

	Safety and Airspace Regulation Group	SARG 1C
Doc Type:	Annex C	Version: 1/2012
Title:	Airspace Change Proposal Operational Assessment	Page 1 of 15

Title of Airspace Change Proposal	MORAY FIRTH TRANSPONDER MANDATORY ZONE
Change Sponsor	NATS on behalf of Beatrice Offshore Windfarms Ltd (BOWL) and Moray Offshore Renewables Ltd (MORL)
SARG Project Leader	[REDACTED]
Case Study commencement date	6 Aug 15 - Doc Check 28 Jul 15
Case Study report as at	16 November 2015

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>

	Safety and Airspace Regulation Group	SARG 1C
Doc Type:	Annex C	Version: 1/2012
Title:	Airspace Change Proposal Operational Assessment	Page 2 of 15

1.	Justification for change and “Option Analysis”	Status
1.1	Is the explanation of the proposed change clear and understood?	
	<p>The change is well understood and in summary is a 3-part solution that includes PSR blanking; the introduction of a Transponder Mandatory Zone (TMZ), and operational mitigation between HIAL Wick Airport and RAF Lossiemouth to control Secondary Surveillance Radar (SSR) within the TMZ and allow Wick non-transponding aircraft to transit the TMZ under the procedural control of Wick (Ratification subject to an approved MOD/Developer Safety Case). Whilst an early application, the timing of the ACP is driven by the need for a decision before the Financial Investment Decision (FID) for the sponsor.</p>	
1.2	Are the reasons for the change stated and acceptable?	
	<p>The reasons for the change are clearly stated in the ACP document. The change is required because the new wind farm extension Wind Turbine Generators (WTGs) at 669ft amsl are ‘highly likely’ to produce clutter on the RAF Lossiemouth Primary Surveillance Radar (PSR). This clutter will be indistinguishable from real aircraft returns and the provision of ATSOCAS in the area would have to react to this clutter. This limitation would have a detrimental impact on the flexible use of the Moray Firth Class G airspace by military and civilian aircraft and on the safety and efficiency of the RAF Lossiemouth QRA and LARS owing to increased ATCO workload.</p>	
1.3	Have all appropriate alternative options been considered, including the ‘do nothing’ option?	
	<p>Six options including the Do Nothing option have been considered in the ACP. The lack of advances in PSR technology allowing a long-term technical solution to the radar, mean the chosen and proposed solution, with implementation of a TMZ, whilst sub-optimal, is an acceptable short-term alternative that will enable the continued efficient use of the affected airspace.</p>	
1.4	Is the justification for the selection of the proposed option sound and acceptable?	
	<p>The suggested solution is the only one that, in the short-term, is financially viable and fully mitigates all the issues associated with the erection of the new, taller WTGs, and the compounding effect of additional clutter on the RAF Lossiemouth PSR. The consented WTGs are theoretically visible to two ATC PSRs. Along with the Lossiemouth PSR, the NATS Allanshill radar will also be affected and the same mitigation applied; radar blanking. In this instance, however, Perwinnes and other radars within the Multi Radar Tracking (MRT) system will be used by NATS to provide primary radar data overhead the wind farms. The compounding effect on the radar picture at Lossiemouth and Allanshill means that radar blanking is required to reduce this, and therefore a TMZ is required to maintain usability of this portion of airspace.</p>	
2.	Airspace Description and Operational Arrangements	Status

	Safety and Airspace Regulation Group	SARG 1C
Doc Type:	Annex C	Version: 1/2012
Title:	Airspace Change Proposal Operational Assessment	Page 3 of 15

2.1	Is the type of proposed airspace clearly stated and understood?	
------------	--	--

The type of proposed airspace is clearly stated and understood. A TMZ is to be established as one element of a proposed three-part mitigation process that all together will allow continued efficient operations in the area of the Moray Firth comprising the Beatrice Offshore Wind Farm (BOWL) and Moray Offshore Renewables Wind Farm (MORL). The impact of the WTGs is described in the technical assessment within the ACP. The proposed solution will ensure that operations by local airspace users can continue in a safe, effective and efficient manner, with minimal if any impact on the environment. There will only be a limited impact on the very occasional airspace users who have no SSR transponder and are either transiting the area or using the HIAL Wick IFPs, but this traffic will be operating under a proposed MoU or LoA between RAF Lossiemouth and HIAL Wick. TMZs have been proved to be an eminently workable solution to similar issues in other geographical locations.

2.2	Are the hours of operation of the airspace and any seasonal variations stated and acceptable?	
------------	--	--

The TMZ will be operational H24, 365 days per year as RAF Lossiemouth maintains a 24 hour Quick Reaction Alert service.

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?	
------------	--	--

No other airspace structures are affected by this change. The proposed TMZ would extend from sea level to the base of Y904 controlled airspace, which is FL75. To the east of Y904, where there is no controlled airspace, the top height of the TMZ would be FL100.

	Safety and Airspace Regulation Group	SARG 1C
Doc Type:	Annex C	Version: 1/2012
Title:	Airspace Change Proposal Operational Assessment	Page 4 of 15

2.4 Is the supporting statistical evidence relevant and acceptable?

The supporting statistical evidence consists of impact assessments of the BOWL and MORL proposed wind farm developments on the RAF Lossiemouth PSR, and the likely impact on traffic operations based on consultation responses and operational analysis. The impact assessments are highly relevant and are the main basis for the described ACP. There will be no impact on any aircraft operations at levels above FL100 as above FL100 transponder carriage is mandatory and for this reason the TMZ ceases at FL100. It is considered that there will be no adverse impact on military and public transport flights (including offshore helicopter operations) as these categories of aircraft are transponder equipped. There is a potential impact on non-transponder equipped aircraft operating inbound/outbound from Wick on published instrument procedures. Aircraft not equipped with an operating transponder will be required to make radio contact with the controlling authority, or Wick ATC will need to obtain permission from RAF Lossiemouth on its behalf. The traffic survey demonstrates that the vast majority of sports and recreational General Aviation (GA) flying in the local area are transponder equipped. There may be additional complexity and an increase in controller workload at Wick if the Wick ATCO is controlling a non-transponder equipped aircraft requiring transit of the TMZ. The 2014 Wick statistics suggest a worst case scenario of 1.15 aircraft movements per day could be non-transponder equipped.

2.5 Is the analysis of the impact of the traffic mix on complexity and workload of operations complete and satisfactory?

This change will have a minimal effect on complexity and operations workload. The TMZ proposal (para 2.16) is over 5.9nm from the nearest coastline, and 10nm from Wick Airport and will have little significant effect on local traffic patterns or operations.

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?

The Developers worked with RAF Lossiemouth and Wick to establish the number of non-transponding aircraft which could be impacted and to agree suitable procedures to ensure non-transponding aircraft following Wick instrument procedures and/or under a procedural service from Wick can be granted access to the TMZ airspace safely. The approval of this ACP will require a MoU/LoA between RAF Lossiemouth and HIAL Wick before implementation date. A draft MoU/ LoA is currently being agreed between Wick and RAF Lossiemouth as a result of the Class E + TMZ airspace changes to Y904. This LoA will be updated with the agreed TMZ access procedures for Wick. A NATS study indicated 0.27 flight per day on average by non transponding ac would be impacted. NATS Aberdeen Local LoAs and MoUs will be updated to reflect how non-transponder equipped aircraft under it's control of can enter and transit the TMZ with permission from the controlling authority. NATS Aberdeen is content with assurances from RAF Lossiemouth these details will be discussed and procedures established in good time, prior to the establishment of the TMZ.

	Safety and Airspace Regulation Group	SARG 1C
Doc Type:	Annex C	Version: 1/2012
Title:	Airspace Change Proposal Operational Assessment	Page 5 of 15

2.7	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?	
------------	---	--

There may be a need to limit the types of military training undertaken in the TMZ as high energy manoeuvres may cause SSR contacts to be temporarily lost. This analysis is being conducted as part of the Annex E safety assessment of the TMZ deployment with RAF Lossiemouth. It is believed that sufficient local airspace, for example D809, exists which can accommodate these high energy manoeuvres. No other aviation activity in the vicinity has been identified and therefore no associated actions are necessary by the Sponsor. Any other activity/unusual aerial activities in this area traditionally take place over coastal areas and do not impinge on the TMZ area.

2.8	Is the evidence that the Airspace Design is compliant with ICAO SARPs, Airspace Design & FUA regulations, and Eurocontrol Guidance satisfactory?	
------------	---	--

Yes. This design is similar to others operating in UK airspace and is compliant with the UK TMZ Policy Statement, Apr 2009.

2.9	Is the proposed airspace classification stated and justification for that classification acceptable?	
------------	---	--

The airspace is currently Class G, and this proposal does not seek to alter this classification. A TMZ does not require an airspace classification change.

2.10	Within the constraints of safety and efficiency, does the airspace classification permit access to as many classes of user as practicable?	
-------------	---	--

Yes. The new TMZ structure offers access to the overwhelming majority of all existing and future users of this airspace, including military, routine commercial traffic and GA. If non-transponding GA aircraft wish to access the area they can do so by prior arrangement with HIAL Wick and through RAF Lossiemouth ATC.

2.11	Is there assurance, as far as practicable, against unauthorised incursions? (This is usually done through the classification and promulgation)	
-------------	---	--

	Safety and Airspace Regulation Group	SARG 1C
Doc Type:	Annex C	Version: 1/2012
Title:	Airspace Change Proposal Operational Assessment	Page 6 of 15

Yes. All associated charts and documentation will be amended and advanced notice will be broadcast for all airspace users through a press notice in line with the procedures stated in CAP 725. There is an identified need, in this case, for the TMZ area to include a buffer around the RAG blanked areas. This buffer is to give RAF Lossiemouth ATC an opportunity to identify any non-transponder aircraft that appear to be entering the TMZ before the radar returns are lost in the RAG blanking area. The deployment of similar TMZ mitigation within the UK has highlighted that a 2nm buffer is the preferred margin. A 2nm buffer would allow an ATCO one minute to identify a non-transponder GA aircraft track (presuming 120kts over sea speed) and 18 seconds to identify a non-transponder military fast-jet aircraft track (presuming 400kts over sea speed). This also provides additional risk mitigation against non transponder equipped aircraft using the Wick IFPs.

Where airspace structures exist in close proximity to the TMZ buffer, such as the western edge of Y904, these structures have been incorporated into the design of the TMZ for ease of charting; this results in the buffer marginally exceeding 2nm on the western edge of the proposed TMZ, but will make the cartography surrounding the windfarms neater as it then maps against the existing airspace structure. This will be easier to identify use/avoid from a users point of view which could aid proper usage and reduce risk of infringement .

2.12	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?	
-------------	---	--

Yes. Any aircraft wishing to operate within the area during the service provision hours of operation can do so providing they are SSR equipped without a specific permission or communication fitment. Non-transponder equipped aircraft will normally be permitted to operate within the area through a permission issued by RAF Lossiemouth ATC. By establishing a TMZ as small as practicable, a service around the area could be offered with minimal impact to routing, especially as the area is off-shore and does not impinge on popular traffic routes along the coast. Within the boundaries of the proposed TMZ local ANSPs can provide: Deconfliction Service, Traffic Service, Procedural Service, and Basic Service.

2.13	Are appropriate arrangements for transiting aircraft in place in accordance with stated commitments?	
-------------	---	--

Yes. Any aircraft wishing to transit the area during the service provision hours of operation can do so providing they are transponder equipped. Non-transponder equipped aircraft can seek approval to transit the area through a permission issued by RAF Lossiemouth ATC.

2.14	Are any airspace user group's requirements not met?	
-------------	--	--

No. Operations can continue as normal if this solution is implemented. An objection to the proposal by HIAL Wick is recorded in the Consultation Assessment. This objection is fully considered in accordance with CAA statutory obligations, and the concerns should be mitigated by the agreement with RAF Lossiemouth.

2.15	Is any delegation of ATS justified and acceptable? (If yes, refer to Delegated ATS Procedure).	
-------------	---	--

	Safety and Airspace Regulation Group	SARG 1C
Doc Type:	Annex C	Version: 1/2012
Title:	Airspace Change Proposal Operational Assessment	Page 7 of 15

No delegation of ATS is required.

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. The proposed TMZ is the minimum practical dimensions to meet the safety and operational requirements of all airspace users. There will be no impact on any aircraft operations at levels above FL100 as above FL100 transponder carriage is mandatory and for this reason the TMZ ceases at FL100. Where airspace structures exist in close proximity to the TMZ buffer, such as the western edge of Y904, these structures have been incorporated into the design of the TMZ for ease of charting; this results in the buffer marginally exceeding 2nm on the western edge of the proposed TMZ.

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).	
-------------	---	--

Current buffer policy for segregated airspace does not apply to TMZs and is assessed on a case by case basis, however there is an identified need for this TMZ area to include a buffer around the RAG blanked areas. This buffer is to give RAF Lossiemouth ATC an opportunity to identify any non-transpondering aircraft that appear to be entering the TMZ before the radar returns are lost in the RAG blanking area. This also provides additional risk mitigation against non transponder equipped aircraft using the Wick IFPs. The deployment of similar TMZ mitigation within the UK has highlighted that a 2nm buffer is the preferred margin. The TMZ boundaries proposed by the case officer are assessed as adequate and appropriate for the purpose of providing the operational mitigation identified against the WTGs and associated PSR suppression as identified in the Safety Case documentation.

The area of the Range Azimuth Gating (RAG) covering the Beatrice and Moray offshore wind developments has been designed to accommodate the area likely to be affected by returns from the wind turbines, with the TMZ covering the same area plus a buffer zone around the perimeter. Although the extent of the RAG and subsequently the TMZ has been designed to encompass the entire area likely to be affected, there is a risk that turbine returns will extend beyond the RAG thus reducing the buffer zone. Additionally, there is also a risk that an area of reduced probability of detection will extend outside the boundary of the TMZ, more likely in the area beyond the wind farm when viewed from the direction of the radar, however there is a very low risk that this will also occur along the remainder of the TMZ boundary. **The sources of both of these risks are the dimensions of the wind turbines – which are much greater than those previously seen within the coverage of a MOD Watchman radar – along with the observation of wind turbine shadows during Air Defence radar trials.**

	Safety and Airspace Regulation Group	SARG 1C
Doc Type:	Annex C	Version: 1/2012
Title:	Airspace Change Proposal Operational Assessment	Page 8 of 15

However, it will not ultimately be known if these risks will occur until after the wind farm(s) have been built and the RAG applied. Therefore, should either of these risks arise, it may be necessary to request a refinement of the TMZ boundary as appropriate, reducing/extending it as necessary and if required. This likelihood of requesting a TMZ boundary refinement is considered to be more likely along the perimeter of the TMZ furthest from the Watchman radar, rather than at the sides or in front where there may be a possibility of reducing the TMZ boundary in these areas

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?	
-------------	---	--

The proposal describes a 3-element solution to mitigate the expected PSR clutter effects. PSR blanking, the introduction of a TMZ and permission for RAF Lossiemouth to control SSR only within the TMZ. It is the latter permission that will ensure RAF Lossiemouth ATC can continue to apply the prescribed separation criteria between traffic operating both inside and outside the TMZ.

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?	
-------------	--	--

There are no terrain clearance issues of concern as the proposed change only concerns an off-shore airspace structure.

2.20	If the new structure lies close to another airspace structure or overlaps an associated airspace structure, have appropriate operating arrangements been agreed?	
-------------	---	--

The proposed TMZ extends up to the base of CAS Y904 but requires no change to existing operating arrangements for CAS traffic.

2.21	Where terminal and en-route structures adjoin, is the effective integration of departure and arrival routes achieved?	
-------------	--	--

The proposed solution does not impact where terminal and en-route structures adjoin.

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:	
------------	---	--

▪ 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 S&S Section?	
-------------------------	--	--

- No change to existing communication infrastructure is necessary as part of the proposed solution.

	Safety and Airspace Regulation Group	SARG 1C
Doc Type:	Annex C	Version: 1/2012
Title:	Airspace Change Proposal Operational Assessment	Page 9 of 15

<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? e.g. Nav aids – has coverage assessment been made eg. a DEMETER report, and if so, is it satisfactory? 	
---	--

- Not applicable.

<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? 	
---	--

An assessment of the impact of the WTGs on RAF Lossiemouth's PSR is provided in the ACP document. Services provided by RAF Lossiemouth in this area would be significantly disrupted if the proposed solution is not implemented. This would result in a reduction of usable airspace by virtue of Lossiemouth not being able to offer a radar service through areas of clutter. The area of the Range Azimuth Gating (RAG) covering the Beatrice and Moray offshore wind developments has been designed to accommodate the area likely to be affected by returns from the wind turbines, with the TMZ covering the same area plus a buffer zone around the perimeter. Although the extent of the RAG and subsequently the TMZ has been designed to encompass the entire area likely to be affected, there is a risk that turbine returns will extend beyond the RAG thus reducing the buffer zone. Additionally, there is also a risk that an area of reduced probability of detection will extend outside the boundary of the TMZ, more likely in the area beyond the wind farm when viewed from the direction of the radar, however there is a very low risk that this will also occur along the remainder of the TMZ boundary. **The sources of both of these risks are the dimensions of the wind turbines – which are much greater than those previously seen within the coverage of a MOD Watchman radar** – along with the observation of wind turbine shadows during Air Defence radar trials.

However, it will not ultimately be known if these risks will occur until after the wind farm(s) have been built and the RAG applied. Therefore, should either of these risks arise, it may be necessary to request a refinement of the TMZ boundary as appropriate, reducing/extending it as necessary and if required. This likelihood of requesting a TMZ boundary refinement is considered to be more likely along the perimeter of the TMZ furthest from the Watchman radar, rather than at the sides or in front where there may be a possibility of reducing the TMZ boundary in these areas

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?	
------------	---	--

	Safety and Airspace Regulation Group	SARG 1C
Doc Type:	Annex C	Version: 1/2012
Title:	Airspace Change Proposal Operational Assessment	Page 10 of 15

Not applicable.

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. Charts and coordinates have been provided and these details are sufficient to provide the required detail for cartographic purposes.

4.2	Do the charts clearly indicate the proposed airspace change?	
-----	---	--

The proposed TMZ and geographic WTG boundaries are clearly indicated by the supplied charts and/or data points. Vertical dimension is also clearly described (ACP 4.2.1-4 Pages 20-21) and straightforward.

4.3	Has the Change Sponsor identified AIP pages affected by the Change Proposal and provided a draft amendment?	
-----	--	--

AIP pages are identified in ACP 11 page 35 and a draft amendment has been provided as the proposed implementation is targeted for 29 March 2018, AIRAC 2018/4; however, the ACP requires early approval prior to the sponsor's Financial Investment Decision date Q4 2015.

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>	

	Safety and Airspace Regulation Group	SARG 1C
Doc Type:	Annex C	Version: 1/2012
Title:	Airspace Change Proposal Operational Assessment	Page 11 of 15

The impact is minimal and the mitigation, specifically on VFR general aviation traffic, is rational and satisfactory. There is a potential impact on non-transponding non-radio equipped aircraft flying in this area. However, the TMZ boundary is over 5.97nm off-shore, and 10nm from Wick Airport (8.6nm from Wick LCT) and the evidence collated of this type of flight which has been assessed is that traffic levels are minimal. In addition, in order to remove this issue there will be a facility for non-transponding aircraft to request transit of the TMZ from the controlling authority if they make radio contact with the controlling authority (RAF Lossiemouth) 5 minutes prior to planned entry of the TMZ. The controlling authority will give authorisation for transit at a specific altitude and for a specific time period wherever possible.

b) Impact on VFR Routes.	
---------------------------------	--

Nil, subject to the operational mitigations described at 5.1..

c) Consequential effects on procedures and capacity, ie on SIDS, STARS, holds. Details of existing or planned routes and holds.	
--	--

No change to current procedures providing the proposed 3-part preferred solution is implemented in full.

d) Impact on Airfields and other specific activities within or adjacent to the proposed airspace.	
--	--

Other airfields operating in the local area have documented the fact that there will be no impact on their current operations, other than HIAL Wick who documented concerns over non-transponding aircraft utilising the Wick IFPs near to the TMZ. However this is mitigated by the RAF Lossiemouth and HIAL Wick LOUs required for implementation of this ACP.

e) Any flight planning restrictions and/or route requirements.	
---	--

Nil.

5.2	Does the Change Sponsor Consultation letter reflect the likely operational impact of the change?	
------------	---	--

Yes. The language used and the technical explanation is tailored to ensure non-aviation audiences would understand the concept and issues.

6.	Economic Impact	Status
6.1	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).	

	Safety and Airspace Regulation Group	SARG 1C
Doc Type:	Annex C	Version: 1/2012
Title:	Airspace Change Proposal Operational Assessment	Page 12 of 15

The proposed TMZ is not assessed to be significant from an economic perspective. It is anticipated that there will be little, if any, traffic displacement resulting from this change. Traffic patterns in the Moray Firth area were analysed in separate surveys and the impact of this change on GA operations is assessed as negligible.

Case Study Conclusions – To be completed by AR Project Leader	Yes/No
Has the Change Sponsor met the AR Airspace Change Proposal requirements and Airspace Regulatory requirements above?	

The Change Sponsor has been fully compliant with all the above.

--

Outstanding Issues

Serial	Issue	Action Required
1	The MOD has identified 2 potential risks of performance limitations to the coverage of a MOD Watchman radar due to RAG as a result of the increased size of the WTGs as described at Para 2.17 and 3.1, which will not be able to be assessed until after the WTGs are operational and the RAG applied, and which may require a subsequent TMZ boundary refinement.	The MOD/Sponsor/Developer will be required to conduct an assessment, as soon as practicable, and within the one year Post Implementation Review, post construction and on commencement of operation of proposed WTGs to confirm satisfactory application of RAG and containment of clutter within the proposed TMZ boundary. Evidence of the assessment confirming successful mitigation is to be provided and is to be in advance of the PIR or the change sponsor is to propose revised dimensions of the Moray TMZ boundaries.

Additional Compliance Requirements (to be satisfied by Change Sponsor)

Serial	Requirement

	Safety and Airspace Regulation Group	SARG 1C
Doc Type:	Annex C	Version: 1/2012
Title:	Airspace Change Proposal Operational Assessment	Page 13 of 15

1	RAF Lossiemouth and HIAL Wick should record full details of all instances where access to the TMZ is denied for any reason. This log will be reviewed as part of the Post Implementation Review.
2	The approval of this ACP will require a MoU/LoA between RAF Lossiemouth and HIAL Wick before implementation date.
3	The MOD/Sponsor/Developer will be required to conduct an assessment, as soon as practicable, and within the one year Post Implementation Review, post construction and on commencement of operation of proposed WTGs to confirm satisfactory application of RAG and containment of clutter within the proposed TMZ boundary. Evidence of the assessment confirming successful mitigation is to be provided and is to be in advance of the PIR or the change sponsor is to propose revised dimensions of the Moray TMZ boundaries.

Recommendations	Yes/No
------------------------	---------------

Is the approval of the SoS for Transport required in respect of the Environmental Impact of the airspace change?	
---	--

No -The Environmental Assessment concludes that as it is anticipated that the proposal will not result in a significant detrimental environmental impact approval from the Secretary of State is not necessary for this proposal.

Is the approval of the MoD required in respect of National Security issues surrounding the airspace change?	
--	--

No - There are no issues associated with National Security and the MoD has no objection to the ACP subject to the following caveats:

- a. The TMZ continues to be an interim solution to the interference issues caused by this proposed development on the RAF Lossiemouth PSR.
 - b. The developers honour their agreement to fund the implementation of Range and Azimuth Gating hardware that will be required by the RAF Lossiemouth PSR, and that this proves effective at removing the radar clutter within the proposed TMZ whilst ensuring that there is no negative impact on the remainder of the PSR's coverage
 - c. The developers honour their agreement to provide funding to identify, trial and subsequently implement a long-term technical solution and, once operational, cancel this TMZ as part of the ongoing Post Implementation Review process.
 - d. The Safety Case being completed by the Developers and Generation Development, SSE is approved by the RAF Lossiemouth Duty Holder chain.
-

	Safety and Airspace Regulation Group	SARG 1C
Doc Type:	Annex C	Version: 1/2012
Title:	Airspace Change Proposal Operational Assessment	Page 14 of 15

General Summary

The 3-part solution proposed in this ACP appropriately balances the requirements of current and future airspace users in a proportionate and efficient manner. If the proposed wind farm extension was implemented without the ACP solution described then there would be a significant impact on the current operations for RAF Lossiemouth traffic. Other airspace users requiring a service from RAF Lossiemouth ATC would also experience disruption with either a re-routing or limited ATS. Technical PSR solutions are in the advanced stages of design; however, as yet there is no technical solution that offers the highest levels of mitigation to the radar clutter effects and has the associated UK safety case required allowing unhindered ATC services in this area.

Comments

The revised TMZ proposal addresses the objection and creates an efficient ACP which is the minimum practical size to meet the safety and operational requirements, whilst having minimal impact on other airspace users. The inclusion of a TMZ Buffer Zone is assessed on a case by case basis and is appropriate in this proposal as:

1. The late uncertainty from the MOD as to the effect of the increased size of the blades, which will be reviewed as soon as practicable post implementation must be assessed, but may help to negate the need for the buffer zone in the future and redefine the actual size of the proposed TMZ.
2. it provides additional risk mitigation against non transponder equipped aircraft using the Wick IFPs
4. The buffer zone makes the cartography surrounding the windfarms neater as it then maps against the existing airspace structure, which then is easier to identify use/avoid from a users point of view which could aid proper usage and reduce risk of infringement.

Observations

The TMZ solution should be regularly reviewed and assessed with consideration for future PSR technical advancements to mitigate PSR clutter. An acceptable level of mitigation should be developed and used to assess the suitability of technical advancements that would enable the removal of the TMZ in the future.

	Safety and Airspace Regulation Group	SARG 1C
Doc Type:	Annex C	Version: 1/2012
Title:	Airspace Change Proposal Operational Assessment	Page 15 of 15

Operational Assessment Sign-off/Approvals			
	Name	Signature	Date
Operational Assessment completed by (DAP Project Leader)	[REDACTED]	[REDACTED]	Dec 15
Operational Assessment approved by (Head of Section)	[REDACTED]	[REDACTED]	Dec 15

Case Study Sign-off/Approvals			
I recommend that the TMZ is approved subject to there being no technical solution by the date of implementation.			
	Name	Signature	Date
Case Study Assessment Conclusions approved by (Hd AAA)	[REDACTED]	[REDACTED]	Dec 15

Dir SARG Comment/Approval			
Approved as per note above.			
Name	[REDACTED] D SARG	Signature	[REDACTED]
		Date	Dec 15