

05 May 2023

## Policy Statement

### **Guidance for airspace and instrument flight procedure designers for the design of standard departures that end at a flight level.**

#### **1. Introduction**

- 1.1 This policy statement supersedes the interim guidance for Standard Instrument Departures (SID) design considerations for airspace planners and instrument flight procedure designers for the design of departures to Flight Level (FL) initially published the 24th of January 2014.
- 1.2 Standard ICAO (International Civil Aviation Organisation) procedures state that below the Transition Altitude (TA), the reference for the vertical position of the aircraft shall be expressed in terms of altitude based on the latest QNH. Above the TA, the vertical position of the aircraft shall be expressed in terms of a Flight Level (FL) based upon the Standard Altimeter Setting (SAS) of 1013.2 hPa. This is normally achieved by aircrew's adherence to their company Standard Operating Procedures (SOP); but these differ by operator. Many of these SOPs (Standard Operating Procedures) dictate that a change from the QNH to SAS must be made after aircraft pass through the TA. However, standard practice for a significant number of operators, when departing on a SID, is to set the standard altimeter setting at the point of aircraft acceleration shortly after the departure, well before the TA, typically around 1000ft or 1,500ft amsl. This practice is noticed for departure on a SID that has a FL as its end level restriction, if there are no intermediate constraints based on QNH.
- 1.3 Airspace and instrument flight procedure designers must therefore consider the effects of large pressure variations and the impact on interacting procedures of these differing SOPs. This will ensure that the correct vertical separations involved with altitude and/or FL constraints adjacent to other procedures and the containment of such procedures within Controlled Airspace structure are maintained and reduce any inherent built-in "level-bust."
- 1.4 The following guidance has been developed amplifying the design of departure, which has a FL constraint, to ensure that the effects of low pressure on interacting procedures are considered and that level attainment waypoints are achievable.

#### **2. Applying the guidance for the design of standard departures that end at a flight level.**

- 2.1 The guidance provided in this policy statement applies to all departures that end at a flight level, designed by an Approved Procedures Design Organisation in compliance with the CAA (Civil Aviation Authority) IFP Regulations<sup>1</sup> and submitted to the CAA.
- 2.2 Given the current limitations identified at 1.2 above, early engagement with the CAA should be sought prior to the application of such guidance. The regulatory framework for the concept of designing SIDs to flight level in all volumes of airspace will be subject to review and amended

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<sup>1</sup> CAP 785A, CAP 785B applies

in light of any future developments.

### 3. Definitions.

3.1 For the purposes of this policy statement, the following definitions apply:

- 'Altitude' is a vertical distance of a level, a point or an object considered as a point, measured from mean sea level (MSL).
- 'Flight Level' is defined by a surface of constant atmospheric pressure which is related to a specific pressure datum, 1013,2 hectopascals (hPa), and is separated from other such surfaces by specific pressure intervals. A pressure type altimeter calibrated in accordance with the Standard atmosphere will indicate:
  - An altitude when set to a QNH.
  - A height when set to a QFE.
  - A Flight Level when set to a pressure of 1013,2 hPa.
- 'Instrument flight procedure (IFP)' is a generic term meaning a standard instrument arrival (STAR), an instrument approach procedure (IAP), or a standard instrument departure (SID). ([CAP 785A Oversight of UK Approved Procedure Design Organisation](#) and [CAP 785B Implementation and Safeguarding of Instrument Flight Procedures](#) (IFPs) in the UK).
- 'Standard instrument departure (SID)' means a designated instrument flight rule (IFR) departure route linking the aerodrome or a specified runway of the aerodrome with a specified significant point, normally on a designated ATS (Air Traffic Services) route, at which the en-route phase of a flight commences. (ICAO Doc 4444 PANS-ATM)

### 4. Policy

4.1 The following design scenarios should be considered when designing SIDs (Standard Instrument Departures) with altitude and FL waypoints:

- Scenario 1: Guidance for the design of departure when Flight Level waypoints are required.

The design of SID with waypoints where level attainment points are published as altitude constraints that are immediately followed by waypoints where level attainment points are published as a Flight Level, can cause problems if variances in pressure settings between QNH and the SAS have not been considered. Therefore, SIDs with a mix of altitude and Flight Level attainment points, where variances in QNH from SAS could lead to planned vertical separations not being met, require careful design consideration.

When designing a SID that contains a vertical profile that terminates at a FL, the design should not normally contain intermediate stop, 'At' or 'Below', altitudes, unless ATC (Air Traffic Control) mitigations can be provided, for example:

**Example 1 – No additional ATC mitigations required. SID design profile without stop (hard) altitudes below a TA of 6000ft:**

Not below WP – Not below WP – FL WP above TA.

WP1	WP2	WP3
3000	4000	<u>FL 90</u>

**Example 2 – Additional ATC mitigations required. SID design profile with stop (hard) altitudes to be avoided where possible, a TA 6000ft:**

Not below WP – At WP below TA – FL WP above TA.

<u>WP1</u>	<u>WP2</u>	<u>WP3</u>
<u>3000</u>	<u>4000</u>	<u>FL 90</u>

- Scenario 2: Guidance for the design of departure requiring vertical constraints close to the transition altitude.

To account for operators that follow the ICAO practice of setting the SAS at the Transition Altitude, SIDs should be designed to avoid a ‘built in’ level bust scenario. Therefore, for those SIDs which require to terminate with a waypoint at a FL close to the Transition Altitude, a vertical allowance sufficient to cater for extreme variances in pressure setting that may occur between QNH and the SAS should be considered.

Example of design issue to consider:

TA at 6000ft.  
SID terminates FL070.  
QNH is 979; 34 hPa difference to SPS.  
Aircraft climbing to FL070 and sets SAS whilst passing 6000ft.  
At 6000ft, 1020ft (approx.) is added on to the altimeter and aircraft is already above FL070, before the crew realises the consequences of a level bust.

- Scenario 3: Guidance for the design of departure using a course to altitude (CA) path terminator.

For departures using an initial Course to Altitude (CA) path terminator, obstacle clearance, noise abatement, Noise Preferential Route (NPR) requirements must be considered and the potential for crews to change to SAS at the point of aircraft acceleration shortly after departure, typically around 1,000ft/15000ft amsl must also be considered.

## 5. References

5.1 **Related CAA CAPs (Civil Aviation Publication) & Airspace Policy Statements.** We have included the most relevant documents below, but a full list can be found on the [CAA website](#).

### 5.2 CAPs

- [CAP \(Civil Aviation Publication\) 1616 - Airspace Change Process.](#)
- [CAP 778 - Policy and Guidance for the Design and Operation of Departure Procedures in UK Airspace’.](#)
- [CAP 785A - Oversight of UK Approved Procedure Design Organisation.](#)
- [CAP 785B Implementation and Safeguarding of Instrument Flight Procedures \(IFPs\) in the UK.](#)

## 6. Review of Policy

- 6.1 The CAA shall review this policy statement and its associated annexes on a discretionary basis but not less than triennially from its publication date.

## 7. Point of Contact

Any queries or further guidance required on the content of this Airspace Policy Statement should be addressed to:

### **Airspace & ATM (Air Traffic Management) Policy**

Airspace, ATM & Aerodromes  
CAA Safety and Airspace Regulation Group  
Aviation House  
Beehive Ringroad  
Crawley  
West Sussex  
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E-mail: [ats.enquiries@caa.co.uk](mailto:ats.enquiries@caa.co.uk)

Any queries or further guidance required on the implementation of this Airspace Policy Statement should be addressed to:

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