NATS Bristol Airport ACP

CAP1616 Stage 2 Safety Appraisal

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Document Use

External use: *Yes (CAA)*

Glossary

ATC	Air Traffic Control
ATS	Air Traffic Service
CAS	Controlled Airspace
CTA	Control Area
DCL	Data Comms Link
HAZID	Hazard Identification
MTA	Military Training Area
RNAV	Required navigation (Area Navigation Basic 5nm Precision 1nm)
TRA	Training Area

References

ID & Title	Reference
[1] NATS Safety Management Manual	SMM Web page
[2] CAP 1616: Airspace Change guidance	CAP 1616

1. Introduction

1.1 Purpose

This report documents the initial safety appraisal of the Bristol Airport procedure designs for an Airspace Change Proposal (ACP) process. The ACP is being conducted in accordance with CAP 1616 regulations [2]. This safety appraisal is intended to fulfil the requirements stated at Stage 2 (Develop and Assess) for the Initial Options Appraisal as defined in CAP 1616 Appendix E paras E49 to E52 [2].

1.2 Scope

The aim of this initial options appraisal is to:

- Give an indication of safety implications.
- Provide a qualitative statement on potential impacts of each option.

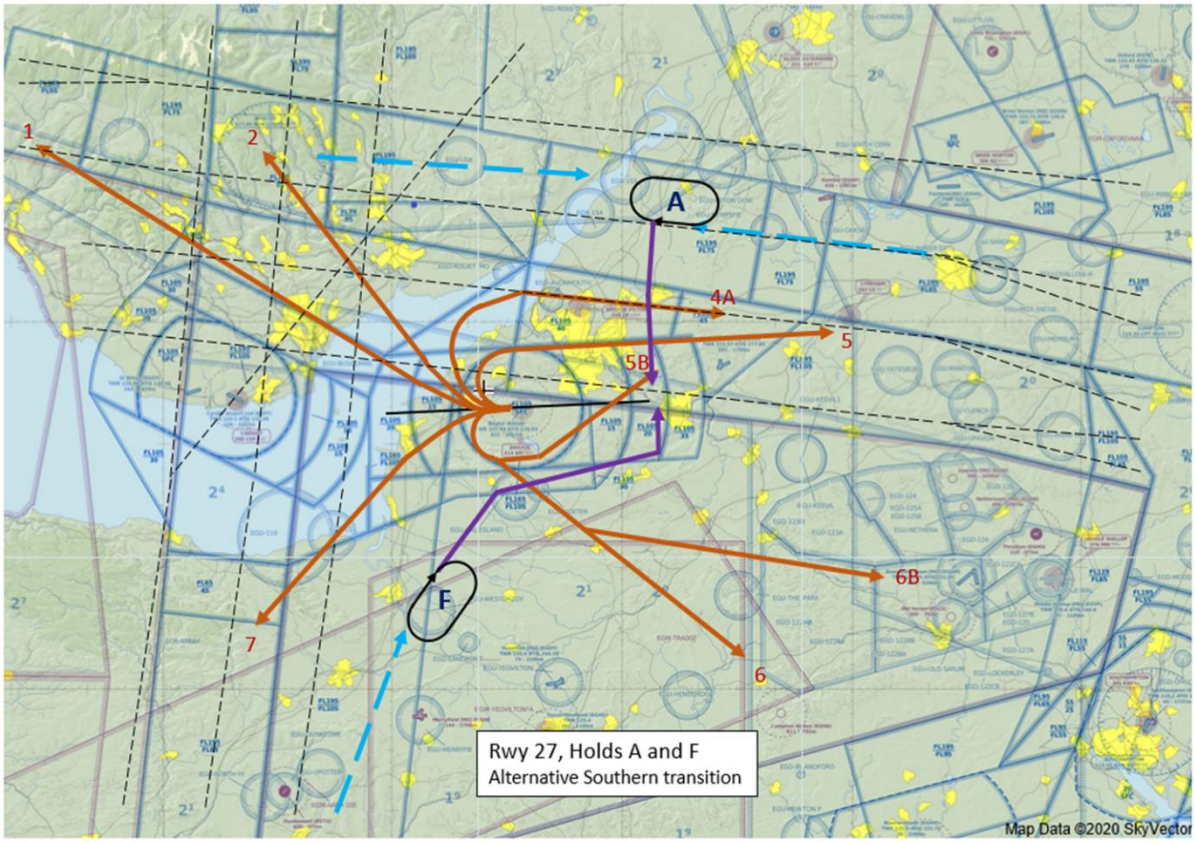
1.3 Assumptions

A number of assumptions have to be made in this appraisal as the designs are considered immature at this stage of the ACP process:

1. The designs for departure routes and holds are assumed to be below 7000ft AGL.
2. Accuracy of plot points for the routes is low and explicit latitude/longitude positions have not been derived.
3. All options (even those thought to be non-viable) have been included.

2. Method

The preliminary safety appraisal is conducted at a basic level. This involves looking at the basic design proposals that were drawn using Skyvector (link) which is a freely available open software mapping web page that also provides basic aeronautical planning services. The basic route designs were drawn as overlays to the VFR map displayed by Skyvector covering the South West region. An example is shown below:



1.1. Method

The route designs were given basic alpha-numeric descriptors and are portrayed in 2D. In order to assess the proposed designs, the design team and subject matter experts from Bristol were consulted. The steps below outline the methodology of this task.

Step 1 - Identify any potential hazards associated with the design considering the functions and the roles of other airspace users.

Step 2 – Identify any potential hazards associated with the ATS delivery at Bristol airport.

Step 3 – Provide recommendations to reduce safety issues for the design phase

1.2. Assessment

The procedures have been assessed using the following terminology:

Low Safety Impact = unlikely to require any in-depth analysis or modelling beyond basic assurance work such as Hazard Identification process.

Medium Safety Impact = may require more detailed analysis to quantify risk levels and/or impacted users beyond ATC.

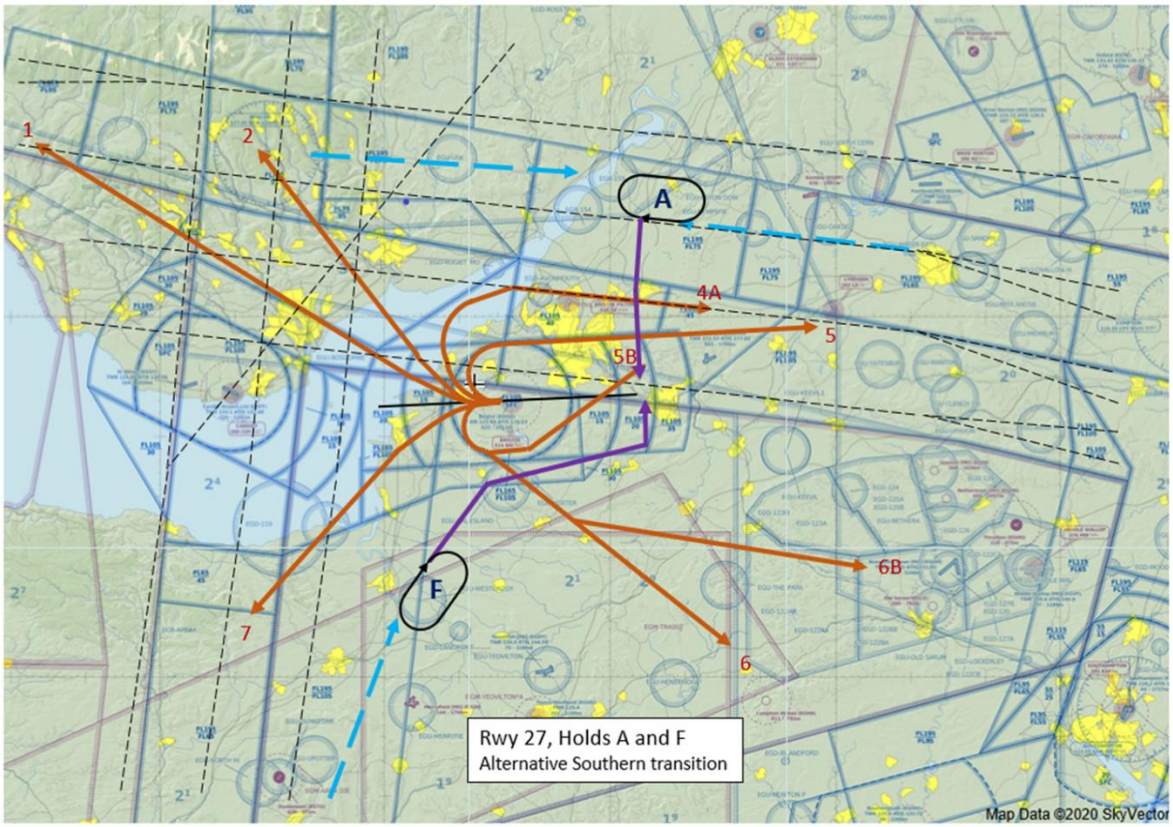
High Safety Impact = likely to require in-depth analysis of one or more safety hazards to the operation or to other users. May need modelling, explicit route-separation assurance, changes to airspace structures or complex interactions with other organisations.

In order to better assess adjacent airspace structures, not displayed on the Skyvector map, the UK AIP ENR 6-7 chart was used as that displays UK ATS Airspace Classifications from – the surface to FL195, which for this assessment is deemed sufficient. This map is displayed below:

3. Proposed Routes Safety Assessment

3.1 Departures RW27

The proposed Standard Instrument Departure (SID) routes from Runway 27 with associated proposed holds:



1
With an initial climb out to the North West over water, this route appears to have medium safety impact however may require integration with the airspace of Cardiff Zone, in addition to consideration of Cardiff arrivals and potentially departure traffic. This would require a safety hazard assessment.

2
An initial climb over water and further climb beneath controlled airspace to the North West, this route appears to have minimal (low) safety impact. This may have safety benefit in a reduced number of interactions required by the controller.

3
Not depicted.

4A
A turn North East aligned to the airways route structure heading East, this route appears to have minimal (low) safety impact, remaining within the Bristol CTA. Additionally, potential interaction with transitions from Hold A exist that should also be hazard assessed.

5
Similar to route 4A, a tight turn North East aligned to the airways route structure heading East toward Compton, this route appears to have minimal (low) safety impact, remaining within the Bristol CTA. Additionally, potential interaction with transitions from Hold A exist that should also be hazard assessed.

5B
This route departs on a left-hand turn out heading East before turning North-East. Although remaining within the Bristol CTA, any route crossing the arrivals path should be safety assessed for impact and therefore should be considered to have a medium safety impact. Additionally, potential interaction with transitions from Hold A exist that should also be hazard assessed.

6
The route departs to the South East, on leaving the Bristol CTA into Class G airspace presenting relatively low risk. However, there are military danger and training areas to the South and any potential interaction would require a hazard assessment.

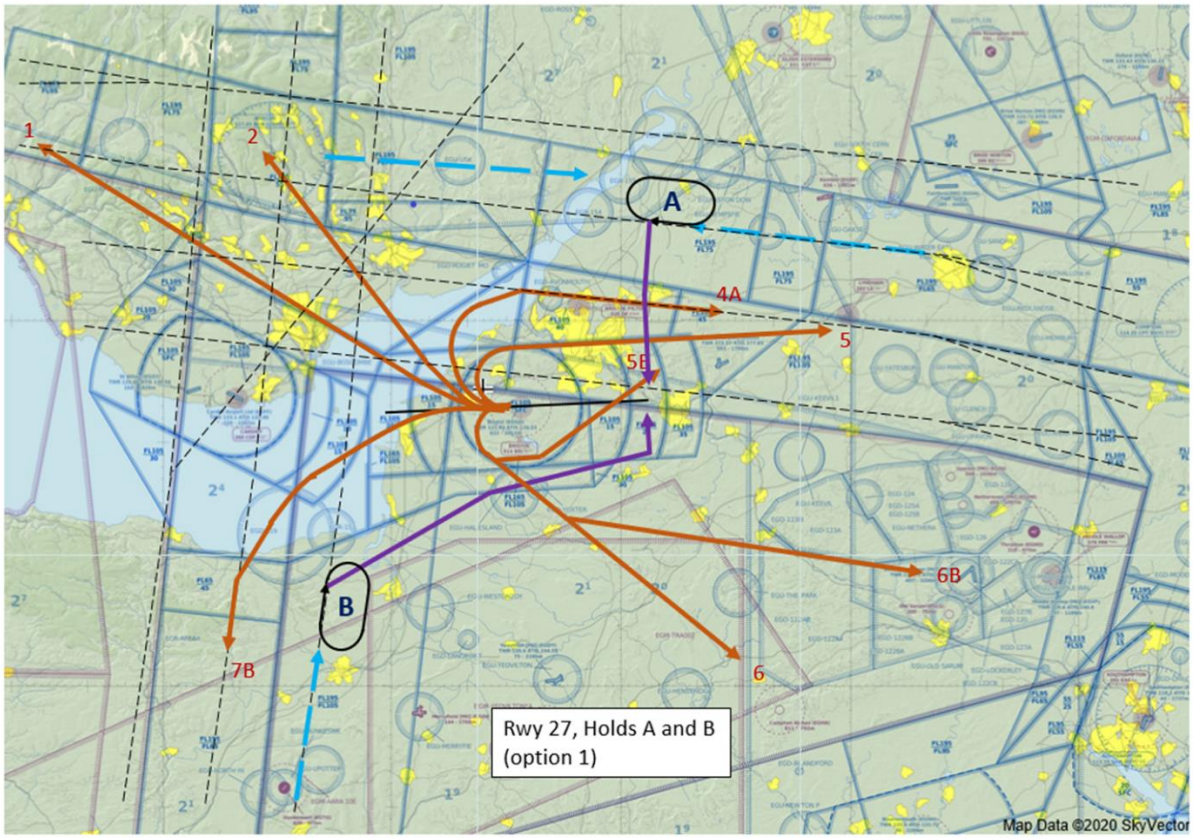
6B
The route departs to the South East, on leaving the Bristol CTA into Class G airspace before tracking East. There are additional hazards to consider particularly as the route flies toward military danger and training areas to the South and the Boscombe Down airspace complex delivering a medium safety impact. Any potential interactions would require a hazard assessment.

7
Routing South West and avoiding other airspace structures this route has a low safety impact. There is a military danger area normally active to 5000ft amsl along the route however aircraft should expect to be safely above this. A safety hazard assessment may be required.

Hold A
Beneath controlled airspace, this hold has a transition direct South that interacts with outbound proposals 4A, 5 and 5B and would require a safety assessment as a high safety impact hold.

Hold F

To the South West of Bristol and partially within a military training area, this hold has a transition that crosses outbound routes 6 and 6B. This medium risk hold may require additional controlled airspace and a safety hazard assessment to assess interactions.

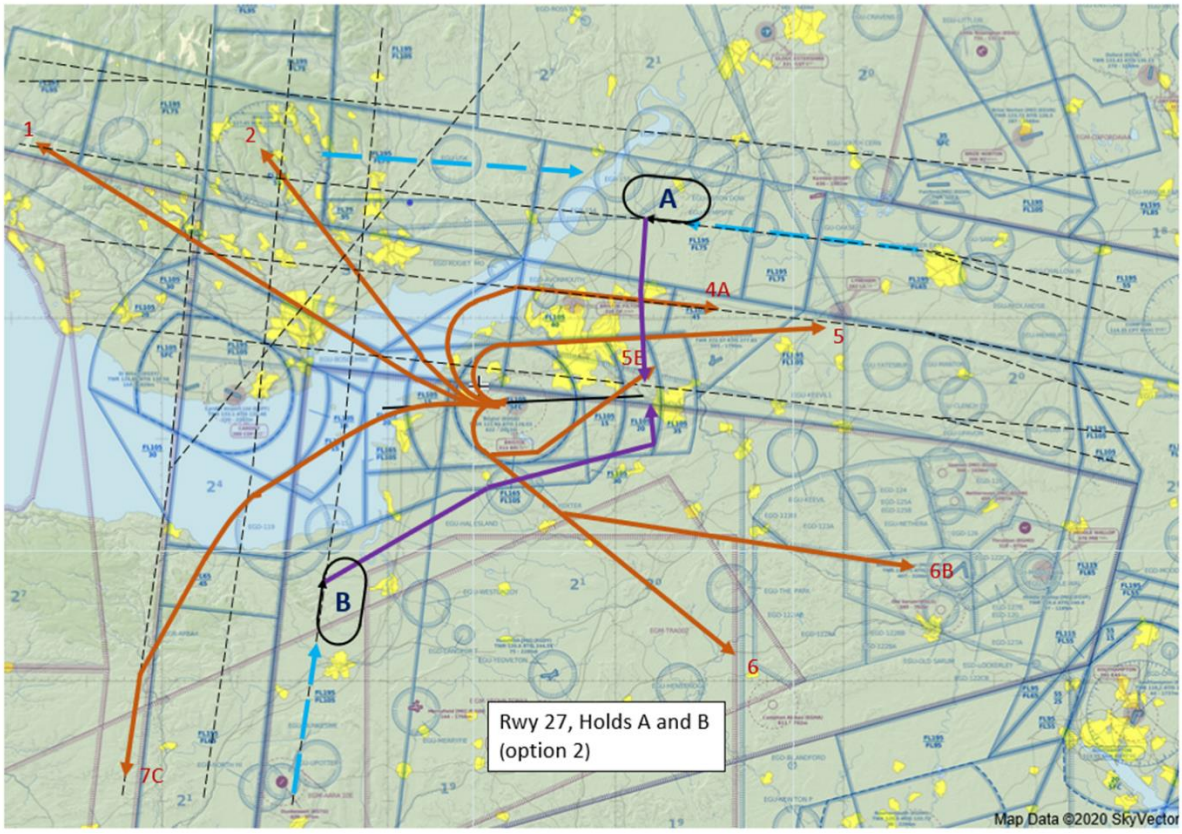


7B

Routing South West mostly over water, this route interacts with Cardiff airspace and potentially EGD-119. Co-ordination with Cardiff to deconflict departures/arrivals may be required on this high safety impact route. A safety hazard assessment would be required.

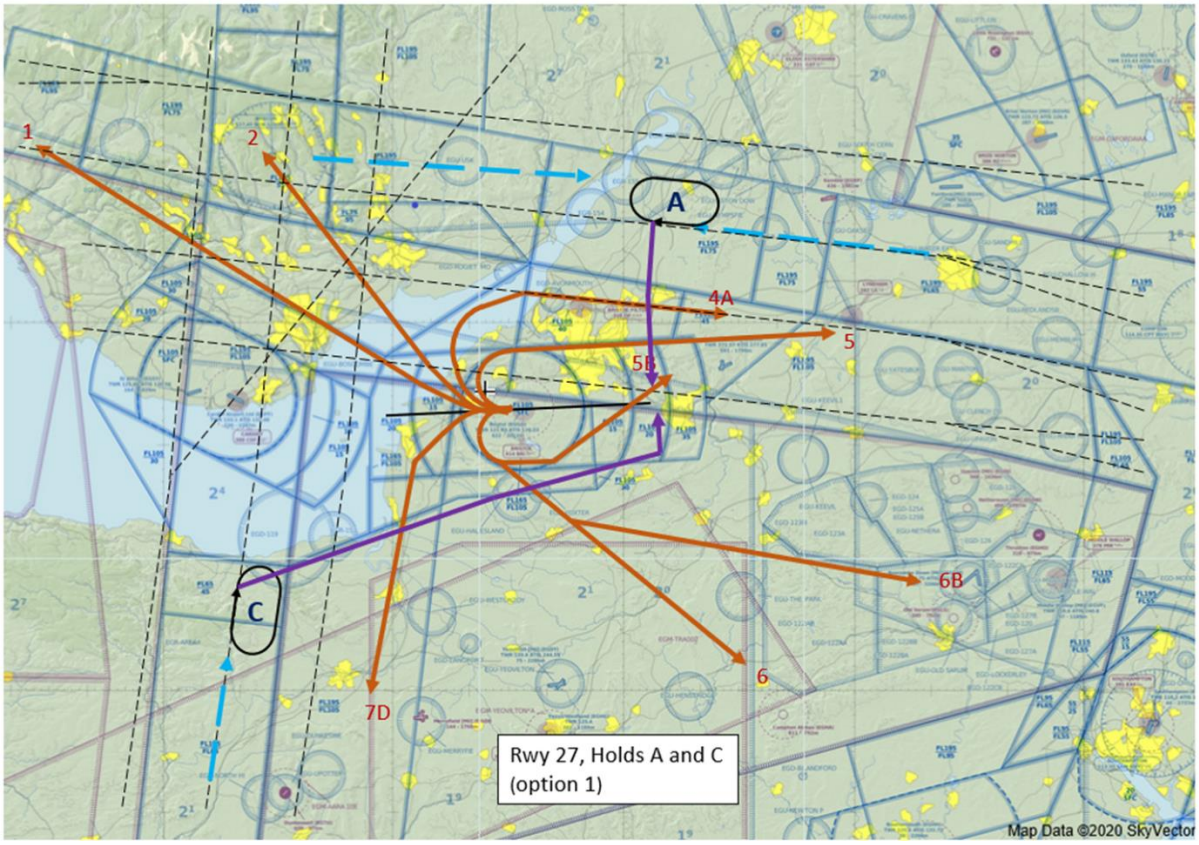
Hold B

Further West than the proposed F Hold and partially within a military training area, this hold has a transition North East that interacts with outbound proposals 6 and 6B and would require a safety assessment as a medium safety impact hold.



7C

Similar to 7B, and routeing South West mostly over water, this route interacts with Cardiff airspace while skirting the boundary of EGD-119. Co-ordination with Cardiff to deconflict departures/arrivals may be required on this high safety impact route. A safety hazard assessment would be required.

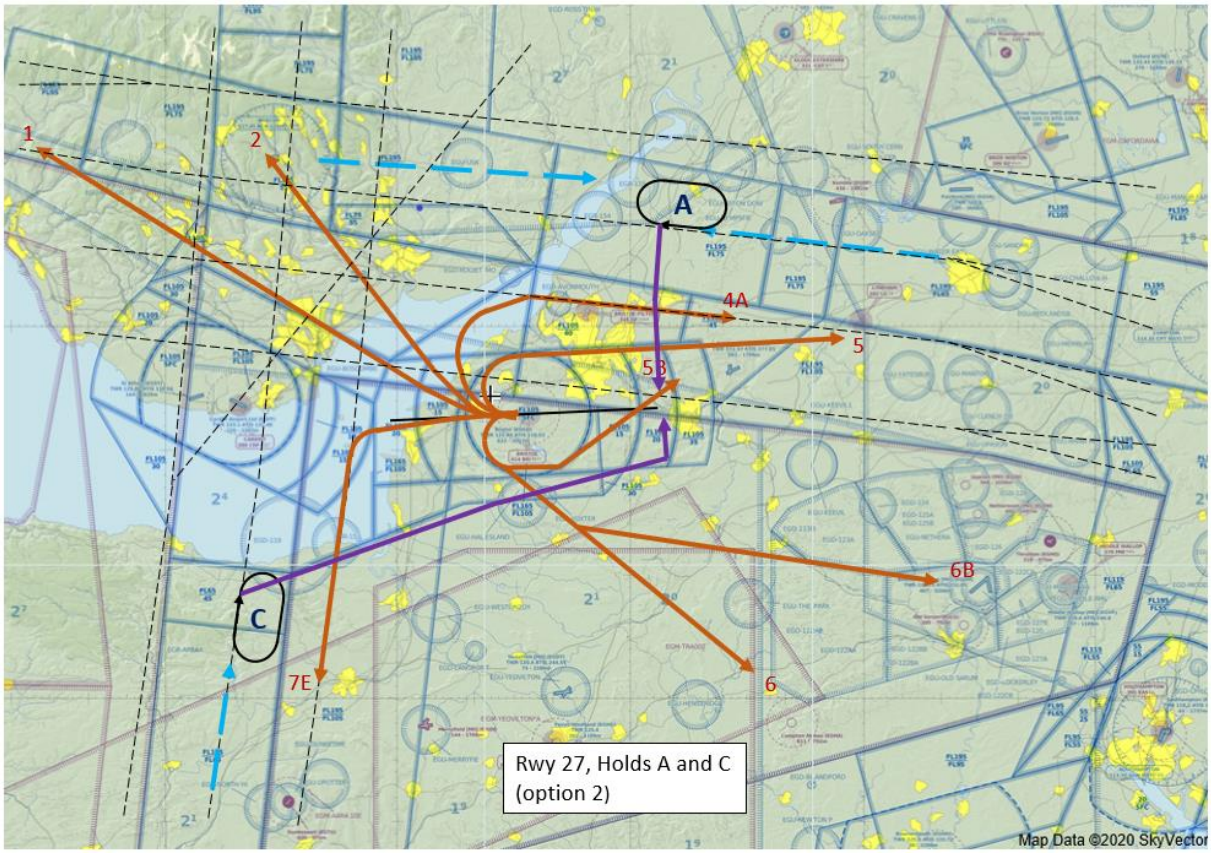


7D

Routing South West, this route initially remains within Bristol airspace then tracks toward the South. Delivering a low safety impact, interaction with the military training areas to the South should be considered and a safety hazard assessment may be required.

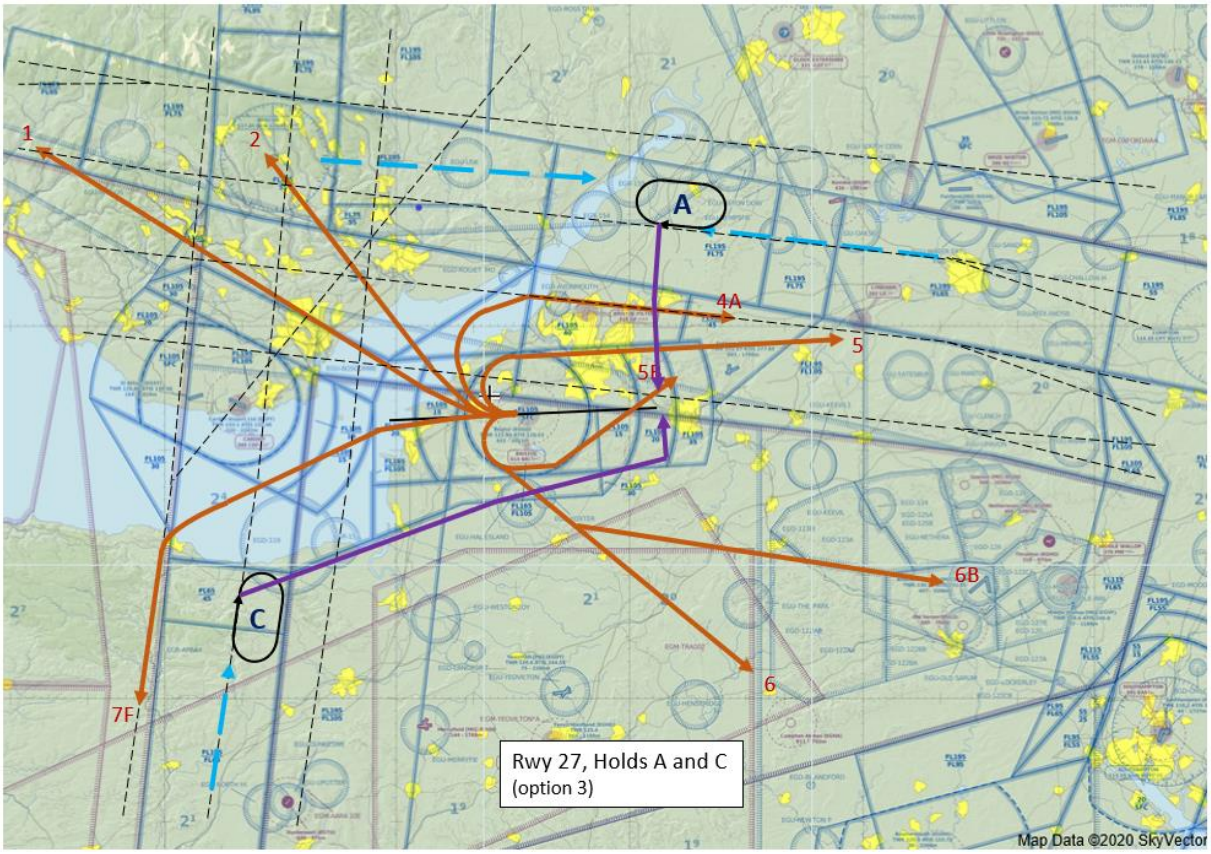
Hold C

Situated beneath the Berry Head CTA, this hold has a transition North East that interacts with outbound proposals 6, 6B, 7B, 7D and would require a safety assessment as a medium safety impact hold.



7E

Routing South West mostly over water before turning South, this route interacts with Cardiff airspace and potentially EGD-119 (although it skirts the boundary). Co-ordination with Cardiff to deconflict departures/arrivals may be required on this high safety impact route. It also crosses the transition inbounds from Hold C. A safety hazard assessment would be required.

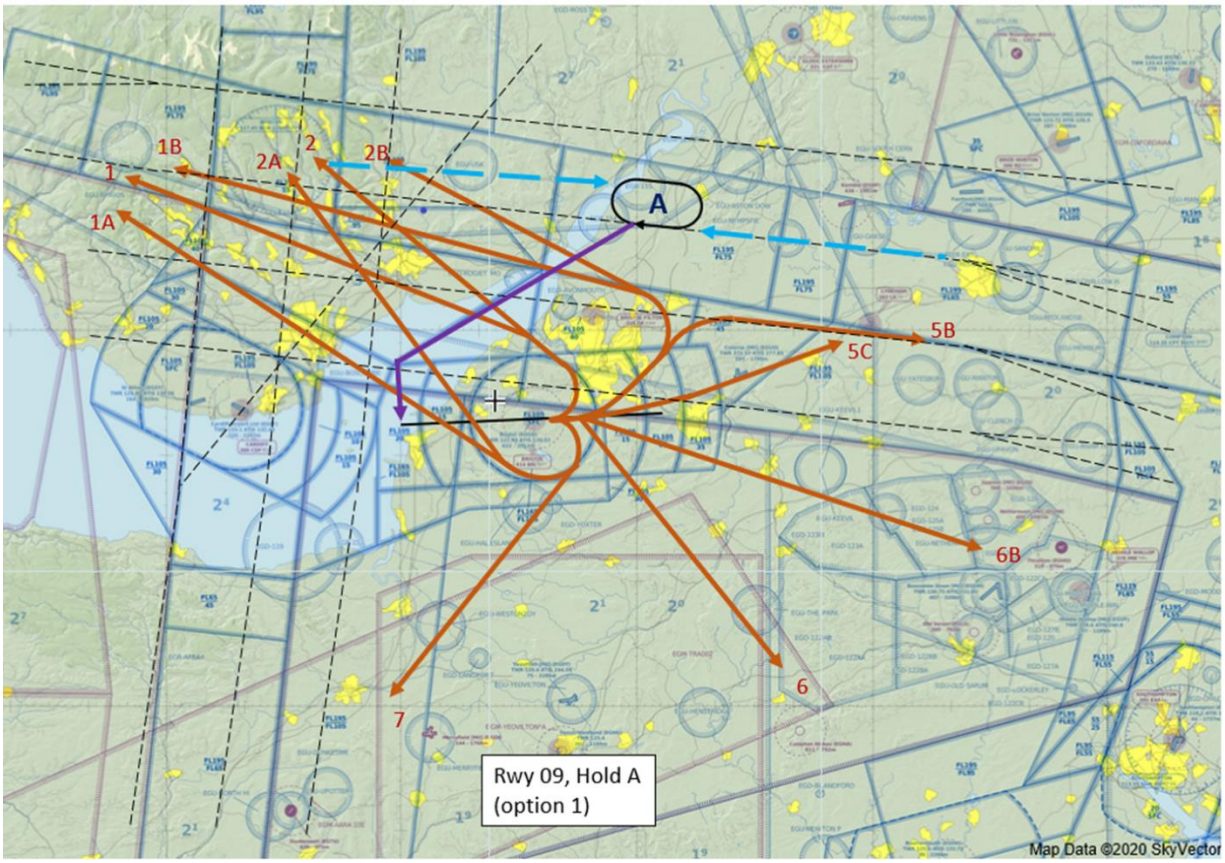


7E

Routing South West over water, this route interacts with Cardiff airspace then turns South routing West of Hold C. Co-ordination with Cardiff to deconflict departures/arrivals may be required on this high safety impact route. A safety hazard assessment would be required.

3.2 Departures RW09

The proposed Standard Instrument Departure (SID) routes from Runway 09:



1

A left-hand turn out toward the North West, initially in Bristol CTA before climbing toward the CAS structures, this track has a relatively low safety impact however it would be prudent to assess any safety implications around joining controlled airspace and any impact on the Proposed Hold A Transitions would need a hazard assessment of any potential level conflictions.

1A

A right-hand turn out toward the North West (crossing the inbound path), initially in Bristol CTA before climbing toward the CAS structures, this track has a high safety impact as it may affect Cardiff arrivals from the North and East in addition to any impact on the proposed Hold A Transitions. This route would need a hazard assessment of any potential level conflictions in addition to the other airspace interactions.

1B
A low-performance aircraft departure profile with extended climb path to the North East prior to turning North West, this track has a relatively low safety impact however it would be prudent to assess any safety implications around joining controlled airspace and any impact on the Proposed Hold A Transitions would need a hazard assessment of any potential level conflictions.

2
A left-hand turn out toward the North West, initially in Bristol CTA before climbing toward the CAS structures, this track has a relatively low safety impact however it would be prudent to assess any safety implications around joining controlled airspace and any impact on the Proposed Hold A Transitions would need a hazard assessment of any potential level conflictions.

2A
A right-hand turn out toward the North West (crossing the inbound path), initially in Bristol CTA before climbing toward the CAS structures, this track has a high safety impact as it may affect Cardiff arrivals from the North and East in addition to any impact on the proposed Hold A Transitions. This route would need a hazard assessment of any potential level conflictions in addition to the other airspace interactions.

2B
A low-performance aircraft departure profile with extended climb path to the North East prior to turning North West, this track has a relatively low safety impact however it would be prudent to assess any safety implications around joining controlled airspace and any impact on the Proposed Hold A Transitions would need a hazard assessment of any potential level conflictions.

5B
North East departure designed for a climb to join the airspace structure tracking East, this low safety impact track appears relatively benign.

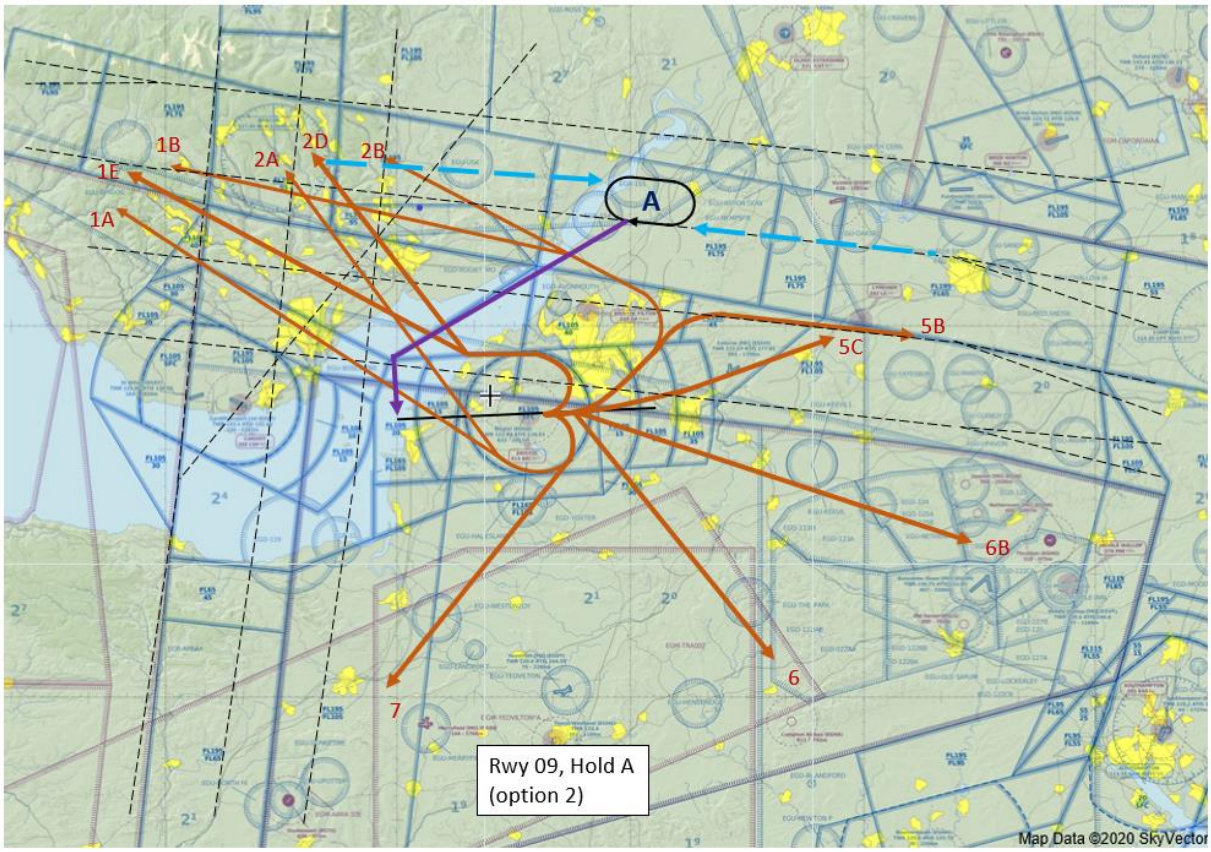
5C
Taking a direct route North east to join CAS, this track presents a low safety impact.

6
Routing South East, on leaving Bristol CTA this track routes through the military training area presenting a low safety impact however a hazard assessment of interaction would be advised.

6B
Similar to route 6 but routeing more Easterly, this medium safety impact track routes directly toward the Boscombe Down military complex and any airspace interaction would require a safety hazard assessment.

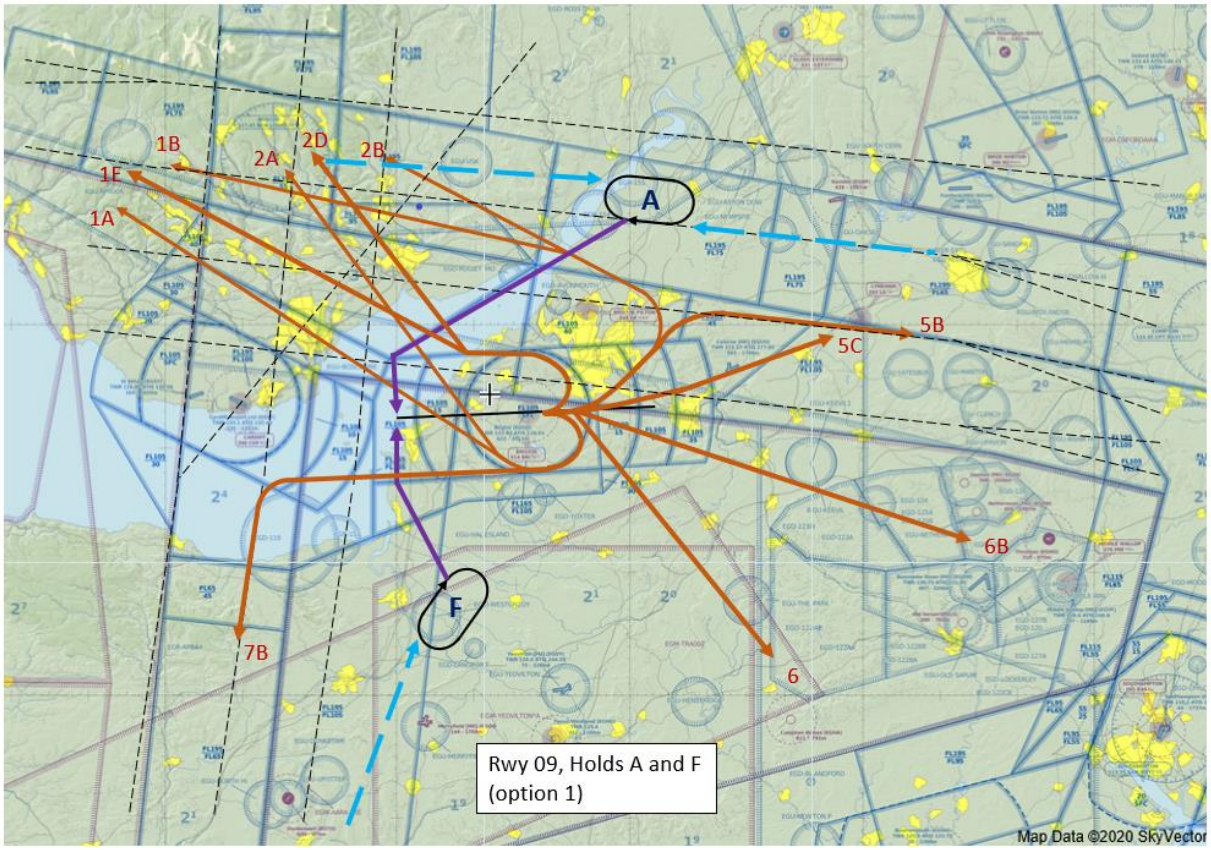
7.
Routing South West, on leaving Bristol CTA this track routes through the military training area presenting a low safety impact however a hazard assessment of interaction would be advised.

3.3 Departure RW09 alternates



1E and 2D
A redirection of the initial turning point from routes 1 and 2, A left-hand turn out toward the North West, initially in Bristol CTA before climbing toward the CAS structures, this track has a relatively low safety impact however it would be prudent to assess any safety implications around joining controlled airspace and any impact on the Proposed Hold A Transitions would need a hazard assessment of any potential level conflictions.

Note: *Additionally, Route 1B is changed very slightly from the route 1B depicted on page 16 however the safety risk impact is unchanged.*

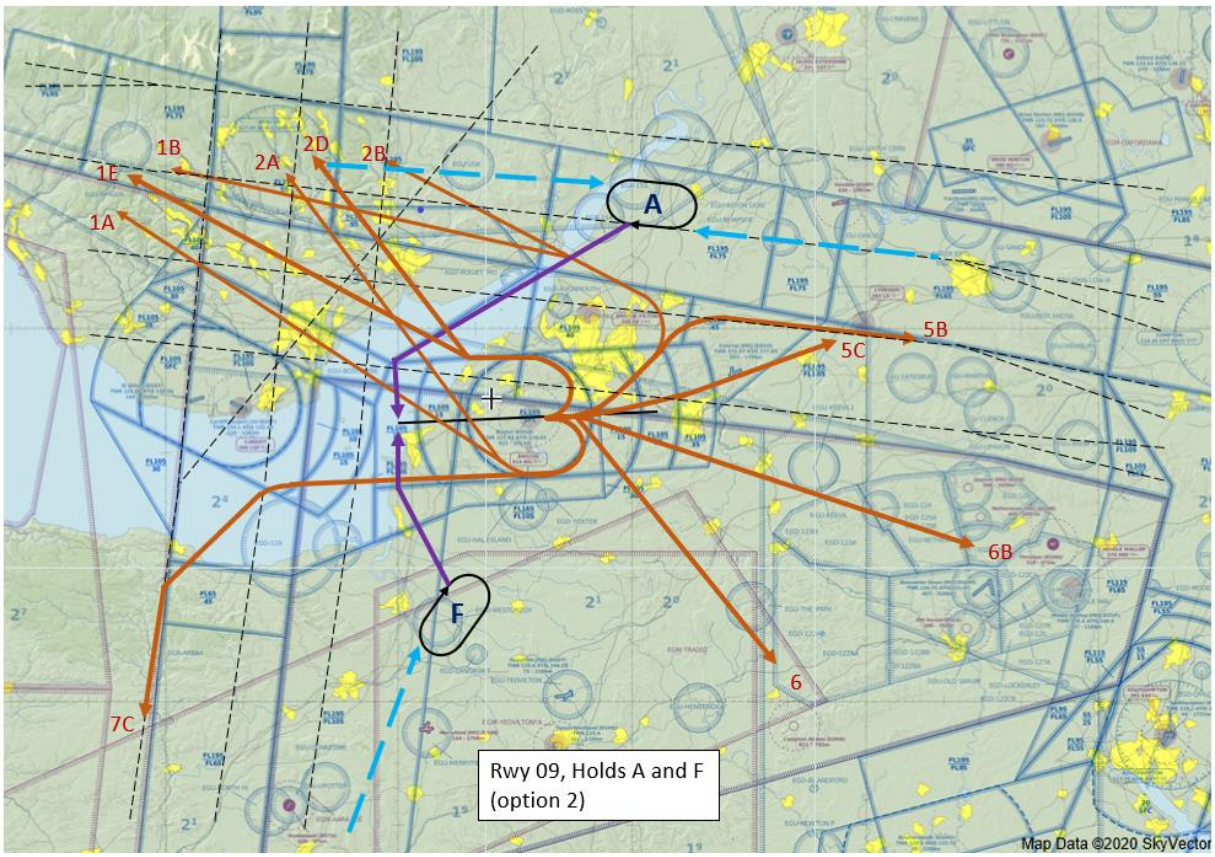


7B

The initial right turn out departure track climbs Westerly within the Bristol CTA before turning South to join CAS. It is a relatively low safety impact route however interactions with inbounds from Hod F would require a safety hazard assessment.

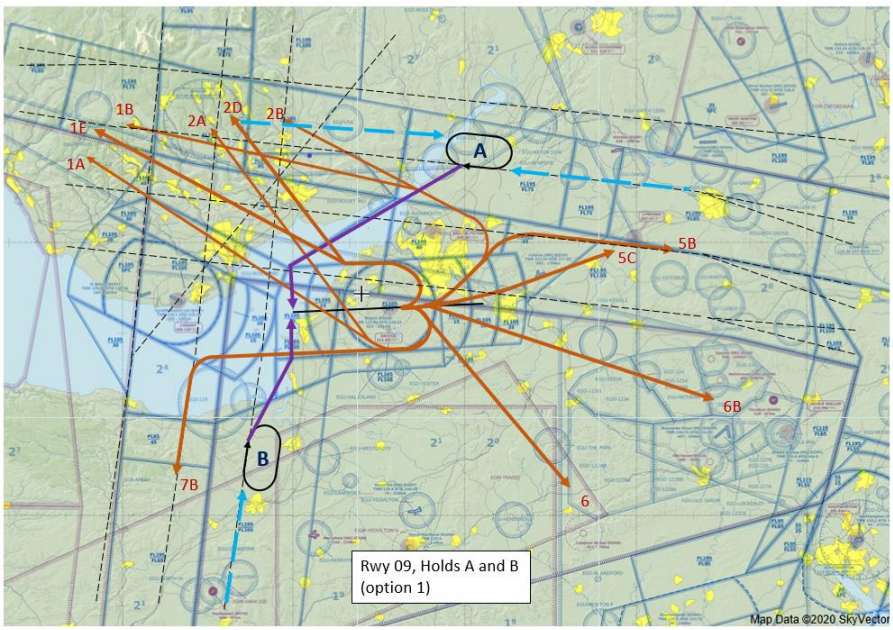
Hold F

Located in a Military Training Area, this hold to the South West has a relatively simple transition to RW09 arrivals and would require additional controlled airspace. Interacting with only one departure profile this medium impact safety risk would require a safety hazard assessment.



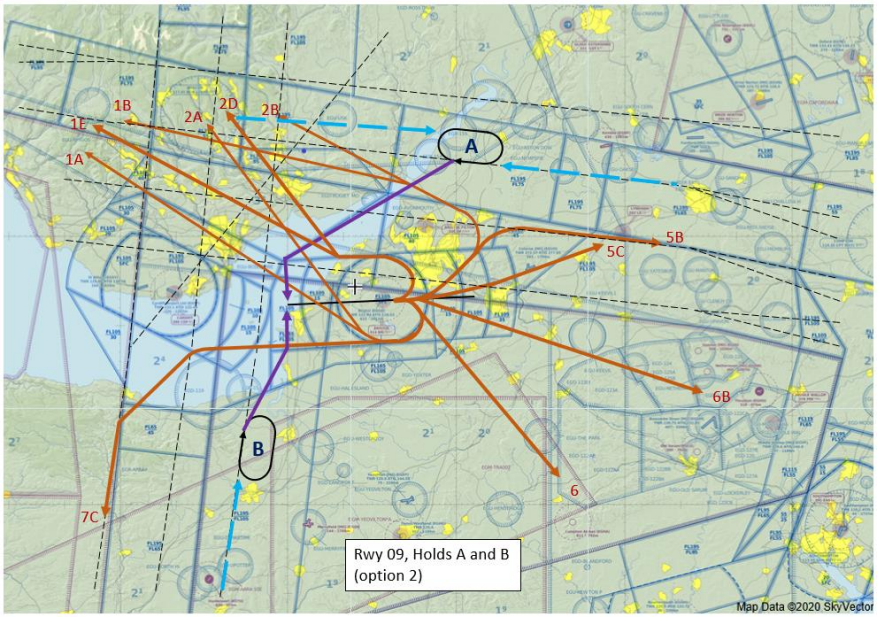
7C

The initial right turn out departure track climbs Westerly within the Bristol CTA before turning South to join CAS. It is a relatively low safety impact route however interactions with inbounds from Hold F would require a safety hazard assessment.



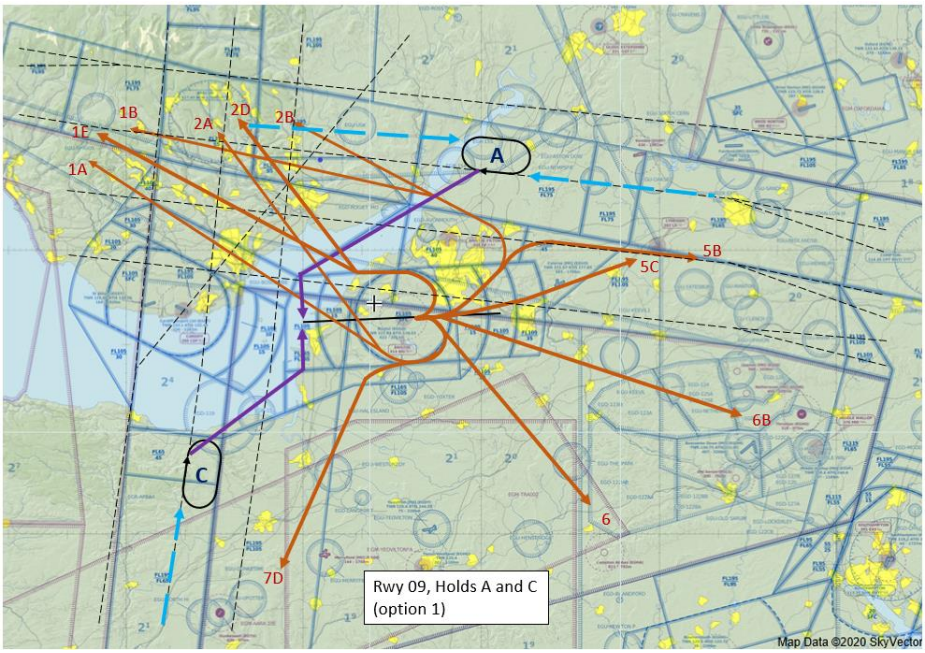
Hold B

Located partially within a Military Training Area, this hold to the South West has a relatively simple transition to RW09 arrivals and would require additional controlled airspace. Interacting with only one departure profile this medium impact safety risk would require a safety hazard assessment.



7C aligned with Hold B

Similar to Route 7C (low) as above but aligned to Hold B

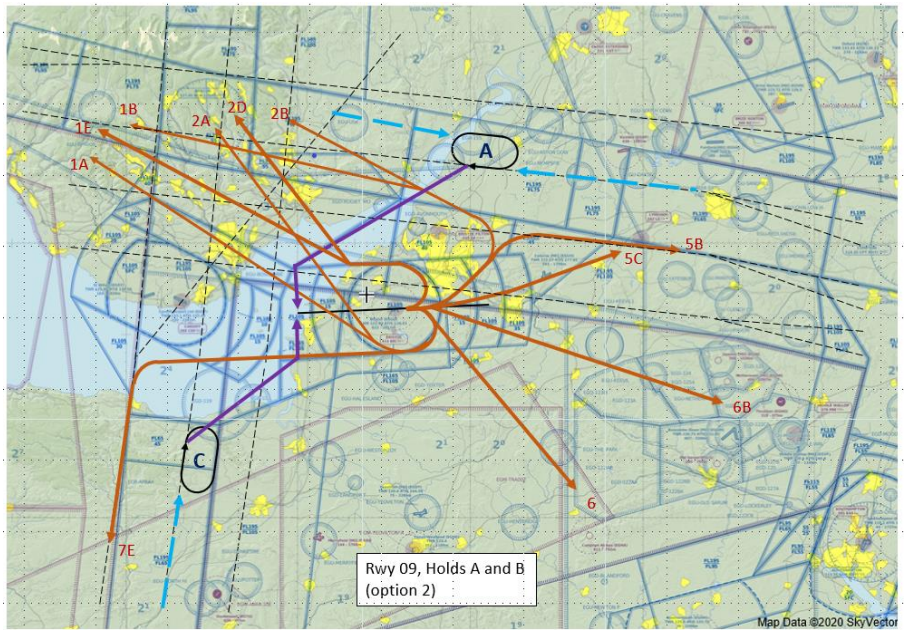


Hold C

This hold is beneath current CAS to the South West and has a single transition routing North East to RW 09. There are other airspace structures nearby and extra CAS would be required. This medium safety impact hold would require a safety hazard assessment.

7D

Route to the South West no longer interacts with arrivals however although a low safety impact, would require a hazard assessment against military traffic operating within the MTA to the South of Bristol.



7E

Route 7E interacts with arrivals from Hold C routing due West through Cardiff CTA prior to turning South to join the network. This medium safety impact route would require a safety hazard assessment.

4. Conclusion

This report provides qualitative safety statements for all proposed routes and holds for the Bristol ACP. This responds to the Safety assessment for the Initial options appraisal as detailed in CAP 1616 [2], Appendix E, paras E49-52.