Future Airspace Strategy Implementation South (FASI-S)

Cardiff Airport

Gateway documentation:

Stage 2 Develop & Assess

2A (ii) Design Principle Evaluation

cardiff airport
maes awyr caerdydd

Sign-Off

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Contents

Introduction

This document forms part of the document set required for the CAP1616 airspace change process: *Stage 2 Develop and Assess, Step 2A (ii) Design Principle Evaluation*

Its purpose is to consider this proposal's comprehensive list of airspace design options against its design principles, discarding those which fit least, progressing those which fit better. This document is designed to be read in conjunction with the document *Stage 2 - Step 2A (i) Design Options* which describes and illustrates each of the design options, and also refers to a preceding document Step 1B Design Principles.

During Stage 2, we have re-engaged our representative stakeholder groups, recapped the airspace change process and design principles, and explained the fundamental concept of this proposal. We explained the design option constraints, and what was feasible within those constraints. We targeted our stakeholders for feedback relevant to their interests, which informed the construction of this document. We thank the stakeholders for this engagement.

The purpose of the Design Principle Evaluation is to qualitatively assess each design option (e.g., a departure route) against each of the Design Principles. The evidence is high level and based on feedback received from stakeholders and the evolving design work. This high-level assessment states whether each Design Principle is not met, partially met, or fully met. The Design Principles can be found at the end of this document, in Annex A.

A "do nothing" option has also been included (and rejected) for comparison purposes.

During Stage 1B, each Design Principle was assigned a priority (high/ medium/ low) to signify the importance of an airspace change meeting this principle i.e., DP0 (encompassing safety) was assigned the highest priority (A) as any airspace change must maintain or improve the current safety standards. As part of this Design Principle Evaluation, any design option that does not meet a Priority A Design Principle has been discounted and will not be taken forward. Design options may progress if Design Principles of any priority are fully or partially met. This will allow improvements to be made during subsequent design work. The full RAG (Red/ Amber/ Green) criteria for this assessment can be found in Annex B at the end of this document.

Executive Summary

A total of 11 Hold and 19 Standard Instrument Departure (SID) (10 for Runway 12/ 9 for Runway 30) design options have been evaluated as part of this Design Principle Evaluation; alongside a "do nothing" option. Below is a breakdown of the design options which are being progressed and rejected; a total of 6 Hold and 3 SID design options have been rejected as part of this process.

Runway 12 SID Options

- SID C1 – progressed
- SID C2 – progressed

- SID C3 – progressed
- SID C4 – progressed
- SID C5 – progressed
- SID C6 – progressed
- SID C7 – progressed
- SID C8 – rejected (safety/ operational resilience/ operational capacity criteria not met)
- SID C8a – rejected (safety/ operational capacity criteria not met)
- SID C9 – progressed

Runway 30 SID Options

- SID C10 – progressed
- SID C11 – progressed
- SID C12 – progressed
- SID C13 – progressed
- SID C14 – progressed
- SID C15 – progressed
- SID C16 – progressed
- SID C17 – rejected (safety/ operational resilience criteria not met)
- SID C18 – progressed

Hold Options

- Hold 1 – rejected (safety criteria not met)
- Hold 2a – progressed
- Hold 2b – progressed
- Hold 3 – rejected (operational resilience criteria not met)
- Hold 4 – rejected (safety criteria not met)
- Hold 5 – progressed
- Hold 6 – progressed
- Hold 7 – progressed
- Hold 8a – rejected (operational resilience criteria not met)
- Hold 8b – rejected (safety/ operational resilience criteria not met)
- Hold 9 – rejected (safety/ operational resilience criteria not met)

Cardiff Airport has justified why design options have been discounted in the Design Principle Evaluation later on within this document. This is based on stakeholder feedback, design evolution and discussions that have occurred throughout. Upon commencing Stage 3, these individual design options will be integrated into complete airport "scenarios". We acknowledge that the design options presented herein will likely have to evolve based on their combination with other procedures. Similarly, we are open to the situation whereby a design option has to be re-introduced if new feedback comes to light or issues are resolved when it is integrated with other options.

Cardiff Airport Baseline Option (do nothing)

DP0: Safety Safety: Must maintain or where possible, enhance current levels of safety (HIGH) *Current safety standards maintained but not enhanced. No improvement from today's operation which has identified required safety improvements as covered in our Statement of Need e.g., current Hold in the overhead.*	PARTIAL
DP1: Operational Resilience: The proposed airspace must maintain or where possible, enhance operational resilience of the ATC (Air Traffic Control) network and operations (HIGH) *No change from today's operation. However, no interface with upcoming network changes therefore further work would be required which this option does not enable.*	NOT MET
DP2: Operational Capacity: The proposed airspace design will yield the maximum capacity benefits from systemisation in line with the CAAs (Civil Aviation Authority) published airspace modernisation programme (HIGH) *No changes to support future growth or known changes in traffic flows, including the updated en route network.*	NOT MET
DP3: Economic Network Performance: The proposed Cardiff FASI-S (Future Airspace Strategy Implementation – South) airspace should facilitate optimised network economic performance (MEDIUM) *No change from today, no improvements introduced.*	PARTIAL
DP4: Environmental Greenhouse Gas Emissions (CO2): The proposed Cardiff FASI-S airspace should minimise CO2 emissions per flight (MEDIUM) *No change from today, no improvements introduced.*	PARTIAL
DP5: Environmental Noise impact to stakeholders on the ground: The proposed Cardiff FASI-S airspace should limit, and where practicable reduce, noise impacts to stakeholders on the ground (MEDIUM) *No change from today, no improvements introduced.*	PARTIAL
DP6: Technical Airspace Access and Integration (MoD Requirements): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on the MoD (MEDIUM) *No change from today's operation therefore opportunities to explore access improvements would not be realised.*	PARTIAL
DP7: Technical Airspace Access and Integration (GA Impacts): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on GA and other civilian airspace users (MEDIUM) *No change from today's operation therefore opportunities to explore access improvements would not be realised.*	PARTIAL
DP8: Technical Airspace Access and Integration (Minimise CAS): The volume and classification of controlled airspace required for the Cardiff FASI-S ACP should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of all airspace users (MEDIUM) *No change from today's operation.*	MET
DP9: Technical Use of Advanced Navigation Technology (PBN): The route network linking airport procedures with the enroute phase of flight will be designed to yield maximum safety and efficiency benefits by using an appropriate standard of PBN (HIGH)	MET

No known conflictions.	
DP10: Policy	MET
Use of Advanced Navigation Technology: The proposed Cardiff FASI-S airspace design must be compliant with all relevant laws and regulatory requirements (HIGH)	
No known policy conflictions.	
DP11: Technical	PARTIAL
Airspace Access and Integration (Impact on Adjacent Airfields/ Aerodromes): The proposed airspace should where possible, achieve a mutually beneficial solution to surrounding airfields ensuring equitable access to the airspace 'shared' with Bristol Airport (HIGH/ MEDIUM)	
No change from today's operation therefore opportunities to explore access improvements would not be realised. Neighbouring regional airports are known to be undertaking their own airspace changes.	

Cardiff Airport Stage 2 Runway 12 SID Options

This section summarises the Design Principle Evaluation for Cardiff Airport's Runway 12 SID options. Figure 1 below shows the options which are being progressed through Stage 2 in black, and the two options which are being rejected in red.

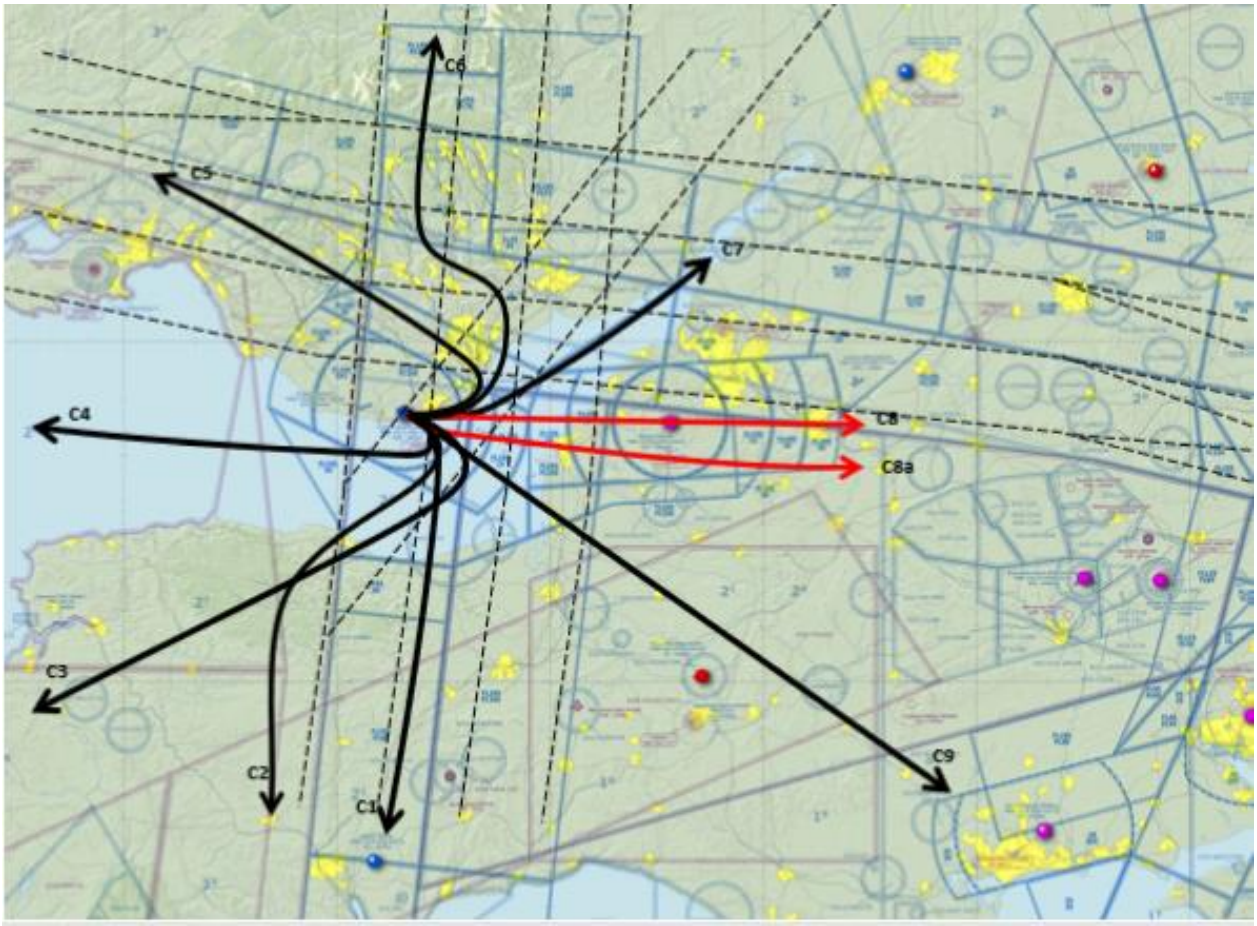
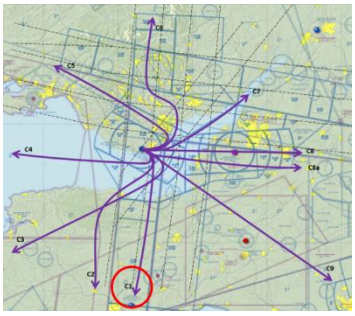


Figure 1: Cardiff Airport Stage 2 Runway 12 SID Options

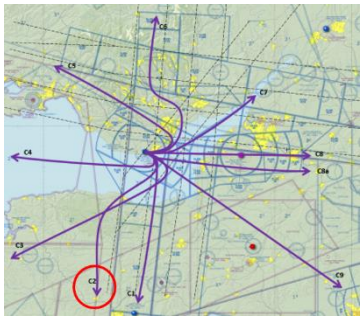
SID C1 (Runway 12 departure to the south) - progressed



DP0: Safety	MET
Safety: Must maintain or where possible, enhance current levels of safety (HIGH)	
No known safety concerns.	
DP1: Operational	PARTIAL
Resilience: The proposed airspace must maintain or where possible, enhance operational resilience of the ATC (Air Traffic Control) network and operations (HIGH)	
Opposite alignment with network routes, further work required. *Otherwise, similar to what is currently flown and suitable for low performance aircraft.*	
DP2: Operational	MET
Capacity: The proposed airspace design will yield the maximum capacity benefits from systemisation in line with the CAAs (Civil Aviation Authority) published airspace modernisation programme (HIGH)	
No known capacity constraints (aligned with the Airspace Modernisation Strategy (AMS)). Anticipated to be used frequently as a large percentage of traffic flies to/ from the south.	
DP3: Economic	PARTIAL
Network Performance: The proposed Cardiff FASI-S (Future Airspace Strategy Implementation – South) airspace should facilitate optimised network economic performance (MEDIUM)	
Continuous climbs above 7,000ft may be impacted by potential transitions/ Hold to the south of Cardiff Airport.	
DP4: Environmental	PARTIAL
Greenhouse Gas Emissions (CO2): The proposed Cardiff FASI-S airspace should minimise CO2 emissions per flight (MEDIUM)	
Continuous climbs above 7,000ft may be not be possible.	
DP5: Environmental	MET
Noise impact to stakeholders on the ground: The proposed Cardiff FASI-S airspace should limit, and where practicable reduce, noise impacts to stakeholders on the ground (MEDIUM)	
All of the initial phase of climb is over water (up to 7,000ft) therefore no noise impact.	
DP6: Technical	MET
Airspace Access and Integration (MoD Requirements): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on the MoD (MEDIUM)	
Minimal impact on MoD operations.	
DP7: Technical	MET
Airspace Access and Integration (GA Impacts): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on GA and other civilian airspace users (MEDIUM)	
Minimal impact on GA operations (potential that gliders are around 3,000ft by the coast but not typical).	
DP8: Technical	MET
Airspace Access and Integration (Minimise CAS): The volume and classification of controlled airspace required for the Cardiff FASI-S ACP should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of all airspace users (MEDIUM)	
Contained within existing CAS.	
DP9: Technical	MET

Use of Advanced Navigation Technology (PBN): The route network linking airport procedures with the enroute phase of flight will be designed to yield maximum safety and efficiency benefits by using an appropriate standard of PBN (HIGH)	
No known conflictions.	
DP10: Policy	MET
Use of Advanced Navigation Technology: The proposed Cardiff FASI-S airspace design must be compliant with all relevant laws and regulatory requirements (HIGH)	
No known policy conflictions.	
DP11: Technical	PARTIAL
Airspace Access and Integration (Impact on Adjacent Airfields/ Aerodromes): The proposed airspace should where possible, achieve a mutually beneficial solution to surrounding airfields ensuring equitable access to the airspace 'shared' with Bristol Airport (HIGH/ MEDIUM)	
Potential cross-over with Exeter departures to the north (dependent on network route choice and climb rate).	

SID C2 (Runway 12 departure to the south) - progressed



DP0: Safety	MET
Safety: Must maintain or where possible, enhance current levels of safety (HIGH)	
No known safety concerns – may provide a safety benefit from a reduced number of interactions required by the controller.	
DP1: Operational	MET
Resilience: The proposed airspace must maintain or where possible, enhance operational resilience of the ATC (Air Traffic Control) network and operations (HIGH)	
Good alignment with network route structure. *Suitable route for lower performance aircraft types.* *Similar to what is currently flown.*	
DP2: Operational	MET
Capacity: The proposed airspace design will yield the maximum capacity benefits from systemisation in line with the CAAs (Civil Aviation Authority) published airspace modernisation programme (HIGH)	
No known capacity constraints (aligned with the AMS). Anticipated to be used frequently as a large percentage of traffic flies to/ from the south.	
DP3: Economic	PARTIAL
Network Performance: The proposed Cardiff FASI-S (Future Airspace Strategy Implementation – South) airspace should facilitate optimised network economic performance (MEDIUM)	
Continuous climbs above 7,000ft may be affected by potential transitions/ Hold to the south of Cardiff Airport.	
DP4: Environmental	PARTIAL
Greenhouse Gas Emissions (CO2): The proposed Cardiff FASI-S airspace should minimise CO2 emissions per flight (MEDIUM)	
Longer track than currently flown and slightly longer track distance than SID C1. *Continuous climbs above 7,000ft may be not be possible.*	
DP5: Environmental	MET
Noise impact to stakeholders on the ground: The proposed Cardiff FASI-S airspace should limit, and where practicable reduce, noise impacts to stakeholders on the ground (MEDIUM)	
All of the initial phase of climb is over water (up to 7,000ft) therefore no noise impact.	
DP6: Technical	MET
Airspace Access and Integration (MoD Requirements): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on the MoD (MEDIUM)	
Minimal impact due to being positioned over the water and contained within existing lower-level CAS.	
DP7: Technical	MET
Airspace Access and Integration (GA Impacts): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on GA and other civilian airspace users (MEDIUM)	
Minimal impact due to being positioned over the water and contained within existing lower-level CAS.	
DP8: Technical	PARTIAL

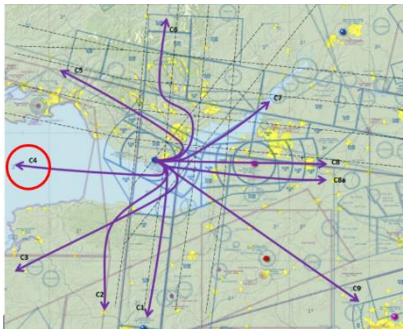
Airspace Access and Integration (Minimise CAS): The volume and classification of controlled airspace required for the Cardiff FASI-S ACP should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of all airspace users (MEDIUM)	
May require a small amount of additional CAS to the west of the current Berry Head CTA (although majority should be above 7,000ft).	
DP9: Technical	MET
Use of Advanced Navigation Technology (PBN): The route network linking airport procedures with the enroute phase of flight will be designed to yield maximum safety and efficiency benefits by using an appropriate standard of PBN (HIGH)	
No known conflictions.	
DP10: Policy	MET
Use of Advanced Navigation Technology: The proposed Cardiff FASI-S airspace design must be compliant with all relevant laws and regulatory requirements (HIGH)	
No known policy conflictions.	
DP11: Technical	MET
Airspace Access and Integration (Impact on Adjacent Airfields/ Aerodromes): The proposed airspace should where possible, achieve a mutually beneficial solution to surrounding airfields ensuring equitable access to the airspace 'shared' with Bristol Airport (HIGH/ MEDIUM)	
No known impacts (expected to be high enough to avoid flights to/from Exeter Airport.)	

SID C3 (Runway 12 departure to the south-west) – progressed

DP0: Safety	MET
Safety: Must maintain or where possible, enhance current levels of safety (HIGH)	
No known safety concerns – may provide a safety benefit from a reduced number of interactions required by the controller.	
DP1: Operational	PARTIAL
Resilience: The proposed airspace must maintain or where possible, enhance operational resilience of the ATC (Air Traffic Control) network and operations (HIGH)	
Does not currently align with network routes, further work required. *Expectation that the current fleet mix could achieve the climb profile required.*	
DP2: Operational	PARTIAL
Capacity: The proposed airspace design will yield the maximum capacity benefits from systemisation in line with the CAAs (Civil Aviation Authority) published airspace modernisation programme (HIGH)	
This would be used as an early morning offload route for traffic joining southerly Atlantic tracks or southern Europe destinations (supports growth for these destinations). *However, low demand anticipated for this route.*	
DP3: Economic	PARTIAL
Network Performance: The proposed Cardiff FASI-S (Future Airspace Strategy Implementation – South) airspace should facilitate optimised network economic performance (MEDIUM)	
Continuous climbs may be affected by potential transitions/ Hold to the south of Cardiff Airport. *Low demand anticipated for this route.* *Potential small saving in airline route charges and fuel burn (route slightly cuts the corner).*	
DP4: Environmental	PARTIAL
Greenhouse Gas Emissions (CO2): The proposed Cardiff FASI-S airspace should minimise CO2 emissions per flight (MEDIUM)	
Cuts the corner slightly when compared to today (small saving in emissions). *However, continuous climbs may be not be possible.*	
DP5: Environmental	MET
Noise impact to stakeholders on the ground: The proposed Cardiff FASI-S airspace should limit, and where practicable reduce, noise impacts to stakeholders on the ground (MEDIUM)	
All of the initial phase of climb is over water (up to 7,000ft) therefore no noise impact.	
DP6: Technical	MET
Airspace Access and Integration (MoD Requirements): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on the MoD (MEDIUM)	
Minimal impact on MoD - expected to only be used well before MoD operations occur later in the day.	
DP7: Technical	MET
Airspace Access and Integration (GA Impacts): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on GA and other civilian airspace users (MEDIUM)	
No known impacts.	
DP8: Technical	PARTIAL

Airspace Access and Integration (Minimise CAS): The volume and classification of controlled airspace required for the Cardiff FASI-S ACP should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of all airspace users (MEDIUM)	
Anticipated to climb outside of CAS but early in the morning.	
DP9: Technical	MET
Use of Advanced Navigation Technology (PBN): The route network linking airport procedures with the enroute phase of flight will be designed to yield maximum safety and efficiency benefits by using an appropriate standard of PBN (HIGH)	
No known conflictions.	
DP10: Policy	MET
Use of Advanced Navigation Technology: The proposed Cardiff FASI-S airspace design must be compliant with all relevant laws and regulatory requirements (HIGH)	
No known policy conflictions.	
DP11: Technical	MET
Airspace Access and Integration (Impact on Adjacent Airfields/ Aerodromes): The proposed airspace should where possible, achieve a mutually beneficial solution to surrounding airfields ensuring equitable access to the airspace 'shared' with Bristol Airport (HIGH/ MEDIUM)	
No known impacts (anticipated to be high enough to avoid an impact on Exeter operations).	

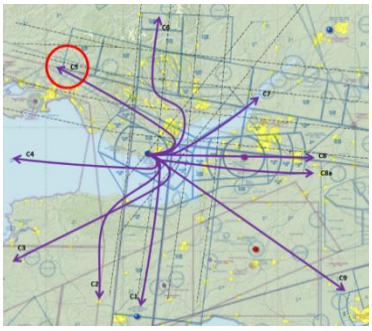
SID C4 (Runway 12 departure to the west) – progressed



DP0: Safety	MET
Safety: Must maintain or where possible, enhance current levels of safety (HIGH)	
No known safety concerns – may provide a safety benefit from a reduced number of interactions required by the controller.	
DP1: Operational	PARTIAL
Resilience: The proposed airspace must maintain or where possible, enhance operational resilience of the ATC (Air Traffic Control) network and operations (HIGH)	
Does not currently align with network routes, further work required.	
DP2: Operational	PARTIAL
Capacity: The proposed airspace design will yield the maximum capacity benefits from systemisation in line with the CAAs (Civil Aviation Authority) published airspace modernisation programme (HIGH)	
This would be used as an early morning offload route for traffic joining southerly Atlantic tracks or southern Europe destinations (supports growth for these destinations). *However, low demand anticipated for this route.*	
DP3: Economic	PARTIAL
Network Performance: The proposed Cardiff FASI-S (Future Airspace Strategy Implementation – South) airspace should facilitate optimised network economic performance (MEDIUM)	
Continuous climbs may be affected by potential transitions/ Hold to the south of Cardiff Airport. Support growth for a future increase in western/ transatlantic flights (initially low demand anticipated).	
DP4: Environmental	PARTIAL
Greenhouse Gas Emissions (CO2): The proposed Cardiff FASI-S airspace should minimise CO2 emissions per flight (MEDIUM)	
Continuous climbs may be not be possible.	
DP5: Environmental	MET
Noise impact to stakeholders on the ground: The proposed Cardiff FASI-S airspace should limit, and where practicable reduce, noise impacts to stakeholders on the ground (MEDIUM)	
All of the initial phase of climb is over water (up to 7,000ft) therefore no noise impact.	
DP6: Technical	MET
Airspace Access and Integration (MoD Requirements): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on the MoD (MEDIUM)	
No impact, avoids danger areas in the south-west of Wales.	
DP7: Technical	MET
Airspace Access and Integration (GA Impacts): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on GA and other civilian airspace users (MEDIUM)	
No known impact due to track being positioned over the sea.	
DP8: Technical	NOT MET
Airspace Access and Integration (Minimise CAS): The volume and classification of controlled airspace required for the Cardiff FASI-S ACP should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of all airspace users (MEDIUM)	

Significant amount of new CAS required. This would be over the sea so minimal impact on airspace users (covered above).	
DP9: Technical	MET
Use of Advanced Navigation Technology (PBN): The route network linking airport procedures with the enroute phase of flight will be designed to yield maximum safety and efficiency benefits by using an appropriate standard of PBN (HIGH)	
No known conflictions.	
DP10: Policy	MET
Use of Advanced Navigation Technology: The proposed Cardiff FASI-S airspace design must be compliant with all relevant laws and regulatory requirements (HIGH)	
No known policy conflictions.	
DP11: Technical	PARTIAL
Airspace Access and Integration (Impact on Adjacent Airfields/ Aerodromes): The proposed airspace should where possible, achieve a mutually beneficial solution to surrounding airfields ensuring equitable access to the airspace 'shared' with Bristol Airport (HIGH/ MEDIUM)	
Potential impact on Exeter departures.	

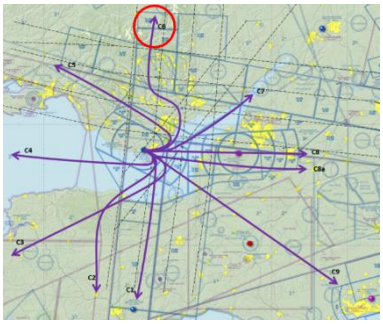
SID C5 (Runway 12 departure to the north-west) – progressed



DP0: Safety	PARTIAL
Safety: Must maintain or where possible, enhance current levels of safety (HIGH)	
Known wind-farm development in this region (possible impact on radar cover) – robust safety case required.	
DP1: Operational	PARTIAL
Resilience: The proposed airspace must maintain or where possible, enhance operational resilience of the ATC (Air Traffic Control) network and operations (HIGH)	
Good alignment with network route structure. *Formalises a tactical procedure used in the current operation.* *However, potential increase in operational complexity as the route departs towards adjacent CAS.*	
DP2: Operational	MET
Capacity: The proposed airspace design will yield the maximum capacity benefits from systemisation in line with the CAAs (Civil Aviation Authority) published airspace modernisation programme (HIGH)	
No known constraints (aligned with the AMS).	
DP3: Economic	MET
Network Performance: The proposed Cardiff FASI-S (Future Airspace Strategy Implementation – South) airspace should facilitate optimised network economic performance (MEDIUM)	
Direct route and currently used on a tactical basis.	
DP4: Environmental	MET
Greenhouse Gas Emissions (CO2): The proposed Cardiff FASI-S airspace should minimise CO2 emissions per flight (MEDIUM)	
More direct route than what is flown today via Brecon therefore providing a fuel burn saving. *Currently used on a tactical basis.*	
DP5: Environmental	PARTIAL
Noise impact to stakeholders on the ground: The proposed Cardiff FASI-S airspace should limit, and where practicable reduce, noise impacts to stakeholders on the ground (MEDIUM)	
Potential new noise impact around Cardiff City.	
DP6: Technical	NOT MET
Airspace Access and Integration (MoD Requirements): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on the MoD (MEDIUM)	
Addition of new CAS would impact heavily upon MoD operations (spin training specifically occurs between Swansea and western edge of Cardiff CTA).	
DP7: Technical	PARTIAL
Airspace Access and Integration (GA Impacts): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on GA and other civilian airspace users (MEDIUM)	
Addition of new CAS may impact upon GA flights (reduced area they can operate in).	
DP8: Technical	PARTIAL
Airspace Access and Integration (Minimise CAS): The volume and classification of controlled airspace required for the Cardiff FASI-S ACP should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of all airspace users (MEDIUM)	

A small amount of new CAS required to the north-west of Cardiff Airport (large impact on MoD operations).	
DP9: Technical	MET
Use of Advanced Navigation Technology (PBN): The route network linking airport procedures with the enroute phase of flight will be designed to yield maximum safety and efficiency benefits by using an appropriate standard of PBN (HIGH)	
No known conflictions.	
DP10: Policy	MET
Use of Advanced Navigation Technology: The proposed Cardiff FASI-S airspace design must be compliant with all relevant laws and regulatory requirements (HIGH)	
No known policy conflictions.	
DP11: Technical	PARTIAL
Airspace Access and Integration (Impact on Adjacent Airfields/ Aerodromes): The proposed airspace should where possible, achieve a mutually beneficial solution to surrounding airfields ensuring equitable access to the airspace 'shared' with Bristol Airport (HIGH/ MEDIUM)	
Potential interaction with network traffic, known to be a busy region of airspace.	

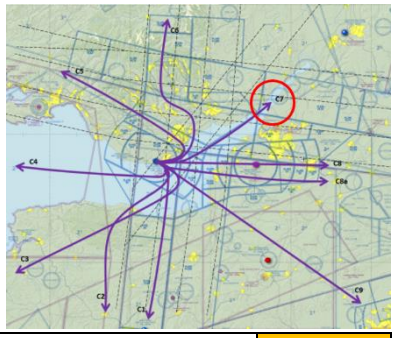
SID C6 (Runway 12 departure to the north) – progressed



DP0: Safety	MET
Safety: Must maintain or where possible, enhance current levels of safety (HIGH)	
No known safety concerns.	
DP1: Operational	PARTIAL
Resilience: The proposed airspace must maintain or where possible, enhance operational resilience of the ATC (Air Traffic Control) network and operations (HIGH)	
Good alignment with network route structure. *Similar to current route.* *However, potential increase in operational complexity as the route departs towards adjacent CAS.*	
DP2: Operational	MET
Capacity: The proposed airspace design will yield the maximum capacity benefits from systemisation in line with the CAAs (Civil Aviation Authority) published airspace modernisation programme (HIGH)	
No known capacity constraints (aligned with the AMS). Routed to avoid potential northern Hold location and therefore not constrain traffic.	
DP3: Economic	PARTIAL
Network Performance: The proposed Cardiff FASI-S (Future Airspace Strategy Implementation – South) airspace should facilitate optimised network economic performance (MEDIUM)	
Slightly longer track distance.	
DP4: Environmental	PARTIAL
Greenhouse Gas Emissions (CO2): The proposed Cardiff FASI-S airspace should minimise CO2 emissions per flight (MEDIUM)	
Slightly longer track distance due to positioning around populations and potential Hold location (increased fuel burn).	
DP5: Environmental	MET
Noise impact to stakeholders on the ground: The proposed Cardiff FASI-S airspace should limit, and where practicable reduce, noise impacts to stakeholders on the ground (MEDIUM)	
Will initially overfly the channel and then specifically positioned to avoid populated areas.	
DP6: Technical	MET
Airspace Access and Integration (MoD Requirements): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on the MoD (MEDIUM)	
Minimal impact on MoD operations.	
DP7: Technical	MET
Airspace Access and Integration (GA Impacts): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on GA and other civilian airspace users (MEDIUM)	
Minimal impact, contained within CAS (unless the current base is lowered).	
DP8: Technical	MET
Airspace Access and Integration (Minimise CAS): The volume and classification of controlled airspace required for the Cardiff FASI-S ACP should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of all airspace users (MEDIUM)	
Contained within existing CAS (small possibility that CAS may require lowering).	
DP9: Technical	MET

Use of Advanced Navigation Technology (PBN): The route network linking airport procedures with the enroute phase of flight will be designed to yield maximum safety and efficiency benefits by using an appropriate standard of PBN (HIGH)	
Would use PBN to specifically minimise flying over local population densities (around Cardiff).	
DP10: Policy	MET
Use of Advanced Navigation Technology: The proposed Cardiff FASI-S airspace design must be compliant with all relevant laws and regulatory requirements (HIGH)	
No known policy conflictions.	
DP11: Technical	MET
Airspace Access and Integration (Impact on Adjacent Airfields/ Aerodromes): The proposed airspace should where possible, achieve a mutually beneficial solution to surrounding airfields ensuring equitable access to the airspace 'shared' with Bristol Airport (HIGH/ MEDIUM)	
No known impacts.	

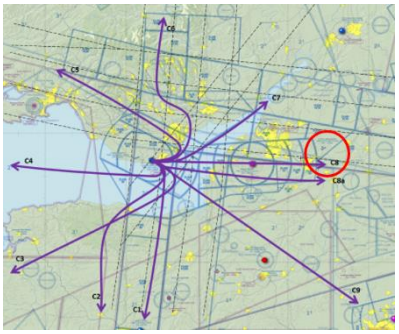
SID C7 (Runway 12 departure to the north-east) – progressed



DP0: Safety	PARTIAL
Safety: Must maintain or where possible, enhance current levels of safety (HIGH)	
Increased workload due to coordination between Cardiff and Bristol ATC.	
DP1: Operational	PARTIAL
Resilience: The proposed airspace must maintain or where possible, enhance operational resilience of the ATC (Air Traffic Control) network and operations (HIGH)	
Good alignment with network route structure. *Suitable route for lower performance aircraft types.* *However, increased collaboration with Bristol Airport due to the impact on Bristol arrivals.*	
DP2: Operational	MET
Capacity: The proposed airspace design will yield the maximum capacity benefits from systemisation in line with the CAAs (Civil Aviation Authority) published airspace modernisation programme (HIGH)	
No known capacity constraints (aligned with the AMS). Expected increase in future traffic to the east which this would support.	
DP3: Economic	MET
Network Performance: The proposed Cardiff FASI-S (Future Airspace Strategy Implementation – South) airspace should facilitate optimised network economic performance (MEDIUM)	
Shorter track distance than today.	
DP4: Environmental	MET
Greenhouse Gas Emissions (CO2): The proposed Cardiff FASI-S airspace should minimise CO2 emissions per flight (MEDIUM)	
Shorter track distance than flown today (fuel burn benefit).	
DP5: Environmental	MET
Noise impact to stakeholders on the ground: The proposed Cardiff FASI-S airspace should limit, and where practicable reduce, noise impacts to stakeholders on the ground (MEDIUM)	
Routed to specifically overfly the channel therefore no noise impact for ground-based stakeholders.	
DP6: Technical	MET
Airspace Access and Integration (MoD Requirements): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on the MoD (MEDIUM)	
Minimal impact on MoD operations.	
DP7: Technical	MET
Airspace Access and Integration (GA Impacts): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on GA and other civilian airspace users (MEDIUM)	
Minimal impact on GA traffic.	
DP8: Technical	MET
Airspace Access and Integration (Minimise CAS): The volume and classification of controlled airspace required for the Cardiff FASI-S ACP should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of all airspace users (MEDIUM)	
Contained within existing CAS.	
DP9: Technical	MET

Use of Advanced Navigation Technology (PBN): The route network linking airport procedures with the enroute phase of flight will be designed to yield maximum safety and efficiency benefits by using an appropriate standard of PBN (HIGH)	
No known conflictions.	
DP10: Policy	MET
Use of Advanced Navigation Technology: The proposed Cardiff FASI-S airspace design must be compliant with all relevant laws and regulatory requirements (HIGH)	
No known policy conflictions.	
DP11: Technical	PARTIAL
Airspace Access and Integration (Impact on Adjacent Airfields/ Aerodromes): The proposed airspace should where possible, achieve a mutually beneficial solution to surrounding airfields ensuring equitable access to the airspace 'shared' with Bristol Airport (HIGH/ MEDIUM)	
Potential interaction with Bristol arrivals.	

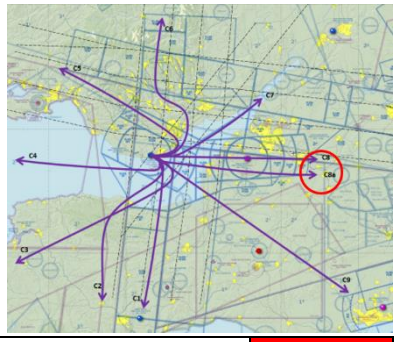
SID C8 (Runway 12 departure to the east) – rejected



DP0: Safety	NOT MET
Safety: Must maintain or where possible, enhance current levels of safety (HIGH)	
Concerns about radar clutter above Bristol Airport. *High workload due to increased coordination between Cardiff and Bristol ATC.* *Safety concern from interaction with military danger areas up to FL50 (Salisbury Plain).*	
DP1: Operational	NOT MET
Resilience: The proposed airspace must maintain or where possible, enhance operational resilience of the ATC (Air Traffic Control) network and operations (HIGH)	
Good alignment with network route structure however, operational complexities from busy London Terminal Control Area (LTMA) inbounds utilising the same route. *Further complexities created due to this procedure being in close proximity to Bristol departures and directly overflying the airport. This is a very busy area of airspace, particularly in the morning.* *Not appropriate for low performance aircraft.*	
DP2: Operational	NOT MET
Capacity: The proposed airspace design will yield the maximum capacity benefits from systemisation in line with the CAAs (Civil Aviation Authority) published airspace modernisation programme (HIGH)	
Severe delays anticipated due to the impact Cardiff departures would have on Bristol arrivals and departures. LTMA inbounds on network route would also constrain Cardiff departures. Not aligned with the AMS.	
DP3: Economic	PARTIAL
Network Performance: The proposed Cardiff FASI-S (Future Airspace Strategy Implementation – South) airspace should facilitate optimised network economic performance (MEDIUM)	
More direct and simpler route than the current "dogleg". *However, interaction with London Airport arrivals (Heathrow, Stansted, Luton) could prevent achieving a continuous climb.*	
DP4: Environmental	PARTIAL
Greenhouse Gas Emissions (CO2): The proposed Cardiff FASI-S airspace should minimise CO2 emissions per flight (MEDIUM)	
Direct route, no excessive fuel burn. *However, London Airport arrivals (Heathrow, Stansted, Luton) could prevent achieving a continuous climb and onward joining into the network.*	
DP5: Environmental	MET
Noise impact to stakeholders on the ground: The proposed Cardiff FASI-S airspace should limit, and where practicable reduce, noise impacts to stakeholders on the ground (MEDIUM)	
All of the initial phase of climb is over water (up to 7,000ft) therefore no noise impact.	
DP6: Technical	NOT MET
Airspace Access and Integration (MoD Requirements): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on the MoD (MEDIUM)	
Significant impact on MoD operations north of Boscombe Down (Salisbury Plain danger areas).	
DP7: Technical	MET
Airspace Access and Integration (GA Impacts): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on GA and other civilian airspace users (MEDIUM)	

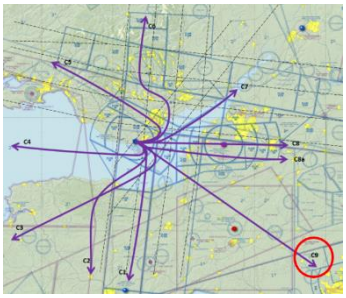
Minimal impact on GA traffic.	
DP8: Technical	MET
Airspace Access and Integration (Minimise CAS): The volume and classification of controlled airspace required for the Cardiff FASI-S ACP should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of all airspace users (MEDIUM)	
Contained within existing CAS.	
DP9: Technical	MET
Use of Advanced Navigation Technology (PBN): The route network linking airport procedures with the enroute phase of flight will be designed to yield maximum safety and efficiency benefits by using an appropriate standard of PBN (HIGH)	
No known conflictions.	
DP10: Policy	MET
Use of Advanced Navigation Technology: The proposed Cardiff FASI-S airspace design must be compliant with all relevant laws and regulatory requirements (HIGH)	
No known policy conflictions.	
DP11: Technical	NOT MET
Airspace Access and Integration (Impact on Adjacent Airfields/ Aerodromes): The proposed airspace should where possible, achieve a mutually beneficial solution to surrounding airfields ensuring equitable access to the airspace 'shared' with Bristol Airport (HIGH/ MEDIUM)	
Detrimental impact on Bristol operations which will require close coordination between Cardiff and Bristol ATC.	

SID C8a (Runway 12 alternate departure to the east) – rejected



DP0: Safety	NOT MET
Safety: Must maintain or where possible, enhance current levels of safety (HIGH)	
Concerns about radar clutter above and around Bristol Airport. *Very high workload due to increased coordination between Cardiff and Bristol ATC.* *Safety concern from interaction with military danger areas up to FL50 (Salisbury Plain).*	
DP1: Operational	PARTIAL
Resilience: The proposed airspace must maintain or where possible, enhance operational resilience of the ATC (Air Traffic Control) network and operations (HIGH)	
Better alignment with the network than SID C8, it would join further to the east. *However, complexity due to this procedure being alongside Bristol departures within the same region of airspace. This is also a busy area of airspace, particularly in the morning.* *Not appropriate for low performance aircraft.*	
DP2: Operational	NOT MET
Capacity: The proposed airspace design will yield the maximum capacity benefits from systemisation in line with the CAAs (Civil Aviation Authority) published airspace modernisation programme (HIGH)	
Severe delays are anticipated due to the impact Cardiff departures would have on Bristol arrivals and departures. Not aligned with the AMS.	
DP3: Economic	MET
Network Performance: The proposed Cardiff FASI-S (Future Airspace Strategy Implementation – South) airspace should facilitate optimised network economic performance (MEDIUM)	
More direct and simpler route than the current "dogleg". *Does not have the same issue with London traffic as design option SID C8.*	
DP4: Environmental	MET
Greenhouse Gas Emissions (CO2): The proposed Cardiff FASI-S airspace should minimise CO2 emissions per flight (MEDIUM)	
Direct route, no excessive fuel burn. *Does not have the same issue with London traffic as design option SID C8.*	
DP5: Environmental	MET
Noise impact to stakeholders on the ground: The proposed Cardiff FASI-S airspace should limit, and where practicable reduce, noise impacts to stakeholders on the ground (MEDIUM)	
All of the initial phase of climb is over water (up to 7,000ft) therefore no noise impact.	
DP6: Technical	NOT MET
Airspace Access and Integration (MoD Requirements): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on the MoD (MEDIUM)	
Significant impact on MoD operations north of Boscombe Down (Salisbury Plain danger areas).	
DP7: Technical	MET
Airspace Access and Integration (GA Impacts): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on GA and other civilian airspace users (MEDIUM)	
Minimal impact on GA traffic.	
DP8: Technical	MET

Airspace Access and Integration (Minimise CAS): The volume and classification of controlled airspace required for the Cardiff FASI-S ACP should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of all airspace users (MEDIUM)	
Contained within existing CAS.	
DP9: Technical	MET
Use of Advanced Navigation Technology (PBN): The route network linking airport procedures with the enroute phase of flight will be designed to yield maximum safety and efficiency benefits by using an appropriate standard of PBN (HIGH)	
No known conflictions.	
DP10: Policy	MET
Use of Advanced Navigation Technology: The proposed Cardiff FASI-S airspace design must be compliant with all relevant laws and regulatory requirements (HIGH)	
No known policy conflictions.	
DP11: Technical	NOT MET
Airspace Access and Integration (Impact on Adjacent Airfields/ Aerodromes): The proposed airspace should where possible, achieve a mutually beneficial solution to surrounding airfields ensuring equitable access to the airspace 'shared' with Bristol Airport (HIGH/ MEDIUM)	
Detrimental impact on Bristol operations which will require close coordination between Cardiff and Bristol ATC.	



SID C9 (Runway 12 alternate departure to the south-east) – progressed

DP0: Safety	PARTIAL
Safety: Must maintain or where possible, enhance current levels of safety (HIGH)	
Increased workload for Hurn sector controllers when compared to today. However, it may provide a safety benefit from a reduced number of interactions required by the controller.	
DP1: Operational	PARTIAL
Resilience: The proposed airspace must maintain or where possible, enhance operational resilience of the ATC (Air Traffic Control) network and operations (HIGH)	
No connectivity with the network, further work required. *Anticipated increased workload for sector controllers however, similar procedures have previously been used.* *Useful for low performance aircraft.*	
DP2: Operational	MET
Capacity: The proposed airspace design will yield the maximum capacity benefits from systemisation in line with the CAAs (Civil Aviation Authority) published airspace modernisation programme (HIGH)	
No known capacity constraints (aligned with the AMS). Useful for known early peak and used as an offload route, particularly during the summer period.	
DP3: Economic	PARTIAL
Network Performance: The proposed Cardiff FASI-S (Future Airspace Strategy Implementation – South) airspace should facilitate optimised network economic performance (MEDIUM)	
Shorter and more direct route than flown today. *However, continuous climbs above 7,000ft may be affected by potential transitions/ Hold to the south of Cardiff Airport.*	
DP4: Environmental	PARTIAL
Greenhouse Gas Emissions (CO2): The proposed Cardiff FASI-S airspace should minimise CO2 emissions per flight (MEDIUM)	
Direct route with a significant fuel saving when compared to today. *However, continuous climbs may be not be possible.*	
DP5: Environmental	MET
Noise impact to stakeholders on the ground: The proposed Cardiff FASI-S airspace should limit, and where practicable reduce, noise impacts to stakeholders on the ground (MEDIUM)	
All of the initial phase of climb is over water (up to 7,000ft) therefore no noise impact.	
DP6: Technical	PARTIAL
Airspace Access and Integration (MoD Requirements): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on the MoD (MEDIUM)	
Minimal impact on MoD operations if only used in the morning as an offload route. *However, if not, it would have a significant operation on military operations within the day (around Boscombe Down).*	
DP7: Technical	MET
Airspace Access and Integration (GA Impacts): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on GA and other civilian airspace users (MEDIUM)	
Minimal impact on GA traffic.	
DP8: Technical	NOT MET

Airspace Access and Integration (Minimise CAS): The volume and classification of controlled airspace required for the Cardiff FASI-S ACP should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of all airspace users (MEDIUM)	
Significant amount of new CAS required. Large impact on MoD operations if the route timings are not restricted.	
DP9: Technical	MET
Use of Advanced Navigation Technology (PBN): The route network linking airport procedures with the enroute phase of flight will be designed to yield maximum safety and efficiency benefits by using an appropriate standard of PBN (HIGH)	
No known conflictions.	
DP10: Policy	MET
Use of Advanced Navigation Technology: The proposed Cardiff FASI-S airspace design must be compliant with all relevant laws and regulatory requirements (HIGH)	
No known policy conflictions.	
DP11: Technical	PARTIAL
Airspace Access and Integration (Impact on Adjacent Airfields/ Aerodromes): The proposed airspace should where possible, achieve a mutually beneficial solution to surrounding airfields ensuring equitable access to the airspace 'shared' with Bristol Airport (HIGH/ MEDIUM)	
Potential interaction with Bristol arrivals and LTMA arrivals (e.g., Heathrow).	

Cardiff Airport Stage 2 Runway 30 SID Options

This section summarises the Design Principle Evaluation for Cardiff Airport's Runway 30 SID options. Figure 2 below shows the options which are being progressed through Stage 2 in black, and the one option which is being rejected in red.

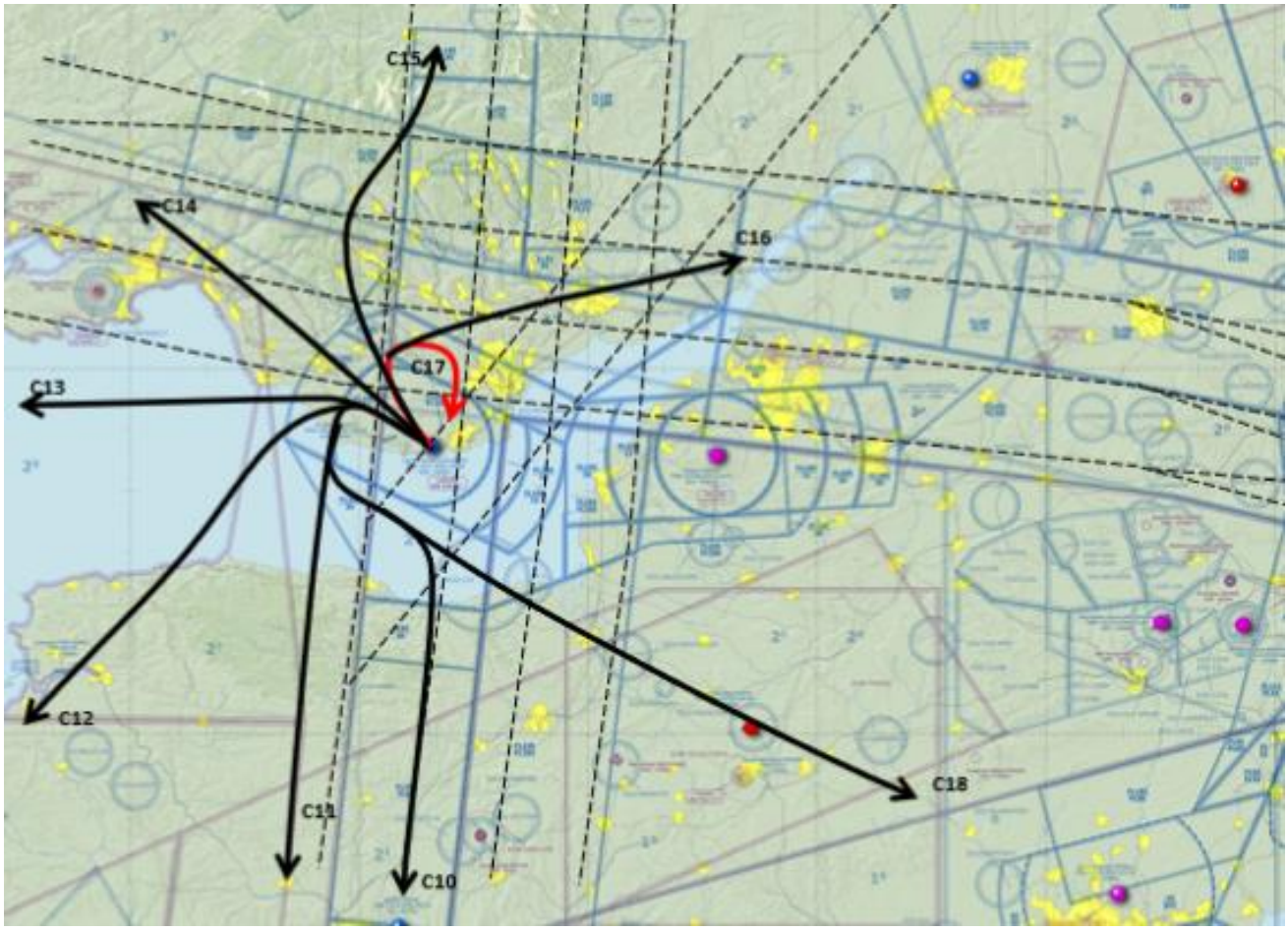
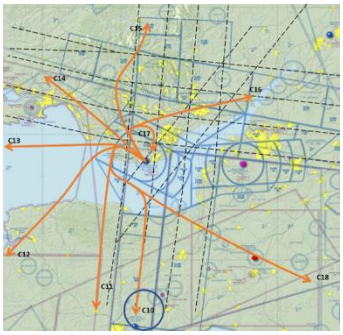


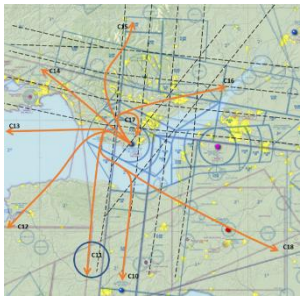
Figure 2: Cardiff Airport Stage 2 Runway 30 SID Options

SID C10 (Runway 30 departure to the south) – progressed



DP0: Safety	MET
Safety: Must maintain or where possible, enhance current levels of safety (HIGH)	
No known safety concerns.	
DP1: Operational	MET
Resilience: The proposed airspace must maintain or where possible, enhance operational resilience of the ATC (Air Traffic Control) network and operations (HIGH)	
Similar to what is flown today. *Good alignment with network route structure.*	
DP2: Operational	MET
Capacity: The proposed airspace design will yield the maximum capacity benefits from systemisation in line with the CAAs (Civil Aviation Authority) published airspace modernisation programme (HIGH)	
No known capacity constraints (aligned with the AMS). Anticipated to be used frequently as a large percentage of traffic flies to/ from the south.	
DP3: Economic	PARTIAL
Network Performance: The proposed Cardiff FASI-S (Future Airspace Strategy Implementation – South) airspace should facilitate optimised network economic performance (MEDIUM)	
Continuous climbs above 7,000ft may be affected by potential transitions/ Hold to the south of Cardiff Airport.	
DP4: Environmental	PARTIAL
Greenhouse Gas Emissions (CO2): The proposed Cardiff FASI-S airspace should minimise CO2 emissions per flight (MEDIUM)	
Continuous climbs above 7,000ft may not be possible. *Slight track extension to best avoid St Athan.*	
DP5: Environmental	MET
Noise impact to stakeholders on the ground: The proposed Cardiff FASI-S airspace should limit, and where practicable reduce, noise impacts to stakeholders on the ground (MEDIUM)	
Initial climb primarily over the water then avoids overflying any large populations.	
DP6: Technical	MET
Airspace Access and Integration (MoD Requirements): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on the MoD (MEDIUM)	
Minimal impact on military operations.	
DP7: Technical	MET
Airspace Access and Integration (GA Impacts): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on GA and other civilian airspace users (MEDIUM)	
No known impacts.	
DP8: Technical	MET
Airspace Access and Integration (Minimise CAS): The volume and classification of controlled airspace required for the Cardiff FASI-S ACP should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of all airspace users (MEDIUM)	
Utilises existing CAS.	

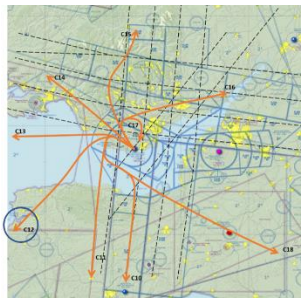
DP9: Technical	MET
Use of Advanced Navigation Technology (PBN): The route network linking airport procedures with the enroute phase of flight will be designed to yield maximum safety and efficiency benefits by using an appropriate standard of PBN (HIGH)	
No known conflictions.	
DP10: Policy	MET
Use of Advanced Navigation Technology: The proposed Cardiff FASI-S airspace design must be compliant with all relevant laws and regulatory requirements (HIGH)	
No known policy conflictions.	
DP11: Technical	MET
Airspace Access and Integration (Impact on Adjacent Airfields/ Aerodromes): The proposed airspace should where possible, achieve a mutually beneficial solution to surrounding airfields ensuring equitable access to the airspace 'shared' with Bristol Airport (HIGH/ MEDIUM)	
Routes around and close to St Athan but no change from today.	



SID C11 (Runway 30 alternate departure to the south) – progressed

DP0: Safety	MET
Safety: Must maintain or where possible, enhance current levels of safety (HIGH)	
No known safety concerns.	
DP1: Operational	PARTIAL
Resilience: The proposed airspace must maintain or where possible, enhance operational resilience of the ATC (Air Traffic Control) network and operations (HIGH)	
Similar to what is flown today. *However, opposite alignment with network routes, further work required.*	
DP2: Operational	MET
Capacity: The proposed airspace design will yield the maximum capacity benefits from systemisation in line with the CAAs (Civil Aviation Authority) published airspace modernisation programme (HIGH)	
No known capacity constraints (aligned with the AMS). Anticipated to be used frequently as a large percentage of traffic flies to/ from the south.	
DP3: Economic	PARTIAL
Network Performance: The proposed Cardiff FASI-S (Future Airspace Strategy Implementation – South) airspace should facilitate optimised network economic performance (MEDIUM)	
Continuous climbs above 7,000ft may be affected by potential transitions/ Hold to the south of Cardiff Airport.	
DP4: Environmental	PARTIAL
Greenhouse Gas Emissions (CO2): The proposed Cardiff FASI-S airspace should minimise CO2 emissions per flight (MEDIUM)	
Continuous climbs above 7,000ft may be not be possible.	
DP5: Environmental	MET
Noise impact to stakeholders on the ground: The proposed Cardiff FASI-S airspace should limit, and where practicable reduce, noise impacts to stakeholders on the ground (MEDIUM)	
Initial climb primarily over the water then avoids overflying any large populations.	
DP6: Technical	MET
Airspace Access and Integration (MoD Requirements): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on the MoD (MEDIUM)	
Minimal impact on military operations.	
DP7: Technical	MET
Airspace Access and Integration (GA Impacts): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on GA and other civilian airspace users (MEDIUM)	
Minimal impact on GA flights.	
DP8: Technical	PARTIAL
Airspace Access and Integration (Minimise CAS): The volume and classification of controlled airspace required for the Cardiff FASI-S ACP should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of all airspace users (MEDIUM)	
Likely to require new CAS.	
DP9: Technical	MET

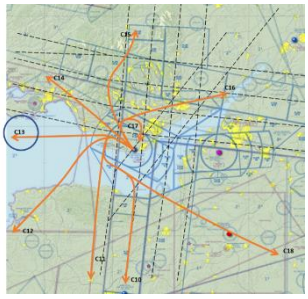
Use of Advanced Navigation Technology (PBN): The route network linking airport procedures with the enroute phase of flight will be designed to yield maximum safety and efficiency benefits by using an appropriate standard of PBN (HIGH)	
No known conflictions.	
DP10: Policy	MET
Use of Advanced Navigation Technology: The proposed Cardiff FASI-S airspace design must be compliant with all relevant laws and regulatory requirements (HIGH)	
No known policy conflictions.	
DP11: Technical	PARTIAL
Airspace Access and Integration (Impact on Adjacent Airfields/ Aerodromes): The proposed airspace should where possible, achieve a mutually beneficial solution to surrounding airfields ensuring equitable access to the airspace 'shared' with Bristol Airport (HIGH/ MEDIUM)	
Routes around and close to St Athan Airport (potential impact). *Anticipated to be high enough to avoid impact on Exeter Airport flights.*	



SID C12 (Runway 30 alternate departure to the south-west)
- progressed

DP0: Safety	MET
Safety: Must maintain or where possible, enhance current levels of safety (HIGH)	
No known safety concerns – may provide a safety benefit from a reduced number of interactions required by the controller.	
DP1: Operational	PARTIAL
Resilience: The proposed airspace must maintain or where possible, enhance operational resilience of the ATC (Air Traffic Control) network and operations (HIGH)	
Does not currently align with network routes, further work required. *Expectation that the current fleet mix could achieve the climb profile required.*	
DP2: Operational	PARTIAL
Capacity: The proposed airspace design will yield the maximum capacity benefits from systemisation in line with the CAAs (Civil Aviation Authority) published airspace modernisation programme (HIGH)	
This would be used as an early morning offload route for traffic joining southerly Atlantic tracks or southern Europe destinations (supports growth for these destinations). *However, low demand anticipated for this route.*	
DP3: Economic	PARTIAL
Network Performance: The proposed Cardiff FASI-S (Future Airspace Strategy Implementation – South) airspace should facilitate optimised network economic performance (MEDIUM)	
Continuous climbs may be affected by potential transitions/ Hold to the south of Cardiff Airport. *Low demand anticipated for this route.* *Potential small saving in airline route charges and fuel burn (route slightly cuts the corner).*	
DP4: Environmental	PARTIAL
Greenhouse Gas Emissions (CO2): The proposed Cardiff FASI-S airspace should minimise CO2 emissions per flight (MEDIUM)	
Cuts the corner slightly when compared to today (small saving in emissions). *However, continuous climbs may be not be possible.*	
DP5: Environmental	MET
Noise impact to stakeholders on the ground: The proposed Cardiff FASI-S airspace should limit, and where practicable reduce, noise impacts to stakeholders on the ground (MEDIUM)	
Initial climb primarily over the water. *Avoids overflying any large populations and very similar initial placement as today.*	
DP6: Technical	MET
Airspace Access and Integration (MoD Requirements): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on the MoD (MEDIUM)	
Minimal impact on MoD - expected to only be used well before MoD operations occur later in the day.	
DP7: Technical	MET
Airspace Access and Integration (GA Impacts): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on GA and other civilian airspace users (MEDIUM)	
No known impacts.	
DP8: Technical	

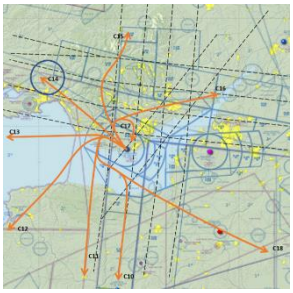
Airspace Access and Integration (Minimise CAS): The volume and classification of controlled airspace required for the Cardiff FASI-S ACP should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of all airspace users (MEDIUM)	MET
Anticipated to climb outside of CAS but early in the morning (negligible impact on other airspace users.	
DP9: Technical	MET
Use of Advanced Navigation Technology (PBN): The route network linking airport procedures with the enroute phase of flight will be designed to yield maximum safety and efficiency benefits by using an appropriate standard of PBN (HIGH)	
No known conflictions.	
DP10: Policy	MET
Use of Advanced Navigation Technology: The proposed Cardiff FASI-S airspace design must be compliant with all relevant laws and regulatory requirements (HIGH)	
No known policy conflictions.	
DP11: Technical	MET
Airspace Access and Integration (Impact on Adjacent Airfields/ Aerodromes): The proposed airspace should where possible, achieve a mutually beneficial solution to surrounding airfields ensuring equitable access to the airspace 'shared' with Bristol Airport (HIGH/ MEDIUM)	
No known impacts (anticipated to be high enough to avoid any impact on Exeter operations).	



SID C13 (Runway 30 alternate departure to the west)
- progressed

DP0: Safety	MET
Safety: Must maintain or where possible, enhance current levels of safety (HIGH)	
No known safety concerns – may provide a safety benefit from a reduced number of interactions required by the controller.	
DP1: Operational	PARTIAL
Resilience: The proposed airspace must maintain or where possible, enhance operational resilience of the ATC (Air Traffic Control) network and operations (HIGH)	
Does not align with the network, further work required.	
DP2: Operational	PARTIAL
Capacity: The proposed airspace design will yield the maximum capacity benefits from systemisation in line with the CAAs (Civil Aviation Authority) published airspace modernisation programme (HIGH)	
Supports growth for more western and transatlantic flights in the future. *However, low demand anticipated for this route.*	
DP3: Economic	PARTIAL
Network Performance: The proposed Cardiff FASI-S (Future Airspace Strategy Implementation – South) airspace should facilitate optimised network economic performance (MEDIUM)	
Low demand anticipated for this route.	
DP4: Environmental	MET
Greenhouse Gas Emissions (CO2): The proposed Cardiff FASI-S airspace should minimise CO2 emissions per flight (MEDIUM)	
Direct track to the west.	
DP5: Environmental	MET
Noise impact to stakeholders on the ground: The proposed Cardiff FASI-S airspace should limit, and where practicable reduce, noise impacts to stakeholders on the ground (MEDIUM)	
Overflies minimal land and no populated areas.	
DP6: Technical	NOT MET
Airspace Access and Integration (MoD Requirements): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on the MoD (MEDIUM)	
Detrimental impact on MoD operations.	
DP7: Technical	PARTIAL
Airspace Access and Integration (GA Impacts): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on GA and other civilian airspace users (MEDIUM)	
Likely impact on GA operations (training flights) from additional CAS required.	
DP8: Technical	NOT MET
Airspace Access and Integration (Minimise CAS): The volume and classification of controlled airspace required for the Cardiff FASI-S ACP should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of all airspace users (MEDIUM)	
Significant amount of CAS required for protection purposes. Likely impact on GA flights.	
DP9: Technical	MET

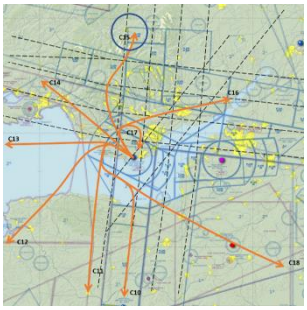
Use of Advanced Navigation Technology (PBN): The route network linking airport procedures with the enroute phase of flight will be designed to yield maximum safety and efficiency benefits by using an appropriate standard of PBN (HIGH)	
No known conflictions.	
DP10: Policy	MET
Use of Advanced Navigation Technology: The proposed Cardiff FASI-S airspace design must be compliant with all relevant laws and regulatory requirements (HIGH)	
No known policy conflictions.	
DP11: Technical	MET
Airspace Access and Integration (Impact on Adjacent Airfields/ Aerodromes): The proposed airspace should where possible, achieve a mutually beneficial solution to surrounding airfields ensuring equitable access to the airspace 'shared' with Bristol Airport (HIGH/ MEDIUM)	
No known impacts.	



SID C14 (Runway 30 alternate departure to the north-west)
- progressed

DP0: Safety	PARTIAL
Safety: Must maintain or where possible, enhance current levels of safety (HIGH)	
Known wind-farm development in this region (possible impact on radar cover) – robust safety case required.	
DP1: Operational	PARTIAL
Resilience: The proposed airspace must maintain or where possible, enhance operational resilience of the ATC (Air Traffic Control) network and operations (HIGH)	
Good alignment with network route structure, however, could conflict with en route traffic in a known busy region of airspace.	
DP2: Operational	MET
Capacity: The proposed airspace design will yield the maximum capacity benefits from systemisation in line with the CAAs (Civil Aviation Authority) published airspace modernisation programme (HIGH)	
No known capacity constraints (aligned with the AMS). Supports growth for more western and transatlantic flights in the future.	
DP3: Economic	MET
Network Performance: The proposed Cardiff FASI-S (Future Airspace Strategy Implementation – South) airspace should facilitate optimised network economic performance (MEDIUM)	
Direct track and well positioned for flexibility with the onward network.	
DP4: Environmental	MET
Greenhouse Gas Emissions (CO2): The proposed Cardiff FASI-S airspace should minimise CO2 emissions per flight (MEDIUM)	
Direct track to the north-west.	
DP5: Environmental	PARTIAL
Noise impact to stakeholders on the ground: The proposed Cardiff FASI-S airspace should limit, and where practicable reduce, noise impacts to stakeholders on the ground (MEDIUM)	
Small increase in noise impact for new communities around Cowbridge.	
DP6: Technical	NOT MET
Airspace Access and Integration (MoD Requirements): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on the MoD (MEDIUM)	
Significant impact on MoD operations, this could potentially prevent military operations from taking place in this region. *However, if this route were positioned further to the north it could reduce/ remove the impact on the MoD.*	
DP7: Technical	NOT MET
Airspace Access and Integration (GA Impacts): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on GA and other civilian airspace users (MEDIUM)	
Significant impact on gliding operations around Brecon and other GA users.	
DP8: Technical	PARTIAL
Airspace Access and Integration (Minimise CAS): The volume and classification of controlled airspace required for the Cardiff FASI-S ACP should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of all airspace users (MEDIUM)	
New CAS potentially required for protection purposes.	

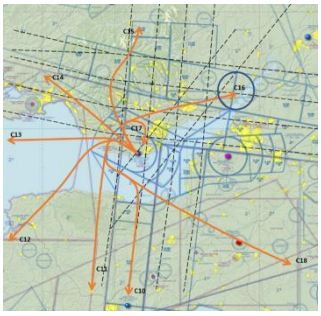
DP9: Technical	MET
Use of Advanced Navigation Technology (PBN): The route network linking airport procedures with the enroute phase of flight will be designed to yield maximum safety and efficiency benefits by using an appropriate standard of PBN (HIGH)	
No known conflictions.	
DP10: Policy	MET
Use of Advanced Navigation Technology: The proposed Cardiff FASI-S airspace design must be compliant with all relevant laws and regulatory requirements (HIGH)	
No known policy conflictions.	
DP11: Technical	PARTIAL
Airspace Access and Integration (Impact on Adjacent Airfields/ Aerodromes): The proposed airspace should where possible, achieve a mutually beneficial solution to surrounding airfields ensuring equitable access to the airspace 'shared' with Bristol Airport (HIGH/ MEDIUM)	
Possible conflict with network traffic e.g., arrivals to LTMA airports.	



SID C15 (Runway 30 alternate departure to the north)
- progressed

DP0: Safety	PARTIAL
Safety: Must maintain or where possible, enhance current levels of safety (HIGH)	
Known wind-farm development in this region (possible impact on radar cover) – robust safety case required.	
DP1: Operational	PARTIAL
Resilience: The proposed airspace must maintain or where possible, enhance operational resilience of the ATC (Air Traffic Control) network and operations (HIGH)	
Good alignment with network route structure however may cut across LTMA arrivals beforehand (impact on Sector 5 controllers), a known busy region of airspace.	
DP2: Operational	PARTIAL
Capacity: The proposed airspace design will yield the maximum capacity benefits from systemisation in line with the CAAs (Civil Aviation Authority) published airspace modernisation programme (HIGH)	
Possible capacity constraints from conflict with a potential northern Hold for Cardiff Airport and slow Cardiff departures.	
DP3: Economic	PARTIAL
Network Performance: The proposed Cardiff FASI-S (Future Airspace Strategy Implementation – South) airspace should facilitate optimised network economic performance (MEDIUM)	
Slightly longer track distance than flown today.	
DP4: Environmental	PARTIAL
Greenhouse Gas Emissions (CO2): The proposed Cardiff FASI-S airspace should minimise CO2 emissions per flight (MEDIUM)	
Slightly longer track distance due to positioning around populations and potential Hold location (increased fuel burn).	
DP5: Environmental	MET
Noise impact to stakeholders on the ground: The proposed Cardiff FASI-S airspace should limit, and where practicable reduce, noise impacts to stakeholders on the ground (MEDIUM)	
Positioned to specifically avoid populated areas, including Bridgend.	
DP6: Technical	MET
Airspace Access and Integration (MoD Requirements): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on the MoD (MEDIUM)	
Minimal impact on MoD operations.	
DP7: Technical	PARTIAL
Airspace Access and Integration (GA Impacts): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on GA and other civilian airspace users (MEDIUM)	
Potential impact on gliders and an increased impact on GA flights if the base is lowered.	
DP8: Technical	MET
Airspace Access and Integration (Minimise CAS): The volume and classification of controlled airspace required for the Cardiff FASI-S ACP should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of all airspace users (MEDIUM)	
Contained within existing CAS (small possibility that CAS may require lowering).	
DP9: Technical	MET

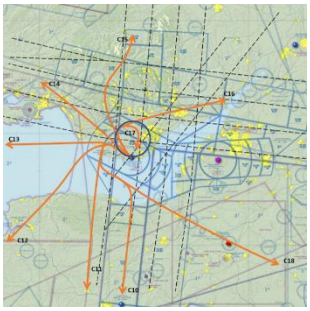
Use of Advanced Navigation Technology (PBN): The route network linking airport procedures with the enroute phase of flight will be designed to yield maximum safety and efficiency benefits by using an appropriate standard of PBN (HIGH)	
No known conflictions.	
DP10: Policy	MET
Use of Advanced Navigation Technology: The proposed Cardiff FASI-S airspace design must be compliant with all relevant laws and regulatory requirements (HIGH)	
No known policy conflictions.	
DP11: Technical	MET
Airspace Access and Integration (Impact on Adjacent Airfields/ Aerodromes): The proposed airspace should where possible, achieve a mutually beneficial solution to surrounding airfields ensuring equitable access to the airspace 'shared' with Bristol Airport (HIGH/ MEDIUM)	
No known impacts.	



SID C16 (Runway 30 alternate departure to the east)
- progressed

DP0: Safety	MET
Safety: Must maintain or where possible, enhance current levels of safety (HIGH)	
No known safety concerns.	
DP1: Operational	MET
Resilience: The proposed airspace must maintain or where possible, enhance operational resilience of the ATC (Air Traffic Control) network and operations (HIGH)	
Good alignment with network route structure. *Very similar to what is flown today including procedures used to safely cross inbound Cardiff/ Bristol traffic.*	
DP2: Operational	MET
Capacity: The proposed airspace design will yield the maximum capacity benefits from systemisation in line with the CAAs (Civil Aviation Authority) published airspace modernisation programme (HIGH)	
No known capacity constraints (aligned with the AMS). Expected to be used frequently. *Should be easily positioned above other Cardiff traffic.*	
DP3: Economic	PARTIAL
Network Performance: The proposed Cardiff FASI-S (Future Airspace Strategy Implementation – South) airspace should facilitate optimised network economic performance (MEDIUM)	
More direct and simpler route than the current "dogleg". *However, London Airport arrivals (Heathrow, Stansted, Luton) could impact potential for a continuous climb.*	
DP4: Environmental	PARTIAL
Greenhouse Gas Emissions (CO2): The proposed Cardiff FASI-S airspace should minimise CO2 emissions per flight (MEDIUM)	
Direct route, no excessive fuel burn. *However, London Airport arrivals (Heathrow, Stansted, Luton) could impact potential for a continuous climb.*	
DP5: Environmental	PARTIAL
Noise impact to stakeholders on the ground: The proposed Cardiff FASI-S airspace should limit, and where practicable reduce, noise impacts to stakeholders on the ground (MEDIUM)	
All of the climb is over land with the potential to impact new stakeholders north of Cardiff City.	
DP6: Technical	MET
Airspace Access and Integration (MoD Requirements): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on the MoD (MEDIUM)	
Minimal impact on MoD operations.	
DP7: Technical	MET
Airspace Access and Integration (GA Impacts): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on GA and other civilian airspace users (MEDIUM)	
No impact on GA operations - departures will be much higher where they do operate.	
DP8: Technical	MET
Airspace Access and Integration (Minimise CAS): The volume and classification of controlled airspace required for the Cardiff FASI-S ACP should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of all airspace users (MEDIUM)	

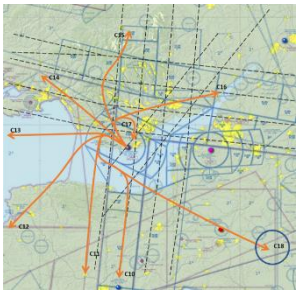
Contained within existing CAS.	
DP9: Technical	MET
Use of Advanced Navigation Technology (PBN): The route network linking airport procedures with the enroute phase of flight will be designed to yield maximum safety and efficiency benefits by using an appropriate standard of PBN (HIGH)	
No known conflictions.	
DP10: Policy	MET
Use of Advanced Navigation Technology: The proposed Cardiff FASI-S airspace design must be compliant with all relevant laws and regulatory requirements (HIGH)	
No known policy conflictions.	
DP11: Technical	PARTIAL
Airspace Access and Integration (Impact on Adjacent Airfields/ Aerodromes): The proposed airspace should where possible, achieve a mutually beneficial solution to surrounding airfields ensuring equitable access to the airspace 'shared' with Bristol Airport (HIGH/ MEDIUM)	
Potential interaction with Bristol north-west departures however, height restrictions could be used to assist (cross-over will occur at some point).	



SID C17 (Runway 30 wrap-around departure to the south) – rejected

DP0: Safety	NOT MET
Safety: Must maintain or where possible, enhance current levels of safety (HIGH)	
Safety concern as the ability to use radar separation may be lost when overflying Cardiff Airport. Further safety issues from potential lack of separation from inbounds and increased workload due to wrap-around procedure being operationally complex.	
DP1: Operational	NOT MET
Resilience: The proposed airspace must maintain or where possible, enhance operational resilience of the ATC (Air Traffic Control) network and operations (HIGH)	
Good alignment with network route structure. *However, very probable interaction with inbounds to Cardiff Airport and incredibly complex from an operational perspective due to wrap-around procedure (not sustainable).* *Also, a "counter-intuitive" procedure from routing north before turning back south.*	
DP2: Operational	PARTIAL
Capacity: The proposed airspace design will yield the maximum capacity benefits from systemisation in line with the CAAs (Civil Aviation Authority) published airspace modernisation programme (HIGH)	
This would constrain the number of departure split options.	
DP3: Economic	NOT MET
Network Performance: The proposed Cardiff FASI-S (Future Airspace Strategy Implementation – South) airspace should facilitate optimised network economic performance (MEDIUM)	
Additional track miles and the wrap-around procedure would be operationally complex. *Continuous climbs not possible.*	
DP4: Environmental	PARTIAL
Greenhouse Gas Emissions (CO2): The proposed Cardiff FASI-S airspace should minimise CO2 emissions per flight (MEDIUM)	
Additional track miles and associated fuel burn for airlines. *Continuous climbs not possible,*	
DP5: Environmental	MET
Noise impact to stakeholders on the ground: The proposed Cardiff FASI-S airspace should limit, and where practicable reduce, noise impacts to stakeholders on the ground (MEDIUM)	
Avoids populated areas and should be well above 7,000ft when overflying Cardiff Airport.	
DP6: Technical	MET
Airspace Access and Integration (MoD Requirements): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on the MoD (MEDIUM)	
Minimal impact on MoD operations.	
DP7: Technical	MET
Airspace Access and Integration (GA Impacts): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on GA and other civilian airspace users (MEDIUM)	
Minimal impact on GA traffic.	
DP8: Technical	MET

Airspace Access and Integration (Minimise CAS): The volume and classification of controlled airspace required for the Cardiff FASI-S ACP should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of all airspace users (MEDIUM)	
Contained within existing CAS.	
DP9: Technical	MET
Use of Advanced Navigation Technology (PBN): The route network linking airport procedures with the enroute phase of flight will be designed to yield maximum safety and efficiency benefits by using an appropriate standard of PBN (HIGH)	
No known conflictions.	
DP10: Policy	MET
Use of Advanced Navigation Technology: The proposed Cardiff FASI-S airspace design must be compliant with all relevant laws and regulatory requirements (HIGH)	
No known policy conflictions.	
DP11: Technical	PARTIAL
Airspace Access and Integration (Impact on Adjacent Airfields/ Aerodromes): The proposed airspace should where possible, achieve a mutually beneficial solution to surrounding airfields ensuring equitable access to the airspace 'shared' with Bristol Airport (HIGH/ MEDIUM)	
Potential interaction with Exeter departures and Cardiff inbounds from the north (dependent on Hold location).	



SID C18 (Runway 30 departure to the south-east)
- progressed

DP0: Safety	PARTIAL
Safety: Must maintain or where possible, enhance current levels of safety (HIGH)	
Increased workload for sector controllers when compared to today (not a significant safety risk).	
DP1: Operational	PARTIAL
Resilience: The proposed airspace must maintain or where possible, enhance operational resilience of the ATC (Air Traffic Control) network and operations (HIGH)	
No connectivity with the network, work required. *Anticipated increased workload for sector controllers however, similar procedures have previously been used in this busy region of airspace.*	
DP2: Operational	MET
Capacity: The proposed airspace design will yield the maximum capacity benefits from systemisation in line with the CAAs (Civil Aviation Authority) published airspace modernisation programme (HIGH)	
No known capacity constraints (aligned with the AMS). Useful for known early peak and used as an offload route, particularly during the summer period. *Incredibly busy region of airspace in the morning.*	
DP3: Economic	MET
Network Performance: The proposed Cardiff FASI-S (Future Airspace Strategy Implementation – South) airspace should facilitate optimised network economic performance (MEDIUM)	
Shorter and simpler route than flown today (currently route includes a dogleg towards Brecon).	
DP4: Environmental	MET
Greenhouse Gas Emissions (CO2): The proposed Cardiff FASI-S airspace should minimise CO2 emissions per flight (MEDIUM)	
Direct route with a significant fuel saving when compared to today.	
DP5: Environmental	MET
Noise impact to stakeholders on the ground: The proposed Cardiff FASI-S airspace should limit, and where practicable reduce, noise impacts to stakeholders on the ground (MEDIUM)	
Initial climb over the water and early height benefit from the turn. *Avoids overflying any large populations.*	
DP6: Technical	PARTIAL
Airspace Access and Integration (MoD Requirements): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on the MoD (MEDIUM)	
Minimal impact on MoD operations if only used in the morning as an offload route. *However, if not, it would have a significant operation on military operations within the day.*	
DP7: Technical	MET
Airspace Access and Integration (GA Impacts): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on GA and other civilian airspace users (MEDIUM)	
Minimal impact on GA traffic.	
DP8: Technical	PARTIAL
Airspace Access and Integration (Minimise CAS): The volume and classification of controlled airspace required for the Cardiff FASI-S ACP should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of all airspace users (MEDIUM)	

Some new CAS may be required however the initial climb occurs within existing CAS.	
DP9: Technical	MET
Use of Advanced Navigation Technology (PBN): The route network linking airport procedures with the enroute phase of flight will be designed to yield maximum safety and efficiency benefits by using an appropriate standard of PBN (HIGH)	
No known conflictions.	
DP10: Policy	MET
Use of Advanced Navigation Technology: The proposed Cardiff FASI-S airspace design must be compliant with all relevant laws and regulatory requirements (HIGH)	
No known policy conflictions.	
DP11: Technical	PARTIAL
Airspace Access and Integration (Impact on Adjacent Airfields/ Aerodromes): The proposed airspace should where possible, achieve a mutually beneficial solution to surrounding airfields ensuring equitable access to the airspace 'shared' with Bristol Airport (HIGH/ MEDIUM)	
Incredibly busy region of airspace in the morning - likely interaction with Bristol arrivals.	

Cardiff Airport Stage 2 Hold Options

This section summarises the Design Principle Evaluation for Cardiff Airport's Hold options. The transitions shown are indicative and subject to further design work. The two diagrams below show Cardiff's design options and indicative transitions to each runway. Holds 8a and 8b (which have been rejected) can be seen next to their summaries below.

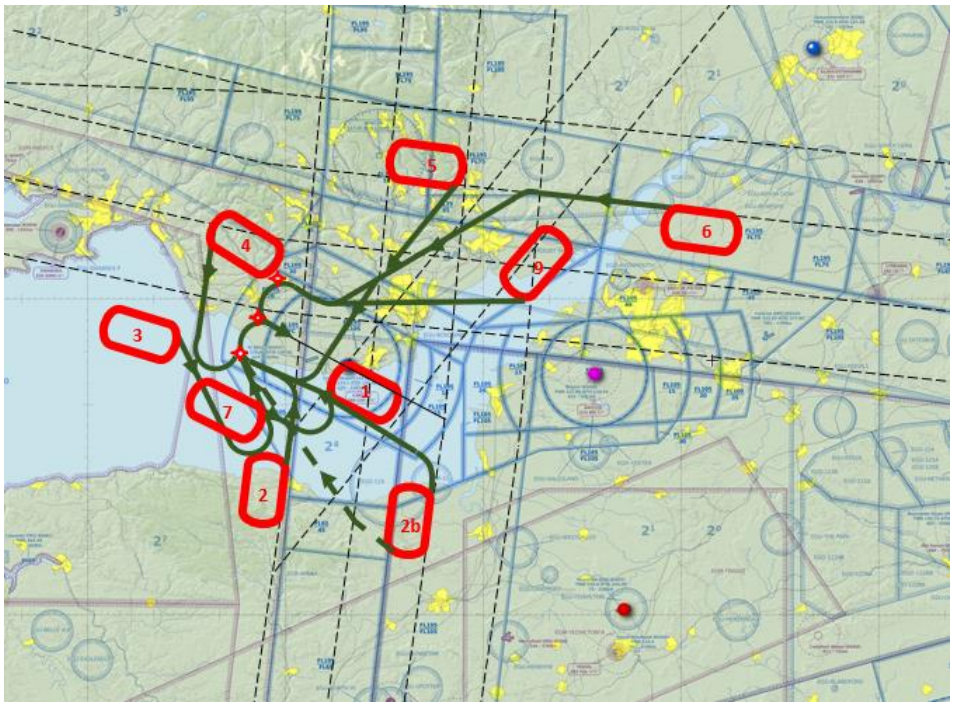


Figure 3: Cardiff Airport Stage 2 Hold Options and Transitions to Runway 12

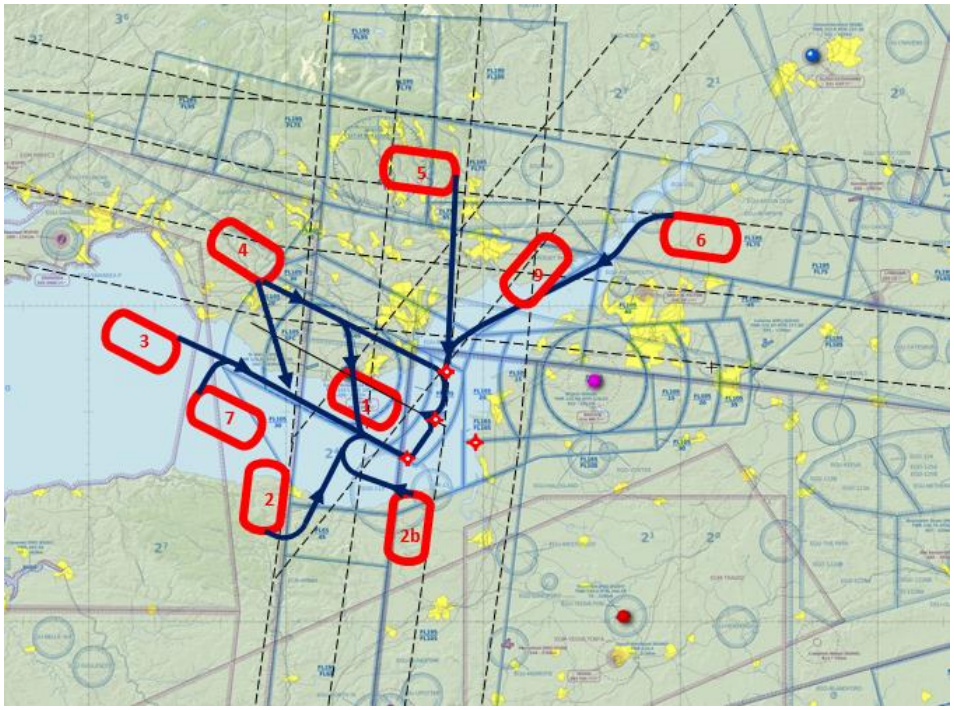
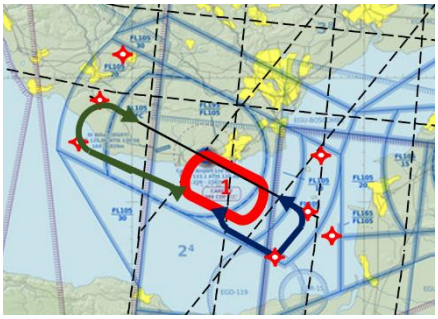


Figure 4: Cardiff Airport Stage 2 Hold Options and Transitions to Runway 30

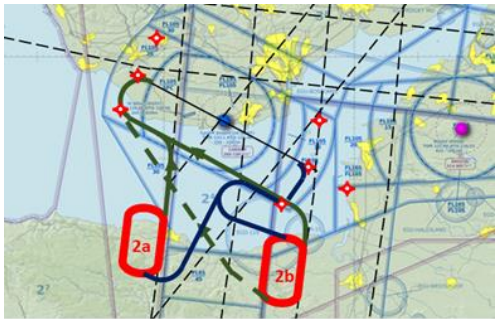
Hold 1 (Hold in the overhead, as today) - rejected



DP0: Safety	NOT MET
Safety: Must maintain or where possible, enhance current levels of safety (HIGH)	
There is a known radar issue where traffic is "lost" due to the close proximity of traffic holding in the overhead of the airport. Cardiff Airport wants to alleviate this safety concern which this option would not do.	
DP1: Operational	MET
Resilience: The proposed airspace must maintain or where possible, enhance operational resilience of the ATC (Air Traffic Control) network and operations (HIGH)	
Very similar to what is used today, no change for aviation stakeholders. *Appropriate location for the vast majority of arrivals which are from the south and east.*	
DP2: Operational	PARTIAL
Capacity: The proposed airspace design will yield the maximum capacity benefits from systemisation in line with the CAAs (Civil Aviation Authority) published airspace modernisation programme (HIGH)	
No change from today but no improvement offered.	
DP3: Economic	PARTIAL
Network Performance: The proposed Cardiff FASI-S (Future Airspace Strategy Implementation – South) airspace should facilitate optimised network economic performance (MEDIUM)	
No change from today but no improvement offered.	
DP4: Environmental	MET
Greenhouse Gas Emissions (CO2): The proposed Cardiff FASI-S airspace should minimise CO2 emissions per flight (MEDIUM)	
Close proximity to the airport thus minimising emissions. Fuel planning does not have to take into account additional trac miles due to Hold location.	
DP5: Environmental	MET
Noise impact to stakeholders on the ground: The proposed Cardiff FASI-S airspace should limit, and where practicable reduce, noise impacts to stakeholders on the ground (MEDIUM)	
No change from today - transitions positioned primarily over water.	
DP6: Technical	MET
Airspace Access and Integration (MoD Requirements): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on the MoD (MEDIUM)	

No change from today.	
DP7: Technical	MET
Airspace Access and Integration (GA Impacts): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on GA and other civilian airspace users (MEDIUM)	
Runway 12 transition may impact upon GA flights within this region.	
DP8: Technical	MET
Airspace Access and Integration (Minimise CAS): The volume and classification of controlled airspace required for the Cardiff FASI-S ACP should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of all airspace users (MEDIUM)	
Contained within existing CAS (as today).	
DP9: Technical	MET
Use of Advanced Navigation Technology (PBN): The route network linking airport procedures with the enroute phase of flight will be designed to yield maximum safety and efficiency benefits by using an appropriate standard of PBN (HIGH)	
No known conflictions.	
DP10: Policy	MET
Use of Advanced Navigation Technology: The proposed Cardiff FASI-S airspace design must be compliant with all relevant laws and regulatory requirements (HIGH)	
No known policy conflictions.	
DP11: Technical	MET
Airspace Access and Integration (Impact on Adjacent Airfields/ Aerodromes): The proposed airspace should where possible, achieve a mutually beneficial solution to surrounding airfields ensuring equitable access to the airspace 'shared' with Bristol Airport (HIGH/ MEDIUM)	
No known impacts.	

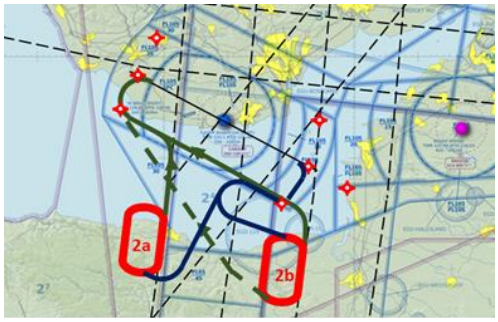
Hold 2A (Hold to the south of Cardiff Airport) – **progressed**



DP0: Safety	MET
Safety: Must maintain or where possible, enhance current levels of safety (HIGH)	
No known safety concerns.	
DP1: Operational	MET
Resilience: The proposed airspace must maintain or where possible, enhance operational resilience of the ATC (Air Traffic Control) network and operations (HIGH)	
Good alignment with network route structure (specifically positioned to do so). *Appropriate location for the vast majority of arrivals which are from the south and east.*	
DP2: Operational	PARTIAL
Capacity: The proposed airspace design will yield the maximum capacity benefits from systemisation in line with the CAAs (Civil Aviation Authority) published airspace modernisation programme (HIGH)	
Hold location has good alignment with the network route structure. The location has minimal impact on Cardiff and Bristol departures allowing for almost unrestricted traffic flow. *However, there may be some climb restriction on departures from Cardiff to the South for traffic from runway 30 due to the transitions from the hold to the runway.*	
DP3: Economic	MET
Network Performance: The proposed Cardiff FASI-S (Future Airspace Strategy Implementation – South) airspace should facilitate optimised network economic performance (MEDIUM)	
Appropriate location for the vast majority of arrivals which are from the south and east and in close proximity to the airport.	
DP4: Environmental	MET
Greenhouse Gas Emissions (CO2): The proposed Cardiff FASI-S airspace should minimise CO2 emissions per flight (MEDIUM)	
Appropriate location for the vast majority of arrivals which are from the south and east and in close proximity to the airport (minimal fuel burn).	
DP5: Environmental	MET
Noise impact to stakeholders on the ground: The proposed Cardiff FASI-S airspace should limit, and where practicable reduce, noise impacts to stakeholders on the ground (MEDIUM)	
Transitions primarily over water, minimal noise impact.	
DP6: Technical	MET
Airspace Access and Integration (MoD Requirements): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on the MoD (MEDIUM)	

Minimal impact on MoD operations.	
DP7: Technical	MET
Airspace Access and Integration (GA Impacts): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on GA and other civilian airspace users (MEDIUM)	
Minimal impact on GA flights which generally have to avoid this area (high terrain). Includes Cardiff Heliport flights which is in close proximity to this Hold.	
DP8: Technical	MET
Airspace Access and Integration (Minimise CAS): The volume and classification of controlled airspace required for the Cardiff FASI-S ACP should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of all airspace users (MEDIUM)	
Contained within existing CAS, including transitions.	
DP9: Technical	MET
Use of Advanced Navigation Technology (PBN): The route network linking airport procedures with the enroute phase of flight will be designed to yield maximum safety and efficiency benefits by using an appropriate standard of PBN (HIGH)	
No known conflictions.	
DP10: Policy	MET
Use of Advanced Navigation Technology: The proposed Cardiff FASI-S airspace design must be compliant with all relevant laws and regulatory requirements (HIGH)	
No known policy conflictions.	
DP11: Technical	PARTIAL
Airspace Access and Integration (Impact on Adjacent Airfields/ Aerodromes): The proposed airspace should where possible, achieve a mutually beneficial solution to surrounding airfields ensuring equitable access to the airspace 'shared' with Bristol Airport (HIGH/ MEDIUM)	
Hold protection area may impact upon Exeter operations such as impeding upon levels.	

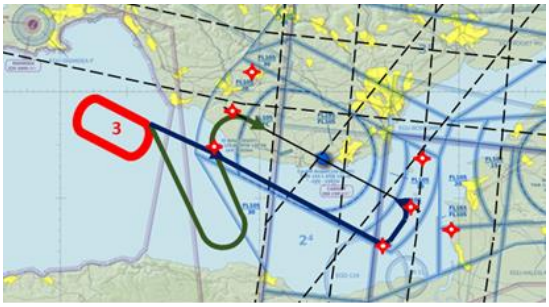
Hold 2B
(alternate Hold to the south of Cardiff Airport) – **progressed**



DP0: Safety	MET
Safety: Must maintain or where possible, enhance current levels of safety (HIGH)	
No known safety concerns.	
DP1: Operational	PARTIAL
Resilience: The proposed airspace must maintain or where possible, enhance operational resilience of the ATC (Air Traffic Control) network and operations (HIGH)	
Good alignment with network route structure (specifically positioned to do so). *Appropriate location for the vast majority of arrivals which are from the south and east.* *Potential to be used as a shared Hold with Bristol Airport.* *However, departures may have to be held underneath the Hold.*	
DP2: Operational	PARTIAL
Capacity: The proposed airspace design will yield the maximum capacity benefits from systemisation in line with the CAAs (Civil Aviation Authority) published airspace modernisation programme (HIGH)	
Capacity could be constrained if departures are held underneath the Hold.	
DP3: Economic	MET
Network Performance: The proposed Cardiff FASI-S (Future Airspace Strategy Implementation – South) airspace should facilitate optimised network economic performance (MEDIUM)	
Appropriate location for the vast majority of arrivals which are from the south and east and in close proximity to the airport.	
DP4: Environmental	MET
Greenhouse Gas Emissions (CO2): The proposed Cardiff FASI-S airspace should minimise CO2 emissions per flight (MEDIUM)	
Appropriate location for the vast majority of arrivals which are from the south and east and in close proximity to the airport (minimal fuel burn).	
DP5: Environmental	MET
Noise impact to stakeholders on the ground: The proposed Cardiff FASI-S airspace should limit, and where practicable reduce, noise impacts to stakeholders on the ground (MEDIUM)	
Transitions primarily over water, minimal noise impact.	
DP6: Technical	MET
Airspace Access and Integration (MoD Requirements): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on the MoD (MEDIUM)	
Minimal impact on MoD operations.	
DP7: Technical	MET
Airspace Access and Integration (GA Impacts): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on GA and other civilian airspace users (MEDIUM)	
Minimal impact on GA flights which generally have to avoid this area anyway (high terrain). Include Cardiff heliport operations which is in close proximity to this Hold.	
DP8: Technical	MET

Airspace Access and Integration (Minimise CAS): The volume and classification of controlled airspace required for the Cardiff FASI-S ACP should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of all airspace users (MEDIUM)	
Contained within existing CAS, including transitions.	
DP9: Technical	MET
Use of Advanced Navigation Technology (PBN): The route network linking airport procedures with the enroute phase of flight will be designed to yield maximum safety and efficiency benefits by using an appropriate standard of PBN (HIGH)	
No known conflictions.	
DP10: Policy	MET
Use of Advanced Navigation Technology: The proposed Cardiff FASI-S airspace design must be compliant with all relevant laws and regulatory requirements (HIGH)	
No known policy conflictions.	
DP11: Technical	PARTIAL
Airspace Access and Integration (Impact on Adjacent Airfields/ Aerodromes): The proposed airspace should where possible, achieve a mutually beneficial solution to surrounding airfields ensuring equitable access to the airspace 'shared' with Bristol Airport (HIGH/ MEDIUM)	
Hold protection area may impact upon Exeter operations such as impeding upon levels. *Runway 12 transition may interact with Bristol departures.*	

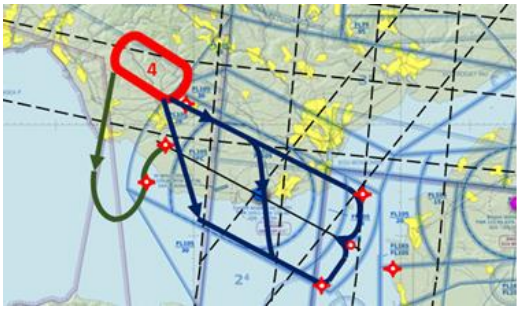
Hold 3 (Hold to the west of Cardiff Airport) – **rejected**



DP0: Safety	PARTIAL
Safety: Must maintain or where possible, enhance current levels of safety (HIGH)	
Increased workload anticipated from more vectoring (rather than leave traffic on its own transition).	
DP1: Operational	NOT MET
Resilience: The proposed airspace must maintain or where possible, enhance operational resilience of the ATC (Air Traffic Control) network and operations (HIGH)	
No current network connectivity, further work required. *Does not suit the general flow of traffic as the vast majority of arrivals are from the east/ south.*	
DP2: Operational	PARTIAL
Capacity: The proposed airspace design will yield the maximum capacity benefits from systemisation in line with the CAAs (Civil Aviation Authority) published airspace modernisation programme (HIGH)	
Not suitable for the vast majority of arrivals due to its location which could impact capacity.	
DP3: Economic	NOT MET
Network Performance: The proposed Cardiff FASI-S (Future Airspace Strategy Implementation – South) airspace should facilitate optimised network economic performance (MEDIUM)	
Not an optimal location for the majority of arrivals. *Excessive fuel would have to be carried due to the location of the Hold (extra track miles).*	
DP4: Environmental	NOT MET
Greenhouse Gas Emissions (CO2): The proposed Cardiff FASI-S airspace should minimise CO2 emissions per flight (MEDIUM)	
Increased track miles for a significant number of arrivals from the south and east. Although holding would not frequently occur, flights will have to plan fuel loading to take into account this additional track mileage.	
DP5: Environmental	MET
Noise impact to stakeholders on the ground: The proposed Cardiff FASI-S airspace should limit, and where practicable reduce, noise impacts to stakeholders on the ground (MEDIUM)	
Hold sat over water and transitions primarily over water, minimal noise impact.	
DP6: Technical	NOT MET
Airspace Access and Integration (MoD Requirements): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on the MoD (MEDIUM)	
Detrimental impact on MoD operations including training (aerobatics/ spinning) - from both the Hold location and transitions.	
DP7: Technical	PARTIAL
Airspace Access and Integration (GA Impacts): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on GA and other civilian airspace users (MEDIUM)	
Potential impact on GA spinning activities due to the Hold protection area (not the actual Hold/ transitions).	
DP8: Technical	NOT MET
Airspace Access and Integration (Minimise CAS): The volume and classification of controlled airspace required for the Cardiff FASI-S ACP should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of all airspace users (MEDIUM)	

Significant amount of new CAS required and large impact on military operations.	
DP9: Technical	MET
Use of Advanced Navigation Technology (PBN): The route network linking airport procedures with the enroute phase of flight will be designed to yield maximum safety and efficiency benefits by using an appropriate standard of PBN (HIGH)	
No known conflictions.	
DP10: Policy	MET
Use of Advanced Navigation Technology: The proposed Cardiff FASI-S airspace design must be compliant with all relevant laws and regulatory requirements (HIGH)	
No known policy conflictions.	
DP11: Technical	MET
Airspace Access and Integration (Impact on Adjacent Airfields/ Aerodromes): The proposed airspace should where possible, achieve a mutually beneficial solution to surrounding airfields ensuring equitable access to the airspace 'shared' with Bristol Airport (HIGH/ MEDIUM)	
No known impacts.	

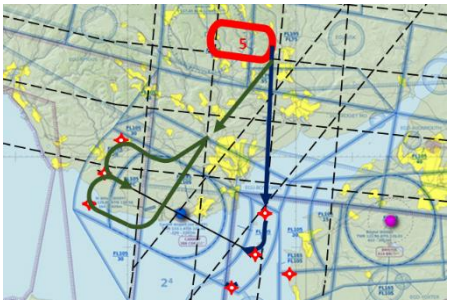
Hold 4 (Hold to the north-west of Cardiff Airport) – **rejected**



DP0: Safety	NOT MET
Safety: Must maintain or where possible, enhance current levels of safety (HIGH)	
Known wind-farm development in this region (possible impact on radar cover). *Also a high likelihood of radar clutter and not being able to monitor aircraft in the Hold – unlikely to pass a safety case.*	
DP1: Operational	PARTIAL
Resilience: The proposed airspace must maintain or where possible, enhance operational resilience of the ATC (Air Traffic Control) network and operations (HIGH)	
Good alignment with network route structure. *However, likely conflict with Cardiff outbound traffic.*	
DP2: Operational	PARTIAL
Capacity: The proposed airspace design will yield the maximum capacity benefits from systemisation in line with the CAAs (Civil Aviation Authority) published airspace modernisation programme (HIGH)	
Likely to be constrained from conflict with outbound traffic.	
DP3: Economic	PARTIAL
Network Performance: The proposed Cardiff FASI-S (Future Airspace Strategy Implementation – South) airspace should facilitate optimised network economic performance (MEDIUM)	
Not an optimal location for the majority of arrivals (from the south and east).	
DP4: Environmental	PARTIAL
Greenhouse Gas Emissions (CO2): The proposed Cardiff FASI-S airspace should minimise CO2 emissions per flight (MEDIUM)	
Very close proximity to the airport however, additional track miles - and associated fuel burn - for the majority of arrivals from the south and east. Fuel planning would have to take the additional track miles into account.	
DP5: Environmental	NOT MET
Noise impact to stakeholders on the ground: The proposed Cardiff FASI-S airspace should limit, and where practicable reduce, noise impacts to stakeholders on the ground (MEDIUM)	
Transition to Runway 12 would descend above and significantly impact upon new populated areas (unless extended to the south which would introduce additional track miles).	
DP6: Technical	NOT MET
Airspace Access and Integration (MoD Requirements): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on the MoD (MEDIUM)	
Detrimental impact on MoD operations including training (aerobatics/ spinning) - from both the Hold location and transitions.	
DP7: Technical	NOT MET
Airspace Access and Integration (GA Impacts): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on GA and other civilian airspace users (MEDIUM)	
Significant impact on gliding, hang-gliding and GA spinning – would force them to operate into a very small amount of airspace.	
DP8: Technical	PARTIAL

Airspace Access and Integration (Minimise CAS): The volume and classification of controlled airspace required for the Cardiff FASI-S ACP should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of all airspace users (MEDIUM)	
More CAS likely required for transitions (design could be tweaked to minimise amount of new CAS).	
DP9: Technical	MET
Use of Advanced Navigation Technology (PBN): The route network linking airport procedures with the enroute phase of flight will be designed to yield maximum safety and efficiency benefits by using an appropriate standard of PBN (HIGH)	
No known conflictions.	
DP10: Policy	MET
Use of Advanced Navigation Technology: The proposed Cardiff FASI-S airspace design must be compliant with all relevant laws and regulatory requirements (HIGH)	
No known policy conflictions.	
DP11: Technical	MET
Airspace Access and Integration (Impact on Adjacent Airfields/ Aerodromes): The proposed airspace should where possible, achieve a mutually beneficial solution to surrounding airfields ensuring equitable access to the airspace 'shared' with Bristol Airport (HIGH/ MEDIUM)	
No known impact.	

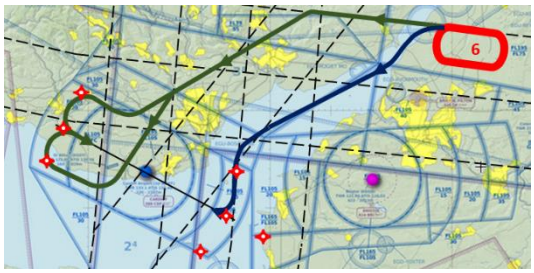
Hold 5 (Hold to the north of Cardiff Airport) – **progressed**



DP0: Safety	MET
Safety: Must maintain or where possible, enhance current levels of safety (HIGH)	
No known safety concerns.	
DP1: Operational	PARTIAL
Resilience: The proposed airspace must maintain or where possible, enhance operational resilience of the ATC (Air Traffic Control) network and operations (HIGH)	
Good alignment with network route structure. *However, uncertainties where the Air Traffic Services would be provided from.*	
DP2: Operational	PARTIAL
Capacity: The proposed airspace design will yield the maximum capacity benefits from systemisation in line with the CAAs (Civil Aviation Authority) published airspace modernisation programme (HIGH)	
Transitions to both runways may have an impact on Bristol operations requiring tactical intervention to deconflict, or a restriction on movements in order to deconflict.	
DP3: Economic	NOT MET
Network Performance: The proposed Cardiff FASI-S (Future Airspace Strategy Implementation – South) airspace should facilitate optimised network economic performance (MEDIUM)	
Not an optimal location for a significant number of arrivals, particularly from the south. *Excessive fuel would have to be carried throughout flights due to the location of the Hold.*	
DP4: Environmental	NOT MET
Greenhouse Gas Emissions (CO2): The proposed Cardiff FASI-S airspace should minimise CO2 emissions per flight (MEDIUM)	
Excessive track miles - and associated fuel burn - for the majority of arrivals from the south and east, more than Holds 4 and 8A. Although holding would not frequently occur, flights would have to plan fuel loading to take into account this additional track mileage.	
DP5: Environmental	NOT MET
Noise impact to stakeholders on the ground: The proposed Cardiff FASI-S airspace should limit, and where practicable reduce, noise impacts to stakeholders on the ground (MEDIUM)	
Transition to Runway 12 would descend over and significantly impact upon new populated areas (unless extended to the south which would introduce additional track miles).	
DP6: Technical	MET
Airspace Access and Integration (MoD Requirements): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on the MoD (MEDIUM)	
Minimal impact on MoD operations.	
DP7: Technical	PARTIAL
Airspace Access and Integration (GA Impacts): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on GA and other civilian airspace users (MEDIUM)	
Transitions likely to conflict with gliders which operate in this region (Class D airspace). Minimal impact otherwise.	
DP8: Technical	MET

Airspace Access and Integration (Minimise CAS): The volume and classification of controlled airspace required for the Cardiff FASI-S ACP should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of all airspace users (MEDIUM)	
Contained within existing CAS.	
DP9: Technical	MET
Use of Advanced Navigation Technology (PBN): The route network linking airport procedures with the enroute phase of flight will be designed to yield maximum safety and efficiency benefits by using an appropriate standard of PBN (HIGH)	
No known conflictions.	
DP10: Policy	MET
Use of Advanced Navigation Technology: The proposed Cardiff FASI-S airspace design must be compliant with all relevant laws and regulatory requirements (HIGH)	
No known policy conflictions.	
DP11: Technical	PARTIAL
Airspace Access and Integration (Impact on Adjacent Airfields/ Aerodromes): The proposed airspace should where possible, achieve a mutually beneficial solution to surrounding airfields ensuring equitable access to the airspace 'shared' with Bristol Airport (HIGH/ MEDIUM)	
Transitions may have an impact on Bristol operations, requiring tactical intervention.	

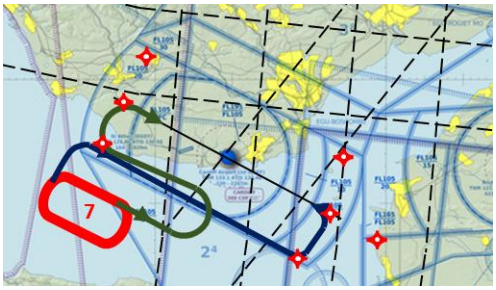
Hold 6 (Hold to the north-east of Cardiff Airport) – **progressed**



DP0: Safety	MET
Safety: Must maintain or where possible, enhance current levels of safety (HIGH)	
No known safety concerns.	
DP1: Operational	PARTIAL
Resilience: The proposed airspace must maintain or where possible, enhance operational resilience of the ATC (Air Traffic Control) network and operations (HIGH)	
Good alignment with network route structure. *Potentially could be used as a shared Hold with Bristol Airport.* *However, likely interaction with other Cardiff traffic.*	
DP2: Operational	PARTIAL
Capacity: The proposed airspace design will yield the maximum capacity benefits from systemisation in line with the CAAs (Civil Aviation Authority) published airspace modernisation programme (HIGH)	
Location far from airfield could constrain capacity e.g., last minute Runway changes difficult to accommodate	
DP3: Economic	NOT MET
Network Performance: The proposed Cardiff FASI-S (Future Airspace Strategy Implementation – South) airspace should facilitate optimised network economic performance (MEDIUM)	
Not an optimal location for the vast majority of arrivals. *Excessive fuel would have to be carried throughout flights due to the location of the Hold.*	
DP4: Environmental	NOT MET
Greenhouse Gas Emissions (CO2): The proposed Cardiff FASI-S airspace should minimise CO2 emissions per flight (MEDIUM)	
Increased track miles for a significant number of arrivals from the south. *Transitions are excessively long (increased fuel burn). Although holding would not occur frequently, flights will have to plan fuel loading to take into account the additional track mileage.*	
DP5: Environmental	NOT MET
Noise impact to stakeholders on the ground: The proposed Cardiff FASI-S airspace should limit, and where practicable reduce, noise impacts to stakeholders on the ground (MEDIUM)	
Transition to Runway 12 would descend over and significantly impact upon new populated areas (unless extended to the south which would introduce additional track miles).	
DP6: Technical	MET
Airspace Access and Integration (MoD Requirements): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on the MoD (MEDIUM)	
Minimal impact on MoD operations.	
DP7: Technical	PARTIAL
Airspace Access and Integration (GA Impacts): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on GA and other civilian airspace users (MEDIUM)	
Transitions likely to conflict with GA flights; there are lots of cross-country flights around the Cotswolds which are often quite high up to around 7,000ft (Class D airspace).	
DP8: Technical	PARTIAL

Airspace Access and Integration (Minimise CAS): The volume and classification of controlled airspace required for the Cardiff FASI-S ACP should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of all airspace users (MEDIUM)	
Containment of transitions may require additional CAS.	
DP9: Technical	MET
Use of Advanced Navigation Technology (PBN): The route network linking airport procedures with the enroute phase of flight will be designed to yield maximum safety and efficiency benefits by using an appropriate standard of PBN (HIGH)	
No known conflictions.	
DP10: Policy	MET
Use of Advanced Navigation Technology: The proposed Cardiff FASI-S airspace design must be compliant with all relevant laws and regulatory requirements (HIGH)	
No known policy conflictions.	
DP11: Technical	NOT MET
Airspace Access and Integration (Impact on Adjacent Airfields/ Aerodromes): The proposed airspace should where possible, achieve a mutually beneficial solution to surrounding airfields ensuring equitable access to the airspace 'shared' with Bristol Airport (HIGH/ MEDIUM)	
Transitions would have a significant impact on Bristol operations (if progressed, these will require further work to reduce impact).	

Hold 7 (Hold to the south-west of Cardiff Airport) – **progressed**



DP0: Safety	MET
Safety: Must maintain or where possible, enhance current levels of safety (HIGH)	
No known safety concerns – potential safety benefit from the controllers being able to clearly monitor tracks in the Hold and transitions, due to less radar clutter from overlapping traffic patterns.	
DP1: Operational	MET
Resilience: The proposed airspace must maintain or where possible, enhance operational resilience of the ATC (Air Traffic Control) network and operations (HIGH)	
Good alignment with network route structure. *Appropriate location for the vast majority of arrivals which are from the south and east.*	
DP2: Operational	PARTIAL
Capacity: The proposed airspace design will yield the maximum capacity benefits from systemisation in line with the CAAs (Civil Aviation Authority) published airspace modernisation programme (HIGH)	
The location is away from departure routes for Cardiff and planned Bristol arrival/departure routes. However, there may be an impact on continuous climb operations for southerly departures from Cardiff runway 30 created by transitions to runway 30.	
DP3: Economic	PARTIAL
Network Performance: The proposed Cardiff FASI-S (Future Airspace Strategy Implementation – South) airspace should facilitate optimised network economic performance (MEDIUM)	
Slightly increased track miles for arrivals from the east (a significant percentage of all arrivals).	
DP4: Environmental	MET
Greenhouse Gas Emissions (CO2): The proposed Cardiff FASI-S airspace should minimise CO2 emissions per flight (MEDIUM)	
Appropriate location for the vast majority of arrivals which are from the south and in close proximity to the airport (minimal fuel burn). *However, slightly increased track miles for eastern arrivals which their fuel planning will have to account for.*	
DP5: Environmental	MET
Noise impact to stakeholders on the ground: The proposed Cardiff FASI-S airspace should limit, and where practicable reduce, noise impacts to stakeholders on the ground (MEDIUM)	
Transitions primarily over water therefore minimal noise impact.	
DP6: Technical	PARTIAL
Airspace Access and Integration (MoD Requirements): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on the MoD (MEDIUM)	
Potential impact on MoD operations which cross the Channel around 6,000ft (from Runway 30 transition). Much less impact than Holds 3 or 4.	
DP7: Technical	MET
Airspace Access and Integration (GA Impacts): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on GA and other civilian airspace users (MEDIUM)	
Minimal impact on GA flights (including Cardiff heliport operations which is in fairly close proximity).	
DP8: Technical	PARTIAL

Airspace Access and Integration (Minimise CAS): The volume and classification of controlled airspace required for the Cardiff FASI-S ACP should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of all airspace users (MEDIUM)	
Transition to Runway 30 likely to require additional CAS. *Otherwise would utilise relatively quiet current CAS.*	
DP9: Technical	MET
Use of Advanced Navigation Technology (PBN): The route network linking airport procedures with the enroute phase of flight will be designed to yield maximum safety and efficiency benefits by using an appropriate standard of PBN (HIGH)	
No known conflictions.	
DP10: Policy	MET
Use of Advanced Navigation Technology: The proposed Cardiff FASI-S airspace design must be compliant with all relevant laws and regulatory requirements (HIGH)	
No known policy conflictions.	
DP11: Technical	MET
Airspace Access and Integration (Impact on Adjacent Airfields/ Aerodromes): The proposed airspace should where possible, achieve a mutually beneficial solution to surrounding airfields ensuring equitable access to the airspace 'shared' with Bristol Airport (HIGH/ MEDIUM)	
No known impacts.	

Hold 8A (Hold to the north-west of Cardiff Airport's Control Zone (CTZ)) – **rejected**

DP0: Safety	PARTIAL
Safety: Must maintain or where possible, enhance current levels of safety (HIGH)	
Last minute Runway changes would significantly impact workload as this Hold would only be used for one Runway.	
DP1: Operational	NOT MET
Resilience: The proposed airspace must maintain or where possible, enhance operational resilience of the ATC (Air Traffic Control) network and operations (HIGH)	
Appropriate location for the vast majority of arrivals which are from the south and east. *However, this Hold would only be effective if combined with Hold 8B.* *Transitions to Runway 12 would also likely interact with Bristol Airport operations.*	
DP2: Operational	PARTIAL
Capacity: The proposed airspace design will yield the maximum capacity benefits from systemisation in line with the CAAs (Civil Aviation Authority) published airspace modernisation programme (HIGH)	
This hold location would work well in isolation as it will not affect departures from Cardiff. However, it is intended to be used in conjunction with Hold 8b which does have negative capacity benefits on Bristol operations.	
DP3: Economic	PARTIAL
Network Performance: The proposed Cardiff FASI-S (Future Airspace Strategy Implementation – South) airspace should facilitate optimised network economic performance (MEDIUM)	
Efficient position for aircraft holding for weather improvements / troubleshooting, allowing for prompt reaction to changing conditions. *However, only effective when combined with Hold 8b which has negative economic impacts as described for Hold 8b.*	
DP4: Environmental	PARTIAL
Greenhouse Gas Emissions (CO2): The proposed Cardiff FASI-S airspace should minimise CO2 emissions per flight (MEDIUM)	
CO2 emissions kept to a minimum due to close position to the final approach to runway 12. *However, only effective when combined with Hold 8b which has negative economic impacts as described for Hold 8b.*	
DP5: Environmental	NOT MET
Noise impact to stakeholders on the ground: The proposed Cardiff FASI-S airspace should limit, and where practicable reduce, noise impacts to stakeholders on the ground (MEDIUM)	
The Hold would require a very low base to achieve transitions. The noise impact would therefore be detrimental.	
DP6: Technical	NOT MET
Airspace Access and Integration (MoD Requirements): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on the MoD (MEDIUM)	
Hold location and new low-level CAS would create a significant impact on MoD operations including training (aerobatics/ spinning).	
DP7: Technical	NOT MET
Airspace Access and Integration (GA Impacts): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on GA and other civilian airspace users (MEDIUM)	

Transitions and new low-level CAS would have a detrimental impact on GA traffic including fixed wing spinning activities.	
DP8: Technical	NOT MET
Airspace Access and Integration (Minimise CAS): The volume and classification of controlled airspace required for the Cardiff FASI-S ACP should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of all airspace users (MEDIUM)	
Significant amount of new low-level CAS required.	
DP9: Technical	MET
Use of Advanced Navigation Technology (PBN): The route network linking airport procedures with the enroute phase of flight will be designed to yield maximum safety and efficiency benefits by using an appropriate standard of PBN (HIGH)	
No known conflictions.	
DP10: Policy	MET
Use of Advanced Navigation Technology: The proposed Cardiff FASI-S airspace design must be compliant with all relevant laws and regulatory requirements (HIGH)	
No known policy conflictions.	
DP11: Technical	PARTIAL
Airspace Access and Integration (Impact on Adjacent Airfields/ Aerodromes): The proposed airspace should where possible, achieve a mutually beneficial solution to surrounding airfields ensuring equitable access to the airspace 'shared' with Bristol Airport (HIGH/ MEDIUM)	
Transitions to Runway 12 would likely interact with Bristol Airport operations.	

Hold 8B (Hold to the south-west of Cardiff Airport's Control Zone (CTZ)) – **rejected**

DP0: Safety	NOT MET
Safety: Must maintain or where possible, enhance current levels of safety (HIGH)	
Very high workload due to increased coordination between Cardiff and Bristol ATC. *Last minute Runway changes would also significantly impact workload as this Hold would only be used for one Runway.*	
DP1: Operational	NOT MET
Resilience: The proposed airspace must maintain or where possible, enhance operational resilience of the ATC (Air Traffic Control) network and operations (HIGH)	
Appropriate location for the vast majority of arrivals which are from the south and east. *However, this would only be effective if combined with Hold 8A.* *Detrimental impact on Bristol Airport arrivals and departures.*	
DP2: Operational	NOT MET
Capacity: The proposed airspace design will yield the maximum capacity benefits from systemisation in line with the CAAs (Civil Aviation Authority) published airspace modernisation programme (HIGH)	
Arrival routes to runway 09 and departures from 27 will be significantly constrained by any aircraft routing to or holding at this facility. This will require close coordination/approval from Cardiff for aircraft on these routes to/from Bristol, impacting on movement rate. Not aligned with the AMS.	
DP3: Economic	PARTIAL
Network Performance: The proposed Cardiff FASI-S (Future Airspace Strategy Implementation – South) airspace should facilitate optimised network economic performance (MEDIUM)	
Additional fuel burn from increased vectoring required to avoid Bristol traffic.	
DP4: Environmental	PARTIAL
Greenhouse Gas Emissions (CO2): The proposed Cardiff FASI-S airspace should minimise CO2 emissions per flight (MEDIUM)	
Increase in emissions from additional vectoring required to avoid Bristol traffic.	
DP5: Environmental	NOT MET
Noise impact to stakeholders on the ground: The proposed Cardiff FASI-S airspace should limit, and where practicable reduce, noise impacts to stakeholders on the ground (MEDIUM)	
The Hold would require a very low base to achieve transitions. The noise impact would therefore be detrimental.	
DP6: Technical	PARTIAL
Airspace Access and Integration (MoD Requirements): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on the MoD (MEDIUM)	
Less impact on MoD operations than Hold 8B however, transitions to Runway 30 may still interact.	
DP7: Technical	MET
Airspace Access and Integration (GA Impacts): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on GA and other civilian airspace users (MEDIUM)	
Minimal impact on GA flights - all contained with CAS.	
DP8: Technical	MET
Airspace Access and Integration (Minimise CAS): The volume and classification of controlled airspace required for the Cardiff FASI-S ACP should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of all airspace users (MEDIUM)	

Hold would be contained within existing CAS.	
DP9: Technical	MET
Use of Advanced Navigation Technology (PBN): The route network linking airport procedures with the enroute phase of flight will be designed to yield maximum safety and efficiency benefits by using an appropriate standard of PBN (HIGH)	
No known conflictions.	
DP10: Policy	MET
Use of Advanced Navigation Technology: The proposed Cardiff FASI-S airspace design must be compliant with all relevant laws and regulatory requirements (HIGH)	
No known policy conflictions.	
DP11: Technical	NOT MET
Airspace Access and Integration (Impact on Adjacent Airfields/ Aerodromes): The proposed airspace should where possible, achieve a mutually beneficial solution to surrounding airfields ensuring equitable access to the airspace 'shared' with Bristol Airport (HIGH/ MEDIUM)	
Detrimental impact on Bristol arrivals and departures which will require close coordination between Cardiff and Bristol ATC.	

Hold 9 (Hold to the north-east of Cardiff Airport) – **rejected**

DP0: Safety	NOT MET
Safety: Must maintain or where possible, enhance current levels of safety (HIGH)	
Significant safety concerns from substantial confliction with Bristol operations (increased workload and complexity). *Additionally, there may be radar loss due to the runway 12 transitions routing through the overhead.*	
DP1: Operational	NOT MET
Resilience: The proposed airspace must maintain or where possible, enhance operational resilience of the ATC (Air Traffic Control) network and operations (HIGH)	
Good alignment with network route structure and positioned close to Cardiff Airport (can respond to changing Runway). *However a Hold in this location would have a detrimental impact on Bristol operations.*	
DP2: Operational	NOT MET
Capacity: The proposed airspace design will yield the maximum capacity benefits from systemisation in line with the CAAs (Civil Aviation Authority) published airspace modernisation programme (HIGH)	
The location of the hold will have a detrimental impact on Bristol arrivals and departures. Any arrivals to runway 09 from the north will have to be coordinated with Cardiff traffic routing from the holding facility and the arrivals may have to be forced down to a lower level to pass below the hold and transitions, severely impacting continuous descent profiles. Departures from runway 27 will potentially be held down by any aircraft within the hold, or transitioning to Cardiff, or may lead to departures from runway 27 being held up pending prior coordination/approval from Cardiff ATC. Not aligned with the AMS.	
DP3: Economic	PARTIAL
Network Performance: The proposed Cardiff FASI-S (Future Airspace Strategy Implementation – South) airspace should facilitate optimised network economic performance (MEDIUM)	
Not an optimal location for a significant number of arrivals from the south therefore additional track miles/ fuel planning.	
DP4: Environmental	PARTIAL
Greenhouse Gas Emissions (CO2): The proposed Cardiff FASI-S airspace should minimise CO2 emissions per flight (MEDIUM)	
Additional track miles for a significant number of arrivals from the south.	
DP5: Environmental	NOT MET
Noise impact to stakeholders on the ground: The proposed Cardiff FASI-S airspace should limit, and where practicable reduce, noise impacts to stakeholders on the ground (MEDIUM)	
Transition to Runway 12 would descend over and significantly impact upon new populated areas (unless extended to the south which would introduce additional track miles).	
DP6: Technical	MET
Airspace Access and Integration (MoD Requirements): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on the MoD (MEDIUM)	
Minimal impact on MoD operations.	
DP7: Technical	NOT MET
Airspace Access and Integration (GA Impacts): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on GA and other civilian airspace users (MEDIUM)	
Significant impact on GA flights which use Class D airspace in this region.	

DP8: Technical	PARTIAL
Airspace Access and Integration (Minimise CAS): The volume and classification of controlled airspace required for the Cardiff FASI-S ACP should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of all airspace users (MEDIUM)	
Existing CAS may require lowering which would (further) impact upon GA flights in this region.	
DP9: Technical	MET
Use of Advanced Navigation Technology (PBN): The route network linking airport procedures with the enroute phase of flight will be designed to yield maximum safety and efficiency benefits by using an appropriate standard of PBN (HIGH)	
No known conflictions.	
DP10: Policy	MET
Use of Advanced Navigation Technology: The proposed Cardiff FASI-S airspace design must be compliant with all relevant laws and regulatory requirements (HIGH)	
No known policy conflictions.	
DP11: Technical	NOT MET
Airspace Access and Integration (Impact on Adjacent Airfields/ Aerodromes): The proposed airspace should where possible, achieve a mutually beneficial solution to surrounding airfields ensuring equitable access to the airspace 'shared' with Bristol Airport (HIGH/ MEDIUM)	
Detrimental impact on Bristol Airport operations.	

Annex A: Cardiff Airport's Design Principles

Theme	Design Principle and Priority	Details
Safety	**DP0 Safety**: Must maintain or where possible, enhance current levels of safety Priority: **high**	*Safety is at the forefront of everything Cardiff Airport does. Safety will underpin any airspace change which where possible, will enhance current safety standards. Cardiff Airport also believes it is crucial that any proposed changes do not have a detrimental safety impact on other airspace users.*
Operational	**DP1 Resilience:** The proposed airspace must maintain or where possible, enhance operational resilience of the ATC (Air Traffic Control) network and operations Priority: **high**	*Cardiff Airport will consider airspace and route designs that support – if not improve - the resilience of the airport and national air traffic network; benefiting associated airspace users.*
Operational	**DP2 Capacity:** The proposed airspace design will yield the maximum capacity benefits from systemisation in line with the CAAs (Civil Aviation Authority) published airspace modernisation programme Priority: **high**	*Cardiff Airport's airspace change, in conjunction with the FASI-S programme and in accordance with the airspace modernisation programme (CAP1711), will need to respond to future growth opportunities. Any changes to airspace or procedures must be able to cope with an increased demand and link efficiently into the network; for the benefit of those who use and are affected by UK airspace.*
Economic	**DP3 Network Performance:** The proposed Cardiff FASI-S (Future Airspace Strategy Implementation – South) airspace should facilitate optimised network economic performance Priority: **medium**	*Cardiff Airport, through improved airspace and procedure designs, will seek to drive growth through environmental and operational improvements e.g., track mileage, route charges, fuel burn and associated emissions.*
Environmental	**DP4 Greenhouse Gas Emissions (CO_2):** The proposed Cardiff FASI-S airspace should minimise CO_2 emissions per flight Priority: **medium**	*Cardiff Airport is committed to minimise environmental impact through the most efficient proposed airspace and procedure design. This covers both CO_2 emissions and associated fuel burn.*
Environmental	**DP5 Noise impact to stakeholders on the ground:** The proposed Cardiff FASI-S airspace should limit, and where practicable reduce, noise impacts to stakeholders on the ground. Priority: **medium**	*Considerations/options to mitigate the impact of noise include (in no particular order):* - *Using more noise efficient operational practices* - *Minimising number of people newly overflown* - *Maximising sharing through predictable respite* - *Avoid overflying communities with multiple routes* - *Maximising sharing through managed dispersal* - *Minimising total population overflown*

Theme	Design Principle and Priority	Details
		- *Designing flight paths over commercial and industrial areas* - *Prioritising routing flight paths over parks and open spaces (rather than over residential areas)*
Technical	DP6 Airspace Access and Integration (MoD Requirements): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on the MoD Priority: **medium**	*Cardiff Airport's proposed design will take into consideration the requirements of the military. The MoD will be involved and engaged with throughout the process, particularly in design work which may propose changes to airspace or procedures.*
Technical	DP7 Airspace Access and Integration (GA Impacts): The Cardiff FASI-S Airspace Change Proposal should minimise impacts on GA and other civilian airspace users Priority: **medium**	*In accordance with the Airspace Modernisation Strategy, Cardiff Airport should consider an Airspace Change Proposal that facilitates and accommodates access to airspace for GA and other civilian airspace users such as emergency service traffic and training flights.*
Technical	DP8 Airspace Access and Integration (Minimise CAS): The volume and classification of controlled airspace required for the Cardiff FASI-S ACP should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of all airspace users Priority: **medium**	*Cardiff Airport's proposed design, including any changes to controlled airspace, will ensure the delivery of a safe and efficient operation. The reference to "other airspace users" covers adjacent aerodromes, General Aviation users and the MoD; amongst others.*
Technical	DP9 Use of Advanced Navigation Technology (PBN): The route network linking airport procedures with the enroute phase of flight will be designed to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. Priority: **high**	*Cardiff Airport will remove the dependencies on legacy navigational aids and will comply with the requirements of known PBN implementing rules. Changes to arrival and departure routes will be designed to make full use of modern navigation technology. Any changes to airspace or systems will have back-up procedures in place.*
Policy	DP10 Use of Advanced Navigation Technology: The proposed Cardiff FASI-S airspace design must be compliant with all relevant laws and regulatory requirements. Priority: **high**	*Cardiff Airport will ensure accordance with all relevant policies – such as the PBN Implementing Rule – for compliance and maintenance of safety standards.*
Technical	DP11 Airspace Access and Integration (Impact on Adjacent Airfields/ Aerodromes): The proposed airspace should where possible, achieve a	*Cardiff Airport will engage with surrounding airfields throughout their design work to mitigate the impact on neighbouring airports such as Bristol Airport, Exeter Airport, St Athan and Cardiff Heliport.*

Theme	Design Principle and Priority	Details
	mutually beneficial solution to surrounding airfields ensuring equitable access to the airspace 'shared' with Bristol Airport Priority: high/ medium	

Annex B: Design Principle Evaluation – RAG (Red/ Amber/ Green) Criteria

DP0: Safety Must maintain or where possible, enhance current levels of safety	
No significant safety issues identified.	MET
Issues identified that would require a robust safety case such as increased workload.	PARTIAL
Unlikely to pass a safety case.	NOT MET
DP1 Operational: Resilience The proposed airspace must maintain or where possible, enhance operational resilience of the ATC (Air Traffic Control) network and operations	
Positive resilience e.g., good network connectivity, useful positioning of procedures.	MET
Minor design changes may be needed to improve resilience e.g., placement of procedures, avoid busy airspace.	PARTIAL
Significant resilience issues e.g., no network connectivity, operational complexity.	NOT MET
DP2 Operational: Capacity	
No known capacity constraints, option supports future schedule.	MET
Potential capacity constraint or low demand anticipated.	PARTIAL
Significant capacity constraints.	NOT MET
DP3 Economic: Network Performance The proposed Cardiff FASI-S (Future Airspace Strategy Implementation – South) airspace should facilitate optimised network economic performance	
Design option will have a positive economic impact e.g., environmental savings or supports future growth.	MET
Further economic benefits could be gleaned if the option is tweaked e.g., positioning.	PARTIAL
Design option would have an adverse impact on economic growth and performance.	NOT MET
DP4 Environmental: Greenhouse Gas Emissions (CO2) The proposed Cardiff FASI-S airspace should minimise CO2 emissions per flight	
Design option supports minimising emissions e.g., through placement or distance from airport.	MET
Emissions could be reduced further if design option is tweaked e.g., positioning.	PARTIAL
Option would have an adverse impact on the environment.	NOT MET
DP5 Environmental: Noise impact to stakeholders on the ground The proposed Cardiff FASI-S airspace should limit, and where practicable reduce, noise impacts to stakeholders on the ground.	
Minimal noise/ tranquillity impact or no change to the current impact.	MET
Small increase in noise/ tranquillity impact compared to today's operation.	PARTIAL
Significant noise/ tranquillity impact.	NOT MET
DP6 Technical: Airspace Access and Integration (MoD Requirements) The Cardiff FASI-S Airspace Change Proposal should minimise impacts on the MoD	
Minimal or no known impact on military operations.	MET

Small impact on military operations.	PARTIAL
Detrimental impact on military operations.	NOT MET
DP7 Technical: Airspace Access and Integration (GA Impacts) The Cardiff FASI-S Airspace Change Proposal should minimise impacts on GA and other civilian airspace users	
Minimal or no known impact on GA flights.	MET
Small impact on GA flights.	PARTIAL
Detrimental impact on GA flights.	NOT MET
DP8 Technical: Airspace Access and Integration (Minimise CAS): The volume and classification of controlled airspace required for the Cardiff FASI-S ACP should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of all airspace users	
Minimal or no changes to CAS alongside impact on other airspace users.	MET
Small increase or change to CAS. Likely impact on other airspace users.	PARTIAL
Significant increase or change to CAS. Detrimental impact on other airspace users.	NOT MET
DP9 Technical: Use of Advanced Navigation Technology (PBN) The route network linking airport procedures with the enroute phase of flight will be designed to yield maximum safety and efficiency benefits by using an appropriate standard of PBN.	
No known conflictions. Appropriate RNAV standard to be used.	MET
Limitation on RNAV standard or fleet mix.	PARTIAL
Option would not make use of modern navigation technology.	NOT MET
DP10 Policy: Use of Advanced Navigation Technology The proposed Cardiff FASI-S airspace design must be compliant with all relevant laws and regulatory requirements.	
No known conflictions.	MET
Partially aligned with relevant laws and regulations.	PARTIAL
Not aligned with relevant laws and regulations.	NOT MET
DP11 Technical: Airspace Access and Integration (Impact on Adjacent Airfields/ Aerodromes) The proposed airspace should where possible, achieve a mutually beneficial solution to surrounding airfields ensuring equitable access to the airspace 'shared' with Bristol Airport.	
Minimal or not impact to stakeholders from surrounding airfields.	MET
Small impact to stakeholders from surrounding airfields.	PARTIAL
Significant impact to stakeholders from surrounding airfields.	NOT MET