HEDGE – PinS LPV (SBAS) IFPP Paper

1 Introduction

The purpose of this paper is to provide the IFPP with information about the development of the helicopter specific PinS LPV (SBAS) that have been flight trialled within the context of the HEDGE project.[1]

The Point in Space procedure is currently specified within ICAO Doc 8168 Vol 2. However, design criteria for the use of SBAS guidance have are not defined. Consequently, the HEDGE project designed the approach procedure according to FAA criteria with the approval of EASA. The use of SBAS with PinS procedures provided real tangible benefits that enabled PinS designed to LPV (SBAS) criteria to be successfully demonstrated. However, to enable widespread implementation and the realisation of benefits to HEMS operators and patients alike, HEDGE has identified a number of issues which may be of interest to the IFPP.

The IFPP is invited to review the issues encountered and determine whether SBAS design criteria for PinS approaches are required and whether further working groups should be notified of the issues identified within the trials.

2 Operational environment

The flight trials were to a helipad at a hospital in Interlaken, Switzerland. The helipad is unmanned, does not have an assigned ICAO 4-letter aerodrome code and is located in uncontrolled airspace. The surrounding terrain is mountainous with the approach over a lake.

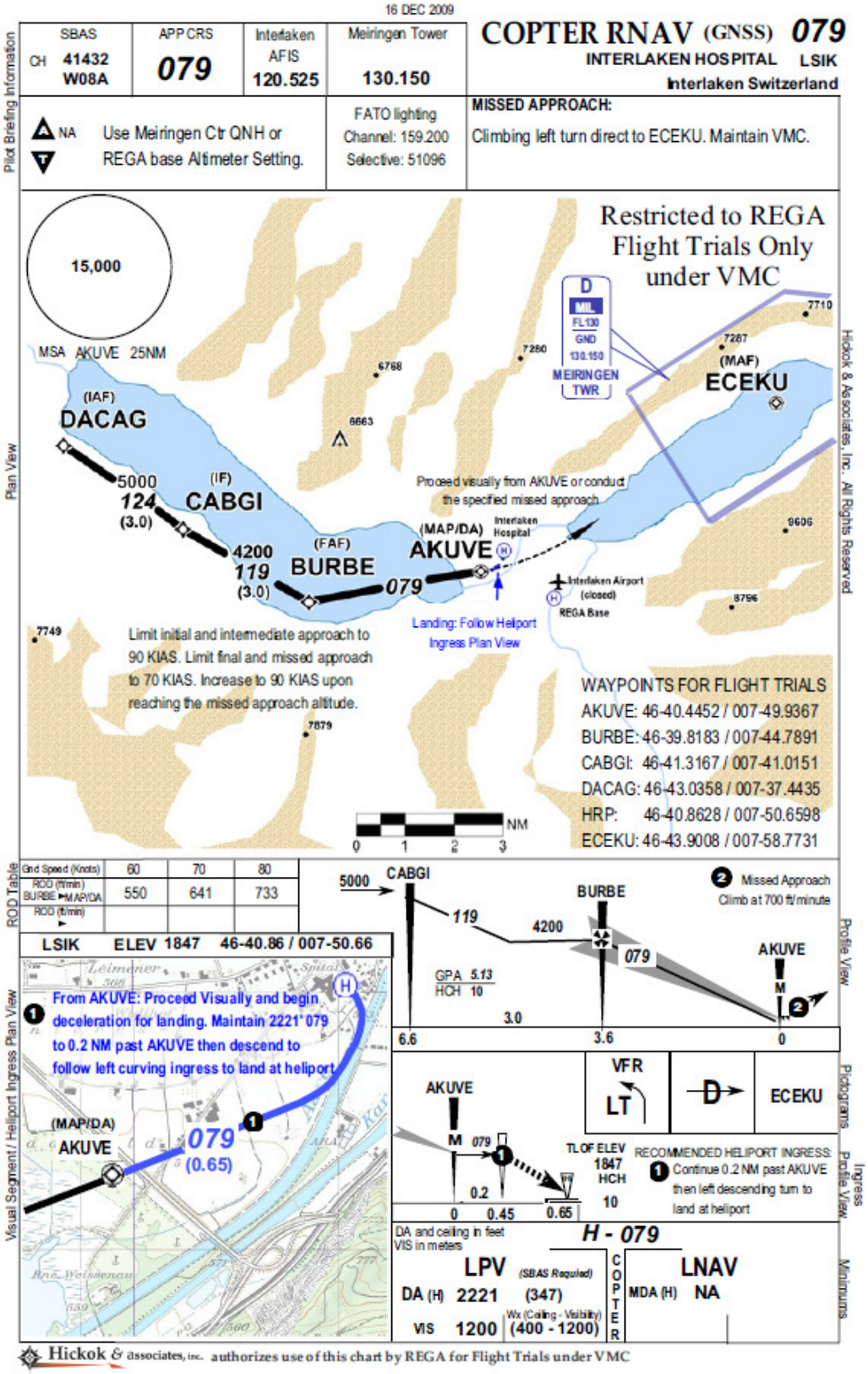
Under national legislation, IFR operations are not permitted in uncontrolled airspace and an ATC service can be provided to IFR operations only in controlled airspace.

[1] HElicopters Deploy GNSS in Europe (HEDGE) is a project commissioned by the European GNSS Supervisory Authority (GSA) and part-funded under the EU's Seventh Framework Programme (FP7). See http://hedge.askhelios.com.

The aim of the project is to develop and demonstrate new helicopter approach procedures as well as other EGNOS applications for general aviation. The initiative builds on the outcomes of the GIANT project (Framework Programme 6). Most activities within HEDGE are directed towards helicopters, but the project also covers fixed-wing activities.

3 The approach

The PinS approach was designed according to FAA criteria. The approach chart is shown below.



4 Issues encountered

The process of development of the flight procedures and certification of the helicopters have identified a number of limitations that without resolution will severely limit the exploitation possibilities of the SBAS PinS approach – a procedure that is urgently needed for HEMS IFR operations in Europe. These limitations are:

- **IFR in uncontrolled airspace:** Most major hospitals are positioned outside existing fixed wing IFR structures, thus being mainly in uncontrolled airspace without ATC. In some countries (e.g. Switzerland) IFR flight outside controlled airspace is prohibited due to the lack of a service agreement with the ATC provider.
- **Assumed requirement for ATC service at the local heliport for IFR operations:** It is inconceivable to create a CTR around every hospital let alone dedicating a certified ATCO to it. A "remote CTR" should be taken in consideration.
- **Missed approach based on GNSS / SBAS:** To date, ICAO criteria do not consider a missed approach calculation below RNP 0.3. In the case of Interlaken a missed approach in a westerly direction (Track 260) would be highly desirable due to high local terrain. Having to calculate the missed approach procedure with RNP 0.3 criteria prevents the creation of a missed approach linked to the existing IFR-network and conventional IFR-alternate airport.
- **Departure criteria:** The LPV approach allows for a helicopter to safely deliver a patient to the hospital Interlaken with a 400ft cloud base and 1200m of visibility. Due to the lack of missing publication of departure criteria a subsequent departure is not possible.
- **SBAS as sole / primary mean of navigation:** When EGNOS is accepted as the primary means for navigation, minimum equipment list (MELs) requirements for navigational equipment will have to be amended. These should define to what degree the requirement for "traditional" navigation equipment (ILS, VOR and ADF) can be reduced since functional SBAS equipment and procedures effectively provide alternate redundancy. Removal of the old and heavy "traditional" IFR equipment would reduce weight, fuel consumption, costs and increase space available on board with zero impact on safety.
- **Dedicating an ICAO 4 letter code to landing zones:** For the planning of a procedure and its use it gets collocated to a locality and allocated an abbreviation; ideally, a 4 letter ICAO code according DOC 7910. In some countries hospital heliports are designated as non specific landing sites. They do not (or just partially) meet the requirements according ICAO Annex 14 for VFR heliports. Even though PANS-OPS only require the correct physical dimensions for a PinS Procedure, State regulators link the allocation of an ICAO 4 letter code to a compliance with ICAO Annex 14. Similar difficulties concern permanently installed oil rigs in the North Sea. A clear and straightforward statement regarding allocation of ICAO 4 letter codes without depending on compliance with ICAO Annex 14 is essential.
- Other unsolved items which also need to be addressed include:
  - Helicopter en-route criteria

- Development of Helicopter Navigation Specification supplement PBN
- Localizer-Only (LP) SBAS criteria (This is needed by operators whose aircraft might not be able to do APV due to autopilot or other aircraft certification issues, but, will still get the benefits of greatly reduced horizontal boundaries for the final approach segment.)
- Route visual segment criteria
- Publication of the manoeuvring visual segment and charting criteria.

5 Conclusions

The flight trials undertaken within HEDGE have demonstrated the viability of the procedure and support amongst helicopter operators. Given that the procedure design procedure will be encoded into the helicopter avionics and that operations are conducted in an environment in which the traditional obstacle is the landing zone, this paper invites the IFPP to determine whether additional obstacle and procedure design criteria should be applied with the context of PANS-OPS.