

CAA Operational Assessment

Title of airspace change proposal	Moray Offshore Windfarm (West)
Change sponsor	NATS
Project no.	ACP-2019-72
SARG project leader	██████████
<i>Case study commencement date</i>	17 May 2021
<i>Case study report as at</i>	28 July 2021
<p><i>Instructions</i></p> <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 SARG project leader’s efficient project management it may be useful that each question is also highlighted accordingly to illustrate what is:</p> <p>resolved Green not resolved Amber not compliant Red</p>	
Executive Summary	
<p>Moray Offshore Wind Farm (West) Ltd (MOWWL) is intending to develop an offshore wind farm in the Moray Firth. The proposed wind farm will cover an area of approximately 225 km² and is located around 22.5 km (12.1 NM) from the Caithness coastline and 24 km (13 NM) from the Aberdeenshire coastline. It will be situated adjacent to the Beatrice (BOWL) and Moray East (MOWEL) developments and will contain up to 85 Wind Turbine Generators (WTGs).</p> <p>WTGs can interfere with air traffic control radars and NATS identified that the MOWWL wind farm has the potential to be detected by the Allanshill Primary Surveillance Radar (PSR). Detection on the PSR would have the potential to cause false radar returns to be displayed to an Air Traffic Control Officer (ATCO). This radar “clutter” could obscure primary returns from actual aircraft and could also interfere with radar tracking. This could affect an ATCO’s ability to identify primary radar aircraft returns and increases the risk of the ATCO not detecting a conflict between aircraft. Large numbers of turbines could also lead to saturation of the radar processing systems.</p> <p>Radar Range & Azimuth Gating (RAG), more commonly known as radar blanking, is the proposed solution to be deployed over the area of the wind farm before it is constructed, to prevent primary radar detection of the WTGs. However, radar blanking will also remove primary radar returns of aircraft</p>	

within the blanked area and the sponsor of this Airspace Change Proposal (ACP) propose that a Transponder Mandatory Zone (TMZ) will need to be established in the same area so that aircraft will remain visible to ATC using Secondary Surveillance Radar (SSR).

1.	Justification for change and options analysis (operational/technical)	Status
1.1	Is the explanation of the proposed change clear and understood?	Yes
	The submission is based upon a number of similar previous submissions and provides a clear explanation of the proposal, describes the use of radar blanking to prevent the clutter associated with WTGs affecting ATCOs' displays and explains the need to introduce a TMZ to enable the continued provision of ATS to aircraft operating in the area through the use of SSR.	
1.2	Are the reasons for the change stated and acceptable?	Yes
	The reasons for the change are clearly stated in the submission document. The sponsor describes the intent to construct the offshore wind farm and highlights that WTGs can cause false radar returns, or clutter, to appear on radar screens. Further explanation is provided to describe the potential impact of this clutter on the ability of an ATCO to safely and effectively provide ATS to aircraft operating in an area affected by the issue. The requirement to provide mitigation for the resulting loss of radar fidelity in the 'blanked' area through the use of a TMZ is also clearly stated and acceptable.	
1.3	Have all appropriate alternative options been considered, including the 'do nothing' option?	Yes
	In Stage 2 of the ACP process, the sponsor provided consideration of a Do Nothing option, use of a TMZ coincident with the radar blanked area to enable continued provision of ATS, and offered information detailing non-airspace alternatives that had been discounted as not viable. Therefore, the options considered were largely confined to variations of the detail pertaining to the introduction of a TMZ with differing considerations of exact size and shape.	
1.4	Is the justification for the selection of the proposed option sound and acceptable?	Yes
	The justification for selection of the preferred option is logical and acceptable; it also accords with similar solutions used elsewhere in the wind farm industry and, crucially in this instance, mirrors the approved solutions for the BOWL and MOWEL wind farm areas which will result in a single, continuous construct with the same specifications applied throughout the area.	
2.	Airspace description and operational arrangements	Status
2.1	Is the type of proposed airspace design clearly stated and understood?	Yes
	The type of proposed airspace is clearly stated in the submission and is well understood. Radar blanking will be implemented on the Alanshill PSR to cover the area of the wind farm development. The boundary of this area will have a 2nm mile buffer applied, it will be smoothed to a regular shape and it will then be aligned with the adjacent BOWL and MOWEL TMZ implementations; the resultant area will be covered by a TMZ from SFC to FL100.	

2.2	Are the hours of operation of the airspace and any seasonal variations stated and acceptable?	Yes
	The Sponsor proposes that the TMZ will be active H24, with no hours of operation or seasonal variation applied. This is considered acceptable as it accords with the wind farm H24 operation and is required in order to maintain safe operations of aircraft in the vicinity.	
2.3	Is any interaction with adjacent domestic and international airspace structures stated and acceptable including an explanation of how connectivity is to be achieved? Has the agreement of adjacent States been secured in respect of High Seas airspace changes?	Yes
	The proposed TMZ will merge with the BOWL (existing) and MOWEL (approved for implementation) TMZs. This will enlarge the Moray Firth TMZ to cover the entire wind farm complex which will then include the Beatrice offshore wind farm development, and the Moray East & West offshore wind farm developments. Intended operation of the Moray Firth TMZ will remain consistent as it expands to include each development and will be described in the LoA between Wick Airport and RAF Lossiemouth (the designated controlling authority). This document will be updated as each development is included. There is no interaction with international airspace structures.	
2.4	Is the supporting statistical evidence relevant and acceptable?	Yes
	The sponsor analysed PSR and SSR returns in the area from August 2019 data as a representative peak period. This indicated that 0.7%, or less than 2 flights per week, were undertaken by airspace users that were not displaying the use of a transponder. It was therefore concluded that the impact of the introduction of a TMZ in this area would be negligible. This use of statistical evidence is considered relevant and acceptable to this proposal.	
2.5	Is the analysis of the impact of the traffic mix on complexity and workload of operations complete and satisfactory?	Yes
	The proposed TMZ lies approximately 22.5km from the Caithness coastline and 24km from the Aberdeenshire coastline and is therefore not expected to have any impact on local traffic patterns or operations. As a result, the complexity and workload of operations for ATCOs is not expected to change.	
2.6	Are any draft Letters of Agreement and/or Memoranda of Understanding included and, if so, do they contain the commitments to resolve ATS procedures (ATSD) and airspace management requirements?	Yes
	There is an extant LoA between Wick Airport and RAF Lossiemouth that defines the procedures to be used to provide ATS within the existing Moray Firth TMZ. A draft copy of this has been included with the ACP submission that defines the LoA for the expanded Moray Firth TMZ, effective 25 th January 2024. This LoA is considered effective and acceptable.	
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 change sponsor carried out to resolve any conflicting interests?	Yes

	Due to the offshore location of the proposed TMZ, no other aviation activity of the types listed has been identified in the vicinity that would be affected by its introduction and, therefore, no additional actions are required of the Sponsor. Military traffic that may operate in the vicinity, including at low level, will be transponder equipped and will therefore be unaffected by the introduction of the proposed TMZ. In addition, the offshore helicopter operators operating locally were included as stakeholders by the sponsor. All operate aircraft that are transponder equipped and will be unaffected by the introduction of this TMZ; all responded positively to the consultation. Finally, in response to this question, the sponsor has stated that 'Should this occur, we would act appropriately and expeditiously'.	
2.8	Is the evidence that the airspace design is compliant with ICAO SARPs, airspace design & FUA regulations, and Eurocontrol guidance satisfactory?	Yes
	The sponsor clearly states that, if approved, the TMZ will be implemented in accordance with ICAO SARPs.	
2.9	Is the proposed airspace classification stated and justification for that classification acceptable?	Yes
	The introduction of the proposed TMZ will not alter the existing background airspace classification, which is Class G.	
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 proposed TMZ would enable continued access to the airspace affected by the introduction of WTGs within the MOWWL wind farm development to the vast majority of airspace users. However, non-transponder equipped aircraft would be prevented from accessing the airspace located within the proposed TMZ unless they were able to negotiate access to the TMZ through the Controlling Authority, as stated in the CAA's TMZ Policy, which the sponsor commits to enabling. The sponsor has provided evidence to indicate that, due to its offshore location, the number of aircraft this would affect is negligible; less than 2 flights per week during August 2019.	
2.11	Is there assurance, as far as practicable, against unauthorised incursions? (This is usually done through the classification and promulgation.)	Yes
	As well as the appropriate notification of the proposed TMZ, the design of the proposal provides additional mitigation against unauthorised incursion in the form of a buffer. The area affected by the implementation of radar blanking to the Alanshill PSR is smoothed to a regular shape and surrounded by a 2nm buffer to create the TMZ. PSR returns will be received from aircraft as they cross the TMZ outer boundary and as they transit the 2nm buffer; PSR returns will no longer be received only once they cross the outer boundary of the radar blanking area. The sponsor indicates that, for a non-transponder equipped aircraft travelling at 200kts, this will ensure it remains 'visible' to an ATCO for at least 36 seconds as it transits the 2nm buffer area. It is suggested that the time it takes a non-equipped aircraft to transit the 2nm buffer zone is sufficient to enable the ATCO to observe the incursion and to intervene.	
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

	As discussed at para 2.10, the sponsor has indicated its commitment to the provisions in the CAA's TMZ Policy which states at para 6.1b: A pilot wishing to operate in a TMZ without serviceable transponder equipment may be granted access subject to specific arrangements agreed with the TMZ Controlling Authority.	
2.13	Are appropriate arrangements for transiting aircraft in place in accordance with stated commitments?	Yes
	Appropriate arrangements for transiting aircraft are detailed in the existing LoA between Wick Airport and RAF Lossiemouth, which has been updated to reflect the implementation of the proposed MOWWL TMZ and included as a draft version in the ACP submission. The LoA makes provision for the commitments stated by the sponsor.	
2.14	Are any airspace user group's requirements not met?	Yes
	It is possible that some of the non-transponder equipped aircraft may seek approval to transit the TMZ from the controlling authority and be denied such approval for operational or safety reasons. In the worst case, all such requests would be denied which would impact less than 2 flights per week during the busiest month of the year (based upon the statistical evidence presented relating to August 2019). Therefore, at the highest level of impact, the hypothetical airspace user group whose requirements may not be met would equate to 0.7% of traffic operating in the area of the proposed TMZ.	
2.15	Is any delegation of ATS justified and acceptable? (If yes, refer to Delegated ATS Procedure).	Yes
	No delegation of ATS is required.	
2.16	Is the airspace design 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 airspace design proposes an area of sufficient dimension to enclose the radar blanking required to remove all anticipated clutter effects on the Alanshill PSR plus an additional 2nm-wide area surrounding the blanked volume of airspace to define the TMZ boundary. This additional 2nm boundary is required to afford ATCOs time to assimilate and act upon a potential infringement by a non-transponder equipped aircraft.	
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.)	N/A
	Not Applicable.	

2.18	Do ATC procedures ensure the maintenance of prescribed separation between traffic inside a new airspace structure and traffic within existing adjacent or other new airspace structures?	Yes
	Aircraft operating within the proposed TMZ boundary (class G airspace) and the surrounding class G airspace will be operating in accordance with applicable visual or instrument flight rules. Extant procedures for separation will remain unchanged; however, non-transponder equipped aircraft will be required to route such that they remain outside of the proposed TMZ unless operating under agreement of the controlling authority.	
2.19	Is the airspace structure designed to ensure that adequate and appropriate terrain clearance can be readily applied within and adjacent to the proposed airspace?	Yes
	There are no terrain clearance issues associated with the proposed TMZ as the area of concern is situated approximately 22.5km offshore.	
2.20	If the new structure lies close to another airspace structure or overlaps an associated airspace structure, have appropriate operating arrangements been agreed?	Yes
	The proposed new structure will merge with the existing Moray Firth TMZ and extend it to encompass the MOWWL development. The existing LoA between Wick Airport and RAF Lossiemouth has been drafted to incorporate this change and place the entire TMZ under the controlling authority of RAF Lossiemouth.	
2.21	Where terminal and en-route structures adjoin, is the effective integration of departure and arrival routes achieved?	N/A
	Not Applicable.	
3.	Supporting resources and communications, navigation and surveillance	Status (CNS) infrastructure
3.1	Is the evidence of supporting CNS infrastructure together with availability and contingency procedures complete and acceptable? The following are to be satisfied:	Yes
	<ul style="list-style-type: none"> Communication: Is the evidence of communications infrastructure including RT coverage together with availability and contingency procedures complete and acceptable? Has this frequency been agreed with AAA Infrastructure? 	Yes
	No change to existing communication infrastructure is required as a consequence of the proposed enlargement of the Moray Firth TMZ. Existing coverage provides empirical evidence of the suitability of the current situation.	

	<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? For example, for navaids, has coverage assessment been made, such as a DEMETER report, and if so, is it satisfactory? 	N/A
	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? 	Yes
	The predicted impact of the installation of a further 85 WTGs to form the MOWWL development in the vicinity of the existing BOWL and MOWEL developments led to the requirement for consideration of this ACP. The proposed implementation of Alanshill PSR radar blanking and an associated TMZ in the area is considered the optimum solution to facilitate continued safe use of the affected airspace.	
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?	N/A
	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?</p> <p>(We would expect sponsors to include clear maps and diagrams of the proposed airspace structure(s) – they do not have to accord with aeronautical cartographical standards (see airspace change guidance), rather they should be clear and unambiguous and reflect precisely the narrative descriptions of the proposals.)</p>	Yes
	The sponsor has provided charts which have been overlaid with figures that depict the Moray Firth TMZ prior to the addition of this proposed extension, a second figure on the same chart that shows this proposed extension and a separate chart simply showing the final Moray Firth TMZ construct encompassing the BOWL, MOWEL and MOWWL developments. The representations are very clear and easily understood. Two tables that provide the latitude and longitude coordinates of the vertices in both decimal degrees format and in degrees, minutes & seconds format for the figures on each chart are also provided.	
4.2	Do the charts clearly indicate the proposed airspace change?	Yes

	The charts clearly depict the proposed TMZ extension and the final size and shape of the construct that will cover all 3 wind farm developments.	
4.3	Has the change sponsor identified AIP pages affected by the change proposal and provided a draft amendment?	Yes
	The sponsor has identified AIP pages that will be affected by the introduction of the proposed extension to the Moray Firth TMZ. A draft amendment has also been provided.	
4.4	Has the change sponsor completed the WGS84 spreadsheet and submitted to the CAA for approval?	Yes
	The AeroData spreadsheet has been submitted for approval.	
5.	Operational impact	Status
5.1	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:	Yes
	a) Impact on IFR General Aviation traffic, on Operational air traffic or on VFR General Aviation traffic flow in or through the area.	Yes
	The Sponsor's analysis indicates that the implementation of the proposed TMZ would only impact non-transponder equipped aircraft, as such traffic will be required to remain outside of the proposed TMZ unless a clearance to enter has been negotiated with the controlling authority. However, the TMZ would be located approximately 22.5km offshore and the statistical evidence provided indicates that a negligible quantity of traffic movements (~2 flights per week in peak period) would potentially be impacted by the proposal. This analysis is considered complete, appropriate and satisfactory.	
	b) Impact on VFR Routes.	N/A
	Not applicable.	
	c) Consequential effects on procedures and capacity, i.e. on SIDs, STARs, holds. Details of existing or planned routes and holds.	Yes
	The sponsor has assessed that there will be no consequential impacts on procedures or capacity.	

	d) Impact on airfields and other specific activities within or adjacent to the proposed airspace.	Yes
	The sponsor has assessed that there will be no impact on airfields and other aviation activities within, or adjacent to, the proposed TMZ. This is supported by the stakeholder responses received during the consultation for this proposal. The majority of commercial stakeholders, including offshore helicopter operators and SAR providers, responded in support of the extension of the Moray Firth TMZ to include the MOWWL development and raised no concerns of consequential impact.	
	e) Any flight planning restrictions and/ or route requirements.	Yes
	There would be no impact, restriction or change to current flight plan or route requirements for applicable operations in the area of the proposed TMZ. However, operators of non-transponder equipped aircraft would be required to plan their flight accordingly to avoid routing through the proposed TMZ should they be unable to negotiate transit with the controlling authority.	
5.2	Does the change sponsor consultation material reflect the likely operational impact of the change?	Yes
	The consultation material provided links to all published documents relating to the ACP and included assessment of the likely operational impact of the introduction of the proposed TMZ. This included a statement that those aircraft not fitted with transponder equipment, estimated to be fewer than 1% of all traffic that operates in the area, would be required to either avoid the TMZ or negotiate entry with the Controlling Authority.	
Case study conclusions – to be completed by SARG project leader		
	Has the change sponsor met the SARG airspace change proposal requirements and airspace regulatory requirements above?	Yes
	The Sponsor has met with the airspace change proposal and airspace regulatory requirements described above through compliance with the CAP1616 process, as confirmed at Stages 1, 2 & 3 through the Gateway Assessment Meeting mechanism and the assessment conducted during this Stage 5: Decision phase.	
RECOMMENDATIONS/CONDITIONS/PIR DATA REQUIREMENTS		
	Are there any Recommendations which the change sponsor should try to address either before or after implementation (if approved)? If yes, please list them below.	N/A
	N/A	
	Are there any Condition(s) which the change sponsor must fulfil either before or after implementation (if approved)? If yes, please list them below.	N/A
	1. The existing LoA between Wick Airport and RAF Lossiemouth must be updated and agreed prior to implementation of the MOWWL extension to	

the Moray Firth TMZ.

2. Confirmation must be provided to the CAA that agreement between the MOD and the change sponsor regarding radar mitigation for RAF Lossiemouth has been reached.

Are there any specific requirements in terms of the data to be collected by the change sponsor for the Post Implementation Review (if approved)? If yes, please list them below.

Yes

Requirement 1: Should the proposed TMZ be approved for implementation, arrangements must be made by the Sponsor to ensure that the following data is collected for use during the PIR:

- Details of occasions that requests for access to, or transit of, the TMZ by non-transponder equipped aircraft is denied.
- Details of occasions a non-transponder equipped aircraft infringes the TMZ, remaining within the 2nm buffer area (PSR return remains displayed).
 - o Details regarding the efficacy of any attempted controller intervention.
- Details of occasions a non-transponder equipped aircraft infringes the TMZ and buffer, resulting in it entering the blanked area (PSR return no longer displayed to a controller).
 - o Details regarding the efficacy of any attempted controller intervention.

Requirement 2: Should the proposed TMZ be approved for implementation, arrangements must be made by the Sponsor to ensure that related stakeholder observations (enquiry/complaint data) are collated and presented to the CAA.

General summary

This ACP seeks to implement an appropriate airspace solution to satisfy the conditions of the planning consent given by Scottish Ministers and enable the development to progress. Construction is scheduled to begin in 2024; the requirement for such an early regulatory decision is usual for ACPs associated with wind farm developments due to the timing and scale of the financial approval of these projects.

The proposed use of radar blanking on the Alanshill PSR, along with the implementation of an associated TMZ, is entirely appropriate and accords with similar solutions at other wind farms in the UK. The proposal to align the boundaries with the TMZ associated with the adjacent BOWL and MOWEL developments is entirely appropriate and will result in a single notified area, known as the Moray Firth TMZ, once all developments in the vicinity are introduced. Due to the offshore location of the site the traffic analysis undertaken by the sponsor indicates the number of airspace users potentially impacted by the introduction of this TMZ to be negligible; ~2 flights per week during the representative busiest period used for analysis, Aug 2019. In addition, the sponsor has indicated its commitment to the provision in the CAA's TMZ Policy which allows non-transponder equipped aircraft to be granted access to a TMZ subject to arrangements agreed with the controlling authority. This commitment is expected to further reduce the impact, which is already considered to be negligible.

Comments and observations

This airspace change proposal addresses the original objection from NATS(NERL) regarding the impact of the wind farm development upon the Alanshill PSR and satisfies the condition attached to the planning consent given by Scottish Ministers. The proposed TMZ is considered the optimum size and shape to meet the safety and operational requirements of the associated PSR blanking, whilst having minimal impact on other airspace users. Its implementation will be completed in line with the Moray Firth TMZ which, in 2024, will include both the existing BOWL development and that associated with the approved MOWEL development.

Operational assessment sign-off/ approvals	Name	Signature	Date
Operational assessment completed by:	[Redacted]	[Redacted]	7 th July 2021
Operational assessment approved by:	Manager Airspace Regulation	[Redacted]	30 th July 2021

Manager Airspace Regulation comments: The proposed solution to be implemented through this ACP, to mitigate the possible effects of wind turbines on PSR is in line with similar solutions at other wind farms. The impact of the a TMZ in this area on other airspace users has been assessed and is considered by the sponsor to be negligible. Conditions have been identified which will need to be met as a condition of approval.

