GCAA

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UAE General Civil Aviation Authority

CIVIL AVIATION ADVISORY PUBLICATION

CAAP 14

ULR OPERATIONS

ADDITIONAL FLIGHT & DUTY TIME GUIDANCE FOR ULTRA LONG RANGE OPERATIONS (ULR) AND OTHER SPECIFIC LONG RANGE (SLR) OPERATIONS

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1 Purpose

This Civil Aviation Advisory Publication (CAAP) provides policy and guidance material for the operation of UAE aircraft operating worldwide on regular Ultra Long Range (ULR) operations as described in Paragraph 3 – Applicability below.

This CAAP will provide methods acceptable to the GCAA for showing equivalent means of compliance and equivalent safety. The requirements and characteristics of a Fatigue Risk Management System are also addressed.

2 Status of This CAAP

This is the second edition of CAAP 14 – ULR Operations dated 1st July 2010. It supersede the previous 01 September, 2003 edition and remains current until being withdrawn. As some of this information includes UAE legislative requirements, compliance is required wherever the word "shall" is used in this document.

3 Applicability

This guidance material applies to all UAE operators when operating on ULR operations as defined in paragraph 6.2;

4 Contents

5 References

The primary references are

(a) CAR Part IV, Subpart Q.

(b) FAA Advisory Circular AC 121-31 on Flight Crew Sleeping Quarters and Rest Facilities

(c) Flight Safety Digest on Crew Alertness in Ultra Long Range operations (August/September 2005)

(d) FAA study on Fatigue & Performance in Aviation by Thomas E. Nesthus, PH. D. (Civil Aerospace Medical Institute & Aerospace Human Factors, Research Division, Oklahoma City, OK, June 2009)

(e) Fatigue Risk Management Systems produced by numerous transportation authorities (e.g.: Australia/New Zealand Standard 4360:1999)

(f) Safety Recommendation document prepared by The Honorable Robert A. Sturgell, Acting Administrator, FAA, by the National Transportation Safety Board Washington, D.C. 20594, June 2008)

6 Introduction

6.1 General

The previous approach to long haul operations has been an informal increment of historical rules and requirements. This has long been recognised by the aviation industry and in 2000 a group of concerned manufacturers, operators, regulators and crew organizations created a working group in cooperation with the Flight Safety Foundation.

The objective was to create a methodology for Ultra Long-Range operations (ULR) based on experience from all groups. After the final meeting in Kuala Lumpur in March, 2003 the working group recommended a general acceptance of an initial operational concept based on scientifically based modelling of city pairs. Included in the recommendations were guidelines to provide for an acceptable means for determining what sufficient in-flight rest/sleep is so crewmembers would be alert enough to perform duties in a safe manner, followed by another meeting that took place in held in Montréal, Canada in November 2009 and was organized by ICAO to introduce a new standard of Annex 6 in relation to the Fatigue Risk Management System (FRMS).The guidance material and policy contained in this CAAP reflects the above.

It was also recognized that the present CARs, and the ULR concept, do not adequately address augmented crew operations where more than three pilots are carried. This CAAP addresses this deficiency. Operators should refer to the definitions of ULR below.

6.2 Definitions

6.2.1 Ultra Long Range Operation (ULR)

An operation involving any sector between a specific City Pairing (Point A- Point B-Point A) where the scheduled flight time could exceed 16 hours at any time during a calendar year taking into account the mean and seasonal wind changes.

The maximum permitted FDP (including Ramp/Air Turn Backs) for any ULR operation is 22:00 hours on both a scheduled/planned and actual basis.

Note: A ULR operation applies to both sectors of a city pair.

6.2.2 FRMS

"A scientifically based data-driven flexible alternative to prescriptive flight and duty time limitations that forms part of an operator's Safety Management System and involves a continuous process of monitoring and managing fatigue risk" (ICAO).

Note: Unless otherwise stipulated in the paragraph, the term crew means flight and cabin crewmember throughout this manual.

7 Crew Avoidance of Excessive Fatigue Operational Requirements

CAR OPS 1 Subpart Q which specifies the limitations applicable to flight time and flight duty periods for crew members is for operations of all flight. The following, however, are additional requirements for ULR operation.

7.1 Crew Rest Facilities

Designated crew rest facilities shall be provided on board aircraft and should be certified to an industry standard. These rest facilities comprise not less than two independent rest areas with horizontal bunks and shall provide an environment that is conducive to rest/sleep. Each rest area shall be equipped with a sleeping surface (bunk or equivalent), adequate lighting, air conditioning, independent temperature controls and have noise levels which afford rest and are less than 75 dBA. Humidity enhancement shall be provided, Operators may refer to the FAA Advisory Circular AC 121-31 on crew rest facilities, he Crew Rest Facilities shall be subject to the prior approval of the GCAA or be part of the certification exercise.

7.2 Operations Manual

ULR shall not be conducted unless approved by the GCAA and in accordance with the provisions of the approved Operations Manual. The Operations Manual shall contain specific instructions to ensure that the ULR flight meets the following requirements:

(a) ULR Pre-flight and In-flight Rest Planning

A scheme shall be established to provide guidance to the crew on the expected pre-flight preparations and in-flight rest to be taken. Flight crew are to be appropriately rested for the ULR flight.

(b) ULR pre-flight Rostering Requirements:

Prior to operating a ULR flight or a ULR Standby departing UAE, all crew members shall be scheduled for 02 days off including 03 local nights of rest in base.

(c) ULR Flight Rest Period Away from Base

In the ULR Rostered Duty Assignment, the scheduled period free of flying duties away from base shall be at least 48 hours.

(d) Post ULR Rostered Duty Assignment Rest At Base Before embarking on the Next Flight:

All crewmembers shall be scheduled for a minimum of 2 days off including 03 local nights of rest in base upon completion of a ULR pairing followed by any other duty or a ULR pairing.

(e) Each crew member shall not be rostered more than 02 ULR Pairings/calendar month.

(f) Travelling Time

Travelling time, other than time spent on positioning, shall not be countered in the computation of the FDP. Where the usual travelling time from the crew member's home to the normal departure aerodrome is in excess of 90 minutes, the crew member concerned shall make rest arrangements nearer the departure aerodrome, so as to ensure that he or she has the minimum rest period as specified in paragraph (b) above.

(g) Cabin crew shall be provided with a minimum in flight rest period of (3 1/2) hours for any ULR flight.

7.3 Flight Disruptions

(a) At base:

Delayed flights will require a replacement of Crew if the projected FDP would exceed total of 22:00 hours.

(a) Standby Crew

i. At base, the standby crew for a ULR Duty shall be rostered such that the standby flight crew meet the requirements of paragraph 7.2 above.

ii. At outstation, the ULR flight crew may be called to operate an ULR FDP after achieving a rest period of at least 24 hours including one local night provided the

Commander and one other crew have met the rest requirement of paragraph 6.1.2 (c) above. The flight crew if has been called out for the ULR FDP will be deemed to have completed a ULR pairing and shall be given the rest provided in paragraph 6.1.2 (d) above.

7.4 Crew compliment and composition

7.4.1 Flight Crew compliment and composition

(a) Each ULR flight is to be operated by no less than four (4) pilots of whom two (2) must be pilot-in-command qualified.

(b) The duty flight crew shall comprise at least two pilots of which one crewmember is pilot-in-command qualified.

7.4.2 Cabin Crew Complement and Composition

Each ULR flight is to be operated by the following Cabin Crew complement which will be in accordance with following table:

AIRCRAFT TYPE	CREW COMPOSITION
A380	24
A340	14
B777/200	14
B777/300	16

The required crew complement shall include at least two Crew-In-Charges for each ULR sector with at least one Crew-In-Charge on duty at all times.

Note: A Crew-In-Charge is defined as a cabin crew member who has completed the Senior Cabin Crew member training requirements as specified in the Cabin crew Training Manual and the CAR-Ops Subpart O.

8 Application and Approval Process

8.1 General

In order to be granted approval to conduct ULR operations, an operator must satisfy the GCAA that the proposed operation can be conducted safely.
The application and approval process sequentially are as follows:

(a) Submission of an operational plan by the operator including the fatigue risk assessment,

(b) Authorization to commence trial by the GCAA,

(c) Validation by the operator,

(d) Validation results and final approval by the GCAA, and

(e) Ongoing safety oversight/audit

(f) Deviations from the CAAP requirements are not permitted unless the FRMS has been established by the operator based on the ICAO FRMS requirements. The recommendations on deviation made by the FRMS are therefore a pre-condition for GCAA approval.

Areas to be considered by the Operator:
The following areas are to be considered by the Operator before the submission of an ULR Operational Plan:

(a) Aircraft entry into service and/or proposed route schedule

(b) Period to obtain scientific-based, or equivalent, data.

(c) Rostering and scheduling procedures, including rostering computer software programmes.

(d) Training and education requirements.

(e) The regulatory process

8.2 Approval Process

The approval process will require at least the following:

(a) Evaluation phase

1. Submission of the proposed operational plan.
2. Consideration of the proposed operational plan by the GCAA. This should be an iterative process between the GCAA and the operator.
3. Submission of a draft Operations Manual amendment reflecting proposed operational plan.
4. Initial approval by the GCAA as a Letter of Approval for a limited time period.

(b) Final approval

1. Submission of the validation results based on the validation programme.
2. Consideration of the validation results by the GCAA. There may require modification of the regulatory basis and further validation required.
3. Final approval as an amendment to the operator's Operations Manual.

9 Operational Plan

9.1 General

The operational plan must be developed using a scientifically-based approach, or equivalent, to achieve an acceptable level of safety. The objective is to determine the best strategies for pre-flight, in-flight and recuperative rest, scheduling and rostering.

9.2 Scientifically-based Approach

A scientifically based approach may refer to mathematical modelling of a City Pair conducted by an authoritative source or may be by expert consultation. Consultants should be recognised within the industry as experienced in the understanding and prediction of the impact of flight and duty schedules on crew performance and flight safety. Alertness and performance modelling is still an inexact science and it should not be used in isolation. Operators should research the most appropriate modelling available and preferably used by other operators (e.g.: Qinetic, NASA). It is one tool that can be used to develop and assess the operation and is a support, but not a substitute, for operational knowledge and normal regulatory processes. Ideally mathematical modelling should have an operational input.

9.3 Equivalent Approach

An equivalent approach to achieve an acceptable level of safety may be based on operational experience. It may include the applicant's previous experience in operations to similar city pairs, as defined by the GCAA, or another operator's modelling information or validation programme between similar city pairs. It must be considered that another operator's schedule to the same or similar city pair may not be appropriate due to their individual work practices, departure time windows, crew complement and rest facilities etc.

9.4 Content of Operational Plan

9.4.1 General:

The operational plan, and associated modelling, must be predicated on specific schedules and rest strategies based on those schedules. The operational plan is therefore only valid for those schedules and strategies.

9.4.2 Schedules:
Scheduling is normally a commercial function of an operation. However, the operational management must ensure that the commercial department is fully aware of these requirements so that the schedule is realistic and generally not changed.

9.4.3 Flight Crew Complement:
For initial operations on a City Pair, the number of crew required would need to be assessed by acceptable scientific means and industry operational experience available at the time. Following this assessment, if there is a discrepancy between the two recommendations, best practice would advocate adopting the higher crew complement. Initially, the GCAA shall require a minimum of 4 pilots for ULR operations.

9.4.4 Crew Qualifications:
Crews should have adequate operational experience including previous long haul flights where augmented crew and time zone change rest strategies have been utilized. For ULR flights, the crew complement must include at least two pilots, who hold Pilot-in-Command qualifications and at least two, but preferably all, should be qualified for the take-off and landing phases of flight. A Pilot-in-Command qualified crewmember must be at the controls at all times excluding operator authorized breaks.

9.4.5 Cabin Crew Complement:
The cabin crew complement shall be at least the minimum required by the GCAA. Sufficient augmented cabin crew shall be carried to enable adequate rest on board for all cabin crew members. The operator shall have a policy to address last minute cabin crew “no-shows” to ensure the complement is met and the proposed rest strategy is not compromised.

9.4.6 Standby System
There shall be a robust standby crew system in place. The operator shall demonstrate to the GCAA that their standby system will ensure that a crewmember assigned to a ULR or specific long-range operation duty from standby can fulfil the pre-flight rest requirements. Where a standby crew system is utilized, crewmembers shall be aware of the planned assignment to address delays beyond the departure window.

9.4.7 Departure Time Windows
Departure time windows from base and outstation should be clearly defined in the operational plan and should be derived by scientific or equivalent means.

9.4.8 Rest Strategy
There shall be a rest strategy for flight and cabin crew. Guidance on rest must be provided to the operating flight and cabin crew as well as standby crew members. It is required that for the operation. Rest requirements should take into account both preparatory and recuperative rest that meets the modelled assumptions, or equivalent, covering the strategies for:

(a) Pre-flight rest

(b) In-flight rest

(c) Post-flight rest

9.4.9 Contingencies:

The operational plan must also include strategies for dealing with operational considerations such as:

(a) Standby activation.

(b) Exceptional circumstances/commander's discretion.

(c) MEL limitations.

(d) Plans to cope with delays and disruptions, including diversions.

9.4.10 The proposed validation process

The application should include details on the proposed process by which the operation will be validated or shown to be safe. Details on the approach to validation are outlined in Section1111.

The proposed validation programme should include at least the following:

(a) Standardised methodology for initial validation

(i) Sample size

(ii) Sampling intervals

(iii) Objective measures – operational and/or individual

(iv) Subjective measures

(b) Ongoing monitoring (all aspects i.e. sleep achieved, performance etc.)

(i) Sample size

(ii) Sampling intervals

(iii) Objective measures – operational and/or individual

(iv) Subjective measures

(c) Feedback reporting system

(d) Establishment of an operational Steering Committee or FRMS

10 Documentation

The Operations Manual shall address all of the above, in the appropriate operational, cabin crew and training sections, as well as any additional MEL items associated with a crew rest facility. An operator will need to revise existing sections of an approved Flight and Duty Time scheme to address these long range operations as the CAR Part IV, Subpart Q basis of a scheme may no longer apply. For example, standby provisions, duty flight crew, crew augmentation, crew rest facilities and the use of dedicated standby crew.

11 Validation Programme

11.1 Responsibility

Validation is the operator's responsibility and is required from the commencement of operations.

11.2 Objective

The objective is to validate the agreed assumptions on which the operational approval is based. For example, city pairs/clusters, aircraft type(s), departure windows, routing, pre-flight and recuperative rest, crew complement, in flight rest strategy, adequacy of facilities etc.

11.3 Process

Validation should be performed by the operator's FRMS or Steering Committee, as appropriate. Validation may consist of both objective and subjective measures and must be shown to be statistically significant with due consideration to sampling size and sampling interval. It should be conducted in two phases.

(a) Initial Validation:

The initial validation should be sufficiently rigorous to ensure operational safety is equivalent to, or better than, current long haul operations. As a result of initial validation, the operational plan, including any model, may then be adjusted as required and ongoing monitoring will take place.

(b) On-going Monitoring:

This is the operator's responsibility and should be part of the operator's FRMS or Steering Committee, as appropriate.

11.4 Validation Re-assessment

An assessment should be conducted to determine if re-validation is required whenever there is any change to;

(a) The operational model;
(b) City pair/cluster;
(c) Departure window,
(d) Major route changes,

(e) Aircraft type; and
(f) Periodically, as an on-going monitoring process which should also assess human and social factors, such as:
  (i) Crew demographic change (age distribution, gender distribution, etc);
  (ii) Crew basing;
  (iii) Medical input

11.5 Validation Tools

11.5.1 Initial Validation:

Initial validation must include both subjective (S) and objectives (O) measures such as the following tools;

(a) Sleep Considerations.
  (i) Sleep diaries (S);
  (ii) Acti-watches with diaries (O);
  (iii) Polysomnography (O).

(b) Alertness Considerations
  (i) Rating scales (S);
  (ii) EEG/EOG (O).

(c) Performance Considerations
  (i) Rating scales (S);
  (ii) Reaction time tests (O);
  (iii) Other cognitive tasks (O).

11.5.2 On-going Monitoring:

On-going monitoring may include some of the items from the above tools in addition to normal processes as adopted by the operators (e.g. LOSA, FOQA, crew reports, air safety reports, regulatory feedback, confidential reporting etc).

12 Steering Committee/FRMS

Before initiation of operations, the operator's FRMS or Steering Committee, as appropriate, is used to define the validation plan. Depending on their level of expertise, this may need to be conducted in conjunction with an individual or organization with experience in the assessment of crew alertness and fatigue issues. The FRMS/Steering Committee should, wherever appropriate, consider an "independent" scientific organization in order to assist in the data collection, analysis and recommendation. The GCAA considers that the Steering Committee should have most, if not all, of the characteristics of a FRMS. It is expected that the recommendations from an approved FRMS or Steering Committee will be considered as indicating an acceptable method of compliance and equivalent safety for the operator's Flight and Duty Time system.

13 FRMS

13.1 Characteristics

A Fatigue Risk Management System (FRMS) is a quality assurance system that provides an objective method for ensuring that levels of crew alertness remain within acceptable limits. The FRMS has the following characteristics:

(a) Education and awareness training programmes;

(b) Means of estimating and recording fatigue levels based on duty hours;

(c) Means of setting acceptable fatigue risk exposure levels for different activities;

(d) Means of recording and reporting exceedence of acceptable fatigue risk exposure levels (as determined by the GCAA);

(e) Means of analysing a roster both prospectively and retrospectively for reasonableness and compliance;

(f) A validation mechanism;

(g) It is auditable by the GCAA;

(h) It may use software validated for reliability and integrity;

(i) Includes a crew reporting mechanism with associated feedback.

13.2 Requirement

The GCAA requirement for ULR operations, effective 01 January, 2004, is that an Air Carrier operator shall establish a FRMS, and Private and Air Transport operators shall create at least a Steering Committee.

13.3 Responsibilities

The responsibility of the FRMS is to;

(a) Assess the proposed validation plan;
(b) Validate the operational plan in all respects;
(c) Review on-going monitoring results.
(d) Determine the need for any change to the operational plan, and associated model;
(e) Decide whether a validation review is needed.
(f) Notify the GCAA, through the appropriate channels, of unsafe or potentially unsafe operations, which potentially could affect continued safe operations.
(g) Maintain awareness of industry best practices in respect to aircraft equipment, rostering strategies and modelling/validation trends.
(h) Determine the risk management on all operations, but especially on ULR flights.

(i) Justify an application for a waiver against the CARs or a variation to an operator's Flight and Duty time system

13.4 Establishment of FRMS

The FRMS requires a commitment by the operator's management in much the same way as the existing Aviation Safety Programme. The FRMS must be formally established with assigned personnel from operations, cabin crew, aero-medical and quality assurance disciplines. All procedures, validations and reports must be documented and auditable. There should be a mechanism within the FRMS for review of benchmark limits and acceptable excursion limits, with associated strategies for exceedances.

13.5 GCAA Recommendations to the operators:

(a) Ensure that the operator's FRMS policy identify management commitment to open and positive fatigue-related reporting mechanisms and describe the conditions under which disciplinary action would be applicable. This is to be carried out in an ongoing consultation with the designated line flight and cabin crew representatives in order to establish a mutually agreeable reporting system for identifying fatigue risks. A clear statement about the mechanisms and disciplinary policy is particularly important to build the trust required to assure the reliable reporting that is fundamental to FRMS.

(b) Operators shall define the FRMS Policy through management in consultation with other stakeholders, including flight and cabin crew representatives, in the spirit of shared responsibility for the FRMS and they shall enable the FRMS to achieve its objective.

(c) Operators shall have the commitment to provision adequate resources to enable the FRMS to collect and analyze the data that forms the basis of the FRMS.

(d) Reports or data including notifiable events that suggests negative safety issues should be provided timely to the GCAA and the operators should propose satisfactory processes to mitigate any safety issues.

(e) Operators should develop a mechanism for providing open and continuous feedback to the stakeholders including flight and cabin crew and should periodically assess whether the communication channels are effective.

(f) Operators should develop and use a methodology that will continually assess the effectiveness of fatigue management systems implemented by operators, including their ability to improve sleep and alertness, mitigate performance errors, and prevent incidents and accidents.

(g) Operators have to develop fatigue management training guidance material which is route specific to include rest strategies, Duty/rest provisions to cover the entire ULR operation from pre-duty, in-flight, layover, and return-to-base rest for both flight crew and cabin crew and follow up on the crew responsibility to implement those strategies. GCAA has to ensure that the operators' FRMS have to coordinate with the stakeholders within aviation community identify possible barriers to change (corporate/management, individual).

(h) Operators have to publish in advance the flight/cabin crew on-board rest cycle to plan their rest before reporting for duty.

(i) Operators have to establish and implement process for adapting best practices for assessment & evaluation of fatigue management programs.

(j) Operators have to ensure flight and cabin crew fatigue data needs to be collected from actual operating environments.

14 Training

Operators shall provide appropriate training, and where appropriate educational awareness, to ground and flying staff associated with these operations. This should include, but is not limited to, operational and commercial management, flight and cabin crew, scheduling and rostering staff, operational control staff and airline medical service providers. Training and educational awareness should be tailored to the job description, as appropriate. The curricula should include, but is not limited to, the following:

(a) Consequences of fatigue on aviation safety

(b) Physiology of sleep

(c) Circadian rhythms and consequences

(d) Homeostatic process

(e) Sleep and alertness strategies

(f) Diet and hydration

(g) Prescription and non-prescription medication

(h) In-Flight environment

(i) Work scheduling

(j) Consequence of delays, flight disruptions and diversions