NATS

Bristol Airport ACP
Stage 2 ‘Develop & Assess’

Step 2A – Options Development

8 Jan 2020

[redacted]

Agenda

Introductions.

Context of this Design Options work.

Inputs to the process so far.

Outputs and how we get there.

Initial design option development (interactive).

Wrap up and next steps.

Context

DfT & CAA have tasked NERL with leading the FASIS-S programme, established to deliver the Airspace Modernisation Strategy (CAP1711).

Coordinated ACPs are required between LAMP2 (London Airspace Modernisation Project) and 15 airports.

Deployment 1 West =

- NATS LAMP ACP1
- Bristol ACP
- Cardiff ACP
- Exeter ACP

} early 2023

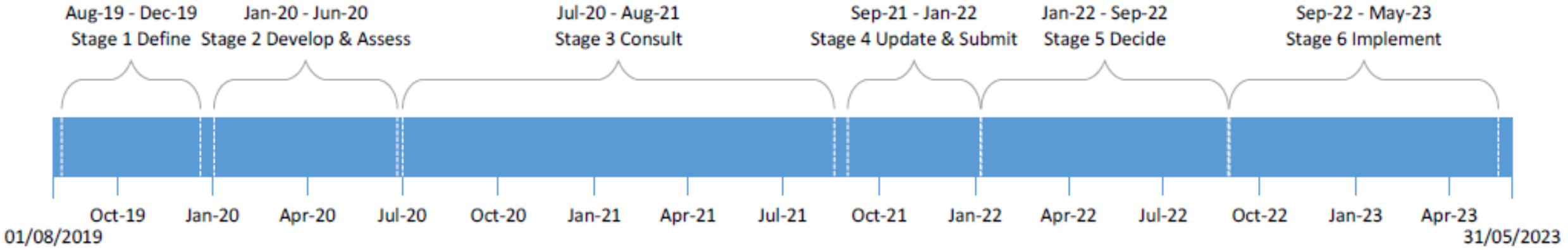
Bristol ACP High-Level Timeline

Stage 1 Define
Step 1A: Assessment Requirement
Step 1B: Design Principles

Stage 2 Develop and Assess
Step 2A: Options Development
Step 2B: Options Appraisal

Stage 3 Consult
Step 3A: Consultation Preparation
Step 3B: Consultation Validation
Step 3C: Commence Consultation
Step 3D: Collate and Review Responses

Stage 4 Update and Submit
Step 4A: Update Design
Step 4B: Submit Proposal to CAA



Stage 2, Step 2A - inputs

ACP Statement of Need (Step 1A).

Design Principles (Step 1B).

Bristol – LAMP Requirements.

Operational issues identified from local Safety Survey (2018).

ACP contract ‘Scope of Services’.

Airspace Modernisation Strategy (CAP1711).

CAP 1616.

Bristol ACP S-o-N – key points

- LAMP addresses the network above 7000ft.
- Airport ACP up to 7000ft.
- Additional airspace capacity to meet growth plans (in response to demand).
- Improved flight efficiency and environmental performance.
- Separated routes using satellite nav. standards.
- Re-designed SIDs & STARs to connect efficiently to network.
  - minimise flight paths over populated areas
  - reduce emissions by minimising additional track miles
  - CAS borders to support RNAV as default method of navigation

Operational issues from Safety Survey - 1

- Current BRI hold location causes operational difficulties (loss of traffic in O/H and label garbling).
- BRI hold capacity is stretched during peak periods.
- Airspace to the south hinders lateral separation on downwind legs; no ability for parallel tracks.
- Airspace to the North East set at levels when both Filton and Lyneham were open; relatively high base levels not complementary to continuous decent profiles and tactical vectoring.

Operational issues from Safety Survey - 2

- Relatively late presentation of traffic from the west hinders proactive traffic planning. Downwind and base legs for Rwy 09 are problematic and not favourable for effective vectoring.
- Runway capacity - 2 minute departure separation does not accommodate growth aspirations.
- Current RNAV STARs are insufficient to meet growth and environmental aspirations.
- Current routes for arrivals and departures do not lend themselves towards a systemised approach of air traffic management and require high levels of input.

Design Principles

- Step 1b of the CAA's CAP1616 Airspace Change Process
- Design Principles describe the general safety, environmental & operational objectives a change should seek to achieve
  - Not specific or seek to identify solutions
- Helps to align the design work to the Design Principles and reduces misunderstandings when the design work is more advanced
- Design Principles which are important to the sponsor (Bristol) may be different than the priorities for stakeholders
- Design Principles can be: contradictory, prioritised against each other, accepted/ rejected - provided justification is provided
- MUST be established through stakeholder engagement

Design Principle Categories

Design Principles can be made to be very specific (e.g. noise considerations) but they should be grouped into general categories.

- Safety – highest priority “golden” principle
- Economic
- Environmental
- Operational
- Policy
- Technical

Design Principles - 1

Safety	DP1) Must maintain and where possible, enhance safety standards *Priority A*	Safety is at the forefront of everything Bristol Airport does. We believe that it is crucial that a new airspace design maintains and where possible enhances current safety standards.
Policy	DP2) Must accord with the CAA's published Airspace Modernisation Strategy (CAP 1711) and any current or future plans associated with it *Priority A*	CAP 1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable; - the need to maximise the utilisation of existing runway capacity
Regulation	DP3) Must be compliant with all relevant laws and regulations *Priority A*	To maintain safety and ensure integration with the wider airspace.

Design Principles - 2

Technical	DP4) Must maximise efficiency by using modern navigation technology *Priority A*	The reliance on legacy technology must be removed. Furthermore, aircraft navigation capabilities have increased. To maximise the benefits that these improvements bring, including satellite navigation standards and route positioning accuracy, arrival and departure routes must be designed to make full use of modern navigation technology.
Operational	DP5) Must provide sufficient capacity to support future demand *Priority A*	We believe that Bristol Airport will need to respond to future growth opportunities and as part of the Airspace Modernisation Strategy programme will, in accordance with government policy, ensure that any new airspace design is sufficient to cope with increased demand and link efficiently into the national network.
Environmental	DP6) Should minimise fuel burn and CO_2 emissions per flight as far as possible *Priority A*	Bristol Airport should, through airspace design, seek to implement the most efficient flight profiles.

Design Principles - 3

Environmental	DP7) Should use noise-efficient operational practices to minimise the impact of aircraft noise on the local community and stakeholders **Refer to the Noise Mitigation Design Principles (11-15) ** *Priority A*	Bristol Airport should, where possible, reduce and mitigate noise and its distribution in order to manage the impact of aviation growth on local communities in line with government policies. The Air Navigation Guidance 2017 states that the priority for airspace below 7,000ft is to minimise the impact of aviation noise, unless evidence demonstrates a disproportionate increase in CO_2 emissions
Operational	DP8) Should maintain or enhance operational resilience of the Air Traffic Control network *Priority B*	Bristol Airport should consider airspace and route designs that benefit the operation and resilience of the airport and the national airspace network.

Design Principles - 4

Technical	DP9) Should minimise impact on other airspace users *Priority B*	In accordance with the CAA's published Airspace Modernisation Strategy, Bristol Airport should consider designs and procedures that facilitate and accommodate access to airspace for non-commercial users, including General Aviation (e.g. recreational aviation or private transport), Ministry of Defence and other aviation communities.
Technical	DP10) Should minimise controlled airspace (CAS) and impact on adjacent aerodrome and airfields *Priority B*	The volume of Controlled Airspace considered by Bristol Airport should be the minimum necessary to deliver a safe and efficient operation, taking into account Procedure Design standards and the needs of adjacent aerodromes and airfields.

‘Sub’ design principles - Noise

Noise Mitigation Design Principle and Priority	Details
DP11) Minimise the number of people newly overflown *Priority c*	To avoid exposing people to aircraft noise who are currently not exposed
DP12) Maximise sharing through predictable respite routes *Priority b*	Operate multiple arrival and departure routes, and alternate between these routes at different times of the day or days of the week. This would allow communities to have predictable periods of respite
DP13) Avoid overflying communities with multiple routes, including from other airports *Priority c*	Use the opportunity to work with other airports to find a solution for this.
DP14) Maximise sharing through managed dispersal *Priority c*	An alternative approach to maximising sharing is to spread routes over a wider area to share the impact of noise. This would mean each flight path was flown less frequently but a wider area would be affected by noise
DP15) Minimise the total population overflown *Priority b*	Concentrating aircraft along defined routes to minimise the total number of people exposed to aircraft noise.

Bristol has also been invited to place Requirements on LAMP

Bristol – LAMP requirements (1)

EGGD_001 HIGH	Bristol want NATS to provide a delay absorption method(s) above the letterboxes which caters for a peak of 35 air traffic movements per hour, all inbound, all departure or a mixture of both.	"To facilitate forecast growth in traffic. 12 arr 9 dep (2017). Currently the airfield rapidly runs out of levels in the current holds. "
EGGD_002 HIGH	Bristol wants NATS to provide a delay absorption method(s) which is not overhead the airport and caters for the future predicted traffic growth.	" Current hold is in the overhead of the airfield. CCO cannot be conducted. The hold runs out of levels in the summer period. "
EGGD_003 HIGH	NATS should not prevent Bristol Airport from developing and using procedures that accommodate the minimum prescribed separation standard between departing traffic.	Existing route is directly ahead meaning 2 min departure splits which will not cater for the future expansion of the airfield. There may be the potential to have one minute departure splits.

Bristol – LAMP requirements (2)

EGGD_005 HIGH	NATS should not prevent Bristol Airport from developing and using procedures that accommodate the forecast growth, the profile of these procedures should support unconstrained entry into the en-route airspace and have the most optimal direction.	Integrate with FASI(S) Programme.
EGGD_006 MED/ HIGH	Bristol want NATS to redesign the STARs for Bristol Airport through use of RNAV standards in order to enable CDO and fuel burn reduction.	Opportunity to improve environmental performance through route efficiency.
EGGD_008 MED/ HIGH	Bristol wants NATS to redesign the arrival and departure routes to enhance traffic sequencing to reduce ATC workload and facilitate predictable, consistent profiles to enable traffic growth.	Integrate with FASI(S) Programme.

Bristol – LAMP requirements (3)

EGGD_009 HIGH	Bristol want NATS to minimise the likelihood of airspace excursions above the letterboxes.	To enhance safety and protect traffic against entering an unknown environment.
EGGD_010 MED	Bristol want NATS to provide Continuous Descent Operations (CDO) from Free Route Airspace (FRA) to the letterboxes.	Improved environment performance.
EGGD_011 HIGH	Bristol want NATS to provide a network above the letterboxes that is independent from ground based navigation infrastructure.	DVOR rationalisation programme

Bristol – LAMP requirements (4)

EGGD_012 HIGH	"Bristol wants NATS to ensure the future designs shall comply with the Implementing Rule PBN 1048/2018 regarding future navigational performance. "	Regulatory Requirement.
EGGD_013 HIGH	Bristol want NATS to ensure the airspace design above the letterbox takes due regard of adjacent airspace dependencies including but not limited to Cardiff, St Athan, Exeter.	Collaborative approach to local and national modernisation strategy.
"New Req EGGD_014“ MED/ HIGH	Bristol want NATS to provide an airspace design to conduct Continous Climb Operations (CCO).	Opportunity to improve environmental performance through route efficiency.

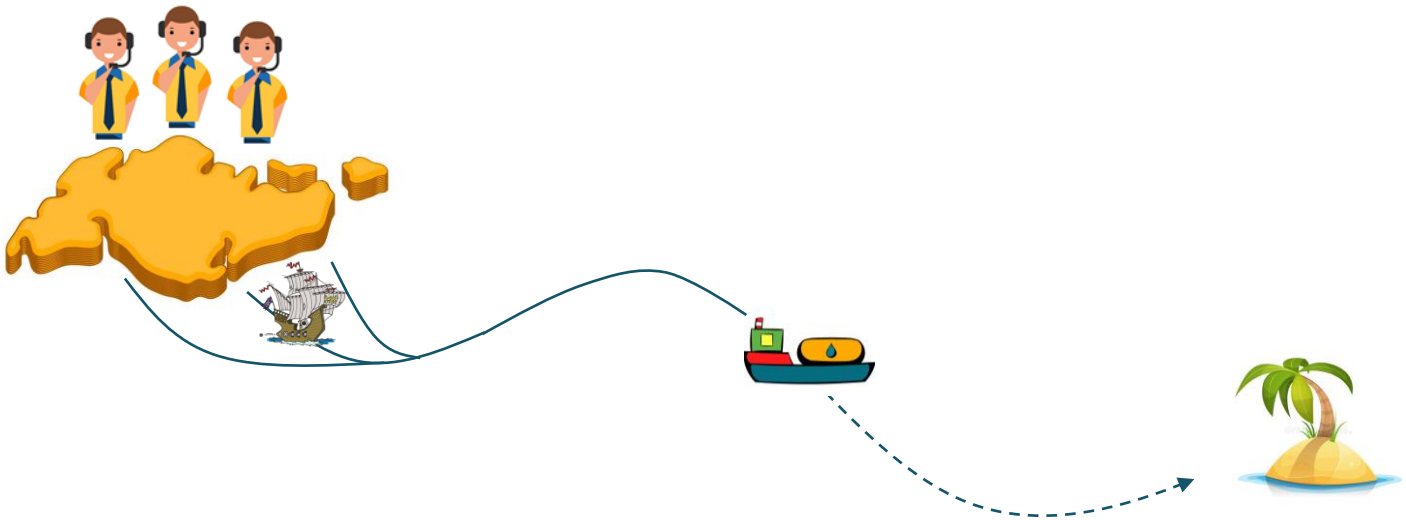
Step 2a – the output

Our task is to produce a list of:

Design Options

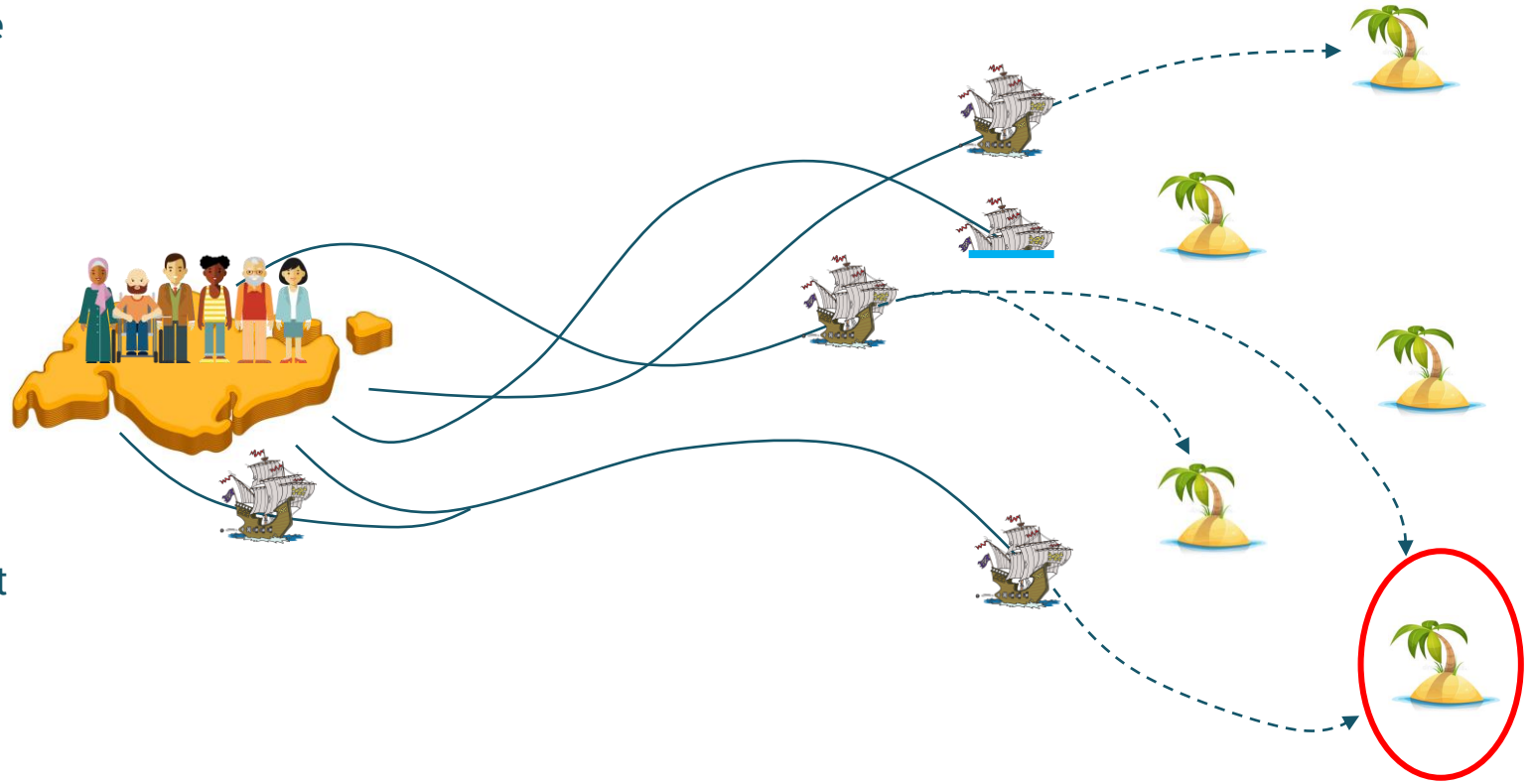
Traditional Approach

- Draw together a group of ATC experts and your known environment
- Begin with a destination in mind
- Start with a restricted view of potential solutions, which narrow quickly
- Set your ‘design ship’ on its voyage of discovery, but….
- This ship soon becomes a meandering oil tanker
- Slow to respond, it arrives at the destination with little change of direction

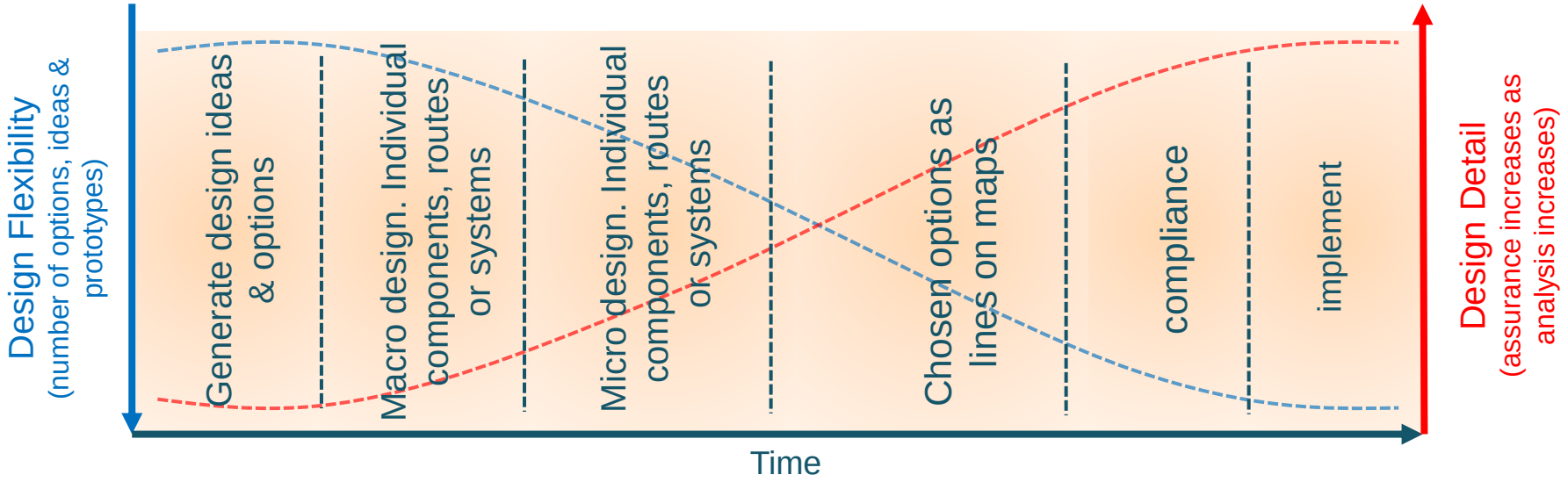


Proposed Approach

- Draw together a group of ‘experts’ and challenge the known environment
- Start with a blank sheet of paper and avoid having any specific ‘destinations’ in mind
- Set your ‘design ships’ on their voyages of discovery:
  - some may not make it
  - other ideas may converge whilst others diverge and spawn new options
  - or they may arrive at the same destination but provide multiple solutions
- Your final choice should prove to be optimal & defensible



How does that translate: Design DNA



All resulting Design Options must:

Address the Statement of Need (from the ACP),
Align with the Design Principles,
Be tested with stakeholders (same group as in 1b).

Later, in Step 2b, a detailed Options Appraisal takes place where we "...must develop a clear list of criteria from the Design Principles and apply these to the options list."

Initial “design elements”, derived from operational needs and the ACP…

“Design elements” (draft)

Revised RNAV SIDs and STARs.

Seamless connection with en-route network to:

- reduce workload
- enable continuous climb & descent ops.

1 minute departure splits (where advantageous).

SIDs to allow for noise ‘respite’.

More efficient delay absorption.

Outbound peak off-load route to reduce mileage and avoid high-demand TC airspace.

Rules of engagement

Capture all ideas – none are too wacky

No constraints to start with

Note opportunities and issues

Method

Break down into:

Departures 27

Arrivals 27

Departures 09

Arrivals 09

Delay absorption