training syllabi to include the class/type specific UPRT provisions and to ensure that their instructors are adequately trained. The foreseen changes are accommodated through the usual update process of training courses. ATOs are also free to integrate more than one prevention element into a single training session. — Additional TK and flight training cost estimated at EUR 1 500 per student pilot due to the introduction of UPRT. (EUR 1 000 for additional FFS session + additional EUR 350 TK training cost + EUR 150 for one-day extra accommodation = EUR 1 500)
	Instructors	— Training costs for existing instructors are estimated to represent 1 day per instructor at an approximate one-off cost of EUR 500 per instructor. — Only an estimated subset of 10 % of these instructors will be required to undergo the regulatory additional instructor training in an

		aeroplane to gain the privilege to deliver the advanced UPRT course for ATP(A) training course students. It is anticipated to last 1–2 weeks, and is likely to involve ground and flight training in an aerobatic category aeroplane at an estimated one-off cost of EUR 4 000 per instructor. — The additional FSTD instructor training provided by the ATO, based on the ATO procedures (OM-D), may take several days and is likely to involve ground and flight training in an FFS at an estimated one-off total cost of EUR 2 500 per FSTD instructor. There are approximately 50 000 flight crew members in the EU[24] and it is roughly estimated that there are 10 active[25] FSTD instructors for every 100 flight crew members, which makes a total of 5 000 active FSTD instructors.
	CA inspectors	One-off additional training cost of maximum EUR 2 500 related to developing inspectors' knowledge and understanding of UPRT.
Option 2 **(= Option 1 + LAPL(A), PPL(A) training courses)**	**LAPL(A) and PPL(A) training courses**	Additional training cost of EUR 200 related to TK training and to the integration of mainly upset prevention elements into the practical flight training. Additional administrative costs for training providers (RFs/ATOs) to comply with the UPRT requirements are considered negligible, because the existing training exercises already include UPRT elements. Any further amendments to the course syllabi, as recommended by the dedicated GA task force, are unlikely to lead to fundamental changes to the course structure, especially regarding the course duration. This may result in some additional cost. These costs are to be further analysed with the publication of the associated ED Decision in due course.

[24] Source: 'Study on the effects of the implementation of the EU aviation common market on employment and working conditions in the Air Transport Sector over the period 1997/2010', Table 4.5.

[25] 'Active' means instructors providing FSTD training on behalf of an operator.

Table 5 — Basic data and assumption on number of pilots and instructors for aeroplane in the EASA Member States

Item	*Estimates for 2014*	
Pilots licences		
MPL	500	The average annual number of new MLP students in the EASA Member States for the next years is also 500
ATPL(A)	70 000	
CPL(A)	40 000	
ATPL(A) + CPL(A)	110 000	
PPL(A)	100 000	
Instructors		
Total number of instructors	20 000	Reasoning: there are about 12 000 flight examiners in the EASA Member States => it is assumed that the number of instructors is almost 2 times more.
Total number of new instructors able to provide recovery training for ATP(A) training	200	
CAs		
Total number of CA staff	7 000	
OPS inspectors	350	5 % of CA staff

The figures in Table 5 form the basis of Table 6 below.

Table 6 — Total implementation cost impact per option item
On the basis of a 10-year appraisal period

Cost Item	Cost impact per option		Assumption	Estimated number of persons subject to this option item per year	Unit cost	Type of cost (one-off/ recurrent)	Total annual costs	Potential maximum implementation cost for 10 years	Comments on the potential maximum cost impacts
	Cost impact per option item								
1	Option 1: CPL(A) training courses	*1.0 %*	*Estimated number of CPL(A) students per year in the next year for the EASA Member States*	1 100	750	Recurrent	825 000	8 250 000	30 % of ATOs have already implemented or started to implement UPRT; in that case, the cost impact should be lower than estimated.
2	Option 1: ATP(A) training course	*2.0 %*	*Estimated number of ATP(A) students per year in the next year for the EASA Member States. Pilot career lasts approximately 30 years, i.e. 2 % per year of new pilots to renew the current number of pilots*	2 200	4 250	Recurrent	9 350 000	93 500 000	30 % of ATOs have already implemented or started to implement UPRT; in that case, the cost impact should be lower than estimated.
3	Option 1: MPL training courses	*500*	*Estimated number of MPL students per year in the next year for the EASA Member States*	500	750	Recurrent	375 000	3 750 000	These cost impacts are likely to be already included in the current training

									programmes
4	Option 1: Single-pilot class/type ratings used in in multi-pilot operations, single-pilot high-performance complex aeroplanes used and multi-pilot aeroplane type rating training courses	*50 %*	*It is estimated that 50 % of the annual CPL and ATPL pilots would follow TR courses*	1 650	1 500	Recurrent	2 475 000	24 750 000	30 % of ATOs have already implemented or started to implement UPRT; in that case, the cost impact should be lower than estimated.
5	Option 1: Training cost for current instructors		*See table above for number of instructors*	20 000	500	One-off	*Not applicable*	10 000 000	
6	Option 1: New instructors able to provide recovery training in an aeroplane for the ATP (A) training course		*See table above for number of **new** instructors*	2 00	4 000	One-off	*Not applicable*	800 000	This cost occurs in the transition time to allow instructors to be trained before they have to train pilots.
7	Option 1: FSTD instructors	*10*	*10 active FSTD instructors for every 100 flight crew members (EASA Decision 2015/012/R)* *Scope: ATPL + CPL*	11 000	2 500	One-off	*Not applicable*	27 500 000	Some FSTD instructors are already currently trained thanks to ED Decision 2015/012/R. Therefore, this is a potential maximum cost impact.
8	Option 1: Inspectors & CAs for OPS	*5 %*	*Estimated share of OPS inspectors in CAs*	350	2 500	Recurrent	*Not applicable*	875 000	

9	Option 2: LAPL(A), PPL(A)	*2.5 %*	*PPL lasts approximately 40 years, i.e. 2.5 % per year of new pilot to renew the current number of pilots*	2 500	200	Recurrent	500 000	5 000 000
	Total cost per option over 10 years							
	Total cost: Option 1							169 425 000
	Total cost: Option 2							174 425 000

With the introduction of UPRT in the various courses, the economic impact of Option 1 is expected to be in the order of magnitude of EUR 169 million over 10 years, i.e. EUR 16,9 million per year. With the introduction of UPRT in the various courses, the economic impact of Option 2 is expected to be in the order of magnitude of EUR 174 million over 10 years, i.e. EUR 17,4 million per year.

In order to assess the impact of these costs, the overall impact of each option is compared to the baseline costs, e.g. how much would a pilot/operator pay in addition due to the introduction of the UPRT. The comparison below is made on the basis of the **additional unit cost** for UPRT in Option 1 and Option 2 considering the baseline costs.

Baseline costs

The costs for acquiring CPL(A), ATPL(A) and MPL and type rating are estimated to be EUR 120 000 (one-off cost and recurrent cost for revalidation of type rating)[26]. The costs would be borne by both pilots and operators. It is assumed that pilots are always funding themselves for acquiring the licence (the unit cost is EUR 80 000[27]) and in 90 % of the cases for acquiring type rating (e.g. 90 % of unit cost EUR 40 000 which is equivalent to EUR 36 000). In the other 10 % of the cases (e.g. 10 % of unit cost EUR 40 000 which is equivalent to EUR 4 000), the operators are funding the costs for acquiring the type rating. Therefore, the baseline costs are split (Table 5a). These costs are spread over a period of less than 2 years (minimum 18 months for licence and 2 months for type rating).

Table 6a — Baseline unit costs for pilots to acquire CPL(A), ATPL(A) and MPL and type rating and for operators to revalidate the type rating

	Unit costs for pilots (EUR)	Unit cost for operators (EUR)	Total unit cost pilots &operator
Baseline unit costs for CPL(A); ATPL(A); and MPL and type rating	116 000 (80 000 licence + 90 % of the type rating)	4 000 (10 % of the type rating cost)	120 000

As regards acquiring PPL and type rating, the costs are estimated as EUR 30 000, whereas around EUR 10 000 is the PPL and EUR 20 000 is type rating[28]. These costs are borne entirely by the pilots. The costs for acquiring the PPL and the type rating are spread over a 5-month period[29] (3 months for the licence and 2 months for the type rating).

[26] ATO data 2016
[27] ATO data 2016 for CPL(A); ATPL(A) and MPL
[28] ATO data 2016 for PPL. As regards type rating, the amount is taken as average to reflect the variety of the type rating courses and costs.
[29] ATO data 2016

Table 6b — Baseline unit costs for pilots to acquire LAPL(A), PPL(A) and type rating

	Unit costs for pilots (EUR)
Baseline unit costs for LAPL(A), PPL(A) and type rating	30 000 (10 000 licence + 20 000 type rating)

The baseline costs for Option 1 and Option 2 are accordingly:

Table 6c — Baseline unit costs for Option 1 and Option 2

	Unit costs for pilots (EUR)	Unit cost for operators (EUR)	Total baseline unit costs
Baseline unit costs — Option 1	116 000	4 000	120 000
Baseline unit costs — Option 2	146 000	n/a	146 000

It is considered that the costs for Option 1 and Option 2 are spread over in a period of 2 years in total.

Overall impact of Option 1 (comparison between unit costs for Option 1 and baseline costs)

Regarding Option 1, the additional unit cost for UPRT is estimated at **EUR 5 583** per licence and type rating training (see Table 5d). The costs would be borne by both pilots and operators.

The costs for pilots are as follows:

— One-off training cost for current and new instructors to provide advanced UPRT in an aeroplane for the ATP(A) training course (***cost items Nos 5 and 6 of Table 5***). It is assumed that 1 instructor trains 12 pilots. The total cost for training current and new instructors is EUR 4 500 (sum of cost items Nos 5 and 6 of Table 5). This amount is divided by 12 pilots to get the unit cost per pilot (EUR 4 500/12 pilots = EUR 375 per pilot)

— Recurrent cost for UPRT as part of the ATPL, MPL, CPL (***cost item No 2 of Table 5).*** In compliance with the provisional data, it is estimated that this cost is EUR 4 250[30] per pilot for a 2-year period.

— Recurrent cost for single-pilot class/type ratings used in in multi-pilot operations, single-pilot high-performance complex aeroplanes and multi-pilot aeroplane type rating training courses (***cost item No 4 of Table 5***). In compliance with the provisional data, it is estimated that this cost is EUR 1 500 per course. It is assumed that in every course there are 2 students and the cost per pilot is EUR 750 (EUR 1 500/2 pilots = EUR 750 per pilot). However, 90 % of this amount will be covered by the pilots and 10 % by operators, following the assumption above. Therefore, the cost for the pilot is (750*90 % = EUR 675 per pilot).

[30] The cost for ATPL covers the MPL and CPL cost.

Summing up, the total cost for pilots is EUR 375 as an one-off cost and EUR 4 925 as a recurrent cost (spread in a 2-year period). These costs are considered maximum, because 30 % of ATOs have probably already implemented or started to implement UPRT[31].

The costs for operators are as follows:

— One-off training cost for FSTD instructors (cost item No 7 of Table 5). It is assumed that 1 FSTD instructor trains 12 pilots. The total cost for training FSTD instructors (as per Table 5) is EUR 2 500. This amount is divided by 12 pilots to get the unit cost per pilot (EUR 2 500/12 pilots = EUR 208 per pilot).

— Recurrent cost for single-pilot class/type ratings used in multi-pilot operations, single pilot high-performance complex aeroplanes and multi-pilot aeroplane type rating training courses: In compliance with the data above, 10 % of this amount will be covered by operators. Therefore, the cost is 750*10 % = EUR 75 per pilot.

The total cost that the operator needs to pay is EUR 208 as an one-off cost and EUR 75 as a recurrent cost. This is a potential maximum cost impact, because some FSTD instructors have already been trained following the issuance of ED Decision 2015/012/R.

Table 6d — Costs for UPRT for Option 1 for pilots/operators

Type of costs	Unit costs for pilots (EUR)	Unit cost for operators (EUR)	Total unit cost for pilots and operators
Capital (one-off) costs (costs for instructors to train pilots) [32]	375	208	583
Recurrent costs for ATPL (cost only for pilots for a 2-year period)	4 250		4 250
Recurrent costs for type rating (costs for pilots and operators)	675	75	750
Total unit costs for UPRT for Option 1	**5 300**	**283**	**5 583**

Overall impact of Option 2 (comparison between unit costs for Option 2 and baseline costs)

Regarding Option 2, the additional unit cost for UPRT for GA pilots is estimated at EUR 200 (***cost item No 9 of Table 5)*** for LAPL(A), PPL(A) and type rating training (see Table 5e). These costs will be spread over a 5-month period (3 months for the licence and 2 months for the type rating).

Table 6e — Costs for UPRT for Option 2 for GA pilots

Type of costs	Unit costs for pilots (EUR)	Unit cost for operators (EUR)	Total unit cost for pilots and operators
Recurrent costs for UPRT for LAPL(A), PPL(A) (costs only for pilots)	200	n/a	200

[31] Based on the survey results
[32] 1 instructor trains 12 pilots.

The total additional unit costs for Option 2 (Option 1 + LAPL(A), PPL(A)) are estimated to be **EUR 5 783** in total (see Table 5f**).** The additional recurrent costs will spread over a 2-year period.

Table 6f — Costs for UPRT for Option 2 for pilots/operators

Costs	Unit costs for pilots (EUR)	Unit cost for operators (EUR)	Total unit cost for pilots and operators
Option 1 total unit costs for UPRT	**5 300**	**283**	**5 583**
Recurrent costs for LAPL(A), PPL(A) (costs only for pilots)	200	n/a	200
Option 2 total unit costs for UPRT	**5 500**	**283**	**5 783**

Apart from these costs, as mentioned in the economic impact, there are additional administrative costs for the training providers (RFs and ATOs) to comply with the UPRT requirements which are not quantified. Said additional costs are considered significant, according to the GA community assessment, thus imposing an additional burden on them[33].

Non-quantifiable costs/benefits

In addition, it should be highlighted that the insurance cost for operators may be reduced as a consequence of pilots being better trained to cope with developing and developed upsets. This is not estimated in this economic impact section due to lack of information.

Moreover, the administrative costs for the GA pilots to comply with the UPRT requirements are not quantified, but assessed in qualitative terms.

Conclusion

Comparing the unit costs for UPRT for Option 1 and Option 2 with regard to the baseline costs (Table 5g), we conclude that there is a slight advantage for **Option 2**. Overall, there is a **medium negative economic impact for the CAT pilots** (Table 5g) and a **minor negative economic impact for the operators (EUR 283 per operator)** which will be negligible compared to the operator's turnover. In regard to GA pilots, a dedicated GA task force will further consider the introduction of mitigating measures within the LAPL and PPL training syllabi on request of EASA, which may lead to additional economic cost. These costs are to be further analysed with the publication of the associated ED Decision in due course.

[33] Stakeholder feedback on NPA 2015-13

Table 6g — Overall impact of Option 1 as regards the baseline costs for CAT pilots

Costs	Unit costs for pilots (EUR)
Baseline unit costs for Option 1	**116 000**
Unit costs for UPRT for Option 1	**5 300**
Overall impact of Option 1 (unit costs for Option 1/baseline costs)	**4.57 %**

Table 6j — Overall impact of UPRT as regards the baseline costs for GA pilots[34]

Costs	Unit costs for pilots (EUR)
Baseline unit costs for LAPL(A), PPL(A) and type rating	30 000
Recurrent costs for UPRT for LAPL(A), PPL(A) (costs only for pilots)	200
Overall impact of UPRT for GA pilots	**0.67 %**

The table below summarises the economic impact per option:

Type of impact	Option 0	Option 1	Option 2
	No policy change	**Commercial pilots**	**Option 1 + GA pilots**
Economic impact	No impact	**Total costs: circa EUR 16.9 million per year/a total cost of EUR 169 million for the 10-year** period for the implementation of Option 1 **Leading to a 4.5 % increase in the costs** for the UPRT implementation at the expense of pilots intending to operate commercially (spread over 2 years' time); minor negative for operators	**Total costs: circa EUR 17.4 million per year/a total cost of EUR 174 million for the 10-year** period for the implementation of Option 2 **Leading to a 0.7 % increase in the costs for the** UPRT implementation at the expense of GA pilots (spread over 2 years' time); minor negative for operators; administrative burden for GA not quantified
	0	-3	-3

[34] These figures are indicative only and are subject to change based on the outcome of the GA Task force recommendations.

2.5.6.4 General Aviation (GA) and proportionality issues

Option 0	No impact	
Option 1	**CPL(A) and ATP (A) training courses**	Not applicable
	MPL training courses	
	Training courses for type ratings for single-pilot aeroplanes operated in multi-pilot operation, single-pilot high-performance complex aeroplanes and multi-pilot aeroplanes	
	Instructors	
	CA inspectors	
Option 2 **(= Option 1 + LAPL(A), PPL(A) training courses)**	**LAPL(A) and PPL(A) training courses**	This option envisages minor changes in the PPL(A) and LAPL(A) training syllabi to reinforce the UPRT aspects (at AMC level). These changes should be compatible with the GA Roadmap and are to be based on the final recommendations from the dedicated GA task force. The actual impacts of these recommendations will be analysed with the publication of the associated ED Decision in due course.

Option 1 will not affect GA significantly as the UPRT is mainly focused on CPL(A), ATPL(A) and MPL, and on type rating training courses. The advanced UPRT course in an aeroplane according to FCL.745.A is optional for LAPL(A) and PPL(A), and may be credited towards an integrated ATP(A) training course. Only PPL(A) pilots wishing to obtain a type rating will be required complete advanced UPRT in an aeroplane in accordance with FCL.745. A as a prerequisite for their first (multi-pilot) class/type rating.

Option 2 will affect GA through some additional UPRT, focused mainly on upset prevention.

The table below summarises the impact on GA per option:

Type of impact	Option 0	Option 1	Option 2
	No policy change	**Commercial pilots**	**Option 1 + GA pilots**
GA impact	No impact	Not applicable	The proposed changes should be proportionate to the GA, and therefore compatible with the GA Roadmap.
	0	0	+1

2.5.6.5 Impact on better regulation and harmonisation

Option 0	Regulatory drift and lack of harmonisation will occur if this option is chosen. ICAO requires UPRT for MPL and for initial multi-pilot type rating training courses, and recommends this for the CPL(A) training course.	
Option 1	**CPL(A) and ATP(A) training courses**	Harmonisation with ICAO SARPs — Annex 1
	MPL training courses	Harmonisation with ICAO SARPs — Annex 1
	Training courses for type ratings for single-pilot aeroplanes operated in multi-pilot operation, single-pilot high-performance complex aeroplanes and multi-pilot aeroplanes	Harmonisation with ICAO SARPs — Annex 1
	Instructors	Harmonisation with ICAO SARPs — Annex 1
	CA inspectors	Harmonisation with ICAO SARPs — Annexes 1 and 6

Option 2 **(= Option 1 + LAPL(A), PPL(A) training courses)**	**LAPL(A) and PPL(A) training courses**	ICAO does not require UPRT for PPL(A). There should be no significant impact in terms of better regulation and harmonisation.

The table below summarises the impact in terms of better regulation and harmonisation per option:

Type of impact	**Option 0**	**Option 1**	**Option 2**
	No policy change	**Commercial pilots**	**Option 1 + GA pilots**
Better regulation and harmonisation	No impact	Harmonisation with the ICAO SARPs.	No significant impact for GA pilots
	0	+1	0

The requirement for the conduct of advanced UPRT course (FCL.745.A) in an aeroplane will pose initial implementation challenges for ATOs. It is a new course and requires instructor training for an extension of the instructor privileges. Moreover, for some parts of the course, aeroplanes qualified and capable of delivering the training should be utilised in order to ensure that an adequate margin of safety is maintained.

EASA also proposes to set up a UPRT advisory board to support the implementation and provision of further guidance, in particular in relation to the advanced UPRT in an aeroplane.

There is no danger of duplication at national level and the proposal does not have an impact on Member States' obligations towards ICAO.

2.5.6.6 Comparison of options

Table 4 — Summary of impacts per option and per criteria

Type of impacts	*Option 0*	*Option 1 (commercial pilots)*	*Option 2 (Option 1 + GA pilots)*
Safety impact	-2	+1	+2
Social impact	0	+2	+2
Economic impact	0	-3	-3
GA and proportionality issues	0	0	+1
Impact on better regulation and harmonisation	0	+1	0
Overall	**-2**	**+1**	**+2**

Based on an analysis of the LOC-I occurrences in GA over the past years, it is clear that GA is also exposed to LOC-I events. In addition, the RMG experts indicated that skill-based behaviours are most often the first type of behaviour encountered when a pilot-to-be begins their training. Therefore, exposing student pilots to upset prevention training at an early stage enhances their upset prevention skills later in life. EASA and the RMG experts, therefore, believe that although ICAO has not included any UPRT provisions for PPL(A), a certain level of mitigating measures should be included in these proposals. EASA and the RMG experts, therefore, agreed to propose Option 2 as the best option which will include a revision of the LAPL(A) and PPL(A) training syllabi at AMC level in order to further develop existing exercises to include UPRT elements. In this regard, a dedicated GA task force will further consider the introduction of mitigating measures within the LAPL and PPL training syllabi on request of EASA, which may lead to additional economic cost. These costs are to be further analysed with the publication of the associated ED Decision in due course.

2.6. How do we monitor and evaluate the rules

EASA foresees setting up a UPRT advisory board to support the implementation and to provide further guidance where needed. In addition, EASA intends to organise workshops to further discuss and support any implementation-related issues.

The proposal might be subject to an evaluation, which will judge how well the adopted rules have performed (or are working), taking account of earlier evaluations made in this impact assessment. The evaluation will provide an evidence-based judgement of the extent to which the proposal has met the objectives effectively and efficiently. The decision whether an evaluation will be necessary will be taken based also on the monitoring results.

2.7. Overview of proposed amendments

2.7.1 Amending the Aircrew Regulation

— A new Article 4b will require students completing:

- an ATPL integrated course;
- an MPL training course; or
- the training course for their first class or type rating for:
  - single-pilot aeroplanes, when operated in multi-pilot operation;
  - single-pilot high-performance complex aeroplanes; or
  - multi-pilot aeroplanes

to have completed UPRT in accordance with Annex I (Part-FCL). Additionally, this new Article 4b will contain transitional provisions and provisions for possible crediting of UPRT completed prior to the implementation of UPRT in Part-FCL.

— Article 10a will be amended to require pilot training organisations to adapt their training programmes in accordance with the new UPRT requirements no later than 8 April 2019.

2.7.2 <u>Amendments to Annex I (Part-FCL) to the Aircrew Regulation</u>

— *FCL.010 Definitions: Definition for 'upset prevention and recovery training' (encompassing 'upset prevention training' and 'upset recovery training') is inserted.*

— *FCL.310 CPL — Theoretical knowledge examinations*: The reference to VFR for the Communications subject is deleted.

— *FCL.315.A CPL — Training course:* FCL.315.A is deleted as amendments to Appendix 3 are proposed instead.

— *FCL.410.A MPL— Training course and theoretical knowledge examinations:* FCL.410.A is amended as, in parallel, respective amendments to Appendix 5 are proposed.

— *FCL.515 ATPL — Training course and theoretical knowledge examinations:* The references to VFR and IFR for the Communications subject are deleted.

— *FCL.615 IR — Theoretical knowledge and flight instruction:* The reference to IFR for the Communications subject is deleted.

— *FCL.720.A Experience requirements and prerequisites for the issue of class or type ratings — aeroplanes:* The advanced UPRT course in FCL.745.A is added as a prerequisite for the first single-pilot class or type rating in multi-pilot operations, multi-pilot aeroplanes type rating and single-pilot high-performance complex aeroplane type rating training courses. This prerequisite is to ensure that a pilot who has completed a CPL training course will also be required to undergo this training prior to commencing the type rating training course.

— *FCL.725.A Theoretical knowledge and flight instruction for the issue of class and type ratings — aeroplanes:* A requirement is added for delivering UPRT related to the specificities of the relevant class or type for single-pilot class or type rating in multi-pilot operations, multi-pilot

aeroplanes type rating and single-pilot high-performance complex aeroplane type rating training courses.

— *FCL.745.A Upset prevention and recovery training course (UPRT) — aeroplanes.* A new advanced UPRT course is introduced to enhance students' resilience to the psychological and physiological aspects associated with dynamic upsets. The course is mandated for ATP integrated and MPL training courses, and as a prerequisite for the first single-pilot class or type rating in multi-pilot operations, multi-pilot aeroplanes type rating and single-pilot high-performance complex aeroplane type rating training courses.

— *FCL.900 Instructor certificates.* Point (b)(1) on 'Special conditions' is amended to be applicable also in cases where a new training course is introduced in Part-FCL.

— *FCL.915 General prerequisites and requirements for instructors.* A new point (e), containing requirements for instructors delivering training during the new FCL.745.A training course, is added.

— *Appendix I – Crediting of theoretical knowledge*. The crediting provisions for the CPL, the ATPL and the IR are revised in order to reflect the merging of the two subjects 'VFR communication' and 'IFR communication' into one subject 'communication'. In point 2.3, additional wording has been inserted to take into consideration differences in the IR and the CB-IR/EIR syllabus with regard to the two subjects listed.

— *Appendix 3 — Training courses for the issue of a CPL and an ATPL.* Section A. (ATP integrated course — Aeroplanes) is amended to require students of such a course to also undergo the new UPRT course according to FCL.745.A unless such a course has already been completed before.

— *Appendix 5 — Integrated MPL training course.* As with Appendix 3, also Appendix 5 is revised to require students of such a course to also undergo the new UPRT course according to FCL.745.A.

— *Appendix 9 — Training, skill test and proficiency checks for MPL, ATPL, type and class ratings, and proficiency checks for IRs.* This appendix is amended to include UPRT for single-pilot class and type rating in multi-pilot operations, multi-pilot aeroplanes type rating and single-pilot high-performance complex aeroplane type rating training courses. The amendments include:

- integration of the upset prevention elements (in AMC) using TEM, CRM and human factors,
- manual flying/handling exercises;
- management and handling of engine failures during final approach after passing the outer marker or 4 NM before touchdown;
- stall event exercises in take-off, clean and landing configurations, and a demonstration of the type-specific characteristics during a stall event;
- upset recovery exercises; and
- go-arounds with all engines operating from various stages during the approach, including rejected landings below decision height and after touchdown.

2.7.3 Amendments to Annex VI (Part-ARA) to the Aircrew Regulation

ARA.FCL.300 Examination procedures: The term 'multiple-choice' is deleted. This allows also open questions to be posed by the European Central Question Bank (ECQB).

Cologne, 29 June 2017

[signed by]

Patrick Ky
Executive Director

3. References

3.1. Affected regulations

Commission Regulation (EU) No 1178/2011 of 3 November 2011 laying down technical requirements and administrative procedures related to civil aviation aircrew pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council (OJ L 311, 25.11.2011, p. 1)

3.2. Related decisions

— Decision 2011/016/R of the Executive Director of the Agency of 15 December 2011 on Acceptable Means of Compliance and Guidance Material to Commission Regulation (EU) No 1178/2011 of 3 November 2011 laying down technical requirements and administrative procedures related to civil aviation aircrew pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council 'Acceptable Means of Compliance and Guidance Material to Part-FCL)

— Decision No 2012/006/Directorate R of the Executive Director of the Agency of 19th April 2012 on Acceptable Means of Compliance and Guidance Material to Commission Regulation (EU) No 1178/2011 of 3 November 2011 laying down technical requirements and administrative procedures related to civil aviation aircrew pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council 'Acceptable Means of Compliance and Guidance Material to Part-ARA'

3.3. Reference documents

— ICAO Annex 1 (Personnel Licensing)

— ICAO Annex 6 (Operation of Aircraft)

— ICAO Doc 10011 'Manual on Aeroplane Upset Prevention and Recovery Training' (First Edition — 2014)

— ICAO Doc 9868 'Procedures for Air Navigation Services – Training (PANS-TRG)' (Amendment No. 3, 23 April 2014)

— ICAO Doc 9625 'Manual of Criteria for the Qualification of Flight Simulation Training Devices' (Third edition — 2009)

— FAA Code of Federal Regulations (CFR) 121.423 'Pilot: Extended Envelope Training'

— Loss of Control Avoidance and Recovery Training (LOCART) FAA Aviation Rulemaking committee (ARC) 208 final report

— International Committee for Aviation Training in Extended Envelopes (ICATEE) final report

— FAA AC 120-109 'Stall and Stick Pusher Training'

— FAA AC 120-111 'Upset Prevention and Recovery Training'

— EASA SIB 2013-02 'Stall and Stick Pusher Training'

— EASA SIB 2013-05 'Manual Flight Training and Operations'

— EASA SIB 2014-09 ‘Aeroplane Go-Around Training’

— Airplane Upset Recovery Training Aid (AURTA), Revision 2 and 3

4. Appendix

CRD 2015-13 (Separate document)