



# European Aviation Safety Agency

## Notice of Proposed Amendment 2014-25

### Requirements for relief pilots

RMT.0190 & RMT.0191 (FCL.004 (A) & (B)) — 4.11.2014

#### EXECUTIVE SUMMARY

This Notice of Proposed Amendment (NPA) addresses safety issues and regulatory gaps related to augmented crew operations, more specifically to the so-called cruise relief pilot (CRP) and cruise relief co-pilot (CRCP). The Agency combined two rulemaking proposals into a single rulemaking task. One proposal relates to a safety recommendation (FRAN-2011-010) by the French accident investigation board (BEA) related to CRP, and the other proposal is based on a request by the EASA committee to conduct a safety risk assessment of the restricted type rating related to CRCP. The specific objectives of the task were to ensure:

- (1) that a CRCP and a CRP are adequately trained and qualified to safely operate an aeroplane during the cruise segment of a flight;
- (2) appropriate operating procedures are established for the transfer of authority from the captain to the CRP; and
- (3) that any developed or amended regulations related to a CRCP or CRP establish a level playing field.

The rulemaking group was composed of different stakeholders, namely long-haul operators, authorities and a pilot union. The Agency and the rulemaking group decided that proposals for changes, additions or even new regulations should be mitigating measures based on identified risks. A risk assessment was carried out based on the assessment of the existing regulations versus the specific objectives of the task using a hazard identification risk assessment (HIRA). Subsequently, several categories of safety issues were identified for both CRP and CRCP of which the level of risk was further evaluated using a risk matrix and expert judgment. As a result, this NPA proposes means of compliance and guidance for the relief of flight crew members, including enhanced emphasis on the handover procedures and command delegation, task sharing, seating positions during different phases of flight and minimum altitudes for transferring duties to another crew member. Moreover, specifically for the CRP, requirements for essential crew resource management (CRM) training topics and guidance material to enhance the CRP's leadership and decision making skills, and a requirement to undergo training exercises related to issues identified by the operator's safety risk management as part of their management system. Furthermore, specifically for the CRCP, more restrictive requirements for recency, ATPL crediting provisions and the CRCP flying experience in relation to zero flight time training (ZFTT). Additionally, provisions for unrestricting a restricted type rating have been developed. Moreover, requirements have been developed for the applicant of a restricted type rating to be fully trained and checked during the initial type rating, including all take-offs and landing exercises in the full-flight simulator (FFS), but excluding the conduct of practical take-off and landing exercises during flight training on the aeroplane, or in the case of ZFTT, in an FFS. Also, requirements during subsequent revalidation or renewal of a restricted type rating to include an assessment of landing abilities but to exclude the take-off exercises have been developed. Finally, a requirement was developed for the holder of a restricted type rating to be trained and checked on their landing skills during recurrent operator's proficiency checks and recurrent training. The proposed changes are expected to increase safety and fill in regulatory gaps.

Applicability		Process map	
Affected regulations and decisions:	Commission Regulation (EU) No 1178/2011 (Part-FCL), Commission Regulation (EU) No 965/2012 (Part-ORO), ED Decision 2011/016/R (AMC/GM Part-FCL), ED Decision 2012/017/R (AMC/GM Part-ORO).	Concept Paper:	No
Affected stakeholders:	Pilots, approved training organisations (ATOs), operators, national aviation authorities (NAA).	Terms of Reference:	2.11.2012
Driver/origin:	Safety	Rulemaking group:	Yes
Reference:	Air France A330-203 (F-GZCP) accident report, Safety Recommendation FRAN-2011-010.	RIA type:	Light
		Technical consultation during NPA drafting:	No
		Duration of NPA consultation:	3 months
		Review group:	No
		Focussed consultation:	No
		Publication date of the Opinion: RMT.0190 (FCL.004 (A))	2015/Q2
		Publication date of the Decision: RMT.0191 (FCL.004 (B))	2016/Q2



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## 1. Procedural information

### 1.1. The rule development procedure

The European Aviation Safety Agency (hereinafter referred to as the 'Agency') developed this Notice of Proposed Amendment (NPA) on requirements for relief pilots in line with Regulation (EC) No 216/2008<sup>1</sup> (hereinafter referred to as the 'Basic Regulation') and the Rulemaking Procedure<sup>2</sup>.

This rulemaking activity on 'Requirements for relief pilots' is included in the [Agency's 4-year Rulemaking Programme](#) under RMT.0190 and RMT.0191 (FCL.004 (a) and (b)). This NPA is based on the Terms of Reference ([ToR](#)) for RMT.0190 and RMT.0191 which were published on 2 November 2012.

The text of this NPA has been developed by the Agency based on the input of a rulemaking group. The rulemaking group included representatives from long-haul operators, authorities and a pilot union. It is hereby submitted for consultation of all interested parties<sup>3</sup>.

The process map on the title page contains the major milestones of this rulemaking activity to date and provides an outlook of the timescale of the next steps.

### 1.2. The structure of this NPA and related documents

Chapter 1 of this NPA contains the procedural information related to this task. Chapter 2 (Explanatory Note) explains the core technical content. Chapter 3 contains the proposed text for the new requirements. Chapter 4 contains the Regulatory Impact Assessment (RIA) showing which options were considered and what impacts were identified, thereby providing the detailed justification for this NPA.

### 1.3. How to comment on this NPA

Please submit your comments using the automated **Comment-Response Tool (CRT)** available at <http://hub.easa.europa.eu/crt/><sup>4</sup>.

The deadline for submission of comments is **4 February 2015**.

### 1.4. The next steps in the procedure

Following the closing of the NPA public consultation period, the Agency will review all comments.

The outcome of the NPA public consultation will be reflected in the respective Comment-Response Document (CRD).

The Agency will make every effort to publish the CRD with the Opinion within 3 months after the consultation period has closed.

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<sup>1</sup> Regulation (EC) No 216/2008 of the European Parliament and 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).

<sup>2</sup> The Agency is bound to follow a structured rulemaking process as required by Article 52(1) of the Basic Regulation. Such process has been adopted by the Agency's Management Board and is referred to as the 'Rulemaking Procedure'. See Management Board Decision concerning the procedure to be applied by the Agency for the issuing of Opinions, Certification Specifications and Guidance Material (Rulemaking Procedure), EASA MB Decision No 01-2012 of 13 March 2012.

<sup>3</sup> In accordance with Article 52 of the Basic Regulation and Articles 5(3) and 6 of the Rulemaking Procedure.

<sup>4</sup> In case of technical problems, please contact the CRT webmaster ([crt@easa.europa.eu](mailto:crt@easa.europa.eu)).



The Opinion contains proposed changes to EU regulations and it is addressed to the European Commission, which uses it as a technical basis to prepare a legislative proposal. The Opinion is expected in the 2nd quarter of 2015.

The Decision containing Acceptable Means of Compliance (AMC) and Guidance Material (GM) will be published by the Agency when the related Implementing Rule(s) are adopted by the Commission.



## 2. Explanatory Note

### Background

In December 2006, the Association of European Airlines (AEA) presented a proposal to the JAA Licensing Sectorial Team (LST) to amend Appendix 2 to JAR-FCL 1.240 & 1.295 (WP JAA LST #123). In this proposal, AEA suggested that Appendix 2 to JAR-FCL 1.240 should be amended to facilitate the issue of a type rating limited to cruise relief co-pilots. This was, in AEA's view, permitted by ICAO Annex 1, which states, in paragraph 2.1.4.1.1, that 'when a type rating is issued limiting the privileges to act as co-pilot, or limiting the privileges to act as pilot only during the cruise phase of the flight, such limitation shall be endorsed on the rating'. AEA justified its proposal by saying that since the operating privileges of the cruise relief co-pilot are restricted in comparison to those of co-pilots, there is no justification that he/she has to perform the same procedures/manoeuvres during training and checking. Various required procedures/manoeuvres are not essential for a cruise relief co-pilot and should, therefore, be excluded from training. The minimum requirements for cruise relief co-pilots should be type-rating training and skill tests as described in Appendix 1 & 2 to JAR-FCL 1.240 with the exception of those for take-off and landing. This AEA proposal did not gain consensus from all the LST representatives, during the LST #21 meeting in April 2007 in Vienna. During this meeting, it was agreed to transfer the WP JAA LST #123 to the EASA Rulemaking Inventory, where it would be subject to the EASA Rulemaking Process. Subsequently, the issue of the cruise relief co-pilot based on the AEA working paper was further discussed during the process of developing the European licensing standards (Part-FCL) with rulemaking task FCL.001. It was decided not to include specific requirements for cruise relief co-pilots in Part-FCL, but to initiate a separate rulemaking task RMT.0190 and RMT.0191 (FCL.004 (a) and (b)). However, during the EASA Committee meeting on 14 October 2010, some Member States proposed to include specific requirements for cruise relief co-pilots as a result of an industry request. During the following EASA Committee meeting on 08 December 2010, the Agency was asked to study the newly included Part-FCL cruise relief co-pilot provisions further and to solidify the safety assessment in this regard, including an analysis of operational experience.

Furthermore, on 5 July 2012, the Bureau d'Enquêtes et d'Analyses (BEA), the French national accident investigation board (AIB), published the final report on the Air France A330-203 (F-GZCP) accident. The report stated that 'the captain left to take his rest without having clearly nominated the Pilot Flying (PF) as his relief. The remaining flight crew consisting of two co-pilots, therefore, inherited a certain strategic vagueness after his departure which was reinforced by a lack of training adapted to crews made up of two co-pilots and to the exercise of the task of relief pilot. Although the distribution of roles between the two co-pilots probably did not seem ambiguous to them, it did, nevertheless, pose a problem.' As a result, the BEA report addressed a safety recommendation to the Agency as follows:

*Safety Recommendation FRAN-2011-010:* It is recommended to define additional criteria for access to the role of relief pilot so as to ensure better task-sharing in case of augmented crews.

The Agency, therefore, decided to include this safety recommendation into the rulemaking task RMT.0190 and RMT.0191. The requirement for additional criteria for the relief pilot was also discussed during the Advisory Group National Authorities (AGNA) meeting 03-2011 on 16 November 2011 and the Safety Standards Consultative Committee (SSCC) meeting on 5 July 2012. During both meetings, it was highlighted that rulemaking tasks RMT.0190 and RMT.0191 should include a review of the



requirements for both the relief co-pilot and relief pilot. This NPA, therefore, addresses the requirements of both the cruise relief co-pilot (CRCP) and cruise relief pilot (CRP).

For the purpose of this NPA, CRP means a pilot who has been delegated the conduct of the flight by the commander for operations above FL 200 only, in effect relieving the commander in order for him/her to comply with the applicable flight time limitations and rest periods. This is solely an operational privilege contained in Annex III (Part-ORO) to Regulation (EU) No 965/2012 and is not an initial licensing requirement as such.

For a CRCP, Part-FCL, FCL.010 Definitions states 'Cruise relief co-pilot means a pilot who relieves the co-pilot of his/her duties at the controls during the cruise phase of a flight in multi-pilot operations above FL 200'.

The CRCP holds a restricted type rating in accordance with FCL.720.A(e) in Annex I (Part-FCL) to Regulation (EU) No 1178/2011. The type rating is restricted, as a CRCP is currently not assessed on his/her conduct of take-off and landing exercises during the type rating in a full-flight simulator (FFS), nor is he/she required to conduct the practical take-off and landing exercises, known as 'base training', on the aeroplane.

#### The approach taken by the Agency and the rulemaking group

Against this background, a rulemaking group with members representing experts from long-haul operators, authorities and a pilot union was established to assist the Agency in preparing this NPA. The rulemaking group met six times to discuss the issues and develop proposals. In order to ensure safe operation of multi-pilot aeroplanes whilst using CRPs or CRCPs, the rulemaking group proposed effective mitigating measures to address the concerns. In general, the mitigating measures contained in this NPA address:

- delegation of the flight requirements and procedures by the commander to the CRP under Part-ORO;
- additional CRM training requirements for the CRP under Part-ORO;
- CRP and CRCP seating positions during the cruise above FL 200 under Part-ORO;
- training and checking requirements for the CRCP under Part-FCL and Part-ORO;
- CRCP and the airline transport pilot licence (ATPL) requirements under Part-FCL; and
- CRCP and conducting zero flight time training (ZFTT) requirements under Part-FCL.

The measures proposed by this NPA are primarily based on the expertise of the rulemaking group experts, as well as on the use of safety risk analysis tools, such as the risk matrix and the 'bow-tie method'. Identified risks were assessed during the rulemaking group activities. In addition, the Agency and the rulemaking experts tried to identify, through the use of a selective questionnaire, to what extent operators within the EU are using, or are planning to make use of, relief pilots. Furthermore, to complement the aforementioned questionnaire, the Agency analysed the number of flights by EU operators where relief crews would likely be needed based on flight duration. The Agency also conducted an analysis of accident and incident reports, however, this did not indicate any contributing factors by the use of a CRP or CRCP. Some coordination with RMT.0411 on CRM training also took place; however, this did not result in changes to the proposed CRM training AMC/GM.



When drafting this NPA, the rulemaking group carefully evaluated the impact of the regulatory solutions envisaged by developing a light regulatory impact assessment (RIA) incorporating flight safety as well as other relevant aspects, such as economic, social and regulatory harmonisation.

Finally, the scope of the CRP and CRCP proposals are limited to commercial air transport (CAT) with multi-pilot aeroplanes. Non-commercial operations with multi-pilot aeroplanes are not addressed with this rulemaking activity. CAT operations with other categories of aircraft are not applicable as generally long-haul flight operations, whereby relief crews are needed, with aircraft other than aeroplanes is not likely.

### **2.1. Overview of the issues to be addressed**

The rulemaking group addressed all of the objectives of the ToR for this rulemaking task, which included a safety recommendation by the BEA and a safety risk assessment of the use of CRCP as requested by the EASA Committee.

For more detailed analysis of the issues addressed by this proposal, please refer to the RIA Section 4.1. 'Issues to be addressed'.

### **2.2. 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 of this NPA. The overall objective of the Basic Regulation is to maintain a high and uniform safety level with cost-efficient rules. The specific objective of this proposal are to:

- ensure that a CRP and a CRCP are adequately trained and qualified to safely operate a multi-pilot aeroplane during the cruise segment of a commercial transport flight;
- ensure appropriate operating procedures are established for the transfer of authority from the captain to the CRP; and
- ensure that any developed or amended regulations related to the CRP and CRCP establish a level playing field.

Furthermore, the aim of the light RIA in Chapter 4 is to determine the safest option to achieve the aforementioned objectives of this rulemaking activity whilst minimising the potential negative impacts to individual pilots, operators or national aviation authorities. Impacts to regulatory coordination with third countries have also been assessed. The light RIA consists of a series of five logical steps that structure the analysis:

- (1) Issue identification;
- (2) Objective definition;
- (3) Options development;
- (4) Impact analysis; and
- (5) Options comparison.





By providing transparent and evidence-based analysis of the advantages and disadvantages of the rule options against the defined objectives, decision-makers and stakeholders have a solid reference framework for discussion and informed evidence-based decisions.

### 2.3. *Summary of the Regulatory Impact Assessment (RIA)*

Three options were analysed. Option 0 is the baseline option where no changes to the regulatory framework are proposed. This option means that the ToR objectives would not be addressed. Both Options 1 and 2 do address the ToR objectives by proposing appropriate mitigating measures based on safety threats identified through the use of a hazard identification risk assessment (HIRA) and expert judgment. The mitigating measures encompass changes to the Aircrew and Air Operations rules and related AMC/GM in the context of the CRP and CRCP. The only difference between Options 1 and 2 is the CRCP recency requirement. The Agency and the group believe that Option 2 should be selected. The reason for this is that Option 2 improves safety by requiring a CRCP to undergo refresher flying training in an FFS every 90 days in the context of recency (instead of every 6 months currently). This additional training is estimated to cost EUR 1 000 per FFS session, excluding travel cost, i.e. at a total cost of a maximum EUR 924 000 per year (462 CRCP x EUR 1 000 per FFS x 2 per year). The total cost will depend on the way the training is integrated into the operator training programme. The additional training should ensure that a CRCP maintains their manual flying skills.

The light RIA analyses the safety, economic, social, proportionality and harmonisation impacts of each option. Both options 1 and 2 mitigate the identified safety threats and ensure alignment with ICAO SARPS. The safety and economic impact of Option 2 is slightly more than that of Option 1. All options have the same impact on the social and proportionality aspects. In terms of proportionality, there are no known small operators that make use of a CRP or CRCP. As only the large long-haul operators are using CRP or CRCPs, no proportionality impacts need to be considered. As a result, the Agency and the group support the selection of Option 2 as the most viable option for addressing the objectives of this task.

Stakeholders are kindly invited to provide data on cost impacts introduced by these draft rules and any other quantitative information they may find necessary to bring to the attention of the Agency. As a result, the relevant parts of the RIA might be adjusted on a case-by-case basis.

### 2.4. *Overview of the proposed amendments*

As a result of extensive expert group discussions and the RIA findings in Chapter 4, this NPA proposes amendments and new implementing rules, AMC and GM for the CRP and the CRCP.

#### 2.4.1. *Proposed CRP mitigating measures*

The group proposed the following mitigating measures to Part-ORO AMC/GM:

- (a) More emphasis on the importance for an operator to establish appropriate procedures for the relief of flight crew members, including handover procedures covering essential information on command delegation and task sharing. This new AMC also emphasises that the related briefing should focus on the continuity of the flight. A new GM to this AMC provides guidance on what should be included in the aforementioned briefing.



- (b) More emphasis on the importance for an operator to establish appropriate procedures when operating with additional crew members, including seating positions during different phases of flight and minimum altitudes for transferring duties to another crew member. This new AMC also highlights that the procedures should additionally take into account the crew composition, such as two captains flying together.
- (c) More emphasis on essential crew resource management (CRM) training topics for the CRP in comparison to a commander. The new AMC requires a CRP to have more in-depth CRM training on the following existing topics:
  - (1) Error prevention and detection;
  - (2) Shared situation awareness, shared information acquisition and processing;
  - (3) Workload management;
  - (4) Effective communication and coordination inside and outside the flight crew compartment; and
  - (5) Leadership, cooperation, synergy, delegation, decision-making, actions.
- (d) New guidance material to enhance the leadership and decision making skills of a CRP by making operators more aware that their training should include training exercises related to issues identified by the operator's safety risk management as part of their management system. Additionally, the group identified and listed several core training scenarios or manoeuvres that should always be included in any CRP training programme, such as initiation of emergency descent, engine failure in the cruise, smoke control and/or removal, unreliable airspeed indication, upset prevention and recovery training.

#### **2.4.2. Proposed CRCP mitigating measures**

The group proposed the following mitigating measures in Part-FCL and Part-ORO, and the related AMC/GM:

- (a) An amendment to the licensing rules with more restrictive recency requirements by deleting the possibility to remain recent with conducting 3 sectors, to ensure that a CRCP always completes refresher flying skills training in an FFS every 90 days. In addition, the group proposed to allow combining the operators' proficiency check and recurrent training with this refresher training as appropriate.
- (b) An amendment to the licensing rules with more restrictive crediting provisions of flying experience towards obtaining an ATPL. As the CRCP only operates above FL 200, the rulemaking experts agreed that only a limited amount of experience should be credited in the case of a CRCP. The group based their proposal on the existing crediting provision for holders of a flight engineer licence in FCL.510.A in Part-FCL.
- (c) An amendment to the licensing rules to include provisions for unrestricting a type rating by requiring the completion of practical take-off and landing exercises in the relevant aeroplane type, refresher training based on the assessment of an ATO and a licence proficiency check. This amendment is based on the group identifying that there are currently no provisions in Part-FCL for unrestricting a restricted type rating.



- (d) An amendment to the licensing rules removing the possibility for a CRCP to count CRCP flying experience towards the ZFTT requirements. The group identified a regulatory gap, in that a CRCP would be able to obtain another type rating without completing the practical take-off and landing exercises during the flight training on the aeroplane solely based on their multi-pilot flight experience and the current ZFTT prerequisites.
- (e) An amendment to the licensing rules requiring the applicant for a restricted type rating to be fully trained and checked during the initial type rating, including all take-offs and landing exercises in the FFS. However, the group further clarified that an applicant for a restricted type rating should not need to conduct the practical take-off and landing exercises during the flight training on the aeroplane, or in the case of ZFTT, in an FFS. Furthermore, during subsequent revalidation or renewal of the rating, the group proposed that holders of a restricted type rating should not be checked during take-off exercises, but that only their landing abilities should be assessed.
- (f) An amendment to the operational rules requiring the holder of a restricted type rating to be trained and checked on their landing skills during recurrent operators' proficiency checks and recurrent training. This item ensures alignment with the amended licensing rules mentioned in item (e).



### 3. Proposed amendments

The text of the amendment is arranged to show deleted text, new or amended text as shown below:

- (a) deleted text is marked with ~~strike through~~;
- (b) new or amended text is highlighted in grey;
- (c) an ellipsis (...) indicates that the remaining text is unchanged in front of or following the reflected amendment.

#### 3.1. Draft Regulation (Draft EASA Opinion)

##### 3.1.1. Annex I (Part-FCL) to Regulation (EU) No 1178/2011 is amended as follows:

- (1) Amend FCL.060 as follows:

###### FCL.060 Recent experience

[...]

- (b) Aeroplanes, helicopters, powered-lift, airships and sailplanes. A pilot shall not operate an aircraft in commercial air transport or carrying passengers:

[...]

- (3) as cruise relief co-pilot unless he/she; **has carried out recency and refresher flying skill training in an FFS at intervals not exceeding 90 days. This refresher training may be combined with the operator's refresher training prescribed in the relevant requirements of Part-ORO or the checking requirements prescribed by Appendix 9 to this Part.**

~~(i) has complied with the requirements in (b)(1); or~~

~~(ii) has carried out in the preceding 90 days at least 3 sectors as a cruise relief pilot on the same type or class of aircraft; or~~

~~(iii) has carried out recency and refresher flying skill training in an FFS at intervals not exceeding 90 days. This refresher training may be combined with the operator's refresher training prescribed in the relevant requirements of Part-ORO.~~

[...]

- (2) Amend FCL.510.A as follows:

###### FCL.510.A ATPL(A) — Prerequisites, experience and crediting

[...]

- (c) Crediting

[...]

- (3) Holders of a restricted type rating issued in accordance with FCL.720.A (e) shall be credited up to a maximum credit of 250 hours. These 250 hours may be credited against the 1 500 hours'**



requirement of paragraph (b), and the 500 hours' requirement of paragraph (b)(1), provided that the total credit given against any of these paragraphs does not exceed 250 hours.

[...]

(3) Amend FCL.720.A(e) as follows:

#### **FCL.720.A Experience requirements and prerequisites for the issue of class or type ratings — aeroplanes**

Unless otherwise determined in the operational suitability data established in accordance with Part-21, an applicant for a class or type rating shall comply with the following experience requirements and prerequisites for the issue of the relevant rating:

[...]

(e) Notwithstanding paragraph (d), a Member State may issue a type rating with restricted privileges for multi pilot aeroplane that allows the holder of such rating to act as a cruise relief co-pilot above Flight Level 200, provided that two other members of the crew have a type rating in accordance with paragraph (d).

To remove the restriction, the applicants shall comply with FCL.740(b) and complete the required flight training on the aeroplane in accordance with Appendix 9 to this Part.

[...]

(4) Amend FCL.730.A as follows:

#### **FCL.730.A Specific requirements for pilots undertaking a zero flight time type rating (ZFTT) course — aeroplanes**

[...]

(c) Hours of flight time or route sectors gained whilst exercising the privileges of a restricted type rating issued in accordance with FCL.720.A(e) shall not count towards (a)(1) and (2) above.

(5) Amend Appendix 9 as follows:

### **Appendix 9**

#### **Training, skill test and proficiency check for MPL, ATPL, type and class ratings, and proficiency check for IRs**

##### **A. General**

[...]

SPECIFIC REQUIREMENTS FOR THE SKILL TEST/PROFICIENCY CHECK FOR MULTI-PILOT AIRCRAFT TYPE RATINGS, FOR SINGLE-PILOT AEROPLANE TYPE RATINGS, WHEN OPERATED IN MULTI-PILOT OPERATIONS, FOR MPL AND ATPL

17. When the type rating course has included less than 2 hours flight training on the aircraft, the skill test may be conducted in an FFS and may be completed before the flight training on the aircraft. In that case, a certificate of completion of the type rating course including the flight training on the aircraft shall be forwarded to the competent authority before the new type rating is entered in the applicant's licence.



18. In case of a restricted type rating issued in accordance with FCL.720.A(e), the applicants shall fulfil the same requirements as other applicants for the type rating except for;
- (a) the take-off and landing exercises during the flight training on the aeroplane or in the case of ZFTT in an FFS as applicable.
  - (b) the take-off manoeuvres during the proficiency check for the revalidation or renewal of the type rating.

#### **B. Specific requirements for the aeroplane category**

[...]

#### **CONTENT OF THE TRAINING/SKILL TEST/PROFICIENCY CHECK**

[...]

#### **6. Multi-pilot aeroplanes and single-pilot high performance complex aeroplanes:**

[...]

- (i) ~~In case of a restricted type rating issued in accordance with FCL.720.A(e), the applicants shall fulfil the same requirements as other applicants for the type rating except for the practical exercises relating to the take-off and landing phases.~~

#### **3.1.2. Annex III (Part-ORO) to Regulation (EU) No 965/2012 is amended as follows:**

- (1) Amend ORO.FC.201 as follows:

##### **ORO.FC.A.201 In-flight relief of flight crew members**

[...]

- (b) The co-pilot may be relieved by:

[...]

- (2) for operations only above FL 200, a cruise relief co-pilot that complies with the following minimum qualifications:

[...]

- (iii) recurrent training ~~and checking~~ in accordance with ORO.FC.230 ~~except the requirement for take-off and landing training.~~

- (iv) recurrent checking in accordance with ORO.FC.230 except for the take-off manoeuvres.

#### **3.2. Draft Acceptable Means of Compliance and Guidance Material (Draft EASA Decision)**

##### **3.2.1. ED Decision 2012/017/R on Annex III (Part-ORO) to Regulation (EU) No 965/2012 is amended as follows:**

- (1) A new AMC2 ORO.GEN.110(f) is added:



**AMC2 ORO.GEN.110(f) Operator responsibilities****PROCEDURES FOR THE RELIEF OF FLIGHT CREW MEMBERS IN CAT OPERATIONS**

If operating with augmented flight crew, the operator procedures should address all of the following:

- the responsibilities and command chain in the flight crew compartment during the absence of the commander;
- the assignment of flight crew member stations or seats to relieving crew members, accounting for different phases of flight, including any possible emergency scenarios and controlled rest periods. The operator should consider all possible crew compositions such as multiple captains operating together, instructors during line training, and possible consequences following an incapacitation. The operator should establish the minimum flight level or altitude below which crew members may not vacate their assigned station for the purpose of transferring duties to another crew member; and
- any handover and related briefing between relieving flight crew members, should cover essential information on command delegation and associated task sharing. The briefing should focus on continuity of the flight.

(2) A new GM1 ORO.GEN.110(f) is added:

**GM1 ORO.GEN.110(f) Operator responsibilities****BRIEFING BETWEEN RELIEVING FLIGHT CREW MEMBERS**

The briefing may include, for example:

- (1) technical status of aeroplane, including remaining fuel;
- (2) en route and destination weather;
- (3) alternate airports;
- (4) contingency scenarios; and
- (5) cabin status.

(3) A new AMC1 ORO.FC.A.201(a)(2)(ii) is added:

**AMC1 ORO.FC.A.201(a)(2)(ii) In-flight relief of flight crew members****CRM TRAINING FOR THE RELIEF PILOT**

The training should include the following CRM elements in AMC1 ORO.FC.115&AMC1 ORO.FC.215 Crew resource management (CRM) training item (f), in depth:

- (a) Error prevention and detection;
- (b) Shared situation awareness, shared information acquisition and processing;
- (c) Workload management;
- (d) Effective communication and coordination inside and outside the flight crew compartment; and
- (e) Leadership, cooperation, synergy, delegation, decision making, actions.

(4) A new GM1 ORO.FC.A.201(a)(2)(ii) and (iii) is added:



**GM1 ORO.FC.A.201(a)(2)(ii) and (iii) In-flight relief of flight crew members****LEADERSHIP AND DECISION MAKING SKILLS OF THE RELIEF PILOT**

To enhance the leadership and decision making skills of the pilot relieving the commander, an operator should include in its training programme training exercises related to issues identified by the operator's safety risk management. In addition, an operator should consider including exercises such as initiation of emergency descent, engine failure in the cruise, smoke control and/or removal, unreliable airspeed indication or upset prevention and recovery training.





## 4. Regulatory Impact Assessment (RIA)

### 4.1. Issues to be addressed

#### 4.1.1. General

This proposal addresses the need to ensure safe in-flight relief of flight crew members when operating with an augmented crew. The proposal focusses on both the cruise relief pilot (CRP) and cruise relief co-pilot (CRCP) functions. The assessed level of risk is based on expert judgment, aided by objective data and statistical analysis, where available.

The following eight relevant threat strings were identified by the experts:

Threat strings	CRP	CRCP
1. Chain of command unclear	X	X
2. Lack of competencies/lack of experience in decision making	X	X
3. Improper dealing with abnormal, including unusual task sharing (e.g. seat related items)	X	X
4. Physical seat change	X	X
5. Incapacitation/commander unable to return to the flight deck quickly	X	X
6. Unclear handshake/transfer of control process/procedures	X	X
7. Recency/currency	N/A	X
8. Flying skills	N/A	X

**Note:** The experts' group also identified the threat strings 'lack of monitoring skills' and 'false sense of security because of high level reliability of modern aircraft'. These strings, however, apply to the overall pilot population and not only to the CRP and CRCP. The experts, therefore, decided not to address these threats with this rulemaking task.

The reasoning behind each threat string can be found in the so-called hazard identification and risk assessment (HIRA) contained in the Annex (chapter 6.1) to this NPA. Through the use of the HIRA, which included the use of the bow-tie method and a risk matrix, and further discussions, the experts were able to identify weaknesses and gaps prevailing in the current regulations and propose mitigating measures. As a result, this proposal amends certain rules in Annex I (Part-FCL) to Regulation (EU) No 1178/2011 and Annex III (Part-ORO) to Regulation (EU) No 965/2012 and associated AMC/GM in the related ED Decisions.

The Agency and the experts' group strongly believe that this proposal addresses the identified threats, the safety recommendation by the BEA, and satisfies the EASA Committee's request for a safety assessment of the CRCP function.



**4.1.2. Who is affected?**

Commercial Air Transport (CAT) pilots, long-haul operators, approved training organisations (ATO),



national aviation authorities (NAA) and pilot unions. The operators impacted are mainly those that operate with augmented crews, i.e. typically flights of more than 8 hours duration. The diagram below illustrates that the proportion of flights longer than 8 hours approximates to a total of 3.7 % of the total number of flights per year performed by EU commercial operators.

**4.1.3. How could the issue/problem evolve?**

In the future, if the regulatory framework is not changed, the below-mentioned identified threat strings and the safety recommendation by the French BEA will not be addressed. This means that the current existing regulatory rule gaps remain with medium risk threats such as an unintended deviation from the safe flight path from the use of a CRP or CRCP during long-haul commercial transport operations.

As mentioned already, approximately 3.7 % of all commercial transport activities by European operators involve long-haul flights of more than 8 hours’ flight duration. This percentage is expected to increase over the next decades due to increased globalisation influences resulting in increased long-haul travel. The emergence of low-cost long-haul operators may potentially increase long-haul travel further by making such flights more accessible to the general public. Consequently, the identified risks are further increased.

**4.1.4. Safety Risk Assessment**

The Agency and the experts’ group used a risk matrix and the ‘bow-tie method’ in identifying and assessing the risks associated to a CRP and CRCP function. The complete safety assessment is contained in the Annex to this NPA as a HIRA, including mitigating recommendations with appropriate reasoning. The table below is an excerpt of this HIRA on the outcome, highlighting the identified threat strings and the current level of risk.

Safety Issues	Issue	Barriers	Probability	Impact	Risk
Chain of command unclear	T-01	B-01, B-02, B-03, B-04	Improbable	Major	<b>MEDIUM</b>
Lack of competencies / lack of experience in decision making	T-02	B-01, B-05, B-02, B06	Remote	Major	<b>MEDIUM</b>
Improper dealing with abnormals, including unusual task sharing (e.g. seat related items)	T-03	B-07, B-08, B-09, B-10	Frequent	Major	<b>HIGH</b>
Physical seat change	T-06	B-10, B-11	Remote	Minor	<b>MEDIUM</b>



Incapacitation / commander unable to return to the flight deck quickly	T-07	B-12, B-13, B-14, B-15, B-16, B-17	Improbable	Minor	LOW
Unclear handshake/transfer of control process/procedures	T-08	B-18, B-19	Occasional	Major	MEDIUM
Recency / currency (CRCP only)	T-09	B-20	Improbable	Minor	LOW
Flying skills (CRCP only)	T-010	B-20	Occasional	Minor	MEDIUM

#### 4.2. 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 of this NPA. The overall objective of the Basic Regulation is to maintain a high and uniform safety level with cost-efficient rules.

The specific objectives of this proposal are to ensure that:

- (1) a CRP and a CRCP are adequately trained and qualified to safely operate a multi-pilot aeroplane during the cruise segment of a commercial transport flight;
- (2) appropriate operating procedures are established for the transfer of authority from the captain to the CRP; and
- (3) any developed or amended regulations related to the CRP and CRCP establish a level playing field.

#### 4.3. Policy options

For each area, the policy of doing nothing (Option 0) has been considered as the reference scenario. Non-rulemaking options were considered wherever possible, i.e. by relying on the operator's safety management system (SMS) and existing rules.

Option No	Short title	Description
0		Baseline option (no change in rules; risks remain as outlined in the issue analysis).
1		Mitigating measures for CRP and CRCP, <b>including</b> the possibility to fulfil the recency requirement (FCL.060(b)(3)(ii)) for the CRCP by carrying out in the preceding 90 days at least 3 sectors as a cruise relief pilot on the same type or class of aircraft
2		Mitigating measures for CRP and CRCP, <b>excluding</b> the possibility to fulfil the recency requirement (FCL.060(b)(3)(ii)) for the CRCP by carrying out in the preceding 90 days at least 3 sectors as a cruise relief pilot on the same type or class of aircraft



#### 4.4. Data collection

##### 4.4.1. Data collection

The data requested for the analysis was based on expert judgement, a statistical analysis and a questionnaire.

###### Expert judgement

The rulemaking group consisted of 5 members with extensive and long standing expertise in long-haul operations, including the use of relief pilots. All members contributed actively in providing the necessary expert knowledge.

###### Statistical Analysis

An assumption made here was that flight durations of more than 8 hours would require a crew complement with relief pilots. The timetable information was obtained from the latest available information from the official airline guide (OAG, 2010). It includes scheduled passenger flight data from all EASA Member States' commercial air transport operators departing from an EASA Member State in 2010.

###### Questionnaire

The questionnaire was published in May 2013 for a period of 2 months. A total of 35 reactions were received from (including third country) operators, aviation authorities and pilot unions. The feedback received provided limited data, it gave, however, some insight into the operating procedures and scope of the use of relief pilots within the EU, the US and Canada. The data showed the use of various procedures mostly confirming the assumptions already made by the rulemaking group experts.

###### Safety risk assessment

The Agency and the rulemaking group, with further support of the IATA (AEA), used the aforementioned HIRA and risk matrix to assess the safety risks and make recommendations for adding and amending rules and AMC/GM.

#### 4.5. Analysis of impacts

##### 4.5.1. Safety impact

The table below is an excerpt from the HIRA in the Annex to this NPA. It shows that the identified safety issues would be mitigated if the relevant recommendations in either Option1 or 2 are inserted into to the rules and AMC/GM.

Safety issues	Risk contribution	Recommendations	Residual risk after mitigation
Chain of command unclear	MEDIUM	6, 7, 8, 9, 10	LOW
Lack of competencies/lack of experience in decision making	MEDIUM	6, 7	LOW
Improper dealing with abnormal, including unusual task sharing (e.g. seat related items)	HIGH	6, 7, 8, 9, 10	LOW
Physical seat change	MEDIUM	8, 9, 10	LOW
Incapacitation/commander unable to return	LOW	1, 3, 4, 6, 7, 8, 9, 10	LOW



to the flight deck quickly			
Unclear handshake/transfer of control process/procedures	MEDIUM	8, 9, 10	LOW
Recency/currency (CRCP only)	LOW	1, 3	LOW
Flying skills (CRCP only)	MEDIUM	1, 2, 3, 4	LOW

Option 0	CRP	Does not mitigate the safety risks identified in the TOR and HIRA to an acceptable level.
	CRCP	
Option 1	CRP	Mitigates the safety risks identified in the TOR and HIRA to an acceptable level.
	CRCP	
Option 2	CRP	Mitigates safety risks identified in the TOR and HIRA to an acceptable level. As this option includes more training in an FFS than Option 1, there are increased safety benefits in maintenance of recency and manual flying skills.
	CRCP	

**4.5.2. Social impact**

The assessment shows that all options have the same impact. The social impact of a restricted type rating with reduced privileges could potentially lead to reduced pay scales. This largely depends on industrial agreements. Conversely, a restricted type rating also allows for an alternative and more gradual transition into an operator’s flight operations environment.

**4.5.3. Economic impact**

Option 0	CRP	No economic impact.
	CRCP	A restricted type rating with reduced privileges could potentially lead to reduced pay scales. This largely depends on industrial agreements.
Option 1	CRP	Minimal additional training cost related to CRM training. The additional training cost largely depends on the organisational structure and the operator’s initial CRM training course content.
	CRCP	<ul style="list-style-type: none"> <li>— Minimal additional training and checking cost due to normal type rating course in FFS, including a complete skill test.</li> <li>— A restricted type rating with reduced privileges could potentially lead to reduced pay scales. This largely depends on industrial agreements.</li> </ul>
Option 2	CRP	Minimal additional training cost related to CRM training. The additional training cost largely depends on the organisational structure and the operator’s initial CRM training course content.
	CRCP	<ul style="list-style-type: none"> <li>— Minimal additional training and checking cost due to normal type rating course in FFS, including a complete skill test.</li> <li>— An approximate two additional FFS training sessions of EUR 1 000 per</li> </ul>



		<p>session per CRCP due to more restrictive recency requirements stipulating that a CRCP needs to conduct refresher training every 90 days.</p> <p>— The total additional cost of Option 2 is estimated at EUR 924 000 per year at European Level (462 CRCP x EUR 1 000 per FFS session X 2 per year, excluding travel cost). <b>Note:</b> 462 is the number of known CRCPs operating for EU CAT operators.</p> <p>— A restricted type rating with reduced privileges could potentially lead to reduced pay scales. This largely depends on industrial agreements.</p>
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#### 4.5.4. Proportionality impact

There are no known small operators that make use of a CRP or CRCP. As only the large long-haul operators are using CRP or CRCPs, no proportionality impacts need to be considered.

#### 4.5.5. Impact on 'better regulation' and harmonisation

There are no implementation problems expected for the proposed options 1 and 2. The proposed amendments mitigate safety risks by closing gaps in the current regulations.

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

The Aircrew and Air Operations Regulations will remain harmonised, albeit slightly more restrictive, when compared to the ICAO SARPS (see Annex) as follows:

- *ICAO Annex 1* — allows a restricted type rating to be endorsed on a licence.
- *ICAO Annex 6* — is slightly less restrictive than Option 2, as the proposed mitigating measures for the CRCP exclude the possibility to fulfil the recency requirement (FCL.060(b)(3)(ii)) by carrying out in the preceding 90 days at least 3 sectors as a cruise relief pilot on the same type or class of aircraft. Option 1 would be fully in line with ICAO.
- *ICAO Doc 9379* — provides guidance to Annex 1 and 6 on cruise relief pilots. Option 2 includes the following proposals that ensure harmonisation with this guidance:
  - AMC and GM on providing a clear definition of the chain of command and of assigned duties for all operations, including the case where the pilot-in-command becomes incapacitated or is unable to return to the cockpit for any reason;
  - AMC and GM on procedures and conduct of briefings when any pilot is relieved or returns to duty;
  - Rules and AMC on qualifications and competences for the augmented flight crew for both the CRP and CRCP;
  - Amended rules for a CRCP to be qualified on type by completing the type rating in the FFS only. The CRCP will have to pass a normal skill test, including take-off and landing items. There will be no requirement, however, for take-off and landing 'base training' on the aeroplane. This training and checking will be followed by an endorsement in the licence as permitted by ICAO Annex 1;



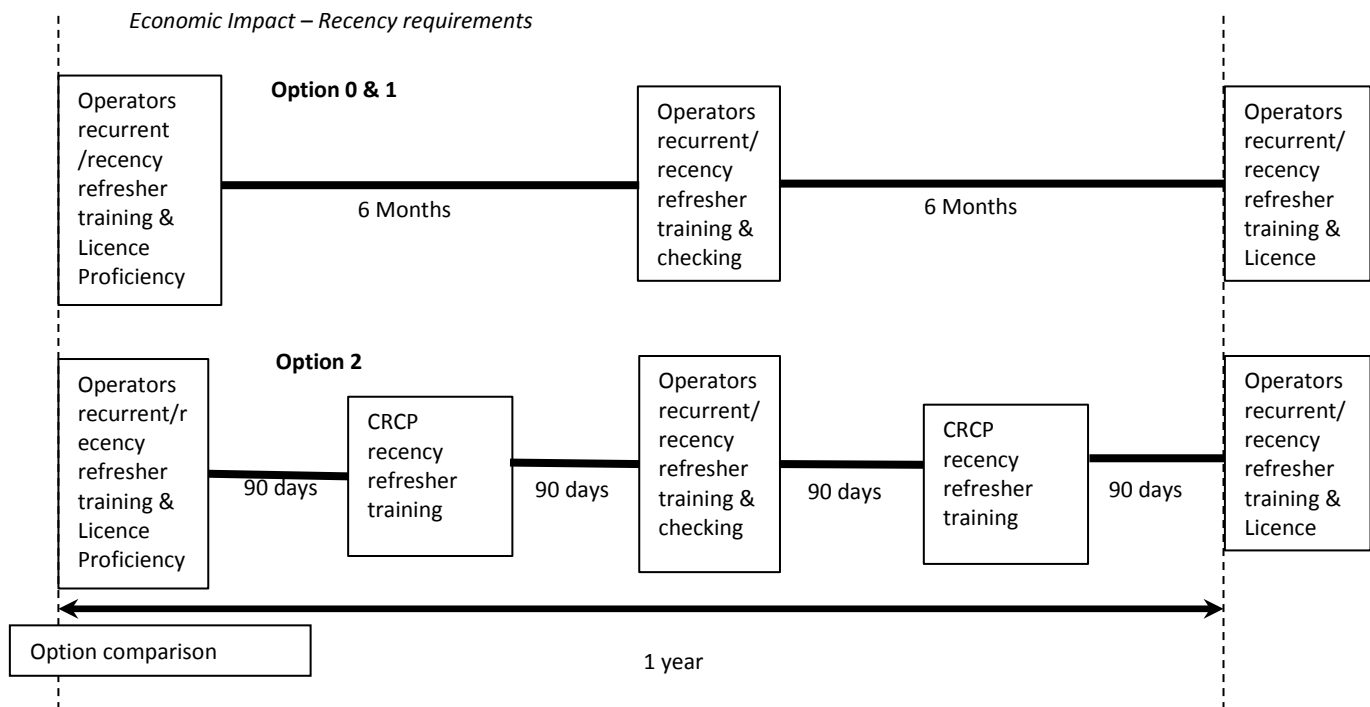
- Amended rules for a CRCP for the maintenance of currency, including an assessment of approach and landing skills, in an FFS every 6 months during operator recurrent training and checking; and
- Rules for a CRCP recency requiring flying skill refresher training every 90 days.

**4.6. Comparison and conclusion**

**4.6.1. Comparison of options**

As indicated at 4.1.3, if Option 0 is chosen, the regulatory framework is not changed, not addressing, thus, the aforementioned identified threat strings and safety recommendation by the French BEA. This would mean that the current existing regulatory rule gaps remain with medium risk threats to a potential unintended deviation from the safe flight path resulting from the use of a CRP or CRCP during long-haul commercial transport operations.

Therefore, both Options 1 or 2 were analysed.



Whilst both options would ensure that the objectives of this rulemaking task are addressed (with a safety improvement compared to Option 0), the group and the Agency believe that Option 2 better addresses the identified gaps. The reason is that Option 2 improves safety by requiring a CRCP to undergo refresher flying training in an FFS every 90 days in the context of recency (instead of every 6 months currently), thereby maintaining their manual flying skills to a higher standard. A CRCP would also be required to conduct recurrent training in an FFS every 6 months. Option 1 on the other hand would also require recurrent training in an FFS every 6 months, but would only require a CRCP to complete at least 3 route sectors on the aeroplane as a CRCP in the preceding 90 days. In essence, this means that in most cases Option 2 would lead to the CRCP having to conduct training in an FFS every 90 days or 4 times per year instead of just 2 as with Option 1 (see illustration above).

As the RIA shows, the economic impact in terms of CRCP training of Option 2 is only slightly greater when compared to that of Option 1. As a result, the Agency and the group support the selection of Option 2 as the most viable option for addressing the objectives of this task.





## 5. References

### 5.1. *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) as amended.

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).

### 5.2. *Affected CS, AMC and GM*

Decision 2011/016/R of the Executive Director of the European Aviation Safety 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 (AMC/GM Part-FCL)

Decision 2012/017/R of the Executive Director of the Agency of 24th October 2012 on Acceptable Means of Compliance and Guidance Material to 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 (AMV/GM Part-ORO)

### 5.3. *Reference documents*

ICAO Annex 1

ICAO Annex 6

ICAO Document 9379

Air France A330-203 (F-GZCP) accident report

Safety Recommendation FRAN-2011-010



## 6. Annex

### 6.1. Hazard Identification Risk Assessment (HIRA)



# Augmented Crew Operation

Hazard  
Identification  
and Risk  
Assessment

EASA  
RMT 0190 & 0191



### 6.1.1. Executive Summary

EASA combined two rulemaking proposals, into a single rulemaking task, RMT 0190 & RMT 0191, starting in January 2013. The rulemaking taskforce was composed of members from different stakeholders; EASA, ECA, CAA's, IATA (AEA) and IAAPS.

The specific objectives, according the TOR, were the following;

1. To ensure a relief co-pilot and a relief captain are adequately trained and qualified to safely operate an aeroplane during the cruise segment of a flight.
2. To ensure appropriate operating procedures are established for the transfer of authority from the captain to the relief captain.
3. To ensure that any developed or amended regulations related to a relief co-pilot or relief captain establish a level playing field.

The specific objectives are all related to augmented crew operation, which is defined as the hazard in this Hazard Identification and Risk Assessment (HIRA). The HIRA framework was provided by the representative of IATA (AEA). However the HIRA was completed by the rulemaking group.

The taskforce decided that proposals for changes, additions or even new rules and regulations should be mitigating measures on defined risks. A risk assessment was carried out basing its assessment on the current existing rules and regulations vs. the specific objectives of the taskforce.

Several categories of safety issues were defined of which the risk has been determined either by data mining or by expert judgment. The following categories of issues were defined;

- Chain of command unclear
- Lack of competencies / lack of experience decision making
- Improper dealing with abnormals, including unusual task sharing (e.g. seat related items)
- Lack of monitoring skills
- False sense of security because of high level of reliability of modern aircraft
- Physical seat change
- Incapacitation / commander unable to return to the flight deck quickly
- Unclear handshake/transfer of control process/procedures
- Recency / currency (CRCP only)
- Flying skills (CRCP only)

Current rules and regulations are considered preventives or corrective barriers to operational risks involved with augmented crew operation. For all categories, including its barriers, the risk was assessed by the taskforce.

**Based on the defined risks recommendations, for changes, additions and new rules and regulations, were drafted. The recommendations made in this report were carefully formulated by the taskforce and are expected to be effective counter-measurements in mitigating the medium and high risks to low risks levels.**



### 6.1.2. Glossary of Terms

<b>AEA</b>	Association of European Airlines
<b>AGNA</b>	Advisory Group National Authorities
<b>BEA</b>	Bureau d'Enquêtes et d'Analyses
<b>CPT</b>	Captain
<b>CRP</b>	Cruise Relief Pilot
<b>CRCP</b>	Cruise Relief Co-Pilot
<b>CRM</b>	Crew Resource Management
<b>FCL</b>	Flight Crew Licensing
<b>FO</b>	First Officer
<b>HIRA</b>	Hazard Identification and Risk Assessment
<b>L</b>	Likelihood
<b>LHS</b>	Left Hand Seat
<b>LST</b>	Licensing Sectorial Team
<b>NPA</b>	Notice for Proposed Amendment
<b>PF</b>	Pilot Flying
<b>PM</b>	Pilot Monitoring
<b>RHS</b>	Right Hand Seat
<b>RMT</b>	Rule Making Task
<b>SFO</b>	Senior First Officer
<b>TOR</b>	Terms of Reference



### 6.1.3. Introduction

#### Background and regulatory context

##### Issue #1 (Cruise relief co-pilot requirements):

In December 2006, the Association of European Airlines (AEA) presented a proposal to the JAA Licensing Sectorial Team (LST) to amend Appendix 2 to JAR-FCL 1.240 & 1.295 (WP JAA LST #123). In this proposal AEA proposed that Appendix 2 of JAR-FCL 1.240 should be amended to facilitate the issue of a type rating limited to cruise relief co-pilots. This was, in AEA's view, permitted by ICAO Annex 1, which states, in paragraph 2.1.4.1.1, that 'when a type rating is issued limiting the privileges to act as co-pilot, or limiting the privileges to act as pilot only during the cruise phase of the flight, such limitation shall be endorsed on the rating'. AEA justified its proposal by saying that since the operating privileges of the cruise relief co-pilot are restricted in comparison to those of co-pilots, there is no justification that he/she has to perform the same procedures/manoeuvres during training and checking. Various required procedures/manoeuvres are not essential for a cruise relief co-pilot and should therefore be excluded from training. The minimum requirements for cruise relief co-pilots should be type-rating training and skill tests as described in Appendix 1 & 2 to JAR-FCL 1.240 with the exception of those for take-off and landing.

This AEA proposal was not met with consensus from all the LST representatives, during the LST #21 meeting in April 2007 in Vienna. During this meeting it was agreed to transfer the WP JAA LST #123 to the EASA Rulemaking Inventory, where it would be subject to the EASA Rulemaking Process.

##### Issue #2 (Relief captain requirements):

On 5th July 2012, the Bureau d'Enquêtes et d'Analyses (BEA) accident investigation board published the Final Report on the Air France A330-203 (F-GZCP) accident. The report states that 'the captain left to take his rest without having clearly nominated the Pilot Flying (PF) as his relief. The remaining flight crew consisting of two co-pilots therefore inherited a certain strategic vagueness after his departure which was reinforced by a lack of training adapted to crews made up of two co-pilots and to the exercise of the task of relief captain. Though the distribution of roles between the two co-pilots probably did not seem ambiguous to them, it did nevertheless pose a problem.'

The BEA Final Report addressed a safety recommendation to the Agency as follows: *Safety Recommendation FRAN-2011-010: It is recommended to define additional criteria for access to the role of relief captain so as to ensure better task-sharing in case of augmented crews.*

#### Regulatory evolution

The issue of the cruise relief co-pilot based on the AEA working paper was discussed during the process of developing the European licensing standards (Part-FCL) with rulemaking task FCL.001. It was decided not to include specific requirements for cruise relief co-pilots in Part-FCL but to initiate a separate rulemaking task RMT.0190 (FCL.004). During the EASA Committee meeting on 14th October 2010, some Member States proposed to include specific requirements for cruise relief co-pilots as a result of an industry request. The issue was discussed and the text of Part-FCL was amended accordingly.

As a result, the following text was added to Part-FCL FCL.720.A(e): '...a Member State may issue a type rating with restricted privileges for multi pilot aeroplane that allows the holder of such rating to act as a cruise relief co-pilot above Flight Level 200, provided that two other members of the crew have a type rating in accordance with paragraph (d)'. Text was also added to Part-FCL Appendix 9 B. 'Specific Requirements for the Aeroplane Category' 6. (i) stating: 'In case of a restricted type rating issued in accordance with FCL.720.A(e), the applicants shall fulfil the same requirements as other applicants for the type rating except for the practical exercises relating to the take-off and landing phases.'

During the EASA committee meeting on the 8th December 2010, the Agency was asked to study this matter further and to solidify the safety assessment in this regard, including an analysis of operational experience.

In addition, the Agency decided to address the Safety Recommendation FRAN-2011-010, referring to the relief captain, to the rulemaking task RMT.0190 (FCL.004).



The requirement for additional criteria for the relief captain was also discussed during the Advisory Group National Authorities (AGNA) meeting 03-2011 on 16th November 2011 and the Safety Standards Consultative Committee (SSCC) meeting on 5th of July 2012. During both meetings it was highlighted that rulemaking task RMT.0190 (FCL.004) should include a review of the requirements for both the 'relief co-pilot' and 'relief captain'.

Note: The words 'captain' and 'commander' refer to the same position of authority in the context of aeroplane and flight operations.

Rulemaking Task Forces 0190 & 0191 where combined and started in 2012.

The goal of this combined task force is to draft a Notice for Proposed Amendment (NPA) in order to meet the specific objectives of these tasks;

1. To ensure a relief co-pilot and a relief captain are adequately trained and qualified to safely operate an aeroplane during the cruise segment of a flight.
2. To ensure appropriate operating procedures are established for the transfer of authority from the captain to the relief captain.
3. To ensure that any developed or amended regulations related to a relief co-pilot or relief captain establish a level playing field.

This risk assessment is used to determine risks and possible mitigating measures during augmented crew operation under current rules and regulations

#### **6.1.4. Assignment Formulation**

The overall objective of the Basic Regulation is to maintain a high and uniform safety level with cost-efficient rules.

The specific objectives of this task are:

4. To ensure a relief co-pilot and a relief captain are adequately trained and qualified to safely operate an aeroplane during the cruise segment of a flight.
5. To ensure appropriate operating procedures are established for the transfer of authority from the captain to the relief captain.
6. To ensure that any developed or amended regulations related to a relief co-pilot or relief captain establish a level playing field.

As a result of the objectives as stated above, the risk assessment should focus on the operation with augmented crew under current rules and regulations.

Standard crew operation is considered safe and not within the scope of this risk assessment.

Proposals for mitigating measures, whenever deemed necessary, should be in the form of proposed amendments to current rules and regulations.

#### **6.1.5. System Description**

The current situation consists of the current rules and regulations related to the relief co-pilot and relief captain in;

- Annex I (Part-FCL) to Regulation (EU) No 1178/2011,
- Annex VII (Part-ORA) to Regulation (EU) No 290/2012,
- Annex III (Part-ORO) and Annex IV (Part-CAT) to draft Regulation on Air Operations.
- AMC or GM, related to the relief co-pilot and relief captain, to the annexes above.

The following rules and AMC text will be reviewed;

- FCL.060 'Recent experience';



- FCL.720.A 'Experience requirements and prerequisites for the issue of class or type ratings — aeroplanes';
- Part-FCL Appendix 9;
- AMC2 ORA.ATO.125 'Training programme';
- ORO.FC.135 'Pilot qualification to operate in either pilot's seat';
- ORO.FC.A.201 'Inflight relief of Flight Crew Members';
- CAT.GEN.AH.105 'Responsibilities of the Commander'.

### 6.1.6. Scope of the HIRA

The scope of the HIRA is limited to augmented crew operation and the specific use of a cruise relief captain and cruise relief co-pilot and requirements regarding the transfer of authority from the captain to the relief captain.

Basic training of flight crew is explicitly not in scope and regarded as satisfactory.

### 6.1.7. Identification of Safety Issues

Issues related to the function of cruise relief pilot (CRP)

code	Identified Safety Issue	Category
si-01	Chain of command unclear, intra cockpit	Chain of command unclear
si-02	Chain of command unclear, cockpit vs. cabin	
si-03	Chain of command unclear, cockpit vs. pax	
si-04	Chain of command unclear, cockpit vs. outside world	
si-05	Lack of competencies/decision making, Application of procedures	Lack of competencies / lack of experience decision making
si-06	Lack of competencies/decision making, Problem solving and decision making	
si-07	Lack of competencies/decision making, aircraft flight path management, automation	
si-08	Lack of competencies/decision making, aircraft flight path management, manual control	
si-09	Lack of competencies/decision making, leadership and teamwork	
si-10	Lack of competencies/decision making, workload management	
si-11	Lack of competencies/decision making, situation awareness	
si-12	Unusual seating position, PF/PNF(PM) issues	Improper dealing with abnormal, including unusual task sharing (e.g. seat related items)
si-13	Unusual seating position, PIC issues	
si-14	Unusual seating position, FO/CRP in LHS	
si-15	Unusual seating position, instructor CPT in RHS	
si-16	Unusual seating position, regular CPT in RHS	
si-	Unusual seating position, not sitting in your own seat	





17 si- 18	Unusual task sharing	
si- 19	Lack of monitoring skills	Lack of monitoring skills
si- 20	False sense of security because of high level of reliability of modern aircraft, complacency, low stress, assumed situational awareness	False sense of security
si- 21	Physical seat change, normal operations	Physical seat change
si- 22	Physical seat change, abnormal operations	
si- 23	Incapacitation, commander	Incapacitation / commander unable to return to the flight deck quickly
si- 24	Incapacitation, first officer, (SFO,CRP)	
si- 25	Incapacitation, second officer (CRCP)	
si- 26	Unclear handshake/transfer of control process/procedures	Unclear handshake/transfer of control process/procedures

A close investigation of the safety issues reveals that some are, at least from a risk point of view, equivalent. The equivalent issues are categorised in the most right column of the table above. The categories will be used in the HIRA.



## Issues related to the function of cruise relief co-pilot (CRCP)

code	Identified Safety Issue	Category
si-27	Chain of command unclear, intra cockpit	Chain of command unclear
si-28	Chain of command unclear, cockpit vs. cabin	
si-29	Chain of command unclear, cockpit vs. pax	
si-30	Chain of command unclear, cockpit vs. outside world	
si-31	Lack of competencies/decision making, Application of procedures	Lack of competencies / lack of experience decision making
si-32	Lack of competencies/decision making, Problem solving and decision making	
si-33	Lack of competencies/decision making, aircraft flight path management, automation	
si-34	Lack of competencies/decision making, aircraft flight path management, manual control	
si-35	Lack of competencies/decision making, leadership and teamwork	
si-36	Lack of competencies/decision making, workload management	
si-37	Lack of competencies/decision making, situation awareness	
si-38	Unusual seating position, PF/PNF(PM) issues	Improper dealing with abnormal, including unusual task sharing (e.g. seat related items)
si-39	Unusual seating position, PIC issues	
si-40	Unusual seating position, instructor CPT in RHS	
si-41	Unusual seating position, regular CPT in RHS	
si-42	Unusual seating position, not sitting in your own seat	
si-43	Unusual task sharing, during a limited time period	
si-44	Lack of monitoring skills	Lack of monitoring skills
si-45	False sense of security because of high level of reliability of modern aircraft, complacency, low stress, assumed situational awareness	False sense of security because of high level of reliability of modern aircraft
si-46	Physical seat change, normal operations	Physical seat change
si-47	Physical seat change, abnormal operations	
si-48	Incapacitation, commander	Incapacitation / commander unable to return to the flight deck quickly
si-49	Incapacitation, first officer, (SFO,CRP)	
si-50	Unclear handshake/transfer of control process/procedures	Unclear handshake/transfer of control process/procedures



si-51	Recency / currency issues	Recency / currency
si-52	Recency / currency issues if CRCP does not exist	
si-53	Decay in manual flying skills	Flying skills
si-54	No training and checking in LDG	
si-55	Area of training and exposure limited to the cruise phase	

A close investigation of the safety issues reveals that some are, at least from a risk point of view, equivalent. The equivalent issues are categorised in the most right column of the table above. The categories will be used in the HIRA.

The categories of threats for both the CRP and the CRCP are similar. The used categories will only be used once in the HIRA. A sanity check on the outcome of the HIRA should assess if this is a correct assumption.

### 6.1.8. Identification of Hazards, Threats and Barrier Failures

The hazard for a “normal” flight is an aircraft in motion. As the risks related to normal operation are not in scope of this HIRA the hazard which is leading in this case is “operation with augmented crew”

The safety Issues found during the brain storm sessions have been categorized based on equivalency and are considered the threats to the Top Event. The Top Event is the moment that the control of the aircraft in motion, with augmented crew, is lost

The barriers assessed on this HIRA are the current rules and regulations in force under EASA.

The following threats may let the above Top Event happen, if unmitigated

code	Relevant Threats
T-01	Chain of command unclear
T-02	Lack of competencies / lack of experience decision making
T-03	Improper dealing with abnormal, including unusual task sharing (e.g. seat related items)
T-04	Lack of monitoring skills
T-05	False sense of security because of high level of reliability of modern aircraft
T-06	Physical seat change
T-07	Incapacitation / commander unable to return to the flight deck quickly
T-08	Unclear handshake/transfer of control process/procedures
T-09	Recency / currency (CRCP only)
T-10	Flying skills (CRCP only)

Each “route” from a threat to the Top Event represents a “threat string”. The following relevant barriers are currently in place to prevent the threat from propagating into a Top Event

Threat strings	EASA barriers
T-01	B-01 ORO.FC.200/ ORO.FC.105 B-02 OR.FC.A.201 B-03 CAT.GEN.MPA.105(B) B-04 AMC3.ORO.MLR.100.4.2 / 4.3
T-02	B-01 ORO.FC.200/ ORO.FC.105 B-05 CAT.GEN.MPA.105(B) B-02 OR.FC.A.201 B-06 AMC1.ORO.FC.230(B).3.i
T-03	B-07 AMC3.ORO.MLR.100.5.1 / 5.2



	B-08	ORO.FC.135
	B-09	ORO.FC.235 (f) (g)
	B-10	AMC3.ORO..MLR.100 - 8.3.10
T-04		Not in scope of HIRA, this is not a typical augmented crew issue.
T-05		Not in scope of HIRA, this is not a typical augmented crew issue.
T-06	B-10	AMC3.ORO..MLR.100 - 8.3.10
	B-11	ORO.FC.A.201 (2)
T-07	B-12	FCL appendix 9.B (3) (f) - 3.6.7
	B-13	AMC1.ORO.FC.220 D(2)
	B-14	AMC3.ORO.MLR.100 - 8.3.14 [OM B.3.(A)]
	B-15	AMC1.ORO.FC.230. (c) 1.2
	B-16	AMC1.ORO.FC.230 (a)(1)(b)
	B-17	AMC3.ORO.MLR.100. 4.3
T-08	B-18	AMC1.ORO.FC.115 & 215 (1) (3)
	B-19	AMC3.ORO.MLR.100.4.1(F) / 4.2 / 4.3
T-09	B-20	FCL.060 (3)
T-10	B-20	FCL.060 (3)

**6.1.9. Classification of Risk**

Each threat string is to be regarded as a component of operational risk and each failing barrier in a threat string may lead to the happening of a top event. Therefore the mission of the HIRA group was to classify the risk contribution from each identified category (safety issue equivalences) to the barrier in the threat string. The group used the following risk matrix to identify the level of risk for each threat strings.

Probability of occurrence		Severity of occurrence				
		Negligible	Minor	Major	Hazardous	Catastrophic
		1	2	3	5	8
<b>Extremely improbable</b>	1					
<b>Improbable</b>	2					
<b>Remote</b>	3					
<b>Occasional</b>	4					
<b>Frequent</b>	5					

**Probability of occurrence<sup>[1]</sup>**

<sup>[1]</sup> These categories need to be applicable to a wide range of safety issues and are taken from the ICAO Safety Management Manual. The description is harmonised with CS-25. Note that these descriptions are indicative only and may have to be adjusted to different rulemaking tasks depending on subsector of aviation.



Definition	Description
Frequent	Likely to occur many times (has occurred frequently)
Occasional	Likely to occur sometimes (has occurred infrequently)
Remote	Unlikely, but possible to occur (has occurred rarely)
Improbable	Very unlikely to occur
Extremely improbable	Almost inconceivable that the event will occur

#### Severity of occurrence

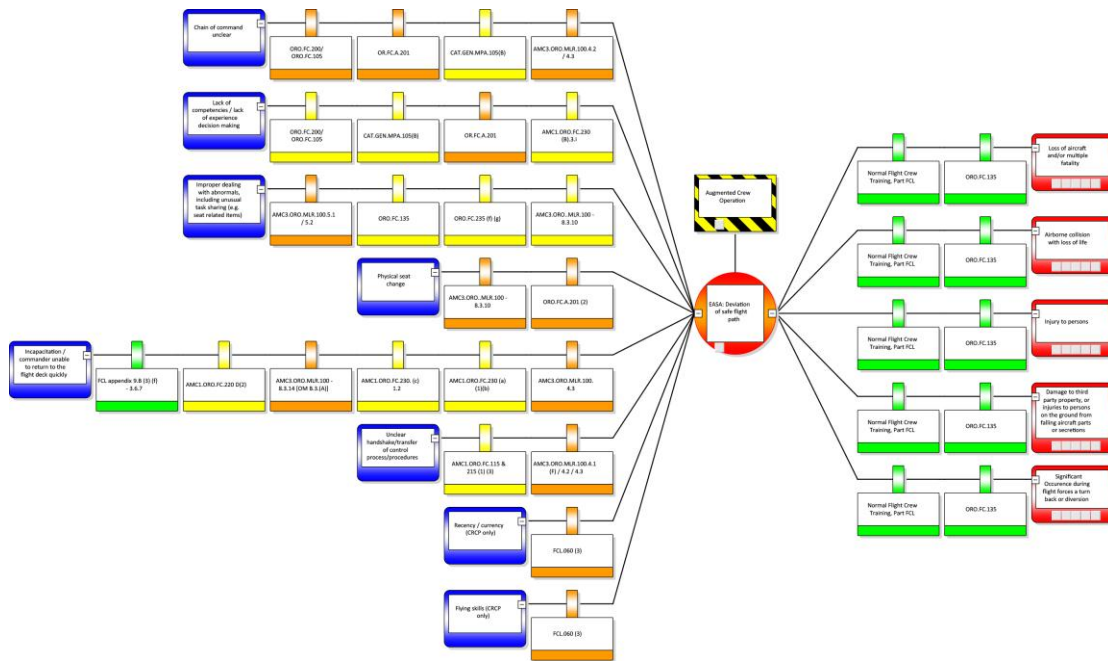
Definition	Description
Catastrophic	Multiple deaths and equipment destroyed (hull loss)
Hazardous	A large reduction of safety margins Maximum two fatalities Serious injury Major equipment damage
Major	A significant reduction of safety margins Serious incident Injury of persons
Minor	Nuisance Operating limitations Use of emergency procedures Minor incident
Negligible	Little consequences

A scale for the severity and probability parameters is used to measure the risk (severity x probability). This results in a **safety risk level**: High / Medium / Low.

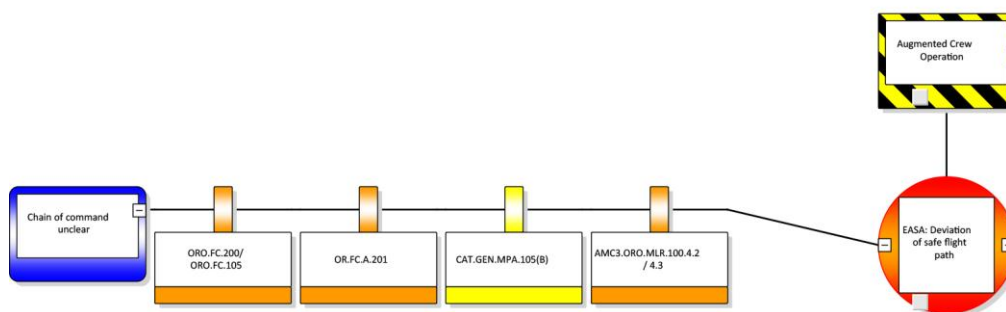
Note that there is no mathematical relationship between threat occurrence, top event occurrence and barrier performance on the one hand and contribution to risk on the other hand. The contributions to risk must be assessed by means of expert judgment, aided by objective data, if available.

#### 6.1.10. Bowtie “Augmented Crew Operation”





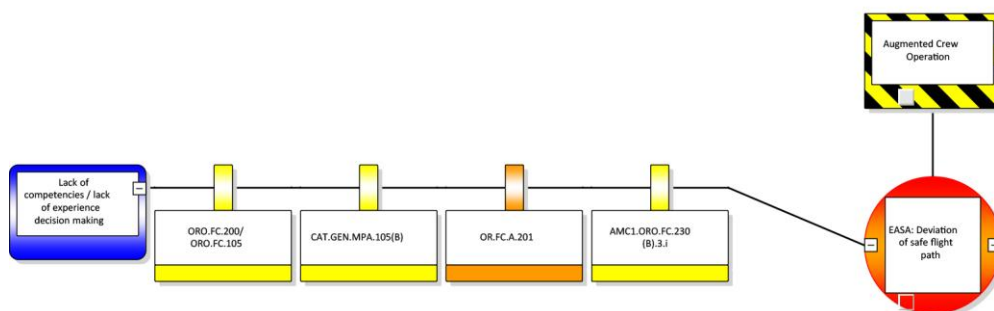
**Threat String 1: Chain of command unclear**



The threat string “chain of command unclear” exists of several factors such as intra cockpit, cockpit vs. cabin, cockpit vs. pax and cockpit vs. outside world, of which the intra cockpit factor is the major contributing factor and is leading for the risk assessment of this threat string.

Threat string	Issue	Barriers	Probability	Impact	Risk
Chain of command unclear	T-01	B-01, B-02, B-03, B-04	Improbable	Major	<b>MED</b>

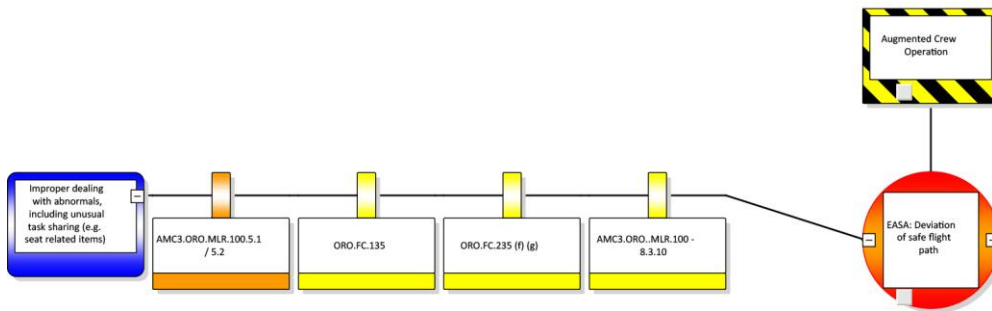
**Threat String 2: Lack of competencies / lack of experience decision making**



The threat string “Lack of competencies / lack of experience decision making” exists of several factors in the form of ICAO core competencies such as application of procedures, communication, problem solving and decision making, aircraft flight path management automation, aircraft flight path management manual control, leadership and teamwork. workload management, situation awareness , of which several competencies are the major contributing factors and are leading for the risk assessment of this threat string.

Threat string	Issue	Barriers	Probability	Impact	Risk
Lack of competencies / lack of experience decision making	T-02	B-01, B-05, B-02, B06	Remote	Major	<b>MED</b>

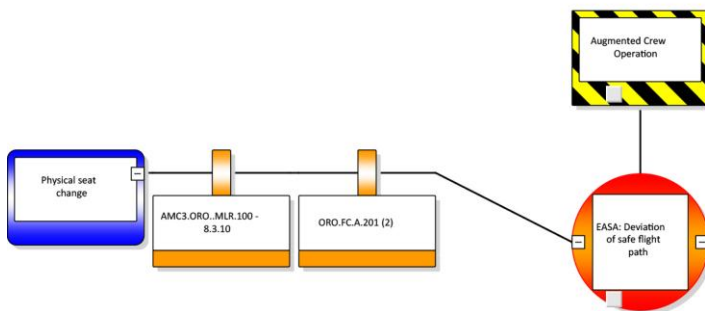
**Threat String 3: Improper dealing with abnormal, including unusual task sharing (e.g. seat related items)**



The threat string “Improper dealing with abnormal, including unusual task sharing” exists of several factors such as not sitting in your own chair, first officer (CRP) or CRCP in left hand seat, instructor captain in right hand seat, regular captain in right hand seat , of which the first officer in the role as CRP is the major contributing factor and is leading for the risk assessment of this threat string.

Threat string	Issue	Barriers	Probability	Impact	Risk
Improper dealing with abnormal, including unusual task sharing (e.g. seat related items)	T-03	B-07, B-08, B-09, B-10	Frequent	Major	<b>HIGH</b>

**Threat String 4: Physical seat change**



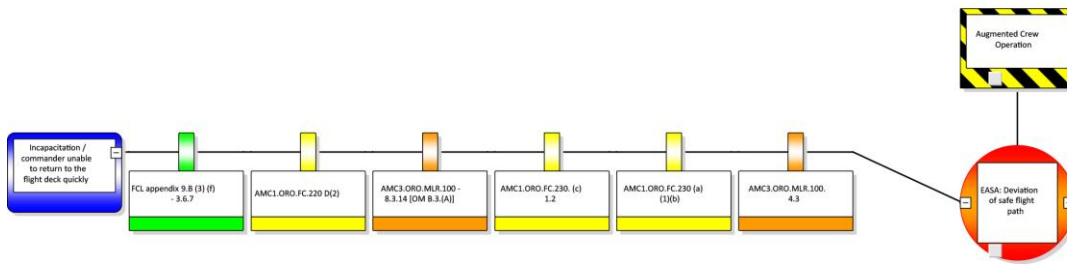
The threat string “physical seat change” takes normal operations and abnormal operations into account of which the normal operations is the major contributing factor due to the high probability and is leading for the risk assessment of this threat string.

Threat string	Issue	Barriers	Probability	Impact	Risk
Physical seat change	T-06	B-10, B-11	Remote	Minor	<b>MED</b>





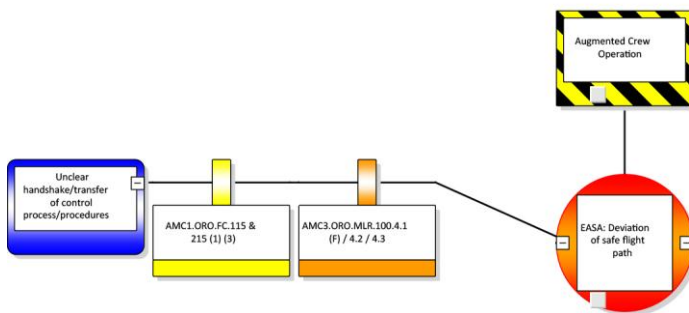
**Threat String 5: Incapacitation / commander unable to return to the flight deck quickly**



The threat string “Incapacitation / commander unable to return to the flight deck quickly” considers incapacitation of the commander, the first officer or the cruise relieve co-pilot, of which an incapacitation of the commander is the major contributing factor and is leading for the risk assessment of this threat string. In existing rules and regulations, and thus crew training, incapacitation is covered and mitigates this risk for two man operation. In the case of augmented crew operation the residual risk, still having two or more crew members available, is considered low.

Threat string	Issue	Barriers	Probability	Impact	Risk
Incapacitation / commander unable to return to the flight deck quickly	T-07	B-12, B-13, B-14, B-15, B-16, B-17	Improbable	Minor	LOW

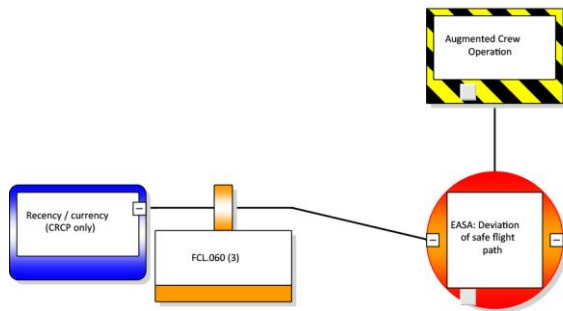
**Threat String 6: Unclear handshake/transfer of control process/procedures**



The threat string “Unclear handshake/transfer of control process/procedures” is considered as a single, and contributing, factor and is leading for the risk assessment of this threat string.

Threat string	Issue	Barriers	Probability	Impact	Risk
Unclear handshake/transfer of control process/procedures	T-08	B-18, B-19	Occasional	Major	MED

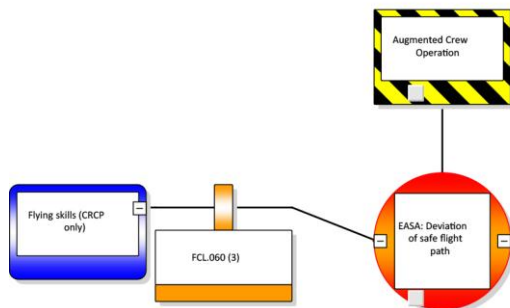
**Threat String 7: Recency / currency (CRCP only)**



The threat string “Recency / currency (CRCP only)” exists of several factors such as recency currency of the CRCP and a positive factor which is the higher exposure of the regular crew as a consequence of having a CRCP. The recency/currency of the CRCP is the major contributing factor and is leading for the risk assessment of this threat string.

Threat string	Issue	Barriers	Probability	Impact	Risk
Recency / currency (CRCP only)	T-09	B-20	Improbable	Minor	LOW

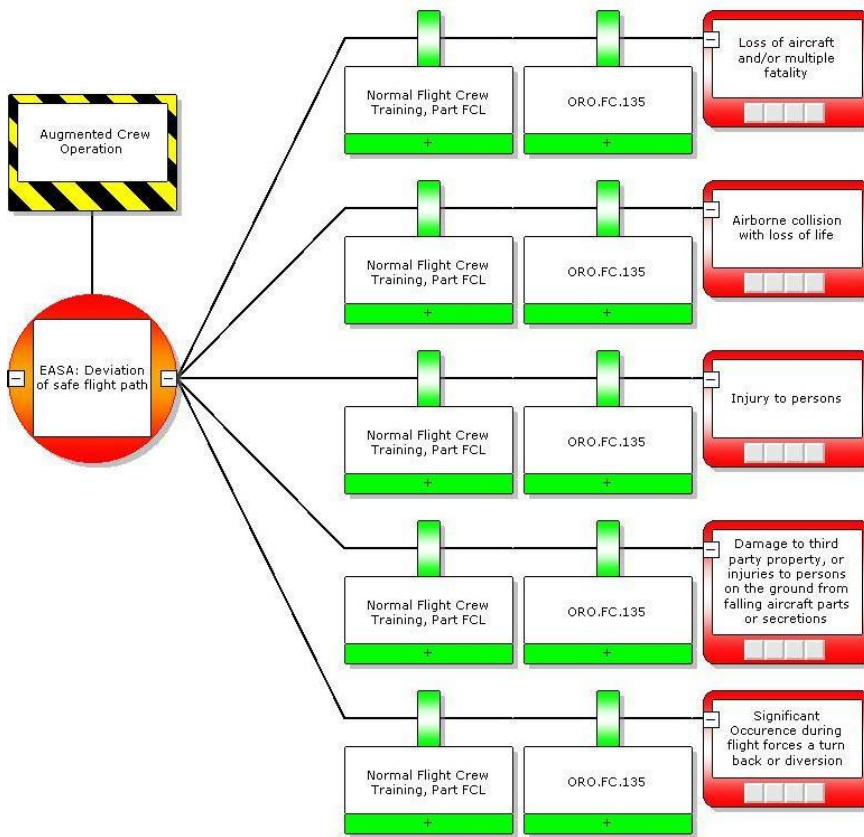
**Threat String 8: Flying skills (CRCP only)**



The threat string “Flying skills (CRCP only)” exists of several factors such as decay in manual flying skills, no training and checking on landings, area of training limited to the cruise phase. All factors are contributing for the risk assessment of this threat string..

threat string	issue	barrier	effect	risk contribution	Risk
Flying skills (CRCP only)	T-010	B-20	Occasional	Minor	MED

6.1.11. Generic outcomes



For the overall assessment, the outcome side of this combined bow tie was assessed for its generic risk. The corrective barrier “normal flight crew training” is considered sufficient for the purpose of this HIRA. The risk of this outcome string is assessed as low. No further mitigating recommendations are made in this report.

6.1.12. Conclusion of the Hazard Identification and Risk Assessment

The table below gives an overview on how the safety issues from the brainstorm, combined into categories (safety issues with equivalence) and the classification of the risk contribution onto the Top Event “Aircraft deviates from intended safe (flight) path”.

Threat string	Issue	Barriers	Probability	Impact	Risk
Chain of command unclear	T-01	B-01, B-02, B-03, B-04	Improbable	Major	MED
Lack of competencies / lack of experience decision making	T-02	B-01, B-05, B-02, B-06	Remote	Major	MED
Improper dealing with abnormals, including unusual task sharing (e.g. seat related items)	T-03	B-07, B-08, B-09, B-10	Frequent	Major	HIGH
Physical seat change	T-06	B-10, B-11	Remote	Minor	MED
Incapacitation / commander unable to return to the	T-07	B-12, B-13, B-14, B-15, B-16, B-17	Improbable	Minor	LOW



flight deck quickly					
Unclear handshake/transfer of control process/procedures	T-08	B-18, B-19	Occasional	Major	<b>MED</b>
Recency / currency (CRCP only)	T-09	B-20	Improbable	Minor	<b>LOW</b>
Flying skills (CRCP only)	T-010	B-20	Occasional	Minor	<b>MED</b>

### 6.1.13. Recommendations for safety barriers

It is recommended to EASA to mandate the proposed changes to current rules and regulations to reinforce the barriers mentioned so that their contribution to the operational risk associated with augmented crew operation is reduced to low.

Recommendation Nr. 2 is following the implementation of other recommendations and in itself does not mitigate the defined issues in this HIRA.

Safety issues	Risk contribution	Recommendations	Residual risk after mitigation
Chain of command unclear	<b>MED</b>	6, 7, 8, 9, 10	<b>LOW</b>
Lack of competencies / lack of experience decision making	<b>MED</b>	6, 7	<b>LOW</b>
Improper dealing with abnormals, including unusual task sharing (e.g. seat related items)	<b>HIGH</b>	6, 7, 8, 9, 10	<b>LOW</b>
Physical seat change	<b>MED</b>	8, 9, 10	<b>LOW</b>
Incapacitation / commander unable to return to the flight deck quickly	<b>LOW</b>	1, 3, 4, 6, 7, 8, 9, 10	<b>LOW</b>
Unclear handshake/transfer of control process/procedures	<b>MED</b>	8, 9, 10	<b>LOW</b>
Recency / currency (CRCP only)	<b>LOW</b>	1, 3	<b>LOW</b>
Flying skills (CRCP only)	<b>MED</b>	1, 2, 3, 4	<b>LOW</b>

## ANNEX 1

**Annex I (Part-FCL) to Commission Regulation (EU) No 1178/2011 is amended as follows:**

### Recommendation 1

#### FCL.060 Recent experience

[...]

(b) Aeroplanes, helicopters, powered-lift, airships and sailplanes. A pilot shall not operate an aircraft in commercial air transport or carrying passengers:

[...]

(3) as cruise relief co-pilot unless he/she has carried out recency and refresher flying skill training in an FFS at intervals not exceeding 90 days. This refresher training may be combined with the operator's refresher training prescribed in Part-ORO or the checking prescribed in this Part.

(i) ~~has complied with the requirements in (b)(1); or~~

(ii) ~~has carried out in the preceding 90 days at least 3 sectors as a cruise relief pilot on the same type or class of aircraft; or~~



~~(iii) has carried out recency and refresher flying skill training in an FFS at intervals not exceeding 90 days. This refresher training may be combined with the operator's refresher training prescribed in Part-OR.OPS.~~

[...]

### **Recommendation 2**

#### **FCL.720.A Experience requirements and prerequisites for the issue of class or type ratings — aeroplanes**

Unless otherwise determined in the operational suitability data established in accordance with Part-21, an applicant for a class or type rating shall comply with the following experience requirements and prerequisites for the issue of the relevant rating:

[...]

- (e) Notwithstanding paragraph (d), a Member State may issue a type rating with restricted privileges for multi pilot aeroplane that allows the holder of such rating to act as a cruise relief co-pilot above Flight Level 200, provided that two other members of the crew have a type rating in accordance with paragraph (d).

To remove the restriction, the applicant shall comply with FCL.740(b) and with the practical take-off and landing training.

[...]

### **Recommendation 3**

#### **AMC1 FCL.720.A (e)**

To fulfil the practical take-off and landing training refer to AMC2 ORA.ATO.125 Training programme (k).

### **Recommendation 4**

#### **Appendix 9 — Training, skill test and proficiency check for MPL, ATPL, type and class ratings, and proficiency check for IRs — B. Specific requirements for the aeroplane category**

##### **B. Specific requirements for the aeroplane category**

[...]

CONTENT OF THE TRAINING/SKILL TEST/PROFICIENCY CHECK

[...]

##### *6. Multi-pilot aeroplanes and single-pilot high performance complex aeroplanes:*

[...]

- (i) In case of a restricted type rating issued in accordance with FCL.720.A(e), the applicants shall fulfil the same requirements as other applicants for the type rating except for the practical exercises relating to the take-off and landing phases in an aeroplane or ZFTT in an FSTD as applicable.
- (j) In case of a proficiency check for a restricted type rating issued in accordance with FCL.720.A(e), the applicants shall fulfil the same requirements as other applicants for the revalidation or renewal of a type rating except for the practical exercises relating to take-off.

## **ANNEX 2**

### **Annex III (Part-ORO) to Commission Regulation (EU) No 965/2012 is amended as follows:**



**Recommendation 5****ORO.FC.A.201 In-flight relief of flight crew members**

[...]

(b) The co-pilot may be relieved by:

[...]

(2) for operations only above FL 200, a cruise relief co-pilot that complies with the following minimum qualifications:

[...]

(iii) recurrent training and checking in accordance with ORO.FC.230 ~~except the requirement for take-off and landing training.~~

(iv) recurrent checking in accordance with ORO.FC.230 except the requirement for take-off checking.

**Recommendation 6****AMC1 ORO.FC.A.201 (a)(2)(ii)**

The following elements in AMC1 ORO.FC.115&215 Crew resource management (CRM) training (g), in depth;

Error prevention and detection;

Shared situation awareness, shared information acquisition and processing;

Workload management;

Effective communication and coordination inside and outside the flight crew compartment;

Leadership, cooperation, synergy, delegation, decision making, actions;

**Recommendation 7****GM1 ORO.FC.A.201 (a)(2)(ii) and (iii)**

In order to enhance the command skills of the pilot relieving the commander, an operator should adapt its training programme to include training exercises related to issues identified by the operator's safety management system. In addition, an operator should consider including exercises such as initiation of emergency descent, engine failure in the cruise, smoke control and/or removal, unreliable airspeed indication, upset prevention and recovery training.

**Recommendation 8****AMC1 ORO.FC.100(d)**

When operating with an augmented crew, the operator should determine the requirements for crew members to occupy their assigned stations or seats during the different phases of flight or whenever deemed necessary in the interest of safety and, for aeroplane operations, including procedures for controlled rest in the flight crew compartment. The operator should also determine the minimum flight level or altitude at which crew members should not vacate their assigned station for the purpose of transferring duties to another crew member.

In addition, the operator should establish procedures for seating positions and the responsibilities delegated to the acting pilot-in-command. These procedures should consider all possible crew compositions such as, multiple captains operating together, instructors during line training and checking and possible consequences following an incapacitation.



**Recommendation 9****AMC2 ORO.GEN.110(f)****PROCEDURES FOR THE RELIEF OF FLIGHT CREW MEMBERS**

The operator should establish procedures, if necessitated by the duration of the flight, for the designation of the pilot-in-command/commander, including the handover and related briefing for the relief of the pilot-in-command/commander or other members of the flight crew. The handover should cover essential information on command delegation and associated task sharing. The briefing should focus on continuity of the flight;

**Recommendation 10****GM1 ORO.GEN.110(f)**

The briefing should include, for example:

1. Technical status of aeroplane, including remaining fuel.
2. En-route and destination weather
3. Alternate airports
4. Contingency scenarios  
Cabin status

**6.1.14. Conclusions of the Residual and Substitute Risk Assessment and Recommendations**

The mitigations proposed by the task force reduce all HIGH and MED residual to SMALL. Therefore it is recommended to EASA implement the proposed mitigations and accept the residual risk.

**6.1.15. References**

Annex I (Part-FCL) to Regulation (EU) No 1178/2011,

Annex VII (Part-ORA) to Regulation (EU) No 290/2012,

Annex III (Part- ORO) and Annex IV (Part-CAT) to draft Regulation on Air Operations.

AMC or GM, related to the relief co-pilot and relief captain, to the annexes above.



6.2. Statistical analysis

Table 1

Flight	Flights	
	Number	Share
≤ 4 hours	6,070,099	91.7%
> 4 hours	552,599	8.3%
> 8 hours	250,536	3.8%
> 9 hours	183,374	2.8%
> 10 hours	117,717	1.8%
Total	6,622,698	100.0%

Table 2

Flight time (t)	Flights	
	Number	Share
t ≤ 4 hours	6,070,099	91.66%
4 < t ≤ 8	309,218	4.67%
8 < t ≤ 12	207,801	3.14%
12 < t ≤ 16	35,230	0.53%
t > 16	350	0.01%
Total	6,622,698	100.00%

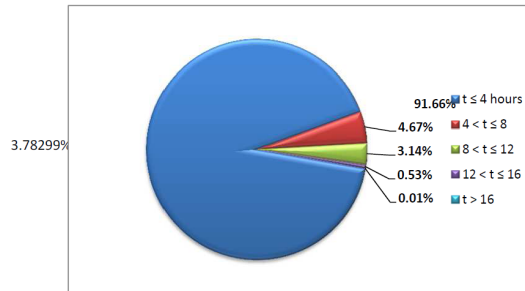
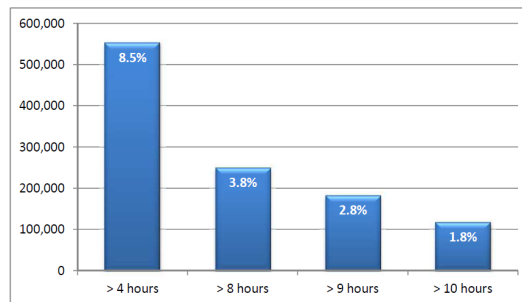


Table 1

Flighttime	Flights	
	Number	Share
≤ 4 hours	6,062,944	91.5%
> 4 hours	559,754	8.5%
> 8 hours	250,536	3.8%
> 9 hours	183,374	2.8%
> 10 hours	124,872	1.9%
Total	6,622,698	100.0%

Table 2

Flighttime	Flights	
	Number	Share
t ≤ 4 hours	6,062,944	91.5%
4 < t ≤ 8	309,218	4.7%
8 < t ≤ 12	207,801	3.1%
12 < t ≤ 16	35,230	0.5%
t > 16	7,505	0.1%
Total	6,622,698	100.0%





**Applicable ICAO SARPS****ICAO Annex 1 – Personnel Licensing***2.1.4 Circumstances in which class and type ratings are required**[...]**2.1.4.1.1, When a type rating is issued limiting the privileges to act as co-pilot, or limiting the privileges to act as pilot only during the cruise phase of the flight, such limitation shall be endorsed on the rating.**[...]***ICAO Annex 6 – Operation of Aircraft Part I – International Commercial Air Transport - Aeroplanes***9.4.2 Recent experience – cruise relief pilot**9.4.2.1 An operator shall not assign a pilot to act in the capacity of cruise relief pilot in a type or variant of a type of aeroplane unless, within the preceding 90 days that pilot has either:**a) operated as a pilot-in-command, co-pilot or cruise relief pilot on the same type of aeroplane; or**b) carried out flying skill refresher training including normal, abnormal and emergency procedures specific to cruise flight on the same type of aeroplane or in a flight simulator approved for the purpose, and has practised approach and landing procedures, where the approach and landing procedure practice may be performed as the pilot who is not flying the aeroplane.**9.4.2.2 When a cruise relief pilot is flying several variants of the same type of aeroplane or different types of aeroplanes with similar characteristics in terms of operating procedures, systems and handling, the State shall decide under which conditions the requirements of 9.4.2.1 for each variant or each type of aeroplane can be combined.*

**ICAO Document 9379 – Manual of procedures for Establishment and Management of a State's Personnel Licensing System****3.1.4 Cruise relief pilot (Annex 1 and Annex 6 requirements)**

*Note.* – There is no guidance in other ICAO documents for cruise relief pilots. This section therefore goes beyond licensing requirements and also contains operational guidance for the maintenance of competency and the recency of experience.

Introduction

Augmented flight crew are defined in Attachment A to Annex 6 – Operation of Aircraft, Part I – International Commercial Air Transport – Aeroplanes as "a flight crew that comprises more than the minimum number required to operate the aeroplane and in which each flight crew member can leave his or her assigned post and be replaced by another appropriately qualified flight crew member for the purpose of in-flight rest".

Practices in relation to the operation of aircraft with augmented flight crews vary considerably among States and operators. Some practices involve a "cruise relief pilot" who is normally only assigned to pilot duties in the cruise portion of a flight, i.e. above a certain altitude (e.g. FL 200) determined by the operator, and generally uses a cockpit observer seat during take-off, climb, descent, approach and landing. Other practices involve using a pilot who is either a pilot-in-command or a co-pilot but is assigned as cruise relief pilot for a flight where an augmented crew is required. Some operators use "cruise relief captains" who are only assigned to pilot duties in the cruise portion of a flight, but are in command under delegation while the pilot-in-command is resting. As part of their Safety Management System, operators should manage the risks specific to augmented flight crew operations, including those identified when the pilot-in-command is resting. Factors to consider include, but are not limited to, the following:

- a clear definition of the chain of command and of assigned duties for all operations, including in case the pilot-in-command becomes incapacitated or is unable to return to the cockpit for any reason;
- procedures and conduct of briefings when any pilot is relieved or returns to duty;
- required qualifications and competence in the augmented flight crew (e.g. when the pilot-in-command is resting, is there always a pilot at the flight controls qualified as pilot-in-command (except when that pilot's absence is necessary for the performance of duties in connection with the operation of the aircraft or for physiological needs) or, if not qualified as pilot-in-command, what are the competencies required to be demonstrated to ensure the pilot second-in-command can take appropriate decisions and safely manage the flight?); and
- Distance of the flight crew rest area from the cockpit.

Type rating

Annex 1 requires a cruise relief pilot to hold at least a valid CPL or MPL, with the appropriate type rating.

Annex 1 does not differentiate among the functions of pilot-in-command, co-pilot or cruise-relief pilot for type rating training and checking requirements: all pilots must be fully type-rated. When the national regulations governing type rating allows for the type rating to be obtained through "zero-flight time" training, i.e. entirely trained to proficiency in an FSTD approved for that purpose by the Licensing Authority, a pilot, including a cruise relief pilot, could be qualified on type without conducting "base" training (i.e. without conducting take-offs and landings in the actual aircraft during training). When a type rating is issued limiting the privileges to act as pilot only during the cruise phase of flight, such limitation shall be endorsed on the rating (Annex 1, 2.1.4.1.1). This ensures that any conversion or validation of the licence would carry the appropriate privileges.



Maintenance of competency (after meeting the type-rating requirement)

Annex 1, 1.2.5.1 also requires that a pilot exercising licence privileges maintains competency and meets the requirements for recent experience established by the State of Registry. In the case of a cruise relief pilot, Annex 6, Part I, paragraph 9.3.1 requires the operator to establish and maintain a ground and flight training programme, approved by the State of the Operator, which ensures that all cruise relief pilots are adequately trained, initially and on a recurrent basis, to perform their assigned duties. Such training may be conducted in an FSTD approved by the State of the Operator for that purpose (Annex 6, Part I, paragraph 9.3.2). For the cruise relief pilot, this initial and recurrent training will include the training described in Annex 6, Part I, 9.3.1, e.g. proper flight crew coordination and training in all types of emergency and abnormal situations or procedures caused by aircraft malfunctions, fire or other abnormalities (such as crew incapacitation that would require the cruise relief pilot to perform duties in the approach and landing phases) and training in visual and instrument flight procedures. The initial and recurrent training for a cruise relief pilot shall include an assessment of competency. In addition, pilot proficiency checks shall be performed twice within any period of one year (with a minimum of 4 months between any two such checks) to ensure competence in piloting technique and in the execution of emergency procedures and, if applicable, the ability to comply with instrument flight rules (Annex 6, Part I, 9.4.4 refers).

Recency of experience

In addition, to be assigned for duty, cruise relief pilots must have within the preceding 90 days (Annex 6, Part I, 9.4.2 refers) either:

- Operated as pilot-in-command, co-pilot or cruise relief pilot on the same type of aeroplane (see also 3.1.3 of this Part); or
- Carried out flying skill refresher training including normal, abnormal and emergency procedures specific to cruise flight on the same type of aeroplane (see also 3.1.3 of this Part) or in an FSTD approved for that purpose, and practiced approach and landing procedures.

