FLIGHT OPERATIONS PANEL

WORKING GROUP

SECOND MEETING

(FLTOPSP/WG/2)

Rome Italy, 4 to 8 May 2015

Agenda Item 5 : New Work Programme items
5.9: Enhanced Vision Systems related tasks

Report from the third meeting of the HESC SG, 10 -12 March, 2015

(Presented by Bo Eckerbert, rapporteur of the HESC SG)

SUMMARY

The 3rd meeting of the HESC SG was mainly devoted to emerging technologies including head-worn displays. It was agreed to propose a circular about the coming SVGS (Synthetic Vision Guidance System). Additionally a proposal for a minor amendment to Annex 6 was agreed. Action by the FLTOPSP/WG/2 is in paragraph 3.

COORDINATION

LVO SG

1. INTRODUCTION

1.1 The HESC SG held their third meeting on 10 – 12 March, 2015. The outcome is reflected in the paragraph 2 below in a concentrated form. The full report from HESC/3 with the presentations can be found in the HESC area at the FLTOPSP site at ICAO portal, where also the presentations can be found. A proposal for a minor amendment to Annex 6 is contained in Attachment 2. A proposal to develop a circular on SVGS will be presented in a separate WP.
2. **BACKGROUND/DISCUSSION**

2.1 Day 1 was hosted by NASA, Langley and devoted mainly to presentations, demonstrations and discussion related to emerging technologies in Vision systems.

2.2 The subjects covered included:

- EFVS (EVS)
- SVS/CVS
- SVGS
- Head worn displays (HWD)/Equivalent Displays
- Virtual VMC/Equivalent Visual Operations
- Vision Systems based on multiple sensor types (FLIR and MMWR)

The demonstrations of emerging technologies were:

- 300 ft RVR with EVS/CVS and HUD
- HWD as a HUD equivalent display
- Virtual VMC Displays & Crew State Monitoring

2.3 Day 2 was spent at another location and devoted to presentations on:

- Economic benefits of EFVS (EVS) in the US. The benefits are not only or mainly related to operations in very low visibilities but rather related to the ability to avoid flow reduction already in visibilities as high as 1200 m by means of EFVS.

- 300 ft RVR Experiment overview, presented by Rockwell-Collins including:
  - Approach and landing operations
  - Take-off operations
  - Taxi operations
  - Millimetre wave radar imagery (MMWR)
  - Forward looking infrared imagery (FLIR)
  - Blending of MMWR and FLIR
  - Synthetic Vision Systems (SVS)
  - Combined Vision Systems (EVS and SVS)
  - Situational awareness

- The “SmartView – Lower minimums” (SVLM) programme was presented by Honeywell. The programme builds on the SVGS (Synthetic Vision Guidance System Concept). The test programme also involves FAA and EASA. The objective of the programme is to allow ILS Cat I and LPV operations to 150ft DH and 1400 ft RVR

2.3 Day 3 was devoted to work on the traditional agenda based on the work programme of the HESC.

2.3.1 The HESC has been identified as one of the key groups for the review of ASBU/GANP together with the LVO SG. HESC members have been asked to review the material.
2.3.2 Preparation for the BUDSS (Block Up-grade Demonstration Showcase and Symposium. The operational credits and flexible aerodrome operating minima play an important role and in affected parts of the industry have been contacted through HESC for participation. This also includes FAA as a key regulator with experience in this area.

2.3.3 IFALPA presented their view on the provision of Vision Systems information at both pilot stations. The IFALPA policy (repletion of information on both sides, although it could be head-down and dual HUD in RVRs of 300 ft or less) was generally agreed with and the matter will be listed for guidance in the next edition of the AWO Manual.

2.3.4 The second IFALPA issue, “Use of SVS below MSA” was also agreed with and it was agreed to develop some guidance material on the subject.

2.3.5 The rapporteur presented a proposal for an amendment of the list of items to be taken into account by an operator when establishing the aerodrome operating minima. The list referred to is the one in paragraph 4.2.8.2 in Annex 6, Part I and paragraph 2.2.8.2 in Part III (for CAT). The proposal is to add “Operational Credits, where applicable” as a new item. “Operational Credits” is already an item in the Operations Specifications form. A Job Card has been developed (Ref Job Card FLTOPSP1-15). The HESC agreed with the proposal which is included as Attachment 1 to this WP.

2.3.6 SVS for provision of visual references and SVS for operational credits will have to await further development of the SVS.

2.3.7 Another application of SVS in the form of SVGS (Synthetic Vision Guidance System) works on the instrument segment, aiming to reducing the DH to 150 ft (initially). The MASP were expected by end of March 2015. Subsequent to this, the operational conditions will need to be developed. Since this operational credit is the first to affect DH, this fact may need to be better reflected in the Note in Annex 6 explaining operational credits by giving examples. There will also be a need to provide guidance material for operations based on SVGS. The form for such guidance may initially be an ICAO Circular on SVGS. Additionally it was agreed to develop a draft definition of SVGS for the ICAO documents. The SVGS is handled in more detail in another WP.

2.3.8 On the issue of approvals for systems qualifying for operational credits, the HESC agreed that there should only be one approval in addition to the airworthiness approval and only for the cases involving operational credits. The HESC will provide a WP for FLTOPSP/2. Job card FLTOPSP/1-14 applies.

2.3.9 The terms basic/advanced aircraft and advanced vision systems are in use and it is felt that there is a need to define or better describe those terms. As long as the terms do not appear in Annex 6, the proper place for explanations or definitions is considered to be the AWO Manual (Doc 9365) in the 5th edition.

2.3.10 EVS operations to touchdown are expected to be allowed in the US in a new rule for EFVS operations. Once the new rule is published (expected before the end of 2015), the HESC will make arrangements for inclusion of guidance material in the 5th edition of the AWO Manual (Doc 9365).

2.3.11 Several other subjects were discussed, but the progress of those is expected to take place somewhat in the future as the technology and demand develops. The HESC will monitor the developments and, where appropriate, discuss the issues at the next HESC meeting, provisionally planned to take place early 2016. In some cases new job cards may need to be developed. These items include:
• Operational procedures for vision systems
• Take-off operations using vision systems
• Interaction between vision systems used for take-off or landing operations and ground operations (in cooperation with the LVO SG)
• Equivalent RVR or other means to grant operational credits for operations based on vision systems.
• Exemption from approach ban for EVS operations?
• Guidance on training for Vision Systems

3. **ACTION BY THE FLTOPSP/WG/2**

3.1 The FLTOPSP/WG/2 is invited to:

a) Note this report from HESC/3 meeting

b) Agree, as may be amended, the proposal for an amendment to Annex 6 contained in attachment 1.
A proposal from the HESC SG to amend Annex 6, Part I, Chapter 4.

**Rationale:** Operational credit is included as an item in the form for Operations Specifications in Annex 6, Part I, Appendix 6. The standard 4.2.8.1.1 in Annex 6, Part I, states that operational credits are subject to authority approval. It follows that operators use an operational credit granted to them, have to take the associated conditions into account when establishing the aerodrome operating minima. The inclusion a new item “i)” in the list in standard 4.2.8.2 is therefore merely an editorial amendment. If agreed a corresponding amendment should be included in Annex 6, Part III, Section II.

**Proposal**

4.2.8.2 The State of the Operator shall require that in establishing the aerodrome operating minima which will apply to any particular operation, full account shall be taken of:

a) the type, performance and handling characteristics of the aeroplane;  
b) the composition of the flight crew, their competence and experience;  
c) the dimensions and characteristics of the runways which may be selected for use;  
d) the adequacy and performance of the available visual and non-visual ground aids;  
e) the equipment available on the aeroplane for the purpose of navigation and/or control of the flight path during the approach to landing and the missed approach;  
f) the obstacles in the approach and missed approach areas and the obstacle clearance altitude/height for the instrument approach procedures;  
g) the means used to determine and report meteorological conditions; and  
h) the obstacles in the climb-out areas and necessary clearance margins; and  
i) the conditions associated with any operational credit granted.