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Title of Airspace Change Proposal	TAG Farnborough
Change Sponsor	TAG
DAP Project Leader	██████████
Case Study commencement date	05 December 2016
Case Study report as at	01 December 2017

Instructions
<p>In providing a response for each question, please ensure that the 'Status' column is completed using the following options:</p> <ul style="list-style-type: none"> • Yes • No • Partially • N/A <p>To aid the DAP Project Leader's efficient Project Management it may be useful that each question is also highlighted accordingly to illustrate what is resolved (Green), not resolved (Amber) or not compliant (Red) as part of the DAP Project Leader's efficient project management.</p>

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1.	Justification for change and “Option Analysis”	Status
1.1	<p>Is the explanation of the proposed change clear and understood?</p> <p>The explanation was acceptable. It is clear that TAG Farnborough is seeking to introduce controlled airspace to contain their new RNAV arrival and departure procedures (which procedures will satisfactorily deconflict from both Heathrow and Gatwick operations).</p> <p>The proposal is to implement a control zone (CTR) and associated control area (CTAs) to contain new instrument flight procedures.</p>	YES
1.2	<p>Are the reasons for the change stated and acceptable?</p> <p>It is considered that the reasons for this proposed airspace change are acceptable in that the present Farnborough IFR operation is inefficient due to unpredictability associated with Class G operations. Farnborough is located in an area of busy general aviation activity and this activity has an impact on the existing arrival and departure IFR procedures. These IFR flights are regularly affected by the presence of unknown or uncoordinated conflicting traffic, which contributes to an inefficiency through either engines running on the ground, waiting for a ‘gap’ or when airborne, Farnborough controllers providing a safe but inefficient routeing resulting from application of standard radar separation against unknown conflicts.</p>	YES
1.3	<p>Have all appropriate alternative options been considered, including the ‘do nothing’ option?</p> <p>On 15th February 2013 TAG Farnborough held a Framework Briefing (FWB) with the CAA. A follow-up FWB was held on 24th July 2013, presenting more mature material to update the TAG Farnborough technical design for its considered airspace change proposal (ACP). From 28th February 2013 until 2nd February 2014 TAG Farnborough undertook consultation preparation, which was then launched on 3rd February 2014 for a period of 14 weeks, which included 9 extra days due to a technical problem with the consultation responses processing system during this period. This formal Consultation was on Option 25. Initially, TAG Farnborough considered 24 iterations as potential options together with the Do-Nothing Option before they formally consulted on Option 25.</p> <p>Following conclusion of the formal consultation, TAG Farnborough undertook analysis of the consultation responses and published its Feedback Report Part A on 29th August 2014. A redesign process was considered necessary and an additional FWB with the CAA was convened on 14th November 2014. The redesign period and development simulations at NATS CTC and Farnborough ran from November 2014 until June 2015 looking at various options and modifications, when on 3rd July 2015, Feedback Report Part B was published and the revised ACP, Option 34 was submitted to the CAA.</p>	YES

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	<p>Options 26-33 were Farnborough development options, each seeking to address the fundamental issues raised by stakeholders during the formal consultation on Option 25. The CAA Case Officer then commenced the first Case Study to assess the ACP against the Regulatory Requirements laid down in CAP 725 and in accordance with the Statutory Duties stipulated in Section 70 of the Transport Act 2000. During this assessment of all the material submitted by Farnborough, the concept of Operations document (CONOPS), a document that is compiled to identify the requirement in an operational scenario and any potential implications on other unit's operation and associated mitigations, identified a procedural conflict risk associated with Farnborough arrivals from the south against slow and heavy Gatwick departures on a KENET (westerly) procedure. A decision was taken to 'stop the clock' on 30th October 2015 due to this operational concern and also due to receipt of a FASVIG mediation report that raised concerns on its assessment of due process¹</p> <p>Option 31 extensively modified the airspace design in order to further minimise noise impacts; further mitigate impacts on GA and Sport & recreational flying groups; further minimise impact RAF Odiham operations: minimise environmental impact of CO₂ emissions, local air quality and tranquillity. Option 31 was simulated with Farnborough, Odiham and TC Heathrow controllers, at CTC, in Feb 15. Following study of the results of the simulation, Options 32 & 33 sought to introduce post-simulation modifications. The Class D CTA south of Parham (CTA 13 in Option 25) was removed to lessen the impact on the South Downs GC and without significant penalty on Farnborough ATS procedures.</p> <p>Additionally, the portion of Class D directly overhead Parham (CTA 12 in Option 25) was only 500ft in depth and was directly below and contiguous with the LTMA 14 Class A airspace above. As it was considered unlikely that Farnborough ATS would be able to provide a safe and expeditious service to VFR traffic requesting access to this small sliver of Class D airspace, it was considered but ultimately dismissed, that this sliver should be subsumed into the LTMA as Class A CAS and better rationalise the overall airspace structure. The removal of one CTA and the retention of another (in the Parham area) became Option 34, which then became the final iteration and the CAS option that was submitted to the CAA as the formal TAG Farnborough ACP.</p> <p>Following a fact-finding meeting with representation of the South Downs Gliding Club (SDGC), it was considered that the introduction of Class D CTAs would impact on the SDGC operation and in particular, the SDGC cross-country gliding activities. It was identified that more effective dialogue was required between the sponsor and other airspace users to better understand each other's requirements and agree to mutually agreeable access arrangements.</p>
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¹ See Annex D Consultation Assessment

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Airspace Regulation reviewed additional material provided by other airspace users, outwith the normal CAP 725 ACP Stage 5 requirements and after the Stage 4 consultation had concluded, either via a series of meetings facilitated by the Manager of Future Airspace or directly. This review provided consideration of the airspace elements in the documents provided to the CAA, to explore ways of providing flexible access for GA users to the proposed airspace structure being proposed by TAG Farnborough.

Revised Airspace Design dated 20 December 2016

Airspace and route design

Both options proposed in this document consist of a slightly smaller CTR, with CTR2 replaced by a CTA with a base of 1,500 feet amsl, retention of CTA1 as it appears in Farnborough's proposal and CTA to the south of the airport with the same dimensions as CTA4 but extending south 6nm perpendicular to the runway at Farnborough.

Both options require an earlier turn to the south than in Farnborough's proposal and require aircraft to climb directly into the LTMA to remain within CAS.

Both options for Runway 06 use the departure route proposed in Farnborough's proposal before it joins the departure route to the south. It is unclear from the document if the Revised Airspace Design proposal aims to retain this easterly departure route as an RNAV1 SID or as an NPR/PDR.

For both options, it is stated that there may need to be an intermediate stop altitude on the departures to avoid conflict with the LTMA traffic above. This is described in the Revised Airspace Design as being a proposal that is made "*without knowledge of any special arrangements between Heathrow and TAG/NATS Farnborough*".

CAA case officers' assessment: Farnborough's design has been influenced by both its own impact on GA operations as well as the interactions with Heathrow and Gatwick procedures in the LTMA, as can be seen through the development of successive options. Extensive simulation was undertaken by NATS Terminal Control and Farnborough to determine the placement of the proposed routes with regard to Farnborough and NATS Terminal Control's current requirements, while attempting to balance the impact on other airspace users below the LTMA.

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It is unlikely that the proposed departure routes described in this Revised Airspace Design would be able to be accepted by both Farnborough and NATS Terminal Control as feasible, due to the likely impacts they would have on LTMA traffic. This would also be the case for arriving traffic as the Revised Airspace Design advocates increased use of the LTMA.

Today's LTMA traffic levels are becoming increasingly demanding and the introduction of the SAIP AD1 airspace change has recently been approved that will help to better manage traffic flows through the introduction of a partly systemised RNAV1 airspace design. The anticipated increased traffic levels however, associated with an additional runway, will seek to prioritise the LTMA flight levels which will further restrict access to other units' IFR traffic demands.

North/South Transit

The document proposes a low-level VFR corridor to allow GA traffic to transit the area without an ATC clearance. The proposed solution in the document is for the reclassification of a portion of the London CTR, south of a line from Woolley NDB to the Ockham VOR, surface to 2,000 feet amsl to Class G airspace; The "Bagshot Gap".

CAA case officers' assessment: Farnborough consulted on a slightly different "Bagshot Gap", in which the airspace remained part of the London CTR but the ATS in that portion of the London CTR would have been delegated to Farnborough. Farnborough decided against taking the proposal forward as, after simulations, it was observed that it actually meant a reduction in the available capacity for dealing with VFR traffic in that area.

The concept of a Class G VFR corridor is potentially a viable option for future consideration. However, its size and shape could only be modelled once detailed stakeholder requirements are ascertained through sponsor and other airspace users' collaboration, together with local parishioners. It would also require considerable analysis work to ascertain the likely impact on non-aviation stakeholders on the ground, Heathrow traffic, and helicopter route H3 as well as other off-route helicopter traffic, VFR traffic passing through the London CTR via Burnham/Ascot, Fair Oaks traffic as well as Farnborough. That is consideration of this idea would need to follow a full ACP process and could not be taken forward as a revision to the proposal put forward in this ACP.

Southdown Gliding Club letter dated 27 December 2016

The letter from Southdown Gliding Club was similar to the airspace design that was detailed in the Revised Airspace Design.

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	<p>The main difference was a depiction of a “Better Way for All”, which included a new arrival route to the west of the arrival route proposed by Farnborough.</p> <p>CAA case officers’ assessment: The new arrival route would remain within the LTMA for longer, producing the same issues of interaction with other LTMA IFR traffic and also, may interact in an unsafe manner with the proposed departure procedure in the Revised Airspace Design.</p> <p>FASVIG R/T loading and traffic presentation 12 April 2017</p> <p>FASVIG presented a tool they had developed which would allow sponsors of airspace changes to assess likely impacts of proposals on GA traffic flows and R/T loading.</p> <p>CAA case officers’ assessment: It was agreed by the CAA that this ‘tool’ could be a very useful means to assess the impact of other airspace users on the local environment. However, the potential cost to airspace sponsors of using it may be too high and those aerodromes that could afford the system were likely to be able to obtain similar information from their own noise and track-keeping systems. The regional CAA ATS inspector was very interested in the R/T loading ‘tool’ but also mentioned that as part of the ongoing oversight and regulation of ATS units, assessment of resource requirements was an essential part of his work so the issues that might be identified by the ‘tool’ were also likely to be identified through ongoing regulation.</p> <p>When taking into consideration the options submitted by the sponsor and taking account of the alternative solutions put forward by other airspace users, the Option 38 proposed is therefore considered a viable option.</p>
1.4	<p>Is the justification for the selection of the proposed option sound and acceptable?</p> <p style="text-align: right;">YES</p> <p>The initial consultation identified that the volume of controlled airspace that was originally envisaged as being required, had a significant impact on other airspace users and would have created potential critical choke points for GA operations. TAG Farnborough therefore instructed their Consultants to undertake further work to seek more acceptable solutions. As indicated at 1.3, the series of options since completion of the Consultation stage, has resulted in a wholly revised airspace structure that has reduced the volume of CAS required by 32% and this has in part been achieved by managing the interaction with Heathrow and Gatwick traffic departures in a different way to</p>

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	<p>reduce proposed controlled airspace required and thereby the impact on GA operations without changing the extant operations of the two London airports.</p> <p>The justification is acceptable</p>	
2.	Airspace Description and Operational Arrangements	Status
2.1	Is the type of proposed airspace clearly stated and understood?	YES
	TAG Farnborough is seeking to introduce RNAV1 SIDs (departures) and STARs (arrivals) and utilise a conventional RNAV5 STAR via PEPIS. These procedures will be wholly contained either within extant LTMA airspace or at lower altitudes, in a new CTR and a series of contiguous CTAs.	
2.2	Are the hours of operation of the airspace and any seasonal variations stated and acceptable?	YES
	The operational hours of the TAG Farnborough CTR and CTAs' controlled airspace are planned as follows: Weekday 0700-2200; Weekend/PH 0800-2000; all times Local. The airspace will not be activated on 25 th /26 ^h December and will therefore remain as Class G airspace.	
2.3	Is any interaction with adjacent domestic and international airspace structures stated and acceptable including an explanation of how connectivity is to be achieved? Has the agreement of adjacent States been secured in respect of High Seas airspace changes?	YES
	<p>The proposed airspace design is within the lateral dimensions of London TMA CAS and has no interaction with either international airspace structures or High Seas airspace.</p> <p>The proposed new CTR and CTAs lie beneath and are contiguous with the LTMA Class A CAS. The connectivity enables containment of the new arrival and departure RNAV procedures and the extant Heathrow, Gatwick and Southampton airport's procedures are not compromised by the introduction of the proposed Farnborough SIDs and STARs.</p>	

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	Although simulation of proposed new procedures was undertaken to satisfy anticipated traffic flows was completed in 2015, the resolution of coordination procedures required to satisfy inter-Unit arrangements was put on hold until the resolution of the potential conflict identified within the CONOPS and classified as a Level B risk. This procedural conflict was between Farnborough arrivals from the south against Gatwick westerly departures on a KENET SID. The modification to the Farnborough VEXUB southerly arrival ensured that the conflict was satisfactorily resolved.	
2.4	Is the supporting statistical evidence relevant and acceptable?	YES
	As detailed in the public Farnborough Consultation Feedback Report Part B, Appendix B, the extrapolated figures for 2019 figures predict traffic levels for Farnborough airfield to have an annual total of 32,000 movements. Appendix B then broke down these figures into an average hourly number for each runway and altitude bands.	
2.5	Is the analysis of the impact of the traffic mix on complexity and workload of operations complete and satisfactory?	YES
	The mix of traffic operating in and out of Farnborough is varied from small turbo-prop up to mid-sized airliner corporate jet. It is made complex today by the lack of a known traffic environment due to wholly operating in Class G uncontrolled airspace. The introduction of Class D for the CTR and CTAs, which is not transponder mandatory, will provide a known traffic environment. However, although by definition less complex, the increase workload anticipated through increased volume of radio telephonic calls will have to be resourced and managed by Farnborough ATC to accommodate other airspace user's requirements.	
2.6	Are any draft Letters of Agreement and/or Memoranda of Understanding included and, if so, do they contain the commitments to resolve ATS procedures (ATSD) and airspace management requirements?	YES
	It is anticipated that Letters of Agreement (LoAs) will be finalised before planned implementation currently understood to be in Winter 2019. Although generic access to the proposed new airspace structures will be in accordance with the conditions associated with Class D CAS, additional access arrangements will be required to be included in bilateral LoAs to accommodate airspace users with limited CNS equipage. It is anticipated that until advances in surveillance conspicuity interoperability with safety systems is realised, gliders and sailplanes that are not equipped with transponders will need to be accommodated through access arrangements based on radio telephony (R/T) equipage.	

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2.7	<p>Should there be any other aviation activity (low flying, gliding, parachuting, microlight site etc.) in the vicinity of the new airspace structure and no suitable operating agreements or ATC Procedures can be devised, what action has the sponsor carried out to resolve any conflicting interests?</p>	ONGOING
	<p>Farnborough ATC has liaised with several airspace user groups to identify how to manage their requirements. The establishment of Class D CTAs will impact on other airspace users, particularly glider activity from Lasham and South Downs gliding clubs. The introduction of pure Class D CAS will not mandate carriage of transponders in gliders, although those that are equipped are recommended to operate the functionality. Gliders not equipped with transponders will not be expected to retrofit but will be expected to adhere to the conditions of access through operation of radio and the introduction of bespoke phraseology approved by SARG.</p> <p>The introduction of LoAs to accommodate some activities has been considered and it is anticipated will be introduced to manage the tripartite requirements of activities in the RAF Odiham area, particularly CTA's 2 and 3. Additionally, as indicated in 2.6 above, other gliders and sailplanes not transponder equipped will be provided access and clearance via R/T, and detailed in the relevant LoA. It is anticipated that to realise the fair and equitable access arrangements glider user groups will sign up to anLoA.</p>	
2.8	<p>Is the evidence that the Airspace Design is compliant with ICAO SARPs, Airspace Design & FUA regulations, and Eurocontrol Guidance satisfactory?</p>	YES
	<p>The original ACP that was delivered to the CAA was compliant with ICAO SARPs, but the airspace design did not satisfy some of the criteria identified in the CONOPS document. The proposed VEXUB arrivals from the south procedurally conflicted with westerly departures from Gatwick on a KENET SID.</p> <p>The revised SID design satisfactorily deconflicted the procedures and again, was fully compliant with ICAO SARPs.</p>	
2.9	<p>Is the proposed airspace classification stated and justification for that classification acceptable?</p>	YES
	<p>The proposed airspace classification for both the CTR and CTAs is Class D. Class D CAS is not mandatory transponder airspace and therefore provides options from the controlling authority's perspective regarding access arrangements for other airspace users with limited compliance capabilities.</p>	

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2.10	<p>Within the constraints of safety and efficiency, does the airspace classification permit access to as many classes of user as practicable?</p> <p>The choice of Class D over Class E+ TMZ can adequately accommodate gliders and in particular, cross-country activities due to the conditions of access associated with Class D CAS, whereby a clearance can be obtained via carriage of radio if not transponder equipped.</p>	YES
2.11	<p>Is there assurance, as far as practicable, against unauthorised incursions? (This is usually done through the classification and promulgation)</p> <p>Unauthorised incursions should be mitigated through both the classification of the airspace and the additional access arrangements to be introduced to accommodate other airspace users. The anticipated introduction of CAS has become a focal point in GA forums and as such, the promulgation of the airspace structural dimensions is probably familiar to most user groups. As Farnborough ATC will become the controlling authority for the new volumes of Class D CAS, it will need to continue work with local aviation groups to ensure positive dialogue is generated and maintained to achieve mutually acceptable activities are maintained.</p>	YES
2.12	<p>Is there a commitment to allow access to all airspace users seeking a transit through controlled airspace as per the classification, or in the event of such a request being denied, a service around the affected area?</p> <p>There is a commitment to provide access to other airspace users through the provision of either a procedural clearance or a radar service, both from Farnborough ATC. Glider transits without transponder capabilities will be provided access and clearance via radio equipage.</p>	YES
2.13	<p>Are appropriate arrangements for transiting aircraft in place in accordance with stated commitments?</p>	ONGOING

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	<p>Farnborough stated from the beginning that in accordance with the proposed airspace classification to be introduced, it would meet the demand imposed on controller resource by the anticipated increased traffic levels. Farnborough has since provided evidence that both advances in ATS technology and controller positions within the operations room are equipped to meet these demands. TAG will therefore need to increase the controller resource to meet the demand. Farnborough will be required to record and report on instances of refusals of crossing clearance to requesting VFR transit aircraft.</p>	
2.14	Are any airspace user group's requirements not met?	NO
	<p>This change proposal has generated much debate, it is clear that for some stakeholders a decision to approve any element will never be seen to satisfy their needs. i.e. those that vehemently oppose it. It is considered that the majority of airspace user groups' needs can be accommodated either through adherence to conditions associated with the airspace classification or through specific requirements collaborated on and included in either a bilateral or tripartite LoA.; potentially with the CAA as third-party overseer.</p> <p>It is a primary objective of the decision to ensure that the perceived funnelling effect and resulting choke points issues articulated clearly by GA user groups, are satisfactorily addressed by either the classifications (Class D or Class E with TMZ) of the new airspace structure or by Farnborough ATC consistently integrating VFR and IFR within the Class D, providing either an ATS or a VFR transit clearance to all airspace users that require access to any new airspace structure.</p>	
2.15	Is any delegation of ATS justified and acceptable? (If yes, refer to Delegated ATS Procedure).	N/A
	<p>There are no delegated ATS procedures or airspace structures associated with this airspace change.</p>	
2.16	Is the airspace structure of sufficient dimensions with regard to expected aircraft navigation performance and manoeuvrability to contain horizontal and vertical flight activity (including holding patterns) and associated protected areas in both radar and non-radar environments?	YES
	<p>The structure design and dimensions look to offer sufficient airspace to allow safe navigation within the volumes specified. With the controlling authority utilising radar derived data regarding holding areas, this allows an extra level of protection for all users. Breaches of containment policy have been subject to specific risk assessment.</p>	

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2.17	Have all safety buffer requirements (or mitigation of these) been identified and described satisfactorily (to be in accordance with the agreed parameters or show acceptable mitigation)? (Refer to buffer policy letter).	YES
	The design has factored in numerous users' operations and designated a controlling authority within complex areas meeting the existing buffer policy.	
2.18	Do ATC procedures ensure the maintenance of prescribed separation between traffic inside a new airspace structure and traffic within existing adjacent or other new airspace structures?	YES
	The complexity of the surrounding areas has been addressed with robust procedures designed and tailored to meet the separation requirements.	
2.19	Is the airspace structure designed to ensure that adequate and appropriate terrain clearance can be readily applied within and adjacent to the proposed airspace?	YES
	The local topography and airspace design are balanced and therefore eliminate any terrain clearance concerns for either aircraft operating within or routeing clear of the new CAS	
2.20	If the new structure lies close to another airspace structure or overlaps an associated airspace structure, have appropriate operating arrangements been agreed?	ONGOING
	Contiguous with the overlying London TMA, the new Farnborough procedures are in the main contained within the lateral and vertical parameters of the proposed new CTR and CTAs. However, an airspace sharing FUA arrangement with Heathrow will be introduced to enable Farnborough to use the lower altitudes within the TMA when the airspace is not required for Heathrow departures. Farnborough ATC will have permanent direct feed to the Heathrow electronic flight progress (EFPS) strip information to enable them to actively deconflict their arrival procedure to runway 24. This project is in progress and will be finalised and the compatible system introduced in 2018	
	Any failure of the EFPS system will automatically deny access to Farnborough arrivals, thereby mitigating any safety concerns.	

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2.21	Where terminal and en-route structures adjoin, is the effective integration of departure and arrival routes achieved?	YES
	Departing and arriving traffic integration is achieved by delegation to a controlling authority and through airspace design.	
3.	Supporting Resources and CNS Infrastructure	Status
3.1	Is the evidence of supporting CNS infrastructure together with availability and contingency procedures complete and acceptable? The following are to be satisfied:	
	<ul style="list-style-type: none"> ▪ Communication: Is the evidence of communications infrastructure including RT coverage together with availability and contingency procedures complete and acceptable? Has this frequency been agreed with CNS&S? 	YES
	The designated operational coverage (DOC) plots provided for both frequencies confirm that the Farnborough ATS radio telephony coverage is satisfactory for 134.350MHz and 130.050MHz antennae at the proposed new controlled airspace base levels.	
	<ul style="list-style-type: none"> ▪ Navigation: Is there sufficient accurate navigational guidance based on in-line VOR or NDB or by approved RNAV derived sources, to contain the aircraft within the route to the published RNP value in accordance with ICAO/Eurocontrol Standards? Eg. Navaids – has coverage assessment been made eg. a DEMETER report, and if so, is it satisfactory? 	YES
	Performance based navigation (PBN) RNAV1 and RNAV5 capability together with a requirement to manage transient traffic requirements using ground-based aids, is satisfactory.	
	NATS en-route ground-based navigational aids provide fully redundant DME/DME position-fix capability to all areas of the proposed STARs ending at VEXUB. This therefore supports the RNAV1 specification	
	NATS en-route ground-based navigational aids provide fully redundant VOR/DME and DME/DME position-fix capability to all areas of the new Farnborough STARs ending at PEPIS. This therefore supports the RNAV 5 specification	
	In addition, the requirement for carriage of an inertial system with runway auto-updating capabilities must be applied to all non-GNSS aircraft flying a Farnborough SID. This will be included on the new SID chart in the AIP.	

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	<ul style="list-style-type: none"> ▪ Surveillance: Radar Provision – have radar diagrams been provided, and do they show that the ATS route / airspace structure can be supported? 	YES
<p>Farnborough ATS uses an ASR10, PSR (up to 40nm range) and has direct feeds from both the Heathrow 10cm (up to 60nm range) and the en-route Pease Pottage radar to provide the SSR feeds.</p> <p>The combination of radars allows for 3nm separation standards providing aircraft are identified (known), operating below FL195 and is within 40nm of the Farnborough ASR10 PSR head.</p>		

3.2	Where appropriate, are there any indications of the resources to be applied, or a commitment to provide them, in line with current forecast traffic growth acceptable?	ONGOING
TAG Farnborough have committed to an increase in controller resource to manage the anticipated increased R/T workload.		

4.	Maps/Charts/Diagrams	Status
4.1	<p>Is a diagram of the proposed airspace included in the proposal, clearly showing the dimensions and WGS84 co-ordinates? (We would expect sponsors to include clear maps and diagrams of the proposed airspace structure(s) – they do not have to accord with AC&D aeronautical cartographical standards (see CAP725), rather they should be clear and unambiguous and reflect precisely the narrative descriptions of the proposals. AC&D work would relate to regulatory consultation charts only).</p>	YES
<p>The public consultation material clearly identified to all stakeholders the exact airspace structures proposed by TAG Farnborough. As the airspace design has evolved and been modified, the detail provided to both the CAA and other stakeholders has been clear and unambiguous.</p> <p>The supporting WGS84 evidence has been accurate for both airspace and the new instrument flight procedures.</p>		

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4.2	Do the charts clearly indicate the proposed airspace change?	YES
	The charts submitted for each of the airspace change versions throughout the process have been comprehensible.	
4.3	Has the Change Sponsor identified AIP pages affected by the Change Proposal and provided a draft amendment?	YES
	Yes	
5.	Operational Impact	Status
5.1	<p>Is the Change Sponsor's analysis of the impact of the change on all airspace users, airfields and traffic levels, and evidence of mitigation of the effects of the change on any of these, complete and satisfactory? Consideration should be given to: a) Impact on IFR GAT, on OAT or on VFR general aviation traffic flow in or through the area.</p>	YES
	<p>The post-Consultation analysis clearly indicated that Option 25 was considered to have a significant impact on GA operations, particularly gliding activities at both South Downs GC (Parham) and Lasham.</p> <p>The modified airspace change proposal (Option 34) and revised controlled airspace structure that was submitted as the TAG Farnborough ACP, reduced the volume of CAS by 32% on that of Option 25, and sought to reduce the impact on GA activities. However, the General Aviation Alliance raised concerns that the proposed controlled airspace structure would still result in choke points for generic GA activities southwest of Farnborough. The choke points would be evident if GA activities chose to remain clear of the proposed CAS. The key points therefore are based on Farnborough ATC providing fair and equitable access to the new CAS to enable core GA activities to continue.</p> <p>The CONOPS identified a procedural conflict between the southerly arrivals to Farnborough with Gatwick heavy westerly departures on a KENET SID. This resulted in a revision to the alignment of the VEXUB STAR, which was Consulted on (Option 36) between August and November 2016. TAG Farnborough published Feedback Report Part C on 14th December 2016, which clearly articulated what subsequent changes were made and the justification for the changes to the airspace structure. This change was titled Option 38 and only modified the airspace to the south, detailed in Feedback Report Part C</p>	

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	<p>From an operational impact perspective, Class D CAS is fundamentally not transponder mandatory and access to the proposed Farnborough CTR and CTAs can therefore be gained in accordance with the conditions of the airspace classification laid down in the AIP. TAG Farnborough has worked with local GA airspace user groups to understand their activities, concerns and their access requirements. The CAA convened a series of meetings with all GA stakeholder groups and Farnborough to resolve outstanding issues, specifically regarding equitable access arrangements. Although limited in resolution of these key issues, there is now an understanding from all stakeholders perspective that any new airspace has to accommodate all user's needs and balance the sponsor's IFR requirements and its concerns regarding the safety risk associated with provision of service to IFR operations in a busy Class G environment, against that of GA stakeholder needs and reasonable access to any new airspace structures.</p> <p>Local procedures and CAA exemptions (pending the final CAA Class E policy) will need to be developed and implemented to remove the need for controllers to inform IFR aircraft that they are transiting from one controlled airspace classification to another, thereby reducing radio/telephony transmissions and controller workload.</p>	
	b) Impact on VFR Routes.	YES

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	<p>There are no specific VFR routes affected by the proposed new CTR and CTAs. Farnborough ATC will however be required to continue to maintain constructive dialogue with local airspace users with regards to preferred VFR routeings close to and through the proposed CTR.</p> <p>Specific access arrangements for local airspace users will be afforded by means of an ATC clearance issued by either Farnborough ATC or London Terminal Control on behalf of Farnborough. A summary of perceived CTA access arrangements is as follows:</p> <p>The base of CTA-1 has been vertically defined in order to facilitate Fairoaks inbound and outbound traffic without requirement for a clearance</p> <p>CTA-2 and CTA-3 both encompass certain elements of the existing RAF Odiham operation. To enable Farnborough and Odiham operations to integrate safely and effectively, LoA measures have been agreed in draft, with simulation of operational procedures having been successfully completed. Additional airspace sharing can be provided by replicating the current arrangement with Kestrel Gliding Club (Kestrel GC) based at RAF Odiham. This arrangement has identified an area within these CTAs and a small part of CTA-6 referred to as the 'The Eye' , with VFR traffic operating autonomously up to 4000ft. Although this arrangement has been designed to accommodate RAF Odiham and Kestrel GC, the airspace could also provide additional autonomous access to other gliding clubs subject to airspace arrangement being collaborated with Odiham and Kestrel GC.</p> <p>Although access to all other CTAs will be afforded by means of a clearance from Farnborough ATC, TAG Farnborough remain committed to providing equitable access to all other airspace users and remain open to continued discussions on how to reasonably accommodate these GA user groups.</p>								
	<table border="1" style="width: 100%;"> <tr> <td style="width: 85%;">c) Consequential effects on procedures and capacity, ie on SIDS, STARS, holds. Details of existing or planned routes and holds.</td> <td style="text-align: center; background-color: #92d050;">YES</td> </tr> <tr> <td colspan="2"> <p>There is no specific capacity issue associated with this proposed change. New RNAV SIDs and STARs contained within Class D CAS will replace conventional radar vectoring procedure used today in the uncontrolled airspace environment. The new procedures will be more efficient and provide better climb and descent profiles.</p> </td> </tr> <tr> <td>d) Impact on Airfields and other specific activities within or adjacent to the proposed airspace.</td> <td style="text-align: center; background-color: #92d050;">YES</td> </tr> <tr> <td colspan="2"> <p>There are GA airfield activities in the area that are potentially affected by the proposed new CAS structure. Lasham Gliding Society (LGS) gliding activities are impacted by the proposed changes, especially when Farnborough are operating on runway 06. When both airfield are operating on their easterly runways, Lasham believe that the current practice works safely and satisfactorily. The introduction of Class D</p> </td> </tr> </table>	c) Consequential effects on procedures and capacity, ie on SIDS, STARS, holds. Details of existing or planned routes and holds.	YES	<p>There is no specific capacity issue associated with this proposed change. New RNAV SIDs and STARs contained within Class D CAS will replace conventional radar vectoring procedure used today in the uncontrolled airspace environment. The new procedures will be more efficient and provide better climb and descent profiles.</p>		d) Impact on Airfields and other specific activities within or adjacent to the proposed airspace.	YES	<p>There are GA airfield activities in the area that are potentially affected by the proposed new CAS structure. Lasham Gliding Society (LGS) gliding activities are impacted by the proposed changes, especially when Farnborough are operating on runway 06. When both airfield are operating on their easterly runways, Lasham believe that the current practice works safely and satisfactorily. The introduction of Class D</p>	
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CAS close to Lasham would however create a narrow Class G uncontrolled airspace corridor approximately half its present size. Lasham considers this would cause a choke point with Lasham on one edge and the area where Lasham GC generally operate, situated right in the centre of the reduced area of Class G airspace and thereby potentially increasing the risk of GA operators conflicting with each other. To lessen the impact on Lasham GC activities, Farnborough ATS has been working on introducing an area within CTAs 2/3, referred to as the Odiham 'eye', detailed in paragraph 5.1b.

The initial design which was consulted upon, Option 25, had a perceived significant impact on LGS activities which was lessened by the revised proposal submitted to the CAA, Option 34. Option 34 reduced the amount of CAS required to satisfy containment of the Farnborough IFR procedures. The interaction with both IFR and VFR requirements for RAF Odiham operations and the affiliated gliding clubs, Kestrel and 618VGS, has been coordinated through agreed procedures that are included in a revised letter of agreement (LoA). An area referred to as the 'Eye' and within the volume of new CAS, has been delegated up to 4000ft on the Farnborough QNH, which would also accommodate LGS activities through an additional signatory to the revised LoA. The LoA would become tripartite and would identify the fundamental requirement to provide fair and equitable access to these VFR operators.

Southdown Gliding Club (SDGC) is based at Parham airfield to the south of Farnborough. The original consulted proposal and the revised proposal submitted to the CAA introduced airspace in the vicinity of the airfield, below the extant LTMA. The subsequent revision required to address the issues identified in the CONOPS document with the conflict of southerly arrivals to Farnborough and slow Gatwick westbound departures, resulted in the co-located airspace being reduced in volume but the CTAs to the north and northwest potentially becoming an increase problem to SDGC cross-country operations.

To provide generic mitigation on all GA affected traffic, the option of introducing Class E+TMZ airspace was dismissed and the preferred option of Class D was maintained. As mentioned at 5.1a above, Class D is not transponder mandatory airspace and can accommodate other airspace user's access through a clearance with either a transponder and radio, or just radio. To satisfy these technologically limited GA activities, Farnborough ATC will provide access and clearance as required to these airspace users, with reasonable flexibility afforded to gliders requesting access to the CTAs, due to their limited capabilities. Farnborough will therefore need to plan and if necessary, sequence its IFR departures through CTA-8 to deconflict any non-SSR VFR transit traffic, on a clearance, before a handover of the IFR traffic to London TC sector controller can be completed.

The CONOPS identified a safety risk which resulted in the ACP (Option 34) being modified and known as Option 36. Option 36 realigned the southerly VEXUB arrival to mitigate the safety risk, which meant that the CTAs were either removed or in the case of CTA-7, enlarged.

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	<p>The modified CTA-7 was considered to have too much of an impact on glider activities in and out of Parham, so was again modified and reduced in size (Option 38) to try and lessen this impact.</p> <p>It is considered that CTA-8 and CTA-7 still impact on the recovery of the cross-country gliding operations to Parham and although the glide angle remaining clear of the new CAS could be managed in ideal conditions, there is no guarantee that the likelihood of a non-airfield landing can be mitigated.</p>	
	<p>e) Any flight planning restrictions and/or route requirements.</p>	YES
	<p>Although it is anticipated there will be no flight-planning restrictions, Farnborough ATC and NATS TC controller training planned for next year will provide greater clarity and identify whether there is a need consider fundamental flight-planning restrictions.</p>	
5.2	<p>Does the Change Sponsor Consultation letter reflect the likely operational impact of the change?</p>	YES
	<p>Following completion of the post-Consultation analysis, TAG Farnborough produced an Airspace Consultation Feedback Report Parts A and B. Part A was produced relatively quickly after completion of the Consultation stage and detailed the analysis of all the responses received during the consultation.</p> <p>Part B identified to all stakeholders the new design that was to be submitted to the CAA as the TAG Farnborough ACP. This was put into the public domain on the same day as the ACP was delivered to the CAA, 3 Jul 15.</p> <p>Part C was an analysis of the additional consultation undertaken between August and November 2016, which was a requirement to offset the VEXUB arrival from the south to satisfactorily deconflict the Gatwick westerly departures on a KENET SID.</p>	

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6.	Economic Impact	Status
6.1	<p>Is a provisional economic impact assessment to all categories of operations and users likely to be affected by the change included and acceptable? (This may include any forecast capacity gains and the cost of any resultant additional track mileage).</p> <p>The TAG Farnborough Feedback Report Part B, Section 12, identified the perceived economic themes and issues raised during formal Consultation. The TAG Farnborough response to these points and mitigation of the issues is detailed in this public document.</p>	NO

Case Study Conclusions – To be completed by SARG Project Leader		Yes/No
<p>Has the Change Sponsor met the SARG Airspace Change Proposal requirements and Airspace Regulatory requirements above?</p> <p>TAG Farnborough has adhered to the airspace change process and has met the regulatory requirements identified in previous sections</p>		YES
Outstanding Issues		
Serial	Issue	Action Required
1	Heathrow air traffic departure information	Establishment of the Heathrow EFPS feed in the Farnborough ATC radar approach room

Additional Compliance Requirements (to be satisfied by Change Sponsor)	
Serial	Requirement

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1	Continued dialogue with GA airspace users groups and finalisation of LoA material if required
2	Increase in Farnborough ATC controller resource to manage the increased ATS task
3	Farnborough ATC to recognise and manage the implications of the CAA mandated change in airspace classification requested in CTAs 8 & 9, from Class D to Class E+ TMZ

Recommendations	Yes/No
Is the approval of the SoS for Transport required in respect of the Environmental Impact of the airspace change?	NO
No	
Is the approval of the MoD required in respect of National Security issues surrounding the airspace change?	NO
No	
General Summary	
<p>The TAG Farnborough airspace change proposal set out the proposals for airspace and route changes in the vicinity of Farnborough airport. The objective was to introduce a new operating environment with RNAV1 SIDs and STARs contained within controlled airspace, in the form of a CTR and a series of CTAs. The aim was to improve the efficiency of the Farnborough IFR operation by creating a known traffic environment, which would help address some of the Unit's safety concerns associated with operating commercial aircraft in Class G uncontrolled airspace.</p> <p>The final proposal submitted to CAA for a decision was Option 34 as set out in ACP v1.0. This option was revised by the airspace design in TAG Farnborough's Consultation Feedback Report C (Option 38), which would indicate there were several versions of design options that were considered either unsuitable for the local environment, excessively constrained other airspace user's activities, or were operationally inefficient from a TAG Farnborough commercial perspective.</p> <p>The proposed airspace design may have an impact on other airspace user's activities if GA users are reluctant to request access to the new airspace in accordance with either the conditions of airspace classification or in accordance with detail identified in a LoA, specifically glider operations from Parham and Lasham airfields. The collaboration between sponsor and other airspace users has been long and drawn out and has</p>	

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not been entirely successful. To that end, the CAA sought to introduce an independent intermediary chaired by a member of the CAA FAS team to help facilitate discussions designed to deliver mutually acceptable operating arrangements for both Farnborough and GA activities.

Comments

The Department for Transport Air Navigation Guidance 2017; Annex D: The Civil Aviation Authority (Air Navigation) Directions 2017, indicates in section 5(2); Proposed permanent change to airspace design, the CAA may make its approval of a proposal subject to such modifications and conditions as the CAA considers necessary.

Specifically regarding the Farnborough airspace change proposal, it is considered practical to expect that when ADS-B surveillance becomes interoperable with the Airborne Collision Avoidance System (ACAS) and the ANSP ground based ATS system, the policy regarding conditions of access for other airspace users would be reviewed to better accommodate ADS-B equipped aircraft within controlled airspace.

Observations

The original Farnborough ACP Framework Briefing took place in 2013. Over 4 years down the line, this airspace change has raised significant comment at all levels with both aviation and non-aviation stakeholders. The political element has been evident throughout, with numerous stakeholders engaging with their MPs to elevate the significance of their concerns.

The modification to the original consulted upon option was definitely required, as the design and volume of airspace was in excess of the requirements as stated in the Transport Act's CAA's Statutory Duties and airspace required being only that which is required – in this case, to contain the new IFR RNAV1 and RNAV 5 procedures.

The combination of Option 34 (the reworked design following consultation on Option 25) and Option 38 (required to modify the southerly VEXUB arrival) is a reasonable option in that the design satisfies the regulatory requirements required of the CAA in conforming with its statutory duties.

The sponsor has been willing to engage with stakeholders throughout the process and willingly contributed to the CAA's Facilitation meetings with other aviation stakeholders to try and seek workable and safe access arrangements within the proposed new airspace structure. Although the result of the meetings was not altogether satisfactory, it is now incumbent on Farnborough ATC and GA user groups to finalise a workable arrangement detailed in LoAs for both Lasham and Parham operations. The implementation of the new airspace will not be contingent on these LoAs, as VFR

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access with or without transponder equipage is available in Class D CAS. However, primacy of access at specific times would be better served through the introduction of bilateral operational LoAs for both Lasham and Parham based gliders and their typical operation.

When surveillance conspicuity is more advanced and fully interoperable with ACAS safety systems and the ANSP ground based radar operation at Farnborough, the fundamental conditions of access within a controlled airspace environment should be examined with regards to identifying that which provides a safe and expeditious capability to all airspace users that can comply with a surveillance mandatory environment.

Operational Assessment Sign-off/Approvals

	Name	Signature	Date
Operational Assessment completed by [REDACTED]	[REDACTED]	[REDACTED]	01.12.2017
Operational Assessment approved by [REDACTED]	[REDACTED]	[REDACTED]	12.01.2018

TAG Farnborough have applied and followed both the DfT's 2014 Environmental Guidance and the CAA's Airspace Change Process well. They have listened to the feedback gained through consultation, willingly engaged with multiple stakeholders and acted on this as far as they felt they could within their objectives. The CAA Case Officer and all the CAA staff involved have undertaken a robust and detailed analysis. I agree that Farnborough TAG have made the case to introduce Controlled Airspace (CAS) to better manage their current IFR traffic to avoid significant detouring that currently occurs, as well as safely and efficiently facilitating any future growth. I agree with the proposed lateral and vertical boundaries and the proposed route structure. However, I don't agree with Farnborough TAG's dismissal of Class E within certain CTAs (9 and some/all of 8). I completely agree that Class E on its own will not provide the 'known' environment argued for by TAG. I accept that Class D does not require an associated TMZ to ensure it becomes a known environment. Class D does need an ATC clearance to enter, and this will on occasion be declined due to ATC workload, but I don't think given the articulated intensity of the Farnborough operation that this is a proportionate requirement for access to CTAs 8 and 9 to offset a lack of a transponder. I do think that Class E, in CTA 9 and some/all of CTA 8, with an associated TMZ (Class E + TMZ), will provide the desired known environment for both Farnborough and Terminal Control (TC) at Swanwick.

I note it was anticipated that the proposed change be supported by LoAs to enable non-transponder, but radio equipped South Downs' gliders to easily access it for a return to their Parham base but that these have not been agreed to date. Nonetheless, I note the offer of access to airspace in

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TAG Farnborough's letter to CAA dated 4 Sept 2017. Additionally, the Class E + TMZ will facilitate itinerant, autonomous operation of VFR transponder equipped aircraft within its volume, but these will be visible to both Farnborough and TC. From a Farnborough perspective, this is better than the current Class G based operation. Non-transponder equipped VFR aircraft will still be able to call for access to the Class E + TMZ CTAs.


Ongoing CAA Class E related policy work will need to be concluded (Mandate for 'Rationalisation of procedures associated with Class E airspace'), plus Farnborough and TC will, as with any change to airspace design, need to work up a training plan (TC en-route controllers in particular are not used to VFR interactions inside CAS) and interface arrangements. I accept there will be added complication for both units, but I don't think this is a reason not to use a legitimate ICAO classification and better facilitate other airspace users. Manager AR.

Case Study Sign-off/Approvals

	Name	Signature	Date
Case Study Assessment Conclusions approved by [REDACTED]	[REDACTED]	[REDACTED]	28.02.18

This Airspace Change Proposal has been challenging and controversial for all parties. It has been a protracted and heated debate with modification and compromise. The Consultation was particularly challenging for the sponsor given the strident responses from stakeholders. Equally for those potentially affected the various iterations of this proposal have represented significant contention. I am satisfied that the case is now made for controlled airspace to contain the RNAV SIDs and STARS. I endorse the comments of the Head of Section above, particularly the introduction of Class E + TMZ, to be clear I propose this for CTA 9 and the whole of CTA 8. I see no argument for segmenting CTA 8 as one of the options inferred by "Head of section" as this would add unnecessarily to the complexity of the proposal, also by all of CTA 8 being Class E + TMZ the ability to transit North-South is less limited by Class D. In conclusion: CTA 8 & 9 are thin volumes of Airspace, in both cases just 1000', large swathes of class G will continue to exist beneath them and beneath the vast majority of this proposal allowing other airspace users unfettered access.

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Gp Director SARG Comment/Approval		
Please see Decision Document (CAP 1678)		
Name	Signature	Date
Mark Swan		28.06.2018