Subject: **Lights for Free Manned Balloon VFR Flights at Night** (Subpart D – Equipment)

Status: Consultation

Requirement reference:
- ICAO Annex 6, Part I
- ICAO Doc. 9760, Volume 2
- EC 748/2012[1] (replaces 1702/2003)
- EASA process Type Certification, PR.TC.00001-002
- EASA MB 02/04, MB Decision n° 7-2004
- CS 31HB[2], CS 31GB[3]
- LFHB[4], CAP 494, BCAR Part 31[5], CFR14 FAR Part 31[6]

Introductory note

This Special Conditions was classified as important SC and as such was subject to public consultation, in accordance with EASA Management Board decision EASA MB 02/04, MB Decision n° 7-2004 products certification procedure, 30 March 2004, Article 3 (2.) of which states:

"2. Deviations from the applicable airworthiness codes, environmental protection certification specifications and/or acceptable means of compliance with Part 21, as well as important special conditions and equivalent safety findings, shall be submitted to the panel of experts and be subject to a public consultation of at least 3 weeks, except if they have been previously agreed and published in the Official Publication of the Agency. The final decision shall be published in the Official Publication of the Agency."

Statement of Issue

EASA received an application for the airworthiness certification of light installation on free manned balloons for VFR flights at night. The applicable codes CS 31HB, CS 31GB, LFHB and BCAR 31 provide no requirements for the design and installation of such lights. The purpose of this Special Condition (SC) is to support the definition of the certification basis for their installation.

It should be noted, that "Night VFR" flying is currently subject to national regulations which might require additional equipment depending on the category of the airspace used for the flight. Therefore national regulations might pose additional requirements (e.g. NAV).

Background

The legal origin of the vast majority of airworthiness requirements can be traced back to ICAO documents. This accounts also for exterior and interior lights for aeroplanes and helicopters. The relevant ICAO sources for these aircraft are ICAO Annex 2, 6 and Doc. 9760, Volume 2. However, ICAO documents do not address airworthiness requirements for balloons operated in VFR night conditions.

Therefore the intent and logics of the airworthiness requirements for aeroplanes certified for VFR night operation is used as far as applicable. Also known technological solutions currently used for national VFR night balloon operation are taken into consideration.

This special condition takes the following properties specific to free flying balloons into consideration when looking at the existing requirements for aeroplanes:

- The balloon's speed is always approximately equal to the wind speed at the ambient air layer.

  With respect to its speed it is therefore reasonable to assume that the balloon is an almost static obstacle in the airspace in comparison to the forward speed of an aeroplane or a helicopter. The detection by other VFR operating aircraft as an obstacle is therefore much more important than estimating its trajectory. The objective of the lighting discussed in this Special Condition is therefore collision avoidance.

  Note: Although a comparable requirement in the CFR 14 FAR Part 31 addresses this issue as "position lights", the intent of this Special Condition is technically consistent with this US

[1] EC 748/2012 - replaces 1702/2003 which is repealed (effectivity date 10 September 2012)
[2] CS 31HB - Certification Specifications and Acceptable Means of Compliance for Hot Air Balloons CS-31HB, Amendment 1, 5 December 2011
[3] CS 31GB - Certification Specifications and Acceptable Means of Compliance for Free Gas Balloons CS-31GB, Initial Issue, 5 December 2011
[4] LFHB – Lufttüchtigkeitsforderungen für Heißluftballone, Germany, 5 March 1982, (Airworthiness Requirements for Hotair Balloons)
[5] CAP 494, BCAR Part 31 - CAP 494, British Civil Airworthiness Requirements, Part 31 - Manned Free Balloons, Issue 2, 12 May 2003
[6] CFR14 FAR Part 31 - Part 31 Airworthiness Standards: Manned Free Balloons

requirement but proposed as Anti-Collision lighting.

- Balloons consist of flexible textile structures without rigid parts (except load frame and basket) and their internal pressure may vary and result in changing stiffness and geometry of the envelope. The position of Anti-Collision lighting is therefore kept consistent with the known pragmatic solutions, not attached to the envelope.
- Balloons tend to rotate around their z-axis so that no component points permanently into the direction of flight. Again this reason for adopting the existing solution for the position of the Anti-Collision lights.

The Special Condition was compiled from parts of CFR14 FAR Part 31.65.

This ensures the maximum extent of compatibility with internationally accepted practice while taking account of the specific balloon characteristics.

Special Condition

The following requirements shall be complied with for free balloons night VFR flights. The nomenclature of "CS 31HB/GB.65" shall mean that the paragraph is applicable to CS 31HB and CS 31GB.

Subpart D

CS 31HB/GB.65 VFR night lighting

(a) If the balloon is operated in night VFR conditions, unambiguous operation of controls and equipment and information provided to the crew essential for safe operation is aided by illumination (see AMC 31HB/GB.65(a)).

(b) For night VFR operation an Anti-Collision light system is installed which complies with the following:

(1) The Anti-Collision light consists of one or more flashing red (or flashing white) light(s) with an effective flash frequency of at least 40, but not more than 150, cycles per minute.

(2) The light provides 360° horizontal coverage and at least 60° vertical coverage above and below the horizontal plane.

(3) The Anti-Collision light is located on or in the proximity of the balloon (see AMC 31HB/GB.65(b)(3)).

(4) The Anti-Collision light is at least visible from a distance of 3.7 km (2 NM) at night under clear atmospheric conditions (see AMC 31HB/GB.65(b)(4)).

(5) The Anti-Collision light system can be switched on/off during flight.

(c) The VFR night lighting will not impair the crews' vision or performance during operation (see AMC 31HB/GB.65(c)).

AMC CS 31HB/GB.65(a) Illumination

A means to provide illumination of the instruments, equipment and controls that are essential for the safe operation of the balloon may be instrument lighting, local lighting or any independent portable (non-handheld) light of sufficient capacity.

It is acceptable that lights can be switched on and off provided that the crew, without undue burden or ambiguity, can switch on the lighting in night conditions.

AMC 31HB/GB.65(b)(3))

An Anti-Collision light suspended not more than 9.15 m (30 feet) below the basket is considered in the proximity of the balloon. Such a suspended Anti-Collision light system has means to:

(i) retract and store the lights.

(ii) ensure release of the cable in case of getting snagged.

AMC 31HB/GB.65(b)(4))

The capacity of power source is such that the energy supplied to the Anti-Collision Light is sufficient for the flight at night time.

AMC 31HB/GB.65(c)

The light from the Anti-Collision light does not directly shine on the operator and passengers and do not create a reflection on the balloon or flare that disturbs the operators' performance.

Lighting level of controls, equipment and instruments must be compatible with the crew night vision. This should prevent untimely fatigue of the eyesight due to frequent adaptation when looking from bright light into dark night and vice versa.

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