SHORT (& MEDIUM) TERM MEASURES - EXECUTIVE SUMMARY

MEASURE SET	**Airport operations**			
MEASURE TITLE	Ground operations improvements			
MEASURE SUMMARY	This measure includes multiple proposals to improve airport ground operations processes to deliver efficiency, noise and emissions benefits.			
MEASURE INVOLVES	☒	Behavioural Change	☒	Infrastructure Change
	☒	Operational Change	☐	Regulatory Change
	☒	Technical Change	☐	Policy Change

WHAT DOES THIS ADDRESS?

This measure contains multiple proposals to improve the performance of airport ground operations, including systems and processes. The measure addresses:

- improving airports' operational efficiency and effectiveness, principally airside
- improving local air quality at and around airports, which is impacted by the emissions from aircraft engines and vehicles with internal combustion engines
- reducing noise on the final approach path near to the airport
- easing the airside ground congestion around airport terminals and increasing the aircraft parking capacity at busy airports
- maximising departure runway utilisation, where the runway is the scarce resource/bottleneck in airport throughput at busy times of the day.

WHAT WOULD BE DONE?

The proposals are for the following actions:

- Airport Collaborative Decision Making (A-CDM), to improve operational efficiency through a partnership involving airport operators, aircraft operators, ground handlers, and Air Traffic Control (ATC) working together more effectively and transparently, and sharing data using a common, intra-airport IT platform in real-time to work from the same operational picture. At the individual airport level, there is particular focus on the aircraft turnaround and pre-departure sequencing processes, which, inter alia, is likely to improve runway utilisation. A-CDM is an integral part of the Single European Sky Air Traffic Management Research (SESAR) Programme and is effectively a compulsory part of the future European air traffic management system
- reducing emissions from aircraft engines by taxiing using a reduced number of engines (reduced engine taxi)
- using electric vehicles to support airside operations to the maximum degree possible
- displacing landing thresholds, meaning that aircraft would touchdown more towards the middle of the runway than at the near-end as at present so that they would be slightly higher and less noisy than at present when entering the airport perimeter
- use of remote stands, together with bussing, this would ease congestion around terminals at busy airports
- using a traffic light system to meter the flow of aircraft to the departure runway to maximise its utilisation.

WHAT IS THE IMPACT?

A-CDM has demonstrated the benefits that can be achieved in terms of reduced delays, improved resource utilisation and better predictability. Implementation of A-CDM is well-advanced at Gatwick and Heathrow.

Reduced engine taxi would reduce the emissions of aircraft as they mode from the stand to the runway and vice versa, however there is potentially a negative noise impact on the airport. Similarly, the use of electric vehicles instead of combustion engine vehicles would make a positive contribution to the reduction of emissions relevant to local air quality. Electric vehicles for ancillary services, including towing baggage dollies, are already in use at some airports and there appears to be no fundamental technological impediment to deploying electric vehicles for all airport operations, including as tugs. Displaced thresholds would potentially reduce the noise footprint close to the airport perimeter. In theory remote stands could be used to improve the parking capacity at congested airports but would also have some impediments and negative impacts: (i) there is unlikely to be space at busy airports, where remote stands could be beneficial; (ii) remote stands would involve additional bussing, be contrary to service quality targets for pier-serviced passengers at regulated airports and degrade the passenger experience.

Use of a traffic light system could be used to manage flows of aircraft to maximise departure runway throughput but would, potentially, have the negative impact of increasing taxi-times, fuel-burn and environmental impact though stop-start processes from the stand to the runway.

MEASURE SET:	Airport operations	Short Term	☒
MEASURE TITLE:	Ground operations improvements	Medium Term	☐

MEASURE SUMMARY

Proposed by:	Air League, BAR UK, Gatwick, Individuals, NATS
Proposal: ApOP-GOI-1 ApOP-GOI-2 ApOP-GOI-3 ApOP-GOI-4 ApOP-GOI-5 ApOP-GOI-6	There are six proposals to improve ground operations processes. The proposals are: • airport collaborative decision making (A-CDM) • reduced engine taxi • use of electric vehicles airside • displaced thresholds • more use of remote stands • traffic light systems to maximise runway utilisation With the exception of more use of remote stands, all of these proposals have the potential to be enacted in the short-term. At busy airports, where they might be needed, there is likely to be little space for remote stands.
Approach	The approach for each of the measures is as follows: • A-CDM aims at improving airport operations via means of enhanced communication and information sharing between airport stakeholders. There are two levels of implementation of A-CDM: local and network; this proposal is concerned with the local implementation (see ApOP-INM-1 for network implementation) • one engine (or more for 4-engine aircraft) can be shut down during taxi-in or taxi-out • the use of electric vehicles would decrease the emissions associated with ground operations • displaced thresholds would allow aircraft to land further towards the centre of the runway • the use of additional remote stands away from the main aprons and terminal areas • traffic light (or similar) systems could be used to enhance ground movements Stated Capital Cost: Will vary Capacity (mppa): Potential capacity increase through A-CDM (NATS have estimated a potential capacity increase of c.5%)/ traffic light systems (NATS have estimated a potential capacity increase of c.0.5%) Capacity (atm): Potential capacity increase through A-CDM / traffic light systems
Benefits	The principal benefits of the proposals are: • the widely acknowledged benefits of A-CDM[1] of improved processes and procedures that deliver reduced delays, improved punctuality, predictability of events, and utilisation of resources • reduced on-airport emissions arising from reduced engine taxi and use of electric vehicles • reduced noise near to the airport perimeter through the use of displaced thresholds • the potential for higher runway utilisation through use of a traffic light system to manage aircraft flows better on the airfield.
Issues & Risks	A major risk associated with this measure is that using increased efficiency and runway utilisation to enable additional slots at peak times could have a negative impact on resilience – the headroom generated by the new systems and processes would be taken by the additional slots and the scope for generation of further headroom for resilience would be reduced. It is also likely that stakeholders operate to different commercial incentives – e.g. (i) potential conflicts between arrivals and departures, (ii) trade-offs between departure (off-blocks) punctuality, runway throughput and environmental impact and (iii) trade-offs between individual and system level performance. This adds complexity to the airport's operations and implementation of these measures. In addition, the feasibility and overall cost benefit of the widespread use of reduced engine taxi and electric vehicles needs to be investigated as does the operational and safety impact of displaced thresholds. The net benefit of the additional use of remote stands is not clear and pressure on space at airports may not allow for this.
Mitigations	None needed.

[1] See, for example, Airport CDM cost benefit analysis, version 1.4, Eurocontrol, 11 April 2008, http://www.eurocontrol.int/sites/default/files/content/documents/nm/airports/acdm-cba.pdf

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Dependencies	A-CDM development and implementation is part of the SESAR programme.

ASSESSMENT SUMMARY

Strategic Fit	Not stated – depends on long-term options.
Economy	The principal economic impacts are likely through: • A-CDM, which will improve the efficiency and predictability of airport operations, especially relating to departures. This will optimise the throughput of the airport during periods when it is capacity constrained and potentially enable additional flights/connectivity during these periods. It will result in cost savings through fuel and time savings for airlines / passengers and more efficient use of ground handling assets • similarly, the traffic light system will enable higher runway utilisation at peak times • reduced engine taxi might result in small reduction in fuel costs (dependent on taxi routes)
Surface Transport	There would be little or no impact on surface transport.
Environment	The environmental impacts of each of the measures is likely to be as follows: • A-CDM: reduced emissions/improved LAQ due to more efficient ground operations and holding aircraft on-stand with engines off rather than queuing on taxi-ways with engines running • electric vehicles: contribute to reduced ground LAQ emissions and potentially reduce noise • reduced engine taxi: improved LAQ due to lower fuel burn from running fewer engines at more efficient throttle settings. May be negative noise impacts due to higher throttle settings • displaced thresholds: a reduction in the noise footprint expected under the approach paths of the airport enabled by higher approaches. Redistribution of noise associated with taxiing. Impact on LAQ and GHG not known and depends on the efficiency of taxi-paths with / without displaced thresholds • more remote stands: are by their nature nearer to the perimeter of airports and therefore might result in an increase in off-airport noise associated with ground running. Reduced congestion might result in lower emissions but this would likely be counteracted by longer taxi times • traffic light systems: it is not clear whether traffic light systems would smooth the flow of traffic across the airport surface (reduced noise and emissions) or create a stop-start environment, in which case the noise and emissions would likely increase.
People	Impact on people is associated with noise and emissions as described under "environment". Increased use of remote stands might have negative impact on passenger experience because it would require additional bussing. It will also impact operations where rapid turnarounds are needed.
Cost	The costs associated with the measures are: • A-CDM: system software development and integration costs, plus costs associated with process changes to enable A-CDM. However, A-CDM is already well under development at LHR and LGW • electric vehicles: procurement costs for electric vehicle fleets and ancillary (charging) equipment • reduced engine taxi: small costs linked to changes to airline procedures / compliance monitoring • displaced thresholds: potential capital costs from modifications to the taxi system, e.g. additional RETs • more remote stands: capital cost associated with the creation of additional stands and, potentially, the increase in ground vehicles needed to support their operation • traffic light systems: system software development and integration, airfield infrastructure (lighting system and cabling) and works as well as costs associated with process changes, operator training and safety cases.

MEASURE SET:	**Airport operations**	**Short Term**	☒
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Operational Viability	Risks and open questions are: • risks associated with scheduling additional slots at peak times based on the efficiency of A-CDM • proving the operational feasibility and cost-benefit of the widespread use of electric vehicles • operational feasibility, safety, operational and environmental impacts of displaced thresholds, which would likely be airport dependent (in use elsewhere – so issues are not insurmountable) • operational feasibility of and best practice for applying reduced engine taxi to all aircraft types in all phases of operation (taxi out as well as taxi in), which would also likely be airport specific • the feasibility and net benefits of additional remote stands • the operational concept, impact and net benefit of using a traffic light system to optimise runway utilisation, including risks associated with disruption if used for additional slots at peak times.
Delivery	There would not appear to be any fundamental impediment to delivery, although A-CDM is largely an organisational and human resources change programme that requires careful management to align incentives and behaviours. Displaced thresholds would require infrastructure changes to the airfield (landing aids, RET's etc.) and require some changes to move the final approach.