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ASSEMBLY – 35TH SESSION

PLENARY

Agenda Item 2: Statements by delegations of Contracting States and of Observers

RULE MAKING FOR ULTRA LONG RANGE FLIGHTS

(Presented by Singapore)

INFORMATION PAPER

SUMMARY

This paper presents the scientific and consultative approach taken by the Civil Aviation Authority of Singapore (CAAS) to develop rules for Ultra Long Range (ULR) flights. A ULR Task Force was set up by CAAS to conduct the study, with the objective of arriving at a set of recommendations to govern the ULR flights. The ULR Task Force worked with other authorities, the ICAO and the international aviation scientific community in its study.

1. INTRODUCTION

1.1 Following an application by Singapore Airlines (SIA) to mount non-stop flights to Los Angeles, using the A340-500 aircraft, the Civil Aviation Authority of Singapore (CAAS) set up an Ultra Long Range (ULR) task force to examine the feasibility of such flights as the flight sectors would involve Flight Duty Periods in excess of the 18 hours currently permitted.

1.2 The ULR task force was made up of members from CAAS, SIA and the Airline Pilot's Association, Singapore (ALPA-S). The objective was to arrive at a set of recommendations to permit the ULR flights.

2. HISTORICAL PERSPECTIVE OF FLIGHT TIME LIMITS

2.1 The ULR task force started by looking at the current flight time limits and how these had been developed, including the reasons for mandatory breaks after a number of consecutive Flight Duty Periods (FDP), and the monthly and yearly flight time limits for prevention of cumulative fatigue. The

association of the number and composition of crew, with the duration of a flight was also looked at, as were the factors for the avoidance of fatigue.

3. DEFINING THE PROBLEM

3.1 In the deliberations of the ULR task force it became very obvious that it would be almost impossible to come up with "generic" recommendations that could cover all possible scenarios in ULR flights (i.e. irrespective of time of departure/landing, destination, time-zone change and flight duration).

3.2 Thus the deliberations were focused on the Singapore - Los Angeles city pair with defined departure/landing windows from both Singapore and Los Angeles.

4. THE 3 ULR WORKSHOPS

4.1 The issues associated with ULR flights were also comprehensively discussed in the three workshops organized by the Flight Safety Foundation and sponsored by Boeing and Airbus.

4.2 The first workshop (Washington DC) managed to define a ULR flight and the basic approach towards formulating acceptable limits for crew alertness on these ULR flights. The second ULR workshop (Paris), underscored the need for looking at the ULR issue in a focused manner i.e. defined city-pair, defined departure windows and defined aircraft type. The third ULR workshop (Kuala Lumpur) provided the framework for an approach to ULR rule making.

5. LINK UP WITH JAA

5.1 To gauge the possible levels of fatigue and alertness on the proposed ULR flights for the city pair of Singapore - Los Angeles it was envisaged that projections would have to be made based on available data from current long haul operations. The need for a research body to address this issue was identified.

5.2 At about this juncture in the process of the Singapore ULR task force's deliberations, Airbus Industrie made an application to the Joint Aviation Authorities (JAA) of Europe for certification of the A340-500 aircraft, including its ULR capability.

5.3 The European Committee for Aircrew Scheduling and Safety (ECASS) was tasked by JAA to conduct a computer modelling study to predict the levels of alertness on ULR flights operating with four pilots. The Singapore - Los Angeles city pair was used as this was seen as being the launch pad for ULR operations for the aircraft. The JAA invited CAAS as observers for the study.

5.4 The results of the modelling "indicated that it should be possible for a 4-man crew to operate the route without experiencing greater problems with fatigue than they are exposed to in several current long range operations". The model predicted that crew alertness would be better if each crew member took two in flight rest periods instead of one.

6. VALIDATION STUDY

6.1 Following the findings of the ECASS study, the Singapore ULR task force felt that it would be prudent to validate the findings based on information on current SIA schedules. With this objective in mind, a Phase II study was commissioned by CAAS. It was designed to gather data from SIA pilots (the initial modelling was on data from European pilots only) on routes that among others, were to include those that would closely resemble the proposed ULR city pair of Singapore - Los Angeles, e.g. current flights between Singapore and the West Coast USA.

7. RESULTS OF VALIDATION STUDY

7.1 The Phase II study carried out by ECASS, validated the findings of the modelling carried out earlier. With 4 pilots, the levels of alertness for the ULR city pair Singapore - Los Angeles were projected to remain as good as those seen in the current SIA routes studied. This is based on each crew member having two in flight rest periods.

7.2 Based on the recommendations derived from the findings of the modelling study, and the subsequent validation, CAAS issued provisional rules to allow SIA to operate the Singapore - Los Angeles city pair ULR flights at the defined departure windows with a 4 man crew (two of whom must be pilot-in-command qualified).

8. CONSULTATION WITH OTHER AUTHORITIES AND ICAO

8.1 The provisional rules drawn up for the ULR flights were then sent to the major aviation authorities (JAA, FAA, UK CAA) and to ICAO for their appraisal and suggestions. All suggestions were discussed at the Task Force and provisional rules were issued to SIA, enabling them to commence the flights.

9. STUDIES ON ACTUAL ULR FLIGHTS

9.1 The ULR flights to Los Angeles were launched on 3rd February 2004. ECASS and another research group from Massey University, New Zealand, were commissioned by CAAS to carry out a study on the implications of fatigue in these new ULR operations.

9.2 This study which stretched over six months between February and July 2004 had the following components:

a) Diary study where the aircrew completed a diary of their sleep and duty from two days before the outward flight from Singapore until four days after the return.

b) An objective performance vigilance task at specified times throughout the flight starting before take-off, at the top of ascent, prior to each rest period and at the top of descent as well as after landing

c) An activity monitor (Actiwatch) to provide independent estimates of sleep – in Singapore, during flight, at the layover, again during flight and upon return to Singapore

d) Polysomnographic (EEG, EOG, EMG) recordings to record the quality and quantity of sleep in the rest facilities on board the aircraft.

10. PRELIMINARY RESULTS

10.1 The scientists have been able to provide an interim report based on data collected during the first two months of operations. These indicate that the levels of alertness throughout the Singapore – Los Angeles – Singapore flights are no lower than those experienced by crew on other long haul flights. Alertness is sustained on the ULR flights as a result of the additional time available for rest and the ability of the crews to take two rest periods in flight.

11. THE NEXT CITY PAIR

11.1 In November 2003, SIA asked CAAS to also consider its request to launch ULR flights to New York. These flights would only be launched some months after the Los Angeles flights and would be contingent on the initial study results from the Los Angeles flights.

11.2 The same approach was adopted for this city pair. A modelling study was done in December 2003. The model was validated with preliminary ULR data from the Los Angeles flights. Approval for the New York flights was given in May 2004 after the scientists indicated that the modelling and validation results showed that these flights were possible.

11.3 The Singapore – New York ULR flights were launched on 28 June 2004. Immediately following the launch, the flights are being monitored, by the scientists.

12. CONCLUSION

12.1 A consultative process of rule making, for ULR flights, with the involvement of the pilot's association, the airline management and the regulatory authority at every step, guided by scientific data, has been presented. Modelling of the proposed ULR flights was carried out using available data from existing operations. The data was then validated using current SIA schedules or, as in the New York flights, with ULR data. Provisional rules were drawn up to enable SIA to launch the ULR flights. The ULR flights are being closely monitored with scientific methodology, while preserving the tripartite (pilots, airline management and aviation authority) arrangement.

13. ACTION BY THE ASSEMBLY

13.1 The Assembly is invited to note the information in this paper.

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