

PROPOSAL
TO ESTABLISH
TRANSPONDER MANDATORY AIRSPACE
IN THE VICINITY OF
THANET OFFSHORE WINDFARM AND LONDON ARRAY

SPONSOR CONSULTATION DOCUMENT



MANSTON TMZ - SPONSOR CONSULTATION

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Executive Summary

In 2006 the Government granted conditional consent for the development of two major offshore windfarms, in the Thames Estuary approaches, known as the Thanet Offshore Windfarm (TOW) and the London Array (LA). Suspensive conditions relating to aviation were attached to the development consent to ensure that the development would not interfere with the safe provision of Air Traffic Services (ATS) by Manston Airport (MSE).

MSE is an Air Navigation Service Provider (ANSP) approved under Article 169 of the Air Navigation Order and, as such, must satisfy the CAA as to their competence to provide ATS and that these services are safe.

During 2007/08 MSE worked with a number of stakeholders, including the TOW and LA developers, BERR (as it then was), and the CAA (Directorate of Airspace Policy (DAP) and Safety Regulation Group (SRG)) to identify and agree, in principle, a mitigation which could be implemented in order to allow the suspensive conditions to be discharged and the windfarm developments to proceed. A number of options were explored, but the consensus settled on the mitigation outlined below.

The agreed mitigation comprises the following inter-dependent elements:

- The installation of a Mode S Secondary Surveillance Radar system (SSR) at MSE;
- Introduction of Transponder Mandatory Zone(s) (TMZ) covering the TOW and LA sites including, if appropriate, a buffer zone;
- MSE to be approved to provide radar services within the TMZ(s) using SSR alone;
- Blanking out the Primary Surveillance Radar (PSR) returns within the TMZ airspace.

The procurement process for the installation of Mode S SSR is underway. Accordingly, MSE can now commence the process for the establishment of Transponder Mandatory Airspace as envisaged by the mitigation and in accordance with the Airspace Change requirements specified by the CAA.

In meeting its statutory responsibilities for safety management of the ATS provided and in order to sustain an acceptable level of flight safety for aircraft inbound to or outbound from MSE in the critical stages of flight, or operating in Class G airspace in the vicinity of the

subject windfarm developments, MSE proposes to submit a case to the CAA to establish Transponder Mandatory Airspace in the vicinity of the two wind turbine developments.

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1 About this Consultation

1.1 What is this consultation about?

1.1.1 This consultation is about a proposal to establish Transponder Mandatory Airspace in the vicinity of two large offshore windfarms, the Thanet Offshore Windfarm (TOW) and the London Array (LA) off the Kent coast and in the Thames Estuary.

1.1.2 Manston Airport (MSE) management believes that the establishment of Transponder Mandatory Airspace is necessary to enable a radar service to be sustained through areas of intense radar clutter that will be generated by the wind turbines when they become operational. This is explained in detail, together with the options that have been considered, in the main text.

1.1.3 It is emphasised that the routes used routinely by aircraft flying to or from MSE, or in the vicinity of MSE, will not change. The proposed airspace change is intended to protect the day-to-day operation as it currently stands.

1.2 Why is the consultation being carried out?

1.2.1 The CAA requires that where a change to the airspace status or a significant change to procedures or the distribution of air traffic in the vicinity of an airport is proposed a consultation must be carried out by the airport operator concerned. It is the responsibility of the airport operator to consult with the airspace users who may be directly or indirectly affected by the change and with organisations representing those who may be affected on the ground by any environmental impact arising from the change.

1.2.2 This proposed airspace development is about adding additional aircraft operating requirements - the requirement to carry and operate a SSR transponder - to the specified portions of the airspace above the windfarm sites. There will be no change to procedures or to the general distribution of air traffic in the vicinity of MSE or to the categorisation of the airspace.

1.2.3 The CAA lays down its regulatory requirements and process for consultation in the Civil Aviation Publication (CAP) 725 "CAA Guidance on the Application of the Airspace Change Process". The CAA Policy Statement for the development of

Transponder Mandatory Zones (TMZ)¹ requires that such airspace developments must be carried out in accordance with the Airspace Change Process. This proposed airspace development and consultation is conducted in accordance with the CAA requirements.

- 1.2.4 The Sponsor Consultation, when carried out by the airport operator, enables the CAA to meet its obligations under the Transport Act 2000 and the Directions given to the CAA by the Secretary of State for Transport.
- 1.2.5 Fundamentally, this consultation will enable MSE to obtain or confirm views and opinions about the impact of the proposed airspace change.

1.3 Who is being consulted?

- 1.3.1 Generally, those consulted fall broadly into two groups: aviation consultees and non-aviation consultees. In the first case, the affected aviation parties comprise: airlines and other aircraft operators based at or using MSE; the operators of adjacent aerodromes; other local aircraft operators who may be affected by the change; and the national bodies representing all UK aviation interests who may be affected by the regulatory requirements within the TMZ.
- 1.3.2 In the second case, although the proposed change to the airspace lies overhead the windfarm developments which are wholly offshore and there are no changes to the way aircraft operate over land, MSE's neighbouring county (Kent, Essex), district and parish councils are being consulted. Certain specific environmental organisations are also to be consulted, as are the respective Windfarm Development Companies.
- 1.3.3 The Airport Consultative Committee (ACC), established under Article 35 of the Civil Aviation Act 1982, comprises organisations covering both aviation and non-aviation interests. Notwithstanding that the ACC and its constituent members, through its Chairman, have been kept informed throughout the development of this proposal, they will be registered as consultees.

¹ A TMZ is defined by the CAA as "a volume of airspace where aircraft wishing to enter or fly within the defined area will be required to have and operate secondary surveillance radar equipment" TMZs are notified for the purposes of Article 39(2) of the Air Navigation Order 2010

1.3.4 Prior to this Sponsor Consultation, it should be noted that MSE has fulfilled the CAP 725 requirement to involve local aviation stakeholders, through the use of Focus Groups, to assist the development of the proposal set out in this document. The results of the Focus Group work are detailed in Section 7 and Appendix B.

1.3.5 A full list of consultees, which has been developed with the advice of the CAA, is given at Appendix H. Consultees have a crucial role in providing relevant and timely feedback to MSE, giving their views and opinions on the impact of the proposed airspace change. Consequently you are urged to participate fully in this important consultation.

1.4 Conduct of the consultation

1.4.1 The CAA requires that this consultation is conducted in accordance with the principles set out in the Cabinet Office Code of Practice on Consultation.

1.4.2 MSE has appointed Cyrrus Limited to assist in the development of this proposal and to co-ordinate the consultation process. Cyrrus is a company that provides consultation and technical services for Communication Navigation and Surveillance/Air Traffic Management (CNS/ATM) projects. It has provided advice to a number of airport operators and aviation authorities on airport operations and airspace matters throughout Europe since 1999. Cyrrus has extensive experience of managing Airspace Change Proposals in the UK and conducting consultation to meet the CAA requirements.

1.4.3 This consultation document encompasses both the aviation and the environmental aspects of the proposed changes to airspace. The document is structured to give a clear and concise explanation of the proposed changes in plain language. Whilst aviation consultees will be familiar with the aeronautical terminology and associated practice used routinely in air operations, non-aviation consultees may not be so familiar. Consequently, these aspects are explained in some detail where appropriate.

1.4.4 A Glossary of Terms is provided at Appendix A. Technical terminology is explained as simply as possible for the benefit of non-aviation consultees. Should individual consultees require additional clarification of the terminology used or other aspects of the consultation or of the proposed airspace design, a

discrete e-mail address tmzconsultation@manstonairport.com is provided. This is the preferred method of contacting the sponsor. Please indicate clearly that you are making a QUERY.

1.4.5 As well as the publication of the of the consultation document by means of the MSE website at: <http://www.manstonairport.com/about-the-airport/planning/airspace-change.html>, hard copies will be provided to consultees on request to the consultation focal point detailed at paragraph 1.7.1.

1.4.6 In accordance with the Cabinet Office Code of Practice on Consultation and the CAA's requirements a period of 12 weeks is allowed for consultation. In order to make allowance for the August Bank Holiday period MSE has extended the consultation period to 13 weeks. **Thus the Consultation Period begins on 9 August 2010 and is planned to close on 8 November 2010.**

1.4.7 **Within this defined period we ask you, or the organisation you represent, to consider the proposal and submit your response to us.** Responses can be made to the discrete e-mail address tmzconsultation@manstonairport.com or in writing (to the address given in paragraph 1.7.1). Please indicate clearly that it is a RESPONSE to the consultation. **Even if you have no comment to make on the proposed changes we would still appreciate a response to that effect.**

1.4.8 If you have any queries about what is presented in the document please contact the focal point (as set out in paragraph 1.7.1) as soon as possible.

1.5 Results of the consultation

1.5.1 We will be monitoring the responses as they come in to us. If we need clarification of any of the comments you have made we will contact you.

1.5.2 At the end of the consultation period we will analyse the responses received and, provided that there are no contra-indications, we will prepare a formal submission to the CAA Directorate of Airspace Policy (DAP). If responses to the Sponsor Consultation indicate areas where minor changes could be made to the design of the airspace to improve any aspects of the operation without detriment to the environmental impact, these will be incorporated within the submission to DAP.

1.5.3 A brief Report of the Sponsor Consultation will be added to the website <http://www.manstonairport.com/about-the-airport/planning/airspace-change.html>

for the benefit of consultees. This will be submitted as soon as practicable. Interested parties should monitor the website address from 22 November 2010 onwards.

- 1.5.4 Subsequently, the CAA will follow its regulatory process and, in due course, if they are content with the proposal and the consultation process employed, implement the proposed airspace change. The target date planned for implementation of the proposed Transponder Mandatory Airspace would be anticipated as 22 September 2011 which accords with the international requirements for the promulgation of aeronautical information.

1.6 What this consultation is not about

- 1.6.1 Finally, it is appropriate to tell you what is not included in the scope of this consultation. This consultation is not about:

- Any future development of MSE;
- Any aspect of Government Airports Policy;
- The establishment of controlled airspace. It should be noted that the introduction of Transponder Mandatory Airspace does not change the status of the airspace from uncontrolled airspace to controlled airspace.

- 1.6.2 Any comments on the above issues which may be included in your responses will be discounted from the analysis.

1.7 Focal Point for this consultation

- 1.7.1 The focal point for this consultation is:

Mr Peter (Pedro) Thompson
Senior Air Traffic Control Officer
(TMZ Consultation)
Manston Airport
PO Box 500
Manston, Kent CT12 5BL

- 1.7.2 The discrete e-mail address tmzconsultation@manstonairport.com is the preferred method for you to submit your formal response. This email can also be

used to raise any queries on the content or conduct of this consultation. However, in so doing please clearly indicate whether you are making a QUERY or RESPONSE. Written responses should be sent to the sponsor at the address detailed at paragraph 1.7.1.

1.8 CAA Oversight

1.8.1 The CAA DAP maintains oversight of the conduct of the consultation being carried out by MSE, to ensure that MSE adheres to the process laid down in CAP 725. If you have any complaints about MSE adherence to the consultation process these should be referred to:

Head of Business Management
Directorate of Airspace Policy
CAA House
45 - 59 Kingsway
London WC2B 6TE
e-mail: businessmanagement@dap.caa.co.uk

1.8.2 It is emphasised that DAP will not comment to consultees on the proposal itself.

1.9 Confidentiality

1.9.1 The CAA requires that all consultation material, including copies of responses from consultees and others, is included in any formal submission to the CAA of an Airspace Change proposal.

1.9.2 MSE undertakes that, apart from the necessary submission of material to the CAA and essential use by our consultants for analysis purposes, MSE will not disclose personal details or content of responses and submissions to any third parties. Our consultants are signatories to confidentiality agreements in this respect.

2 Manston Airport

- 2.1 MSE was established in 1999 at the former RAF airfield of Manston. Current commercial operations are focussed mainly on cargo operations, including humanitarian flights on a world-wide basis, and UK domestic daily flights to Edinburgh. However, the MSE Master Plan incorporates plans for the extensive expansion of passenger flights starting with a daily Manchester service that commences in September 2010.
- 2.2 Additionally, Fishery Protection and Coastguard aircraft and Search and Rescue (SAR) helicopters operate from MSE and work regularly throughout the subject airspace, often at low levels and often as Priority flights. There are also Flying Training organisations, Flying Clubs and privately owned aircraft, the operations of which have to be safely integrated with commercial airline operations in the surrounding airspace.
- 2.3 MSE provides Air Traffic Services (ATS) to transit aircraft, both offshore and overland, under the Lower Airspace Radar Service (LARS) scheme and in accordance with the provisions of Air Traffic Services Outside Controlled Airspace (ATSOCAS).
- 2.4 Growth of traffic at MSE has, in general terms, been varied throughout the airport's history. In 2009, MSE handled 18996 movements in total and provided service to 7398 aircraft under the LARS scheme. Although a slight decline in traffic occurred in 2008 and 2009 due to the world economic climate, it is anticipated that this trend will be reversed in the coming years. Further aircraft movements statistics are tabulated at Appendix D.
- 2.5 The Government's Air Transport White Paper of 2003 indicated policy support for the growth in regional airports as a major feature of the economic growth of the UK. The MSE Airport Master Plan, developed as a consequence of the Air Transport White Paper, reflects the government policy and provides a framework for the future growth and development of the airport. Indeed, the Master Plan envisages a marked increase in aircraft movements in the near future particularly passenger airline and cargo activity. The Master Plan has recently received a boost in that the new UK government has announced the scrapping of plans for additional runways at London Heathrow, Gatwick and Stansted which could

promote opportunities for regional airports to gain more market share in the SE Region.

3 Air Traffic Management at MSE

- 3.1 MSE lies within uncontrolled (Class G) airspace. An Aerodrome Traffic Zone (ATZ) (also Class G airspace) of radius 2.5NM from the Aerodrome Reference Point, surface to 2000ft above aerodrome level (aal), provides the only airspace within which all aircraft are required to make their presence known to MSE ATC and comply with instructions. Controlled airspace lies overhead MSE at higher levels and this is described more fully at paragraph 3.8.
- 3.2 MSE provides an Approach Control Service (APC/APR), using the Primary Surveillance Radar (PSR), and an Aerodrome Control Service (ADC) to arriving and departing flights. The PSR is a S511 located on the airport. An ATS is also provided (under the LARS scheme²) on request to transit and other flights within a radius of 40NM from the airport. The APC/APR is provided from up to two control positions located in the Control Tower Building.
- 3.3 Radar Separation minima approved for Manston APC is 5NM. There are currently no plans to seek approval for a reduction in the radar separation minima in use.
- 3.4 The predominant traffic flows of MSE traffic joining and leaving the European ATS Route System are:
- via DVR to the south (which is not affected by this proposal), and
 - via Significant Points ERING and JACKO to the north.
- 3.5 For outbound aircraft, Manston APC provides an ATS in Class G airspace until such traffic is clear of conflict with other MSE traffic where it is then transferred to the NATS En Route Sectors. ATSOCAS services are provided on request, with transfers effected to the next appropriate ATS agency e.g. Southend or Thames Radar.
- 3.6 For arriving traffic, transfer of control from London ACC is normally effected when the traffic leaves controlled airspace. Subsequently, Manston APR marshals and sequences traffic towards final approach.

² LARS is provided from 0900 to 1700 (local time) 7 days per week.

- 3.7 In the main, transit aircraft comprise light General Aviation (GA) traffic which predominantly operates overland (i.e. to the west and southwest of MSE and via the Dover (DVR) VOR) to achieve the shortest practicable overwater leg for Cross-Channel flights. Notwithstanding, a substantial proportion of the GA traffic still chooses to operate over water to the north and north-east of MSE, in the area of the proposed LA windfarm development, when routing between East Anglia and Belgium. A small traffic study carried out by MSE over a two-month period in 2009 revealed some 22 aircraft transiting below controlled airspace over the proposed windfarm development areas.
- 3.8 MSE lies beneath Class A controlled airspace (Clacton CTA) which has a base level of FL65. The controlled airspace immediately to the north and east of MSE has a base level of FL85. Above the areas of both the TOW and LA windfarm developments, overlying Class A controlled airspace (Clacton CTA) has base levels of variously FL65, FL85 and FL105. ATS within this airspace is provided by NATS.

4 Effects of wind turbines on PSR and ATM

4.1 The effects of wind turbines on PSR radar displays are well-known and widely documented. The CAA has published CAA Document CAP 764 “CAA Policy and Guidelines on Wind Turbines”. This Airspace Change Proposal takes due note of, and complies with, the provisions of CAP 764.

4.2 The turbine blades, when rotating, reflect signals as moving targets in the same manner as aircraft. When producing the maximum Doppler Shift turbine blades will produce reflections with an energy level several orders of magnitude greater than the reflections from aircraft. Furthermore, the effects caused by the rotation of the blades vary according to the aspect of the turbine disc to the radar source. The consequence of turbine returns are two fold:

- a) They will not be removed by the radar processing and display systems and will be displayed as if aircraft; and/or
- b) They will raise the thresholds in the radar processor, resulting in the loss of detection of lower energy targets near the turbines, i.e. aircraft returns in the vicinity of the turbines. This is often referred to as radar desensitization.

In addition, turbines’ large reflected signal also creates a shadowing effect beyond the turbine array; but in the LOW and TA case this is unlikely to have any operational impact.

4.3 The consequences of the clutter are that the radar returns from genuine aircraft over and in the vicinity of the windfarm array would be swamped by the unwanted returns. The controller would therefore be unable to differentiate between aircraft returns and wind turbine display clutter and, as a consequence, would be unable to: retain the identity of aircraft; assimilate its progress; issue executive instructions necessary to maintain separation; provide a radar service.

4.4 A further significant consequence of the appearance of false targets on the radar display is of distraction. Bearing in mind that the controller must spread his concentration between specific aircraft under his direct control and the wider overview of the airspace in general, the controller may be distracted by the appearance of false targets from wind turbines. The greater the proliferation of

windfarms, the greater potential for distraction of the controller. CAP764 acknowledges the distraction effect as being of significance.

- 4.5 The instructions to air traffic controllers regarding the appearance of clutter on the radar display are detailed in the Manual of Air Traffic Services (MATS) Part 1, Section 1, Chapter 5, paragraph 18, and are reproduced for reference at Appendix E. In summary, the controller would be required to re-route aircraft around the area of clutter or terminate radar service, neither of which would be practicable for a clutter area of significant dimensions particularly as it would lie within airspace critical to the marshalling and sequencing of flights operating to and from MSE and to the provision of LARS service.

5 Use of SSR alone in the provision of ATS

- 5.1 Secondary Surveillance Radar (SSR) provides a means for ATC to identify and retain identity of individual transponder-equipped aircraft. Additionally, for suitably equipped aircraft, information regarding the level of the aircraft (displayed by the radar data processing system as Flight Level (FL) or Altitude as appropriate) is displayed to the controller. For Mode S equipped aircraft and ground systems additional identity and intention information can be displayed.
- 5.2 However, in Class G airspace in the UK below FL100, not all aircraft are required to carry or operate a transponder. Currently, only those aircraft operating as Public Transport flights, whether IFR or VFR, are required to carry and operate a transponder.
- 5.3 Whilst SSR provides a useful, and in some cases an essential, tool to assist ATC in the provision of radar-based ATS, it is the PSR which remains the “controlling” tool in Class G airspace for the provision of separation, sequencing and other ATS functions.
- 5.4 The circumstances when SSR may be used alone in the provision of ATS are limited. ICAO PANS-ATM states at Section 8, paragraph 8.1.9:

8.1.9 SSR systems, especially those utilizing monopulse technique or having Mode S capability, may be used alone, including in the provision of separation between aircraft, provided:

- a) the carriage of SSR transponders is mandatory within the area; and*
- b) identification is established and maintained.*

For the UK, the requirement is outlined in MATS Part 1, Chapter 3, paragraph 10.5 as follows:

10.5 Use of SSR alone

10.5.1 Provided the pilots are made aware of the limitations of the service, SSR may be used to provide horizontal separation in the following circumstances:

a) when approved by the CAA;

b) to overcome temporary deficiencies within PSR cover, such as fading or clutter, the SSR return only of one aircraft may be used to provide separation from the PSR or SSR return of another aircraft provided the PSR and SSR situation displays are correctly aligned.

- 5.5 It should be noted that a permanent large area of clutter, such as that generated by a windfarm, is not considered to be a temporary deficiency in PSR cover. Thus, the principle requirement is for CAA approval which, in turn, is dependent on fulfilling the ICAO requirement.
- 5.6 Whilst SSR enhances the ability for the controller to retain aircraft identity through limited areas of clutter, in areas as extensive as the TOW and LA windfarm footprints the SSR symbol as well as the data label itself may be also swamped by the clutter, rendering the provision of ATS impracticable. Thus, the assured availability of SSR data in the vicinity of the wind turbine arrays is not the whole solution but is one element in the ability to sustain a radar service in areas of extensive radar clutter.
- 5.7 Modern radar processing and display systems provide the facility for primary radar returns to be completely removed from specified segments of the controller's radar display. However, whilst this would remove the unwanted effects of clutter in those segments of the display, it would also remove the "wanted" PSR returns of aircraft, although SSR responses would continue to be displayed. The solution being pursued by MSE for approval by the CAA is for continued provision of ATS using SSR data alone in the vicinity of TOW and LA windfarms, having removed all PSR data from the subject airspace.
- 5.8 It is seen that a prerequisite for any consideration by the CAA for provision of ATS using SSR alone is that the carriage of transponders should be mandatory for all aircraft within the airspace concerned. In the UK this is normally achieved within the regulations for Class A, B and C controlled airspace. However, the concept of Transponder Mandatory Airspace has been developed by the CAA to cater for the situation where the carriage of transponders by aircraft is necessary but would not be achieved through the normal airspace classification mechanisms.

6 Options for Consideration

6.1 Option 1 - Do Nothing

6.1.1 CAP 725 requires that in all proposals to develop airspace change the effects of “doing nothing” must be considered.

6.1.2 If no action was taken to adapt the airspace arrangements to sustain the capability to provide safe and effective airspace management over and in the vicinity of the TOW and LA windfarm arrays, a significant volume of airspace would be lost if the windfarms were developed as intended by Government.

6.1.3 Due to the extensive areas of clutter generated on the PSR displays, and the potential for unknown traffic emerging from the clutter area a substantial buffer zone would need to be established around the windfarm footprints in order to ensure the capability of the controller to assimilate an emerging threat and respond to it with avoiding action to aircraft under his jurisdiction.

6.1.4 The proximity of TOW and any necessary safety buffer to the downwind leg, base leg and final approach track for runway 28 at MSE would preclude “right-hand circuit” traffic patterns. There would be a consequential adverse environmental impact in adopting overland “left hand” traffic patterns. For traffic arriving from the northerly sectors, a substantial increase in track mileage would incur a substantial additional fuel burn with associated emissions implications overland.

6.1.5 With respect to the extensive LA array to the north, a significant volume of airspace would be lost which is currently utilised for the effective marshalling of arriving flights from the north-west through to the north-east sectors. Substantial additional track mileage would be incurred in routing towards a southerly traffic pattern or deviating to the east of the windfarm footprint. (The available airspace to the east of LA would be constrained by the Shoeburyness Danger Areas.)

6.1.6 These factors are contrary to Section 70(2)(a) of the Transport Act 2000 and associated Government Directions to the CAA.

6.1.7 The distractive effect of a proliferation of clutter areas around the radar service area would remain, with potential detriment to the safety of the ATS provided. It should be noted that windfarm clutter already exists within the radar service area,

notably the Kentish Flats array to the north-west of MSE; but this is considered tolerable and manageable to the ATM system under the current airspace arrangements. However, the extensive additional clutter areas generated by the much larger footprints of TOW and LA would proliferate the clutter and the result would be neither tolerable nor manageable.

6.1.8 The suspensive conditions attached to the approval given for the development of TOW and LA windfarm arrays took due account that something other than “Do Nothing” would be required before the development could proceed. Discussions undertaken in 2007/08 between MSE, the developers and, in particular, the CAA, indicated that inter-dependent solutions, as detailed below, could be developed to mitigate the adverse impact of the proposed windfarm on ATC safety requirements; but these would necessarily require, as one element, a change to the airspace regulations.

6.1.9 The agreed mitigation comprises the following inter-dependent elements:

- The installation of a Mode S Secondary Surveillance Radar system (SSR) at MSE;
- Introduction of TMZ(s) covering the TOW and LA sites including, if appropriate, a buffer zone;
- MSE to be approved to provide radar services within the TMZ(s) using SSR alone;
- Blanking out the Primary Surveillance Radar (PSR) returns within the TMZ airspace.

6.1.10 Accordingly, therefore, “Do Nothing” is ruled out of the options for the permitted development of the TOW and LA windfarm arrays.

6.2 Option 2 - Establish a “Known Traffic Environment” - Controlled Airspace

6.2.1 The establishment of a “Known Traffic Environment” by means of controlled airspace over the TOW and LA footprints would ensure that all traffic in proximity to the windfarms would be known to ATC and subject to ATC clearance.

- 6.2.2 However, the presence of substantial areas of radar clutter generated by the turbine arrays would still preclude the provision of radar-based ATM within the area as the identification of individual aircraft could not be retained. The adverse impact of clutter on aircraft routeings, described in Section 4 and paragraph 6.1, would remain.
- 6.2.3 Additionally, the distractive effect of a proliferation of clutter areas around the radar service area would also remain, to the potential detriment to the safety of the ATS as described in paragraph 5.6 and 6.1.7 above.
- 6.2.4 Only the establishment of Class A, B or C controlled airspace would ensure the carriage of SSR equipment by all aircraft; but none of these classifications is considered appropriate to the nature of the air traffic operating in the vicinity of the TOW and LA windfarms. Class D or E controlled airspace would require the enhancement of Transponder Mandatory Airspace in order to ensure the carriage of SSR equipment by VFR non-Public Transport flights. The nature and density of air traffic operating in the vicinity of TOW and LA does not currently justify the provision of Class D or E controlled airspace.
- 6.2.5 Accordingly, therefore, the establishment of controlled airspace around the TOW and LA windfarm arrays is ruled out of the options for further consideration.

6.3 Option 3 - Establish Transponder Mandatory Airspace

- 6.3.1 The concept of Transponder Mandatory Airspace, in the form of TMZ(s), has been developed by the CAA to cater for overriding safety reasons where the airspace classification would not normally require all aircraft to carry a transponder. In this case the objective of Transponder Mandatory Airspace would be to allow the airspace to retain its underlying classification (in this case Class G airspace) whilst enabling the ATS Unit to sustain a surveillance capability. The ATS available within that airspace would continue to be applied according to the underlying airspace classification through the assured provision of SSR data to the controller.
- 6.3.2 Extensive discussions between MSE and the CAA (DAP and SRG) during 2007/08 indicated that CAA approval for the continued provision of ATS in the vicinity of TOW and LA using SSR alone would be granted subject to:

- The provision of SSR equipment at MSE;
- An engineering solution which would remove PSR clutter generated by the windfarms; and
- Establishment of airspace within which the carriage of SSR transponders was mandatory for all aircraft.

6.3.3 TMZ airspace is not controlled airspace. Itinerant aircraft would not be required to communicate with or make their presence known to ATC other than by means of the transponder. ATC would continue to provide ATS in accordance with ATSOCAS, using the SSR responses alone of known and unknown aircraft to provide the required separation/de-confliction. Thus, the operational impact on uncontrolled IFR or VFR flights in the area would be minimal. It should be noted that provision is also made within the rules applicable to Transponder Mandatory Airspace for conditional access by aircraft not equipped with a serviceable transponder.

6.3.4 It is recognised that nowadays the majority of aircraft (of all classes) are equipped with SSR and in most cases, subject to the General Exemption 670 detailed in the Official Record Series 4, the level of equipage is to at least Mode S Elementary. Thus it is considered that the barriers to considering Option 3 as a potential candidate for the airspace change are few and issues arising can be overcome by process and procedure.

6.4 Conclusion

6.4.1 It is considered that the establishment of Transponder Mandatory Airspace, as an essential element of the mitigation necessary to allow the TOW and LA developments to proceed, would provide the most effective solution for the continued safe provision of ATS by MSE and the least intrusive option for the aviation community.

6.4.2 MSE therefore intends to adopt this option and proceed through the Airspace Change Process of consultation and latterly, once a suitable response is achieved, submit a formal Airspace Change proposal to the CAA. The development options for the configuration of Transponder Mandatory Airspace are detailed in subsequent sections of this document.

7 Development of the proposed TMZ

7.1 General Considerations

7.1.1 The CAA, in CAP 725, lays down extensive regulatory requirements to be applied to the design of the airspace arrangements. However, most of these requirements, such as Instrument Flight Procedure (IFP) containment, are relevant to the development of Controlled Airspace which is not the case with the MSE proposal. The significant regulatory requirements applicable to this proposal are that the:

- Dimensions of the proposed airspace should be the minimum practicable to meet the safety and operational requirements; and
- Configuration of the airspace should be as simple as practicable.

7.1.2 Thus, the primary matters for consideration in the development of the proposed Transponder Mandatory Airspace are the lateral and vertical dimensions, including alignment with other, pre-existing, airspace boundaries and the impact on:

- Those aircraft wishing to use the airspace which are not and/or cannot be equipped with a transponder, and
- The operational impact on adjacent ATSUs who may not be SSR-equipped.

7.1.3 In all airspace development proposals consideration of potential environmental impact, including any changes to aircraft routings, must be taken into account. However, as this proposed airspace development lies wholly offshore and will not substantially affect any overland routings by aircraft, this aspect, whilst important, is not considered an overriding factor in the development proposal. A more detailed statement on environmental aspects is given at Section 8. Environmental matters and comments raised on this subject will be incorporated in the final Airspace Change Proposal request submitted to the CAA.

7.2 Vertical extent

7.2.1 MSE provides ATS from the surface to the base of the overlying Class A controlled airspace (Clacton Control Area (CTA)) at, variously, FL65, FL85 and FL105. All aircraft flying within the Clacton CTA are required to carry and operate transponders with Mode S capability. In order to ensure continuity of service to arriving and departing IFR flights to/from MSE, or in transit below controlled airspace, it is considered that the proposed TMZ should extend to the base of controlled airspace.

7.2.2 At the lower levels, MSE provides an ATS to: arriving aircraft on final approach down to the runway; departing aircraft from take-off; and transit aircraft at their required operating level. In order that all aspects of ATS over and in the vicinity of TOW and LA windfarms can be safely sustained it is considered that the proposed TMZ should extend down to the surface.

7.3 Lateral boundaries

7.3.1 The lateral boundary of the proposed Transponder Mandatory Airspace defines the area within which the unwanted PSR clutter generated by wind turbines would be removed electronically from the controllers' radar displays and also any additional airspace required to assure effective ATS provision. In considering the lateral boundaries of the proposed TMZ factors to be taken into account include:

- a) Whether a buffer beyond the immediate surface footprint of the two windfarms is necessary for ATS purposes and, if so, what should be the extent of that buffer?
- b) The capability within the radar data processing and/or display systems to eliminate the effects of the 'false returns' generated by the turbines;
- c) Whether the two windfarm footprints should be encompassed by a single TMZ or by separate TMZs;
- d) Establishing the impact of sub-paragraphs a-c above on non-SSR equipped ATSU's, non-transponder equipped aircraft and other airspace users.

Each of these matters is considered below.

7.4 Airspace Buffer for ATS Purposes

7.4.1 It should be recognised that in removing the wind turbine clutter, the PSR returns from aircraft would also be removed. The surface footprint of the respective turbine arrays is precisely defined by the developers, but the turbine clutter would be generated beyond the physical boundaries of the turbine array (this is explained more fully in paragraph 7.5). To assure safe and expeditious ATS provision, it is considered that an additional buffer for ATS purposes is necessary particularly to mitigate the potential navigation error that might occur whenever pilots of non-transponding aircraft fly close to the 'blanked' area.

7.4.2 The objective of establishing the TMZ(s) is not to prevent aircraft from operating in the vicinity of the turbines, merely to require that they operate a transponder when so doing. Notwithstanding, there is always potential for a non-transponder equipped aircraft to "blunder" into the Transponder Mandatory Airspace, thereby becoming invisible to the radar controller and this would pose a potential threat to other flights under the jurisdiction of the radar controller. In a controlled airspace scenario, radar controllers when vectoring aircraft within the controlled airspace aim to keep the aircraft at least 2NM inside the boundary as, generally, this would allow time for the controller to assimilate an airspace intrusion and take appropriate resolution measures to avoid a collision with aircraft under his jurisdiction. However, this would not be the situation with a TMZ; a non-transponding aircraft "blundering" into the TMZ would simply disappear from the controller's display if the TMZ was to be restricted to the limits of the turbine array.

7.4.3 Once a non-transponding aircraft has "blundered" into the TMZ any opportunity to provide separation from other aircraft is lost. The establishment of an additional buffer around the wind turbine footprint would enable a controller to take positive remedial action before the 'blundering' aircraft entered the blanked out area over the turbines. It is considered that the additional buffer should extend to 1NM beyond the blanked out area.

7.5 Radar Technical Considerations

7.5.1 Having determined the ATS operational factors defining the boundaries of the proposed transponder mandatory airspace, we now have to consider the

capabilities of the radar processing and display systems in use at MSE. The S511 PSR at MSE uses simple processing and the reflected radar signal is presented as raw radar returns on the controllers' radar display. In order to ensure that all unwanted clutter is removed from the radar presentation that will be in use when the TMZ(s) are established, it is intended to use the processing capability of the Radar Data Processor (RDP) at the display to create a blanked area over the extent of the windfarm areas.

7.5.2 An important technical consideration is the radar resolution. This is the ability of the radar to distinguish between targets correctly in range and/or angle. Angular resolution is determined by the radar's beam width. Typically, the displayed radar return (blip) is considerably wider than the physical dimensions of the reflecting object, and extends over an angle twice the beam width. For a typical ATC radar of the type in use at MSE (or any replacement), the angular extent of the blip may be as large as 1NM for a reflecting object at 20NM distance, a size which varies in proportion to the actual range. In the radial direction, there is a similar but range-independent effect amounting to a couple of hundred metres greater than the turbine size. To hide turbine-created clutter echoes from the air traffic controllers' displays, the blanked area on the radar display must be large enough to accommodate the sum extent of the echoes from all the turbines. Studies carried out by MSE have determined the geographical boundaries of the areas that need blanking to prevent wind turbine clutter appearing on the radar displays.

7.5.3 Ultimately the S511 PSR will require replacement by a current generation system. Modern radar systems have greater processing capability and different methods of presenting aircraft returns to the controller. In order that the dimensions of the proposed TMZ remains robust despite any upgrade to the radar at MSE, the technical specifications of a typical system have been taken into account. Importantly, it should be noted that some processed radars require that a target is illuminated by the radar for three sweeps before it is determined as a viable moving target that should be displayed on the controller's display as an aircraft symbol.

7.5.4 Consequently, in developing the additional airspace allowance to be made for the future radar replacement, it is assumed that:

- a) An aircraft emerges from the blanked area just after a radar sweep; i.e. the processing delay would become almost four radar sweeps, which at 15rpm equates to 16 seconds;
- b) The emerging aircraft may be travelling at the Class G airspace speed limit below FL100 of 250kt, i.e. 4.2NM/minute.

Thus it is seen that an emerging aircraft may travel 1.1NM before a useable processed radar symbol is available for ATC use which, for simplicity on the basis of probabilities, can be rounded down to 1NM. It is considered that the likelihood of non-transponding military aircraft operating at higher speeds (as allowed for in the airspace speed limit rules) can be discounted.

7.6 Summary of Lateral Boundary Requirements

- 7.6.1 Thus it is concluded that an additional volume of airspace should be added to the blanked area detailed at paragraphs 7.4.1 and 7.5 to accommodate the resolution of the radar, future radar replacement and to assure safe and expeditious ATS provision at all times. The sum of these requirements becomes the required boundary of the proposed TMZ and equates to a 1NM buffer. The development stages of the TMZ design are shown in diagrammatic form at Appendix G.

7.7 Number of TMZs

- 7.7.1 Having considered the design of a TMZ, it is necessary to consider whether a single TMZ covering both wind turbine arrays should be employed or two separate TMZs would be a better option. In this aspect the relative proximity of the two windfarm surface footprints to each other must be considered. It needs to be established whether the space between the two represents a usable volume of airspace to the airspace user community, particularly those elements of the community continuing to operate offshore without transponders.
- 7.7.2 The southernmost boundary of the LA is aligned approximately east-west, as is the northernmost boundary of TOW. The north/south gap between the two boundary alignments (projected) is approximately 7NM wide. It is considered that, given the buffer requirements for radar technical purposes described in paragraph 7.5, this would still represent a useable volume of airspace (with a 5NM width) for non-transponder equipped aircraft, including the vectoring of such

aircraft by non-SSR equipped ATSU. Conversely, to encompass the windfarms within a single TMZ would result in an airspace some 21NM in maximum extremity within which non-transponder equipped aircraft would not be able to operate.

7.7.3 Thus, on balance, it is concluded that the most effective TMZ configuration which would achieve the desired ATS objective, but with the minimum impact on the non-transponder aviation community, would be for individual TMZ to be established around each windfarm.

7.8 Impact on other ATSUs

7.8.1 The effect of Transponder Mandatory Airspace on other non-SSR equipped ATSUs depends entirely upon whether the wind turbines themselves are within the radar horizons of those ATSUs. It is known that the wind turbine arrays of TOW and LA are below the radar horizon of all NATS radar sites and so do not impact the provision of ATS by any NATS Unit.

7.8.2 The only potential ATSU which may be affected by TOW and LA is London Southend Airport (LSA) on the north side of the Thames Estuary, which is not equipped with SSR. The low-level coverage of the LSA radar is unknown; however, the closest extremities of TOW and LA lie some 34NM and 27NM respectively from LSA and therefore below airspace not routinely used by this ANSP. It is understood that LSA did not object to the establishment of either windfarm and the airport has not been cited in the suspensive conditions. It is assumed, therefore, that the avoidance of clutter areas would not be an issue for LSA radar controllers and that appropriate ATC techniques would be employed if required to provide an ATS within the TMZ.

7.8.3 However, in order to ensure the integrity of the Transponder Mandatory Airspace for MSE ATS provision, a requirement should be placed upon Southend APC to ensure that all transponder-equipped aircraft under its jurisdiction display the Southend Conspicuity Code (4575). Where a non-transponder aircraft is under the jurisdiction of the LSA controller then alternative routing outside the TMZ should be given. It is also recommended that the TMZ boundaries should be displayed on the LSA radar displays.

7.9 Impact on military operations

7.9.1 The majority of UK and European-based military aircraft carry and operate SSR transponders, in most cases these are Mode S compatible. The only UK military types which are not transponder equipped are gliders. It is considered that military gliders are unlikely to operate as far offshore as the TOW and LA windfarms and so would be unaffected by the Transponder Mandatory Airspace requirements.

7.9.2 Discussions with the Military Users Airspace Coordination Team (MUACTION) at the Focus Group stage have indicated that any impact of the proposed TMZ on military operations, including operations associated with the Shoeburyness Danger Areas, would be negligible.

7.10 Impact on Light GA Operations

7.10.1 All aircraft operating on Public Transport flights within UK airspace are required to be equipped with, as a minimum, Mode S Elementary transponders. It can be assumed that the majority of GA aircraft over 5700kg MTWA are likely to be transponder equipped on the basis that such aircraft types which can be used for public transport operations are likely to operate from time to time within Class A controlled airspace.

7.10.2 Thus, the predominance of non-transponder equipped aircraft affected by the proposed TMZs is likely to be aircraft of less than 5700kg MTWA which are never operated on Public Transport flights.

7.10.3 Whilst not prohibited from operating over water, the majority of pilots of light aircraft prefer to minimise their over-water flight time by using shorter over-water routes (for example, advice to pilots on Cross-Channel flights is given at UKAIP, ENR 1.1.3 paragraph 7). A small traffic study carried out by MSE over a two-month period in 2009 revealed some 22 aircraft (of all classes) transiting below controlled airspace in the area of the proposed TMZs. Of these aircraft only one was either not transponder-equipped or the transponder (if carried) was not working.

- 7.10.4 Notwithstanding the transponder mandate within the Transponder Mandatory Airspace, provision exists within the TMZ Rules for conditional access by non-equipped aircraft by prior arrangement with the appropriate ATS Unit.
- 7.10.5 Occasionally locally-based (MSE and Maypole aerodrome) light aircraft undertake offshore “sight-seeing” flights which may include the LA and TOW areas. Discussions with MSE-based GA operators and Maypole Aerodrome at the Focus Group stage have indicated that, given the ability for conditional access to the TMZ airspace by non-transponder equipped aircraft, the impact of the proposed TMZs on locally based light aircraft operators would be minimal. It has been recognised that the majority of locally-based light aircraft are, or will be, transponder equipped.
- 7.10.6 Thus it is concluded that the impact on light GA operations, including glider, microlight and balloon operations, would be minimal.

7.11 Naming of TMZs

- 7.11.1 Two options have been considered by MSE for the naming of the two TMZs. Both have advantages and disadvantages.
- 7.11.2 One option would be to designate the TMZs as ‘Manston TMZ North’ and ‘Manston TMZ South’. This would clearly indicate to the pilots of non-transpondering aircraft the ATS agency from whom they should seek permission to enter the TMZ. Conversely, there is an inference that such designation might confer a “Controlling Authority” status on Manston ATC and a possible inference to pilots that the TMZ required permission or clearance from Manston ATC to enter.
- 7.11.3 An alternative TMZ designation could be applied according to windfarm name; i.e. London Array TMZ and Thanet TMZ. Knowledge of the TMZs from aeronautical charts together with adequate pre-flight briefing from the UK AIP would provide the necessary information to pilots to ensure that flights could be conducted safely. It should be noted that the current UK AIP protocol for TMZs would require details of the subject TMZs to be promulgated in AD2-EGMH AD2.21, cross referred from the formal notification at GEN 1-5 paragraph 5.3.2.2,

7.11.4 On balance MSE considers that naming the TMZ according to the windfarm name would be the most appropriate.

7.12 Hours of Operation of the TMZs

7.12.1 Under normal UK AIP arrangements the operating hours of a particular airspace segment established for ATS purposes are linked to the operating hours of the associated ATS Unit i.e. to the operating hours of Manston ATC. "Out of Hours" extensions to the published hours of operation when NOTAMed cause the associated airspace arrangements to remain in force.

7.12.2 However, MSE proposes that the London Array and Thanet TMZs should remain in place H24. It is acknowledged that this would mean that there would be no ATS agency available to provide permission for non-transponder equipped aircraft to access the TMZ outside the hours of Manston ATC. However, given the small number and nature of non-transponder equipped aircraft, this would be unlikely to hinder airspace activity to any significant extent.

7.13 Summary

7.13.1 The development of Transponder Mandatory Airspace to sustain radar service through an area of windfarm clutter has not been done previously in UK Class G airspace.

7.13.2 It is considered that the methodology employed in first determining the ATC Operational Requirement and then adapting that to fit the radar engineering capabilities and future PSR replacement represent a sound and logical argument for the safe development of the required TMZ.

7.13.3 Boundaries of the proposed TMZs would be as detailed at Appendix H. These boundaries will be refined as the TMZ development process continues and the precise RDP display capabilities of the Manston S511 PSR are evaluated; but they are not expected to change by more than 0.5NM.

7.13.4 It is considered that taking the provisional TMZ boundaries into account, there still exists a useable corridor of non-TMZ airspace between the two windfarms for unconditional use by non-transponder equipped aircraft.

- 7.13.5 Focus Group discussions carried out in the development of this Airspace Change Proposal in accordance with the provisions of CAP725 and involving local airspace users and MUACTION have not indicated any insurmountable adverse impacts with the proposed introduction of TMZs in the vicinity of the two subject windfarms.
- 7.13.6 For naming and designation purposes in the UK AIP it is considered that the TMZs should be designated "London Array TMZ" and Thanet TMZ". .
- 7.13.7 It is emphasised that the proposed TMZ boundaries discussed in this document reflect only the currently approved development of TOW and LA windfarms. Outline plans exist for potential expansion of both windfarms post-2014 which may result in a requirement to commensurately expand the TMZ requirement. Each of these potential developments would be the subject of a separate Airspace Change Proposal as necessary.

8 Environmental Considerations

- 8.1 The airspace within which the proposed introduction of TMZs is proposed lies wholly offshore and is Class G airspace. The closest proximity of any TMZ airspace to the mainland is 9NM.
- 8.2 There are no changes to current Instrument Flight Procedures for MSE or to any other flight procedures in the vicinity of MSE arising from this proposal. The noise exposure for communities will not change. Indeed, the intent of this proposal is to sustain the existing routings and ATM operation in the vicinity of MSE.
- 8.3 Notwithstanding that the proposed TMZ airspace is not controlled airspace and no aircraft operations are excluded from it, it is possible nonetheless that some GA operators might elect to route onshore to avoid the TMZ requirements rather than routing offshore through the TMZs. As airspace activity in Class G airspace is not routinely monitored it is not possible to gauge or anticipate those flights which would elect to re-route simply as a consequence of the TMZs even though the TMZs themselves do not inhibit flight operations.
- 8.4 Climate Change: It is recognised that aircraft do contribute to the CO₂ emissions and this has an impact on climate change. A responsible approach to airspace planning is to balance the competing demands and ensure that the most direct routes possible are used with optimal aircraft performance as this will minimise fuel burn and emissions and therefore reduce the impact upon climate change. This proposal enables the most efficient routing of aircraft to be sustained whilst, at the same time, facilitating the most effective use of airspace by the whole aviation community.
- 8.5 Conversely, if the proposed Transponder Mandatory Airspace was not introduced, substantial changes would need to take place to the way in which MSE ATC handled traffic in the vicinity, leading to greater overland routing, a greater noise exposure by communities, and greater fuel burn and CO₂ emission through extended routing around the wind turbine clutter.

- 8.6 MSE considers it appropriate that Kent and Essex County Councils, together with Thanet District Council and neighbouring District and Parish Councils should be included as formal consultees for this proposal.

9 Economic Benefit

- 9.1 As has been explained thus far, the requirement for the establishment of Transponder Mandatory Airspace is a safety requirement to enable radar-based ATS to be sustained in the vicinity of TOW and LA wind turbine arrays. The economic benefits are derived mainly from enabling the wind development to proceed and the avoidance of re-routing traffic operating to and from MSE.
- 9.2 Clearly, it is in the national economic interest for renewable energy developments to be built to the maximum extent possible commensurate with planning considerations and the requirements of other industries like aviation. The TOW and LA windfarm developments will contribute significantly to future renewable energy needs. Suspensive conditions of these developments to protect MSE's interests have now been discharged on the basis of the entire suite of mitigations (outlined in paragraph 6.1.9) being implemented. This proposal is one element of this suite.
- 9.3 If no mitigation measures had been developed by the various stakeholders in discussion with the CAA then the only option would have been not to proceed with the offshore windfarm developments as the Secretary of State had taken into account aviation safety considerations in the granting of his consent. It should be noted, however, that only the acceptance (by MSE) and initiation of a technical mitigation has made the introduction of this airspace change proposal possible. The alternative potential mitigation (not acceptable to the aviation fraternity) would have been to permit the windfarm development and inhibit the ability for MSE to provide a safe and expeditious ATS in the airspace over and immediately adjacent to the windfarm developments. This would cause controllers at MSE to direct aircraft to fly approach profiles away from the wind development areas and in most cases would result in the majority of flights having to make approaches to and departures from the airport over the land with the associated consequential adverse economic and environmental impacts arising from changes to such routing. It is not possible to formally quantify the economic disbenefit for each flight as the particular circumstances for each flight would vary on a day-to-day basis dependent on many variables. Nonetheless it should be accepted that flights would not be flown optimally.

- 9.4 In terms of economic impact to the operators of GA aircraft, this is considered to be minimal as the majority of light aircraft are already transponder equipped and provision is made within the rules for Transponder Mandatory Airspace for conditional access to the airspace by non-transponder equipped aircraft.

10 Summary

- 10.1 MSE, in meeting its safety management responsibilities, has determined that the establishment of Transponder Mandatory Airspace in the form of two TMZs is necessary as one element of four inter-dependent elements necessary to enable a safe ATS to be provided in the vicinity of TOW and LA windfarm developments.
- 10.2 In developing the optimum configuration for the proposed TMZs, MSE has taken full account of the CAA regulatory requirements and the process for airspace change specified in CAP 725.
- 10.3 MSE has taken a balanced approach to the views of local airspace users, both based on and off the airport, and has considered the environmental and economic impact of the proposal. MSE intends to facilitate conditional access to the TMZ airspace by aircraft not equipped with SSR transponders in accordance with CAA Policy.
- 10.4 MSE believes that there are no adverse environmental or economic impacts arising from the proposal. Indeed, if the proposal was not to proceed then significant adverse safety, environmental and economic impacts would result.
- 10.5 MSE believes that the airspace arrangements outlined in this proposal, together with the other elements of the proposed mitigation measures, will enable safe ATS to be sustained through the airspace within which substantial radar clutter would otherwise result.

11 What Happens Next?

- 11.1 Following the development of an acceptable airspace configuration, the CAA requires the Sponsor, MSE, to carry out a full consultation with aviation and non-aviation interested parties. This is known as the Sponsor Consultation, which is the consultation being carried out through this document.
- 11.2 The Sponsor Consultation is carried out with NATMAC (National Air traffic Management Advisory Committee) organisations on the aviation side and with Local Planning Authorities and other representative organisations on the non-aviation side. The consultation list is agreed between MSE and the CAA.
- 11.3 The CAA requires that this consultation provides a minimum of 12 weeks for consultees to consider and respond to the proposal. In order to allow for the August Bank Holiday period MSE is extending this period by one week to 13 weeks. Therefore this Sponsor Consultation commences on 9 August 2010 and continues until 8 November 2010.
- 11.4 Shortly after completion of the consultation MSE will complete a short statistical report on the Consultation which will include details of any issues arising. This will be posted on the MSE website for the benefit of consultees.
- 11.5 Once the Sponsor Consultation is completed and any issues arising have been adequately resolved, MSE is required to submit a formal proposal to the CAA which will detail the case for the proposed Transponder Mandatory Airspace, the airspace design and the consultation carried out. It will include full details of the Sponsor Consultation (including copies of responses and correspondence) together with all documentation necessary for the promulgation of the proposed TMZs. All matters being equal, MSE anticipates that the formal case to the CAA will be presented in early-January 2011.
- 11.6 Once submitted, the CAA normally requires a 16-week period to allow for its own internal analysis of the proposal and to reach a Regulatory Decision. If the case is accepted, then the promulgation process takes a further 8 weeks.
- 11.7 Subject to a satisfactory outcome to this consultation and acceptance of the case by the CAA, the proposed London Array and Thanet TMZs would be introduced on 22 September 2011 (to coincide with the commencement of operation of the

first LA turbines, the TOW turbines having been in operation since the end of 2010).

A Glossary

A.1 Organisational

Abbreviation	Meaning	Comment
ANSP	Air Navigation Service Provider	The organisation approved by the CAA to provide the air traffic navigation services at an airport. In some cases the Airport Operator provides the air traffic services itself (as at Manston Airport) and in some cases the Airport Operator contracts a specialist ANSP (such as NATS) to provide the services.
CAA	Civil Aviation Authority	The specialist UK aviation regulator established by government to oversee all aspects of aviation activity in the UK.
DAP	Directorate of Airspace Policy	The part of the CAA responsible for the airspace arrangements in the UK
ICAO	International Civil Aviation Organisation	An organisation established under the auspices of the United Nations through the Chicago Convention, charged with establishing Standards, Recommended Practices, Procedures for worldwide application.
NATS	National Air Traffic Services	Previously part of the CAA, NATS is an Air Navigation Service Provider (ANSP) and was part privatised by Government in 2001. NATS provides civil en route air navigation services in the UK under license from the Government and provides air navigation services at a number of airports under contract to the airport operators.
LACC	London Area Control Centre	NATS En Route Area Control Centre located at Swanwick, Hants, providing civil en route ATS over the southern part of the UK airspace and Terminal ATC services for the London TMA airports.
SRG	Safety Regulation Group	The part of the CAA which oversees all aspects of air safety including the operation of aircraft and air traffic services.
SES	Single European Sky	A European Commission initiative with the objectives to restructure European airspace as a function of traffic flows rather than according to national boundaries, to create additional capacity and to increase the overall efficiency of the ATM System.
Eurocontrol	European Organisation for the Safety of Air Navigation	The Eurocontrol Mission is to harmonise and integrate air navigation services in Europe, aiming at the creation of a uniform ATM System for civil and military users in order to achieve a safe, secure, orderly expeditious and economic flow of traffic throughout Europe, whilst minimising adverse environmental impact.

A.2 Documents

Abbreviation	Meaning	Comment
AIRAC	Aeronautical Information Regulation and Control	A system which ensures worldwide advanced notification, based on common effective dates, of circumstances that require significant changes to operating practices. (The AIRAC System is linked to the amendment of AIPs on a

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		worldwide basis.)
CAP	CAA Publication	The UK CAA publishes Regulatory, Guidance and Information material in the form of CAPs.
CAP 724	The Airspace Charter	A document published by the CAA which defines the authorities, responsibilities and principles by which the CAA DAP, as the airspace approval and regulatory authority conducts the planning of airspace and related arrangements in the UK.
CAP 725	CAA Guidance on the Application of the Airspace Change Process	A document published by the DAP which details the procedure by which a proposal to modify airspace dimensions, classification or usage in the UK can be put forward to DAP for approval. The process to be followed by sponsors of airspace change enables the CAA to meet its statutory duties established under the Transport Act 2000.
CAP 764	CAA Policy and Guidelines on Wind Turbines	A document published by the CAA in 2006 which has been subsequently re-published and will be updated periodically. It details CAA Policy which provides policy and guidance to aviation stakeholders when addressing wind energy related issues, thereby ensuring greater consistency across the whole aviation industry in the consideration of the potential impacts of wind turbine developments
MATS Part 1	Manual of Air Traffic Services Part 1	The UK document published by the CAA (CAP 493) which contains instructions and procedures applicable to UK air traffic services at civil air traffic control units, and represents the UK interpretation and application of ICAO SARPs and PANS relevant to air traffic services.
MATS Part 2	Manual of Air Traffic Services Part 2	The document which contains the local instructions for each air traffic control unit and provides information which amplifies and interprets, at a local level, the instructions in MATS Part 1 and also details local separation standards to be applied where these differ from the national criteria because of specific local circumstances. The MATS Part 2 is subject to approval by the CAA as part of the Regulatory process.
UK AIP	UK Aeronautical Information Package	The State publication published by the CAA (CAP 32) to ICAO requirements detailing all of the aeronautical information and procedures applicable to civil aircraft operations in the UK. The UK AIP is a notifying document, which means that procedures notified within it have legal authority. Amendment of the UK AIP is in accordance with the AIRAC system.

A.3 Measurement

Abbreviation	Meaning	Comment
	Units of Measurement	Aviation uses a mixture of imperial and metric measurements. Whilst runway lengths are measured in metres, distances for navigation are measured in nautical miles (NM). 1NM is a distance of 6017.12ft, equivalent to 1.8520km. The standard unit for vertical measurement is feet (Ft).
aal	Above Aerodrome Level	The vertical displacement of an aircraft above aerodrome level is known as Height . The aircraft altimeter is set to the barometric pressure at the aerodrome (known as QFE).
AMSL	Above mean sea level	The standard level reference for aircraft operations and airspace design below the Transition Altitude. The height of an aircraft measured above mean sea level is known as Altitude (ALT). The aircraft altimeter is set to the barometric pressure at the aerodrome, adjusted to take account of the aerodrome elevation (known as QNH).
FL	Flight Level	The height of an aircraft above a standard barometric pressure reference of 1013.25 Hectopascals (equivalent to Millibars (Mb) used in the UK), and is the standard level reference for aircraft operations above the Transition Altitude.

A.4 Airspace

Abbreviation	Meaning	Description
	Basic Service (ATSOCAS)	A Basic Service is an ATS provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights. This may include weather information, changes of serviceability of facilities, conditions at aerodromes, general airspace activity information, and any other information likely to affect safety. The avoidance of other traffic is solely the pilot's responsibility.
	Classification of Airspace	The ICAO system of classifying airspace by letter indicating the level of Air Traffic Service provided in the airspace and the meteorological criteria for VFR flight. Classes A to E are Controlled Airspace; Classes F & G are uncontrolled airspace. Class A airspace requires the mandatory operation of all flights according to the Instrument Flight Rules, Classes B, C, D and E controlled airspace permit VFR operations with differing levels of ATM compliance and application of separation by ATC.
	Class G airspace	Uncontrolled airspace within which both IFR and VFR flights are permitted to operate without reference to ATC. Air Traffic Services Outside Controlled Airspace (ATSOCAS) may be provided, on request, by suitably equipped ATSUs

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	Deconfliction Service (ATSOCAS)	A surveillance based ATS where, in addition to the provisions of a Basic Service, the controller provides specific surveillance derived traffic information and issues headings and/or levels aimed at achieving planned deconfliction minima, or for positioning and/or sequencing. However, the avoidance of other traffic is ultimately the pilot's responsibility.
	Radar Vectoring	Provision of navigational guidance to aircraft in the form of specified headings based on the use of radar.
	Traffic Service (ATSOCAS)	A surveillance based ATS, where in addition to the provisions of a Basic Service, the controller provides specific surveillance derived traffic information to assist the pilot in avoiding other traffic. Controllers may provide headings and/or levels for the purposes of positioning and/or sequencing; however, the controller is not required to achieve deconfliction minima, and the avoidance of other traffic is ultimately the pilot's responsibility.
ATSOCAS	Air Traffic Services Outside Controlled Airspace	In the UK, Air Traffic Services Outside Controlled Airspace (ATSOCAS) are provided by many civilian and military Air Traffic Service (ATS) providers to a variety of airspace users including Commercial Air Transport (CAT) operators, General Aviation (GA) and military pilots. The suite of services detailed in CAP774 together form the UK Flight Information Services (FIS), which (excluding aerodrome services) are the only ATS provided in Class F/G airspace within the UK FIR.
ATM	Air Traffic Management	The process used to ensure the safe, efficient, and expeditious movement of aircraft during all phases of operations. Air Traffic Management consists of ATC and traffic flow management.
ATZ	Aerodrome Traffic Zone	Airspace of defined dimensions established around an aerodrome for the protection of aerodrome traffic.
CTA	Control Area	A controlled airspace extending upwards from a specified limit above the surface to a specified upper limit.
IAP	Instrument Approach Procedure	A series of predetermined manoeuvres by reference to flight instruments with specified protection from obstacles from the initial approach fix, or where applicable, from the beginning of a defined arrival route to a point from which a landing can be completed and thereafter, if a landing is not completed, to a position at which holding or en route obstacle clearance criteria apply.
IFR	Instrument Flight Rules	Rules 32 to 37 of the Rules of the Air Regulations 2007.
IMC	Instrument Meteorological Conditions	Meteorological conditions expressed in terms of visibility, distance from cloud and ceiling, less than the minima specified for Visual Meteorological Conditions.

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VFR	Visual Flight Rules	Rules 25 to 31 of the Rules of the Air Regulations 2007
VMC	Visual Meteorological Conditions	Meteorological conditions expressed in terms of visibility, distance from cloud and ceiling, equal to or better than specified minima. In the UK the VMC minima for VFR operations in various classifications of airspace are laid down in Rule 27 of the Rules of the Air Regulations 2007

A.5 Infrastructure

Abbreviation	Meaning	Description
PSR	Primary Surveillance Radar	A surveillance radar system which uses reflected radio signals.
SSR	Secondary Surveillance Radar	A system of radar using ground interrogators and airborne transponders to determine the position of an aircraft in range and azimuth and, when agreed modes and codes are used, height and identity as well.
SSR Mode C		That element of the SSR System which provides information which indicates the level of the aircraft.
SSR Mode S	Mode Select	Modern transponder systems include Elementary Surveillance or Enhanced Surveillance capabilities and provide greater functionality than earlier generations of transponder systems including, inter alia, interactive ACAS Resolution Advisory. Mode S Elementary is the basic level of transponder carriage notified, as appropriate, in UK airspace. Enhanced Surveillance includes additional functionality and is mandated in certain specified controlled airspace.

B Pre-Consultation Activities

Date	Meeting	Remarks
2007/2008	CAA Exploratory Meetings and correspondence.	Advice from CAA regarding TMZ Policy and Development Process and use of SSR alone.
12/01/2010	CAA DAP Framework Briefing	CAP 725 Stage 1. MSE statement of intention to proceed given.
26/03/2010		CAA issues NATMAC Informative Letter
Quarterly	Airport Consultative Committee	Each Meeting of the ACC is given a briefing on progress of the airspace development.
May 2010	Focus Group – Airport Stakeholders	Discussions with on-airport aircraft operators.
May 2010	Focus Group – Adjacent Aerodromes Stakeholders	Discussions with Maypole Aerodrome
07/06/2010	Focus Group – Military Airspace Users	Presentation sent to MUACTION on proposed TMZ development. Consideration of issues raised in respect of military aircraft operations.
June 2010	Focus Group – Adjacent Aerodromes Stakeholders	Discussions with London Southend Airport
16/07/2010	Pre-consultation meeting with CAA DAP.	Presentation to DAP of proposed Sponsor Consultation Document. Finalisation of Consultee List with DAP.

C Provisional Timetable to Promulgation of Manston TMZ

Stage 1	Jan – May 2010	Meeting with DAP. Decision to proceed. Preliminary airspace design Preparation of Stakeholder briefing documents
Stage 2	May/June 2010	Stakeholder Consultation – Focus Groups. Stakeholder Meetings Collate responses Respond to comments. Review Airspace design. Stage 2 Review
Stage 3	June/July 2010	Preparation of consultation material (8 weeks) Develop Sponsor Consultation document Review proposal with DAP Prepare for Consultation
Stage 4	9 Aug – 8 Nov 2010	Consultation Issue Sponsor Consultation Collate results. Deal with objections. Review design Decision to proceed or not. Prepare formal submission to DAP (8 weeks).
Stage 5	Jan 2011 – 22 Sept 2011	DAP Action Case Study. Regulatory Approval. AIP preparation AIRAC Notification Promulgation Effective date 22/09/2011 (AIRAC 10/2011)

D MSE Aircraft Movements and Transit Flights 2003 – 2009

Year	Movements	Transit* see notes
2003	24921	12922
2004	23361	13236
2005	20536	11780
2006	15927	8874
2007	20643	7466
2008	19480	8127
2009	18996	7398

* Notes:

1. From 2001 to July 2003 LARS covered weekends only.
2. From July 2003 LARS increased to 7 days per week.
3. From May 2006 to January 2010, LARS not available due to lightning damage to the radar.
4. Full LARS resumed 1 Jan 2010

E Relevant MATS Part 1 Extracts

- For ease of reference, extracts from the MATS Part 1, Section 1, Chapter 5, paragraph 18 are provided:

18 Clutter on the Situation Display

18.1 Introduction

18.1.1 There are many potential causes of spurious primary returns ('clutter'), including: weather; anomalous propagation; ground/sea returns; birds; wind turbine effects; and radar countermeasures such as chaff. Whilst it may be possible for some forms of clutter to be distinguishable from aircraft surveillance returns, this may not always be possible, especially where processed surveillance systems are employed.

18.1.2 Clutter on the situation display has the potential to impact on ATS provision in the following ways:

- a) Increased risk of the controller not detecting conflicting traffic.
- b) Aircraft position symbols, track histories, data blocks may be hidden or obscured.
- c) Spurious track(s) may be generated, which may be indistinguishable from genuine aircraft returns.
- d) There may be in delay in aircraft being identified and placed under an ATS.
- e) Increased controller workload.

18.1.3 The impacts listed above are likely to affect the degree, accuracy and timeliness of the instructions, advice, and information that controllers are able to provide to pilots, with consequent impacts on safety and expedition. Additionally, the existence of clutter may necessitate aircraft being rerouted, or air traffic services reduced below the level requested by the pilot. Specific tactical procedures to be applied by controllers in response to clutter observed on the situation display are provided at 18.2 and 18.3 below.

18.1.4 In addition to observable clutter, wind turbines have the potential to generate a variety of other negative affects on ATS systems and these should be

considered by ATS providers when participating in the wind turbine application planning process. CAP764 (CAA Policy and Guidelines on Wind Turbines) provides specific information.

18.1.5 Where clutter of a long term or permanent nature is generated in a particular area, in addition to the procedures at paragraph 18.2 and 18.3, the potential impacts and mitigations should be assessed locally and procedures documented in MATS Part 2.

18.2 **Outside Controlled Airspace**

18.2.1 In the event of clutter being present on the situational display controllers should consider the nature and extent of the clutter and if necessary take the following actions:

- a) For aircraft in receipt of a Deconfliction Service, controllers should inform the pilot of the extent of the clutter and where practicable offer a reroute. However, this may not be possible due to traffic density, airspace availability and/or the requirement to follow specific arrival or departure tracks. The extent of such a reroute should where possible aim to achieve the planned lateral deconfliction minima from the observed clutter. However, it may still be necessary to reduce traffic information/deconfliction advice from the direction of the clutter as detailed at Section 1 Chapter 11.
- b) For aircraft in receipt of a Traffic Service, and those aircraft under a Deconfliction Service that are not rerouted as above, controllers shall inform pilots of a reduction in traffic information/deconfliction advice as detailed at Section 1, Chapter 11, paragraph 2.9. If the controller cannot maintain aircraft identity, the service shall be terminated.
- c) For all surveillance services, in order to maintain track identity of aircraft being vectored to final approach, if re-routing around the clutter is not practicable for the reasons specified above, an alternative type of approach may need to be conducted

F Diagrammatic Development of TMZ Boundaries

F.1 The development of the TMZs has been in accord with the description provided in Section 7. The London Array (LA) TMZ is shown in Figure F.1 and the Thanet Offshore Windfarm (Thanet) TMZ is shown in Figure F.2.

London Array

F.2 The proposed layout of the LA TMZ is shown by the wind turbine symbol within the broken red boundary line of Figure F.1 which depicts the extent of the blanked area to remove the clutter that would be seen on the PSR. The solid red line defines the outer limits of the TMZ required to meet both technical and ATS provision requirements.

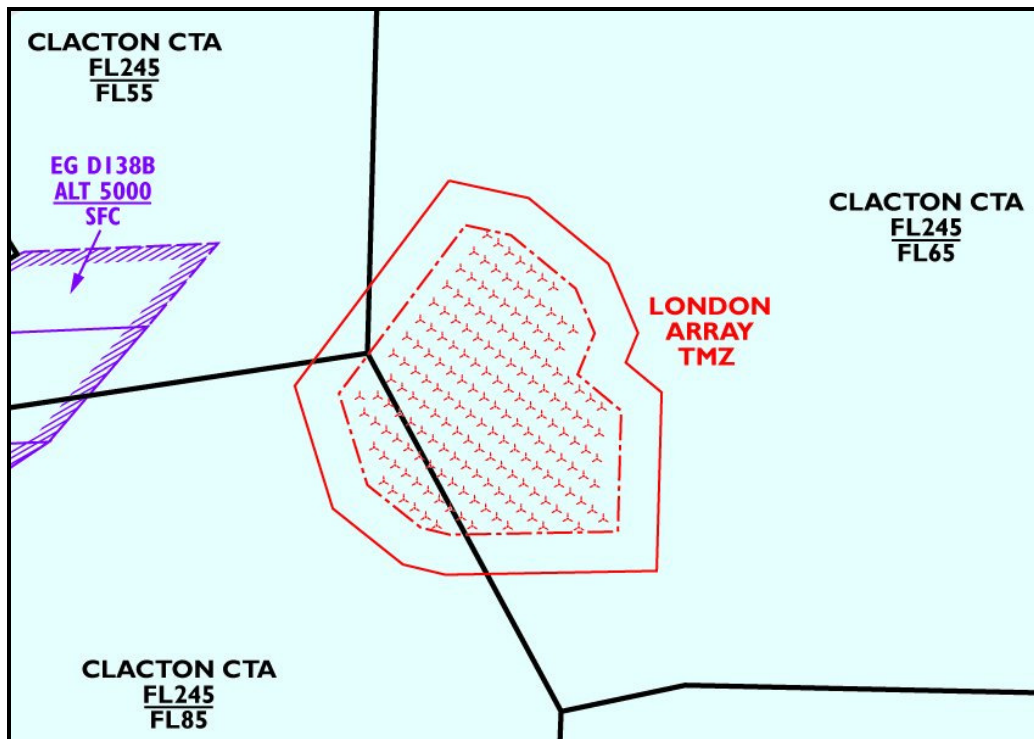


Figure F.1: London Array TMZ

Thanet Offshore Windfarm

- F.3 The same process as described above has been used to determine the boundary of the Thanet TMZ. The results are shown in Figure F.2.

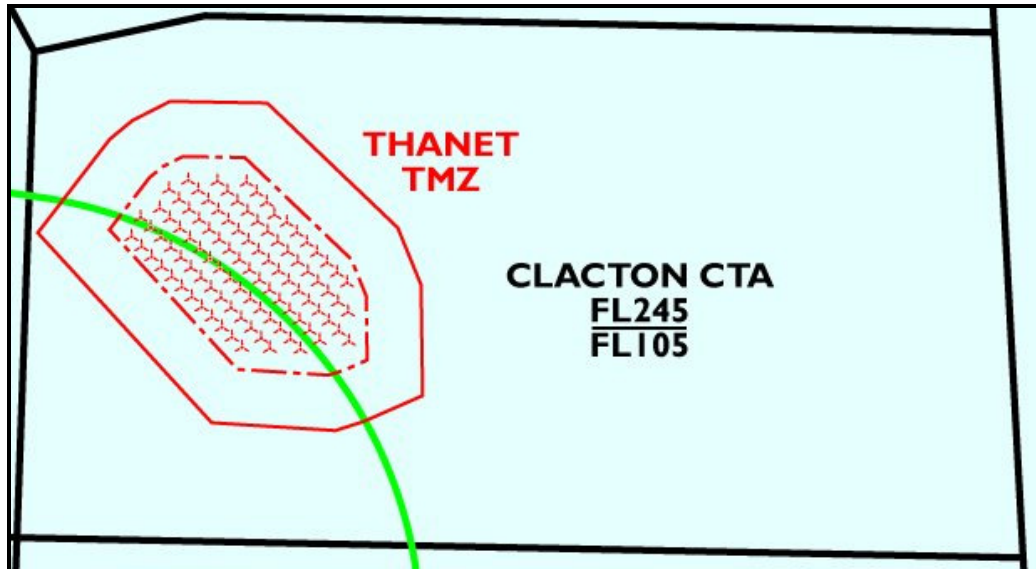


Figure F.2: Thanet Offshore Windfarm TMZ

Current Airspace and Proposed TMZ

- F.4 A diagram showing the two TMZs embedded in the current airspace arrangements is shown at Figure F.3. It should be noted that the LA TMZ would lie under three different segments of the Clacton CTA each of which has a different lower limit. The co-ordinates for each of these segments are described in Appendix G.

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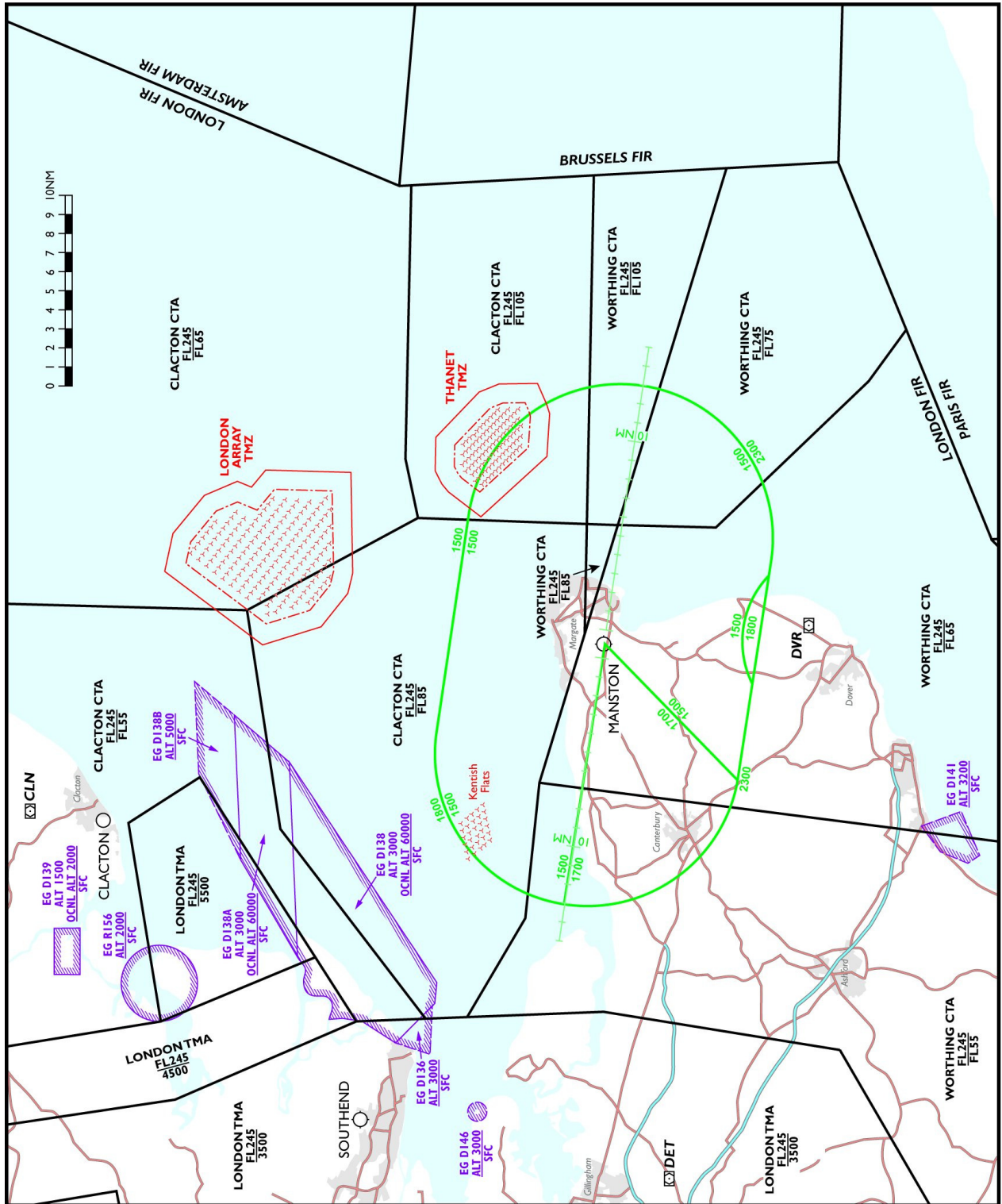


Figure F.3: Current Airspace arrangements and TMZs

G Proposed TMZs - Co-ordinates and AIP Details

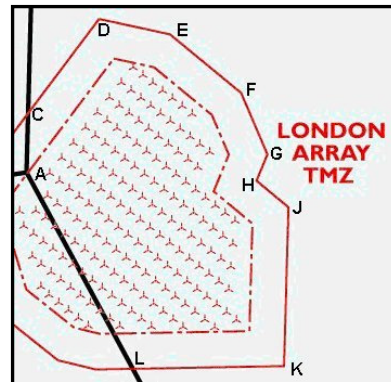
G.1 LA TMZ

G.1.1 The co-ordinates for the LA TMZ are set out according to the controlled airspace under which each segment lies. Note that the letters 'I' and 'O' have not been used as identifiers.

Area LA TMZ-1

WGS 84

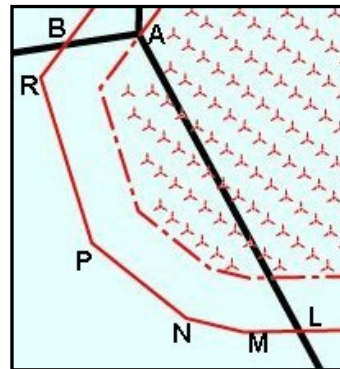
	Lat	Long
C	N51°40'41"	E001°25'16"
D	N51°43'15"	E001°28'41"
E	N51°42'43"	E001°31'51"
F	N51°40'59"	E001°34'56"
G	N51°39'13"	E001°35'59"
H	N51°38'30"	E001°35'26"
J	N51°37'43"	E001°36'48"
K	N51°33'16"	E001°36'15"
L	N51°33'24"	E001°29'27"
A	N51°39'04"	E001°25'04"



Area LA TMZ-2

WGS 84

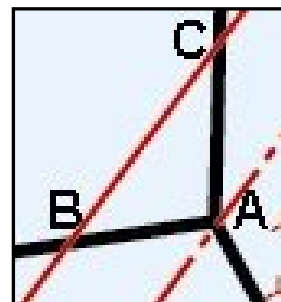
	Lat	Long
L	N51°33'24"	E001°29'27"
M	N51°33'26"	E001°27'48"
N	N51°33'44"	E001°26'07"
P	N51°35'13"	E001°23'25"
R	N51°38'19"	E001°22'07"
B	N51°38'56"	E001°22'56"
A	N51°39'04"	E001°25'04"



Area LA TMZ-3

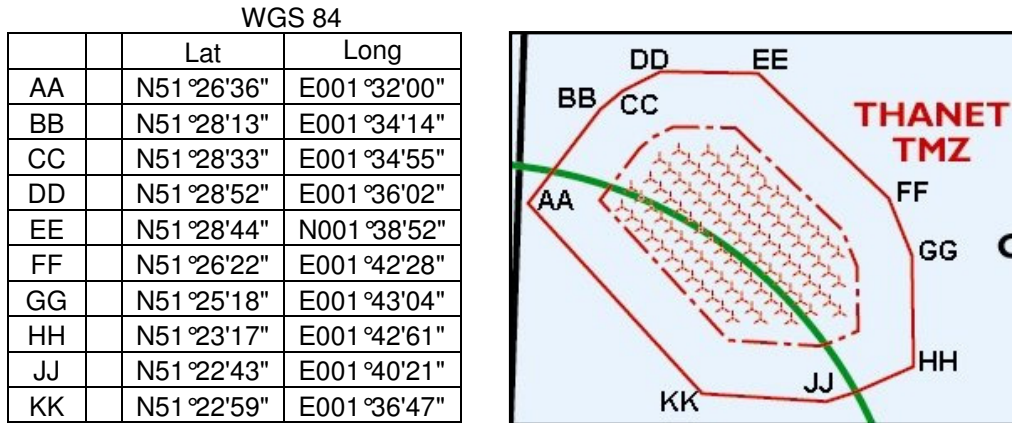
WGS 84

	Lat	Long
A	N51°39'04"	E001°25'04"
B	N51°38'56"	E001°22'56"
C	N51°40'41"	E001°25'16"



G.2 Thanet TMZ

G.2.1 The co-ordinates (WGS-84) for the Thanet TMZ are commensurate with the solid red boundary line shown in Figure F2. Notes that the letters 'll' have not been used as an identifier.



G.3 Proposed AIP Entry

AD2-EGMH 1-8: AD2.21 Flight Procedures: Insert New paragraph 11. Transponder Mandatory Zones (text to follow)

AD2-EGMH 2.24: Insert reference to New Chart AD2-EGMH-3-1
 AD2-EGMH-3-1: New chart: Airspace diagram of Manston TMZs

GEN 1-5 para 5.3.2.2 Insert new bullet:

- The vertical and lateral boundaries of London Array TMZ and Thanet TMZ as detailed in AD2-EGMH AD2.21.

H List of Consultees

1. Aviation Consultees – Airport

Chief Pilot: Flybe
Chief Pilot: Cargolux
Chief Pilot: TG Aviation
Chief Pilot: Kent Police Air Wing
Chief Pilot: Kent Air Ambulance
Chief Pilot: HM Coastguard Helicopters
Chief Pilot: MAFF Fishery Protection Air Wing
DEFRA – Marine Management
Chief Pilot: Summit Aviation
DFTDC
Heli-Charter
Polar Helicopters

2. Aviation Consultees - Other aerodromes

Maypole Aerodrome
London Southend Airport – Manager ATS
Wattisham Airfield

3. Aviation Consultees - National Organisations (NATMAC)

Airport Operators Association
AOPA UK - Martin Robinson
Aviation Environment Federation
BA plc
BAA Limited
BAE Systems
BALPA Chris Evans
BATA S Buck
BBAC
BBGA
BGA
BHPA Tom Hardie
BMAA
BMFA
BPA
BHA
EasyJet
European UAV Systems Centre Ltd
GAPAN C Hodgkinson
GASCo Mike Jackson
GATCO Mark Green

GATCO J Smith
HCGB Jeremy James
Heavy Airlines
LAA
Light Airlines
NATS (NERL)
NATS (NSL)
PPL/IR
UKAB
UKFSC R. Jones

4. Aviation Consultees - Military

MAA
3 AF-UK/A3
DAG (& Chair MUACTION)
HQ DAAvn
Ministry of Defence
MOD Flight Test Regulator

Request response addressed through Chairman MUACTION for consolidated MoD response. (Chairman MUACTION will co-ordinate with OC Ranges)

5. Non-Aviation Consultees - LPAs

Kent County Council
Essex County Council
Thanet District Council
Canterbury City Council
Dover District Council
Medway District Council

Acol Parish Council
Birchington Parish Council
Broadstairs and St Peters Town Council
Cliffsend Parish Council
Manston Parish Council
Minster Parish Council
Monkton Parish Council
St. Nicholas-at-Wade with Sarre Parish Council
KIACC

6. Non-Aviation Consultees - National Organisations

Natural England
CPRE KENT
Friends of the Earth

7. Non-Aviation Consultees - Others

Renewable UK (formerly BWEA)
Vattenfall Group (TOW)
London Array Ltd

Information Addressees**8. Members of Parliament**

Mr Roger Gale MP (North Thanet)
Ms Laura Sandys MP (South Thanet)
Mr Julian Brazier MP (Canterbury)

9. CAA DAP and SRG

DAP Hd Business Management
SRG Hd ATSD
SRG Inspector ATS Operations