

AMENDMENT No. 3
TO THE
PROCEDURES
FOR
AIR NAVIGATION SERVICES

TRAINING

(Doc 9868)

INTERIM EDITION

The text of Amendment No. 3 to the PANS-TRG (Doc 9868) was approved by the President of the Council on behalf of the Council in **April 2014** for applicability on **13 November 2014**. This document includes the new Chapter 7 of PANS-TRG, some additional information, but excludes most changes to the Foreword resulting from Amendment 3, except the description of Chapter 7. It also excludes small amendment to the MPL provisions where “upset recovery training” was replaced by “upset prevention and recovery training”.

APRIL 2014

INTERNATIONAL CIVIL AVIATION ORGANIZATION

**EXTRACTS OF THE TEXT OF AMENDMENT 3 TO THE
PROCEDURES FOR AIR NAVIGATION SERVICES**

**TRAINING
(PANS-TRG, DOC 9868)**

FOREWORD

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6. Contents of the document

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6.7 Chapter 7 — Upset prevention and recovery training

This chapter is intended to provide procedures to Civil Aviation Authorities, operators and approved training organizations in the delivery of upset prevention and recovery training for aeroplane pilots. This training is required for the MPL, the type-rating and the training of commercial air transport pilots, and is highly recommended for the CPL(A).

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Chapter 1. DEFINITIONS AND ACRONYMS

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1.2 ACRONYMS

Editorial Note.— Insert the following new acronyms in the appropriate order and location in Chapter 1, 1.2.

CPL(A) Commercial pilot licence (aeroplane)

LOC-I Loss of control – inflight

OEM Original equipment manufacturer

QA Quality assurance

QAD Quick attach/detach

UPRT Upset prevention and recovery training

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Insert new text as follows:

Chapter 7. UPSET PREVENTION AND RECOVERY TRAINING (UPRT)

7.1 Applicability

- 7.1.1 This Chapter, supported by the *Manual on Aeroplane Upset Prevention and Recovery Training* (Doc 10011), is intended to provide procedures to Civil Aviation Authorities, operators and approved training organizations to meet the UPRT requirements for an MPL and UPRT recommendations for a CPL(A) contained in Annex 1. Similarly, the information provided supports the UPRT requirements for type-rating in Annex 1 and for the recurrent training of pilots required by Annex 6, Part I, paragraph 9.3 – *Flight crew member training programmes*. The procedures in this chapter are applicable only to aeroplane UPRT.
- 7.1.2 Although not obligatory, training organizations engaged in the recurrent assessment and training of flight crew engaged in the operations of large or turbojet aeroplanes in accordance with Annex 6, Part II — *International General Aviation — Aeroplanes* (Section 3 refers) should also use this information to enhance the scope of their training services being offered.

7.2 Background

- 7.2.1 The UPRT development project arose from an industry-wide consensus that the hull loss rates and fatalities attributable to LOC-I events warranted a concerted effort in identifying and effectively implementing mitigating strategies. The study of the LOC-I phenomena and, in particular, the determination of any systemic contributing factors quickly became an ICAO priority.
- 7.2.2 Following an in-depth study, involving representatives from numerous CAA's, aviation accident investigative bodies, industry and professional associations, airlines, major approved training organizations and OEMs, it was determined that the flight crews involved in LOC-I accidents had often reacted inappropriately prior to and/or during the event. An effective countermeasure to LOC-I pointed towards the need for improvements to existing training.

7.3 UPRT approach

- 7.3.1 The UPRT programme and approach are a means of assessing and training critical areas of flight crew performance in conditions of flight during which pilots are likely to be exposed to an increased risk of an in-flight upset. UPRT should be designed and delivered within existing training and regulatory paradigms, which will be focused upon the trainee being “trained to proficiency” based upon achieving pre-determined knowledge and skill performance levels. UPRT for MPL and EBT programmes has to be developed in the same manner as competency-based training, so that they can be seamlessly integrated into those existing programmes. A well-constructed UPRT programme will better enable individual pilots and flight crews to effectively cope with unexpected and unforeseeable situations, which regrettably is a skill set that has been found lacking in virtually every recorded LOC-I accident.
- 7.3.2 To realize the full value of UPRT programmes and permit ATOs to focus their attention on ensuring that the trainee achieves the targeted proficiency requirements, CAAs should

view UPRT as purely a training programme and not invoke direct testing requirements on the trainee as part of their oversight process. Other regulatory due-diligence processes can be used to validate that operational safety levels are not compromised and whether the approved training programme is meeting its stated objectives.

- 7.3.3 The aim of UPRT is to identify and develop the training resources (academic, on-aeroplane, and FSTD-based) and the associated elements of training required to provide pilots with the necessary knowledge and skills required to increase the ability of pilots to recognize and avoid situations that may lead to airplane upsets and improve the pilots' ability to recover control of an airplane that has exceeded the normal flight regime. The guidance contained in the *Manual on Aeroplane Upset Prevention and Recovery Training* (Doc 10011) is intended to enable and support the implementation of more effective training to improve safety levels. Recognizing the criticality of competent instructors in any training programme, the manual also provides specific guidance on the required qualifications of instructors delivering UPRT in addition to those identified in Chapter 6 of PANS-TRG.
- 7.3.4 This chapter does not formally consider training media, but all FSTD training described should be conducted in an FSTD qualified in accordance with 7.5.5.

7.4 Regulatory requirements

In several instances UPRT is not optional. It is a requirement for the MPL as well as for those pilots receiving type rating training or commercial air transport operator-specific initial and recurrent training. It is also recommended for pilots undergoing training towards the issuance of a CPL(A). When introducing UPRT into their regulatory framework, States shall ensure that operators and training organizations apply the principles of the *Manual on Aeroplane Upset Prevention and Recovery Training* (Doc 10011), when developing and implementing such a programme.

Note. — Refer to the following provisions in Annex 1, paragraph 2.1.5 — Requirements for the issue of class and type ratings; 2.4 — Commercial pilot licence; and 2.5 — Multi-crew pilot licence appropriate to the aeroplane category; and Annex 6, Part I, 9.3 — Flight crew member training programmes.

7.5 Training

- 7.5.1 UPRT programmes should focus on training to ensure that trainees achieve the required knowledge and skills to effectively manage those conditions of flight which are likely to increase the risk of an upset or those conditions during which an actual upset has occurred so that a safe condition of flight can be restored without undue delay and risk.
- 7.5.2 UPRT programmes should be developed and introduced in an integrated manner using differing approaches depending on the phase of a pilot's career. Those begin with the appreciation that learning is best achieved when information is presented in context to current conditions. Hence, the recommended UPRT provided at the CPL(A) licensing level should be commensurate with those requirements deemed appropriate for an entry-level licence for a pilot starting employment with a commercial operator. This is because the expansion of that CPL(A) trainee's knowledge, skill and attitudinal abilities would be subsequently developed during the transition to airline level type-rating and operator-specific initial and recurrent training phases. The UPRT programme for an MPL trainee, on the other hand, shall take into account that an MPL programme includes learning the core set of flying abilities as well as achieving a type rating on an airline's commercial air

transport aeroplane. The *Manual on Aeroplane Upset Prevention and Recovery Training* (Doc 10011), addresses the three distinct areas for UPRT in detail under the following headings:

- a) single-pilot training on-aeroplane;
- b) multi-crew training in an FSTD; and
- c) type-specific training in an FSTD.

Note. — *The Manual on Aeroplane Upset Prevention and Recovery Training (Doc 10011), provides detailed guidance on training topics, training elements and their descriptions to enable ATOs to develop comprehensive programmes for all three areas of UPRT. This information is further supplemented by OEM-supported recommendations in prevention and recovery techniques, as well as suggested training scenarios for the FSTD.*

- 7.5.3 The logical delivery of the training syllabus is the second part of the programme integration issue. In this regard, the programme should commence with either the creation or confirmation of a solid foundation of baseline knowledge levels. These should then be reinforced by practical exercises that demonstrate the application of those learned principles. Finally, this level of understanding should then be further enhanced by introducing scenarios during flight (actual or simulated, as applicable) that provide the trainees with a comprehensive set of descriptors in order to expand their ability to recognize specific threats to safe conditions of flight and take deliberate and effective avoidance actions. The emphasis of UPRT shall, therefore, be on awareness, recognition, and avoidance first, as part of the prevention equation of UPRT. The second part of UPRT shall involve developing the analytical and manual handling abilities of the trainee to recognize the type of upset event and then effectively apply the correct recovery actions.

Note.— *Care must be taken at the early stages of UPRT implementation not to assume the existence of a comprehensive level of UPRT-related knowledge, particularly at the commercial air transport type rating and recurrent training levels, as LOC-I accident data strongly indicates that even highly experienced flight crews exhibited signs of shortcomings in understanding and reacting to their predicament, which indicated potential knowledge deficiencies.*

- 7.5.4 ATOs are required by Appendix 2 to Annex 1 to establish a quality assurance system (QA). The objective of QA is to assure the achievement of results that conform to the standards set out in the ATO's manuals and in those requirements and documents issued by the Licensing Authority. QA attempts to improve and stabilize the training process and to identify and avoid, or at least minimize, issues that could lead to problems. It continuously verifies that standards are adhered to throughout the training process by introducing various checkpoints and controls. It further introduces a system of audits to assure that documented policies, processes and procedures are consistently followed. It is the "assurance" part of quality management and its effective operation is crucial to the success of a competency-based training programme. Quality management focuses on the means to achieve product or service quality objectives through the use of four key components: quality planning; quality control; quality assurance; and quality improvement.

- 7.5.5 A large portion of a fully integrated UPRT programme involves the training of flight crews in a simulated environment. Most FSTDs can be used satisfactorily for a significant portion of upset training, including training close to the critical angle of attack but not involving full aerodynamic stalls. However, ATOs and commercial air transport operators shall take into account the fact that existing FSTD flight models have deficiencies in adequately representing aircraft characteristics outside the valid training envelope, i.e. in conditions which exceed the aeroplane flight envelope data used for the FSTD qualification. Furthermore, many current FSTDs lack enhanced instructor feedback tools to allow for a complete and accurate assessment of the trainee's performance. These limitations, if not fully appreciated by training programme designers and instructional staff, can have serious and long term repercussions by which trained flight crews could be left with significant misunderstandings of upset events. While the industry moves towards introducing improvements to FSTD models and instructor operating station design, ATOs shall conduct all FSTD training in an FSTD qualified to an appropriate level in accordance with Civil Aviation Authority rules (Doc 9625 — *Manual of Criteria for the Qualification of Flight Simulation Training Devices* refers) and approved for each intended training task. Detailed guidance on the technical requirements and on the instructor operating station functions and tools for UPRT can be found in Doc 9625, Volume I.

Note.— Regarding 7.5.4 and 7.5.5 ATOs are encouraged to establish more robust quality-related processes to optimize their efforts in achieving excellence in the provision of training. The subject of QA and the implementation of quality systems (QS) are detailed in Appendix B to the Manual on the Approval of Training Organizations (Doc 9841).

- 7.5.6 On-aeroplane training shall include special risk mitigation measures. This is particularly true when the training programme involves the development of analytical and handling abilities among pilots with low levels of experience and often under conditions of high stress. Robust instructor training and qualification requirements, aircraft certification and capabilities appropriate for the training tasks, strict operational control involving appropriate minimum dispatch and weather conditions, adhering to minimum safe altitudes, use of collision avoidance equipment and establishing special separation criteria, and contingency considerations are just some proactive examples to marginalize threats to safety levels. The ATOs ability to establish robust risk mitigation strategies under the umbrella of a mature safety management system (SMS) is critical to the safe and effective implementation of an on-aeroplane UPRT programme. The primary objective of on-aeroplane UPRT shall be to learn best practices in upset avoidance and recovery in a safe and controlled environment.

Note 1.— The Manual on Aeroplane Upset Prevention and Recovery Training (Doc 10011), makes several recommendations for the ATO's risk mitigation efforts.

Note 2.— On-aeroplane UPRT is not to be considered synonymous with aerobatic training. Whilst aerobatic training does provide improved manual handling skills, the primary objective to training aerobatics is proficiency in precision manoeuvring. Aerobatic flight training does not necessarily provide the best medium to develop the full spectrum of analytical reasoning skills required to rapidly and accurately determine the best course of recovery action during periods of high stress.

- 7.5.7 Regardless of an individual's background, all instructors designated to provide training in a UPRT programme should successfully complete an approved UPRT instructor qualification training course in accordance with the applicable provisions in Chapter 6,

6.1.2. Both initial qualification and recurrent training curriculum for instructors should address training elements appropriate to the level of an instructor's participation in delivering a UPRT programme, as a minimum, to ensure that the designated instructor acquires and maintains the required UPRT knowledge levels and skill sets. The UPRT on aeroplane environment may be beyond that which is experienced during normal training operations. The unpredictable nature of trainee inputs, reactions, and behaviour requires fluency in response to a wide variety of potential situations requiring a time-constrained and accurate response. This specialized expertise cannot be acquired through routine flight operations alone, but demands that instructor training provides the appropriate degree of exposure necessary to develop complete knowledge and understanding of the entire UPRT operating environment. As part of their QA effort, ATOs shall ensure that all UPRT instructors are qualified, competent, and current in delivering the course material as well as possessing the ability to make accurate performance assessments and recommendations for remediation, whenever necessary.

Note.— Many LOC-I accident investigations have revealed that the affected flight crew had received misleading information from well-meaning training staff or their organizations. Indeed, some existing trained practices were found to be not only ineffective but were also considered a contributory factor, which led to inappropriate responses by some flight crews. For example, in certain cases, the methodologies being applied in training and checking a recovery from an approach to stall condition of flight were based on the pilot being able to achieve recovery with a minimal loss of altitude. This resulted in training practices emphasizing the importance of a rapid application of power with the least amount of reduction in angle of attack to minimize the loss of altitude rather than appreciating the importance of reducing the angle of attack to effectively increase the ability of the wing to restore its capability to generate lift. Action has now been taken by both regulators and training providers to amend such procedures with new training and testing standards emphasizing that effective recovery from an approach to stall requires, foremost, an immediate and deliberate reduction in the angle of attack. This reduction, while operating at high altitude and depending on the aeroplane energy state, might result in a substantial loss in altitude necessary to ensure that an effective recovery from an impending or actual aerodynamic stall condition is achieved.

- 7.5.8 Training that is delivered under a quality system as described in Appendix B to the *Manual on the Approval of Training Organizations* (Doc 9841) should be capable to avoid instances of inappropriate or incomplete training.

7.6 Regulatory oversight

- 7.6.1 UPRT programmes should be competency-based in their design and delivery in accordance with those principles outlined in Chapter 2 of this document and in Appendix E to Doc 9841. UPRT shall be treated as purely a training programme, which is outcome-focused and permits trainees to gain the skill sets and confidence to effectively manage conditions that may pose a threat to safety. An individual shall not be considered to have completed the training if the required competency levels are not achieved.
- 7.6.2 The training shall not be delivered to meet, or be encumbered by, any newly-devised regulatory testing criteria established by the CAA. Rather the Authority should ensure levels of safety and the quality of the training by applying due diligence processes upon the ATO and its QA policies, processes, procedures and observed practices. The application of this form of oversight is particularly conducive to achieving the best results

in competency-based training environments. Although not required, CAAs should also consider requiring that training programmes approved under the training criteria outlined in Annex 6, Part I, Chapter 9, 9.3, be similarly conducted within a QA governance structure to assure the maintenance of high delivery standards in UPRT.

Note.— Appendices E, F, and G to Doc 9841 as well as Section 6 of the Manual on Aeroplane Upset Prevention and Recovery Training (Doc 10011), provide detailed guidance on the oversight of ATOs and such specially-designed curricula.

End of new text.

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