Developing illustrative policy and costs to implement a new airspace design service and charge

Final report

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1 Introduction

The CAA commissioned Egis to provide the following illustrative document around UK Airspace Design Service (UKADS) economic regulation and cost implications. This activity was supported and informed by key stakeholders within the airport community, NATS, the CAA and DfT, and aims to support consultation on the economic regulation of UKADS in “phase one” (known as UKADS1).

The current proposal being consulted on is for the first phase of UKADS (known as UKADS1), to be tasked to NATS (En Route) plc (NERL) through a change to its air traffic services licence. The scope of UKADS1 would initially be to take forward airspace change proposals (ACPs) to modernise the complex airspace around London.

The proposal in the longer term is to establish the end-state operating model for the UKADS function (known as UKADS2). The detail of UKADS2, including its form and options for any new legislation, would be subject to further consultation in the future.

The scope of our assessment focusses solely on UKADS1 and therefore only considers the cost and policy implications of NERL taking-on the UKADS1 function and the Airspace Design Support Fund (UKADSF).

This report is structured according to four specific topic areas:

- **Cost assessment:** We estimate a range of costs required for NERL to deliver UKADS1 and the associated UKADSF. We present high, mid and low estimates of cost based on a number of modelled scenarios which account for the uncertainty in the exact roles and responsibilities of UKADS1.
- **Form of control:** We discuss the mechanisms/aspects that will need to be considered in the modification to NERL’s licence to account for UKADS1 and define options for form control for each of these aspects.
- **Cost categorisation:** We discuss the implications of UKADS1 and UKADSF cost allocation (CAPEX vs OPEX) and options for reconciliation of NERL’s existing ACP work.
- **Charging:** We define and assess the options around a UK Airspace Design Charge (UKAD-C) to recover the costs associated with the delivery of UKADS1 and the UKADSF from airspace users.

2 UKADS1 cost structure

2.1 Cost modelling

A cost model was developed to forecast the projected costs of UKADS for Phase 1 (UKADS1). Further detail on the approach to cost modelling can be found in the Appendix, at the end of this report.

Given the number of points open for consultation, assumptions had to be a made on the plans for mobilisation of UKADS1. These have been formulated following discussions with NERL, the CAA and DfT, but should not be interpreted as recommendations:

- Costs were modelled over ten years (from mid-2025 to mid-2035). The model assumed that the cost of delivering no more than the London TMA region would be incurred over this ten year time period.
- UKADS1 would undertake four deployments in the delivery of UK Airspace Modernisation over this horizon and would be able to handle two deployments at any given time.
- UKADS1 would be required to follow the CAA's CAP1616 process and would inherit the ongoing ACPs from airports at Stage 3, and earlier stages (Stages 1 and 2) of the ACP would not be repeated.
- UKADS1 would mobilise in mid-2025 and would prioritise modernisation of the complex airspace around London.
- The London Airspace South (LAS) ACP would continue as currently planned and would remain outside the scope of UKADS1.
- ACPs in scope of UKADS1 would be the twelve ACPs within the London cluster. These are assumed to be Biggin Hill, Bournemouth, Farnborough, Gatwick, Heathrow, London City, Luton, Manston, RAF Northolt, Southend, Southampton, and Stansted.
- UKADS1 would be staffed by a combination of existing and new NERL employees. UKADS1 would use external specialist support for environmental assessment. UKADS1 would recruit a number of new communications/engagement staff, supported by external specialists.
- UKADS1 staff would be partially based within a London Office, to ensure reasonable proximity to the ACP partners. Some office space and simulation facilities would be used within NATS' existing offices, and charged back to UKADS1.

The structure of the cost model, has been developed based on our understanding of the likely costs of UKADS1, supported by discussions and assumptions provided by NERL and UK airports.

Based on the above assumptions, the model includes three different scenarios for the delivery of stakeholder engagement and consultation (found to be the largest cost driver of ACPs):

- **Scenario 1:** UKADS1 leads on all stakeholder engagement and consultation activities.
- **Scenario 2:** UKADS1 and the airports partner for stakeholder engagement and consultation activities, with UKADS1 responsible for producing the consultation strategy and consultation materials.

- **Scenario 3:** Airports lead on all stakeholder engagement and consultation activities, with support from UKADS1 on the production of consultation materials and attendance at events.

The costs to UKADS1 are highest under Scenario 1 and lowest under Scenario 3.

Note that these scenarios have been developed for illustrative purposes and should by no means be considered as recommendations. The Joint Consultation on UKADS (CAP 3029) proposes that, where they choose, airports could continue to be responsible for the preparation and running of ACP engagement and consultation. These scenarios have been developed for illustrative purposes and should by no means be considered as recommendations.

2.2 Stakeholder input

We engaged with NERL and a range of 13 masterplan airports to understand the costs and resources related to their ACPs to date and to collect data on key cost assumptions.

NERL and the airports were consistent in their identification of the key cost categories for an ACP:

1) Airspace design;
2) Environmental assessment;
3) Communications, engagement and consultation, and;
4) Project support/administration.

NERL provided estimated ranges for expected roles, numbers of FTE and staff costs.

The airport costs for each of these categories varied significantly from one to another. Airports who hired consultants to undertake these functions tended to have higher costs than those who used internal staff/FTE. The number of FTE engaged on a single ACP ranged from 0.3 to 7 across the airports we engaged, dependant on the extent of outsourcing and nature of ACPs being processed.

The ACP costs were assessed against the airport size to determine whether larger airports incur greater cost than smaller airports. This analysis showed that medium (>100,000 air traffic movements (ATMs)) and large airports (>200,000 ATMs) have a lower ACP cost per ATM than smaller airports, indicating that many of the ACP costs are not correlated to operational size or complexity.

Many of the airport stakeholders commented on a major driver of cost being stakeholder engagement, especially with complex community requirements. Airports in densely populated areas with engaged resident populations have generally incurred higher costs due to demands for ongoing stakeholder communication and engagement.

Data provided by airports varied in detail and nature, but included:

- Costs incurred to date in advancing ACPs to Stage 2/3;
- Projected budget for completing ACPs (Stages 3 to 7);
- Primary ACP functions (as shown in Figure 1);
- Number of FTEs required, sometimes broken down by the four key cost categories described above; and
- Cost per FTE.

Understanding the commercial sensitivities around this data, we have incorporated it into the model in the form of average costs per ATM, pooled into three categories of airport:

- Small: <100,000 ATMs;
- Medium: 100,000-200,000 ATMS;
- Large: >200,000 ATMs.

This approach enabled us to forecast the cost of each airport's ACP based on the size category of that airport and the number of ATMs, rather than on the commercially sensitive data provided. Individual airport names and data have therefore been redacted. However, the cost per ATM values were obtained based on data provided by airports and the airport cost forecasts were sense-checked against the information provided by them.

2.3 Findings

Our modelling indicates the total UKADS1 cost over ten years from mid-2025 to mid-2035 were between **£100.3 million and £160.5 million** (or between **£10 million and £16 million** per year). Approximately 80% of the UKADS1 costs are forecast to be staff costs, with the remaining costs associated with office space, software and additional simulation facilities. . For the remainder of the NR23 period (from mid-2025 to end of 2027), we estimate the total UKADS1 cost to be between **£26 million and £42 million**.

	Low	Mid	High
Scenario 1	£128.4 million	£147.7 million	£160.5 million
Scenario 2	£106.3 million	£122.3 million	£132.9 million
Scenario 3	£100.3million	£115.3 million	£125.4 million

Table 1: UKADS1 costs over 10 years (2024 prices)

The mid and high case optimism bias scenarios added 15% and 25% to all costs to reflect the confidence interval in assumptions. This level of optimism bias is inherent to benchmarking efficient ACP costs and the significant variation between ACP cost data from NERL and different airports.

Note that the cost estimates provided in this document are highly indicative and reflect the uncertainty inherent at this stage of the process. These figures are based on current assumptions and are intended to support the consultation. Final figures may differ depending on future developments and the consultation outcome.

3 Airspace Design Support Fund cost structure

3.1 Cost modelling

The cost model also forecasts the costs of an UKADSF. Further detail on the approach to cost modelling can be found in the Appendix.

The model considers costs over ten years and uses a number of assumptions around the operation of the fund. These include the following:

- The UKADSF would fund ACPs from Stage 3 to Stage 7, consistent with the operation of UKADS1.
- The UKADSF would be available from mid-2025, consistent with UKADS1.
- Each new ACP would take an average of 4 years to complete.
- There is no limit to the number of ACPs that could be funded at the same time.
- NERL would only be responsible for administering the fund and the associated costs of this administration. Two FTEs would be required to administer the fund, co-located with UKADS1.

The model includes three different scenarios for the airports eligible for support from the UKADSF, given the degree of uncertainty around which airports might be eligible for funding and when they might apply:

- **Scenario 1:** All airports previously in the AMS Masterplan, including one additional Medium-sized airport (11 airports).
- **Scenario 2:** All airports previously in the AMS Masterplan (10 airports).
- **Scenario 3:** All airports in the current AMS Masterplan (8 airports).

In addition to the above, all scenarios assume that funding would be requested for additional ACPs each year, and that any ACP in service of airspace modernisation would be supported.

The structure of the cost model, has been developed based on our understanding of the likely costs of the UKADSF, supported by discussions with NERL, DfT and CAA.

3.2 Stakeholder input

ACP cost data provided by the airports was used to forecast the likely airport fund requests. The model uses the airport cost data provided to calculate an average cost per ATM for three categories of airport:

- Small: <100,000 ATMs
- Medium: 100,000-200,000 ATMS
- Large: >200,000 ATMs

The appropriate average cost per ATM is then applied to the airport's 2023 air traffic data to calculate an estimated cost for Stages 3-7 of each airport's ACP.

The additional ACPs could be initiated by any airport so the costs for these are calculated based on the average number of ATMs and the average cost/ATM across the airport source data.

3.3 Findings

Our modelling indicates the total UKADSF cost for ten years from mobilisation were between **£58.6 million and £80.5 million** (or between **£5.9 million and £8 million** per year). Approximately 97% of the UKADSF costs are forecast to be ACP funding requests, with the remaining costs associated with staff administering the fund. For the remainder of the NR23 period, we estimate the total UKADSF cost to be between **£16 million and £23 million**.

	Low	Mid	High
Scenario 1	£64.3 million	£74.0 million	£80.5 million
Scenario 2	£62.1 million	£71.4 million	£77.6 million
Scenario 3	£58.6 million	£67.4 million	£73.3 million

Table 2: UKADSF costs over 10 years (2024 prices)

As for UKADS1, the high case optimism bias scenario added 15% and 25% to all costs to reflect the confidence interval in assumptions and the inherent challenges of benchmarking efficient ACP costs.

Note that the cost estimates provided in this document are highly indicative and reflect the uncertainty inherent at this stage of the process. These figures are based on current assumptions and are intended to support the consultation. Final figures may differ depending on future developments and the consultation outcome.

4 Form of control

This section covers the economic regulation mechanisms/aspects that are required for the delivery of UKADS1 and the UKADSF. These have been defined considering the need for economic incentivisation and appropriate regulatory mechanisms. The following sections aim to present a number of options for each aspect, as well as associated advantages and disadvantages.

4.1 Duration of UKADS price control

The duration of the price control period impacts the length of time the charge and associated control mechanisms would be set for. The duration of the UKADS charge is somewhat influenced by the duration of the UKADS1 delivery, which is currently undefined. Two possibilities are considered for the duration of the UKADS price control:

- Price control running for a short period.
- Price control running for a longer period.

4.1.1 Option 1: Price control running for a short period

With UKADS1 expected to be introduced at some point within 2025, a short price control period for UKADS until the end of NR23 is a possibility, allowing it to be reassessed for NR28.

Advantages: The advantage of running a price control for a shorter duration, is it could allow the initial price control to be considered as a provisional measure to facilitate the integration of UKADS1 within the current NR23 regulatory period. Given that UKADS1 will be a new organisation and its scope and associated set-up and running costs relatively uncertain, a shorter duration price control could also provide greater flexibility to observe the materialisation of UKADS1 costs and delivery efficiency with a view to amend the price control ahead of NR28. This would also facilitate the running of the UKADS price control concurrently to NERL's other price controls, allowing UKADS to operate under the same reference periods, minimising regulatory complexity.

Disadvantages: For a shorter price control period to deliver the above advantages, UKADS1 would need to run for a sufficient period of time prior to NR28 for the efficacy of the initial price control to be determined. Given that UKADS1 is expected to be launched sometime in 2025, and the regulatory preparations for the NR28 price control are likely to commence in advance of 2028, there could be insufficient time to assess the effectiveness of the initial price control prior to NR28.

4.1.2 Option 2: Price control running for a longer period

Setting a price control for a longer duration could initially take the form of a 5-to-7-year timescale, running to some point in NR28 or to coincide with the end of NR28. The potential longer duration solution may be for the initial UKADS1 price control to run for 7-years, as this would coincide with the end of the NR28 price control period.

Advantages: A benefit of setting the initial price control for UKADS1 for a longer period is it provides sufficient time to assess the initial form of control applied, and then to adjust accordingly for NR33. An additional advantage of a 7-year period over a 5-year period is it could allow the UKADS1 price control period to align with the end of NR28/start of NR33, which could simplify the regulatory process around UKADS for all stakeholders.

Disadvantages: A drawback of a longer UKADS1 price control is the need to predict determined costs for UKADS over a longer time-period where the scope and corresponding costs of UKADS1 in the longer term are even less certain. This could make it more challenging to set charges effectively and could result in larger over/under-recoveries within the price control period.

4.2 Efficiency

A driver for the efficient delivery of UKADS1 would be the share of costs and risks between NERL and airspace users, particularly the division of risk associated with potential overspends/underspends. There are a number of possible approaches that could be applied to UKADS1, each of these approaches is described below:

- **Option 1:** Cost pass-through, where all costs incurred to provide UKADS1 are recovered from airspace users and underspends are returned to airspace users.
- **Option 2:** Fixed cost, where the cost to provide UKADS1 is fixed for a set period; overspends are incurred by NERL and underspends are kept by NERL.
- **Option 3:** Cost allowance, with a fixed allowance but signficant underspends are returned to airspace users.
- **Option 4:** Cost-risk sharing, where NERL and airspace users share a proportion of overspends/underspends.
- **Option 5:** Hybrid format, such as where some costs are fixed and others are fully recovered.

The UKADSF costs, given their nature, are expected to be treated as a cost pass-through, as NERL would be providing funding but not undertaking the ACP work being funded. The description, advantages and disadvanatges of the options presented below therefore focus on NERL's delivery of UKADS1.

4.2.1 Option 1: Cost pass-through

A cost pass-through allows all UKADS1 costs to be recovered from airspace users and if NERL outperforms against the allowance it would return over-recoveries to airspace users.

Advantages: The costs associated with UKADS1 are likely to be subject to significant uncertainty. Due to the nature of ACPs, costs can vary significantly compared to initial forecasts (e.g. due to unexpected complexity in the airspace design). This can make it challenging to accurately benchmark the efficient costs required to deliver an ACP. Applying a cost pass-through mechanism would account for this level of uncertainty in assessing efficient UKADS1 costs and NERL would therefore not take on any cost-risk for which it has limited control over.

Disadvantages: A disadvantage of a cost pass-through is it would provide little incentive for NERL to outperform the cost allowance. Although the overall costs to deliver an ACP are subject to a degree of uncertainty and difficult to benchmark, some cost elements can be benchmarked (e.g. corporate overheads). A cost pass-through would not in itself incentivise cost-efficient delivery of UKADS1 via an efficient organisational set-up and could lead to wasteful expenditure being incurred.

4.2.2 Option 2: Fixed costs

In the context of UKADS1, a fixed cost approach would mean that there is no adjustment to account for overspends/underspends.

Under this option, the costs to deliver UKADS1 would be established at the start of the price control period. If NERL outperforms this allowance, it would be able to keep any over-recovery of user charges. If NERL underperforms compared to the allowance, it would be liable for any additional costs incurred.

The treatment of OPEX incurred for NERL's en route service provision is an example of how this approach is applied under the current price control.

Advantages: An advantage of a fixed cost approach is it incentivises NERL to deliver UKADS1 in a cost-efficient way, due to the incentive to spend less than the determined amount. If NERL outperforms its allowance, airspace users would not be returned any over-recoveries, however it may serve as a useful benchmark to facilitate the argument for a lower determined cost in future price control periods. This approach provides the maximum degree of cost certainty for airspace users, who would know the exact cost of UKADS1 to them over the price control period.

Disadvantages: There are a number of potential disadvantages of applying a fixed cost approach to the recovery of UKADS1 costs. As previously discussed, the required costs to deliver the UKADS1 function would be difficult to benchmark. An effective fixed cost recovery approach is dependent on effectively benchmarking and predicting the profile of costs over time (and hence is usually more effective with a relatively short price control period). Consequently, in the scope of economic regulation, this approach is usually only applied to items which can be predicted with a relatively high degree of accuracy. UKADS1 would be delivering work that is known to be complex and unpredictable, within a new organisational set-up, which would be delivering the service for the first time. The degree of uncertainty within the UKADS1 delivery therefore makes it challenging to predict its costs with sufficient confidence for a fixed price arrangement.

As a result, a fixed cost approach could disincentivise ACP progress within UKADS1, if costs are fixed at a level that is insufficient for NERL to deliver all the delivery objectives of UAKDS1. In this instance the need for UKADS1 to manage costs could take precedence over the delivery of the service, leading to suboptimal investment to the delivery of UKADS1. To mitigate this, additional mechanisms would need to be included in NERL's licence to ensure delivery of specific milestones, but this would be difficult given the many external factors affecting delivery of the ACPs. Conversely, if the costs to deliver UKADS1 are fixed too high, airspace users would end up overpaying for the service.

4.2.3 Option 3: Cost allowance

This approach would provide NERL an overall budgetary allowance for UKADS1. If NERL underperforms against this allowance, then it would bear the additional costs, whilst any extent of underspends would be returned to airspace users. Treating costs in this way in essence works as a fixed-cost approach for the treatment of overspends and a cost pass-through for the treatment of underspends.

The treatment of ACOG costs is an example of where this approach is currently used, where NERL has a funding allowance of £3.3m per year to deliver the function, but the CAA has said that any significant underspends at the end of the period are returned to airspace users.

Advantages: A cost allowance, if set at the correct level, would incentivise UKADS1 to deliver efficiently, as any overspends would be incurred by NERL, aiming to deliver in a cost-efficient manner. This approach would also provide certainty to airspace users around UKADS1 cost while also benefiting from underspends.

Disadvantages: One drawback of this option is that it may impose cost-risk on NERL, without providing any potential benefits in return, as any underspend/over recovery would be returned to airspace users. Furthermore, although underspends would be returned, the cost efficiency incentive becomes weaker if the allowance turns out to be significantly higher than the costs that actually materialise. This could drive wasteful expenditure, especially in later years of the period. Setting the cost allowance can be a challenge due to the aforementioned difficulty in benchmarking and predicting ACP costs.

4.2.4 Option 4: Cost risk-sharing

A cost risk-sharing approach is where the risk of incurring overspends, or underspends is shared between NERL and the airspace users. The principle of cost risk-sharing can be applied in multiple different ways.

A simple cost risk-sharing approach could involve dividing overspends/underspends between NERL, and airspace users based on a ratio. For example, a simple '50:50' ratio could be implemented, whereby 50% of overspends are incurred by NERL and 50% are borne by airspace users. Similarly in the case of underspends, NERL would retain 50%, with the other 50% returned to airspace users.

An alternative cost risk-sharing approach involves establishing a threshold defined as a percentage +/- around the determined cost for providing UKADS1. Establishing a threshold could mean that overspends/underspends up to a certain point are borne by NERL, beyond which they are borne by/returned to airspace users. For example, if a threshold is set at a +/- 10% level, this would mean that, if NERL overspends the determined costs for delivering UKADS1 by less than 10%, NERL would incur the additional costs. Any overspend beyond the 10% level would be incurred by airspace users. Similarly, if NERL underspends the determined costs by 10% then it would keep the sums it has over-recovered, whereas any underspend in excess of 10% would be returned to users. A key consideration with this approach is to effectively set the thresholds at which the risk burden pivots between airspace users and NERL.

The primary distinction between employing a ratio approach as opposed to thresholds lies in the allocation of cost risk associated with overspending/underspending. Under a ratio approach, the proportion of risk allocated to NERL or airspace users remains constant across all levels of overspending or underspending. Under a threshold approach, this share of risk can be split differently depending on the level of overspends/underspends.

Advantages: The benefit of a cost risk-sharing approach is it combines the advantages of both the cost pass-through and fixed cost methods, thereby incentivising a cost-efficient UKADS1 delivery whilst ensuring NERL does not take on all the cost risk for a service for which it is difficult to accurately benchmark and estimate efficient costs to deliver. The ratio/thresholds can be set at an agreed level to reflect the relative uncertainty in setting the determined cost, whilst maintaining some incentives for a cost-efficient delivery approach.

Disadvantages: The main challenge associated with a cost risk-sharing approach is to set an appropriate ratio/threshold from the outset to appropriately balance the provision of incentives with a fair distribution of cost risk.

4.2.5 Option 5: Hybrid format

A hybrid format can be applied in conjunction with a combination of the options described above, applying alternative mechanisms to different cost elements associated with delivering UKADS1. An example of a hybrid option that could be applied is to treat some cost items as a pass-through and other cost items as fixed.

Advantages: The rationale behind a hybrid approach is that it could enable some cost items that can be benchmarked to be fixed (such as corporate overheads) to incentivise a cost-efficient organisational set-up, whilst other cost items (such as ACP design work), could utilise a pass-through or cost-allowance mechanism to reflect the greater unpredictability associated with these costs. Tailoring the mechanism applied to the nature of the costs in this way drives a cost-efficient delivery where possible, whilst it also reflects the difficulty in accurately predicting the costs required to deliver certain ACP elements.

Disadvantages: The primary disadvantage of this approach is it adds complexity to the regulatory controls in place and requires accurate reporting and enhanced oversight of UKADS1 costs to ensure they are allocated to the correct mechanism.

4.3 Adjustment/true-up mechanisms

Within NERL's price controls, a number of mechanisms and adjustments are applied to reconcile the unit charge paid by airspace users (formulated through the division of the determined costs for the period by the traffic forecast), with NERL's actual cost and traffic materialisation during a price control period.

Considerations around various adjustments for UKADS1 charges are discussed in more detail below.

4.3.1 Traffic forecasting adjustment

A true-up can be applied to account for the difference between actual traffic and forecast traffic levels used in a determined unit cost calculation. If an adjustment mechanism is not applied this would result in either the under-or over-recovery of costs when actual traffic materialises differently to the traffic levels forecast. The traffic variation adjustment works by trueing-up charges to account for traffic deviations from forecasted traffic and is applied through an adjustment to determined costs in year n+2.

Neither NERL nor airspace users are expected to take the risk of traffic over or under-forecasting and therefore a traffic variation true-up mechanism is expected.

4.3.2 Traffic risk sharing

A traffic risk sharing mechanism spreads the risk of variations in traffic between NERL and the airspace users. For the recovery of costs associated with en route air traffic services, this is advantageous as it ensures that an appropriate risk balance is applied between NERL and airspace users. A traffic risk sharing mechanism is generally an appropriate mechanism to apply to the recovery of costs that have some dependency on traffic. For instance, should traffic increase significantly above the forecast, NERL might need to spend on increasing the amount of air traffic controller overtime to accommodate for this traffic increase (with an associated cost).

UKADS1 and the UKADSF would be a separate service provided by NERL which is not traffic dependent, and hence the cost of delivering this service is not a function of traffic. Therefore, a traffic risk sharing mechanism does not appear to be necessary.

4.3.3 Price/cost indexation

Price indexation links price adjustments to an index, to ensure that the allowable costs within the price control remain fair and adapt to changing economic conditions. It can be expected that the determined costs required to run UKADS1, and the UKADSF would be indexed to a price base and that adjustments applied to account for the difference between forecasted and actual inflation.

The primary options for price indexation of costs would be to index them to the Consumer Prices Index (CPI) or the Retail Price Index (RPI). NERL's en route unit costs are adjusted to account for inflation using the CPI, however NERL's en route regulatory asset base (RAB) is currently adjusted using RPI.[1] The costs incurred for UKADS1, and UKADSF are expected to be treated in a manner consistent with NERL's existing settlements.

4.4 Other considerations

The effectiveness of the above form of control aspects can be supplemented with appropriate governance and oversight provisions. Any licence amendment to account for UKADS1 and the associated UKADSF would therefore need to consider the following aspects:

Accountability: Given NERL would be taking on UKADS1 as a solution to resolve the issues with the current delivery model, UKADS1 should be held to account for the speed, quality and efficiency of the ACP work it delivers. There may also be further incentive mechanisms that could be developed to ensure the efficient delivery of individual projects within UKADS1.

Reporting requirements: ACP work is of significant interest to a wide range of stakeholder groups, including airports, airlines, local community groups, CAA and DfT. Imposing reporting mechanisms would be a key lever to ensure accountability and transparency of the UKADS1 function.

Independence: A degree of UKADS1 independence would provide greater assurance to stakeholders that NERL would assume the role as airspace designer without bias towards a particular interested stakeholder group. This would also facilitate easier tracking of UKADS1 costs, which facilitate different charging mechanisms to be explored.

[1] Trued-up using an RPI-CPI wedge.

5 Cost categorisation

5.1 Treatment of UKADS1 and UKADSF costs

The costs required for NERL to deliver UKADS1 and the finances to support the associated UKADSF may need to be allocated to either capital expenditure (CAPEX) or operating costs (OPEX).

CAPEX generally involves significant, long-term investments in tangible/intangible assets, which are depreciated/amortised over time. NERL's capitalised costs are added to a RAB and usually depreciated/amortised over a period of 15-years following delivery. OPEX refers to ongoing, recurring costs that are recovered in the year incurred. NERL follows IFRS accounting rules, which is a key consideration for the allocation of cost items to either CAPEX or OPEX.

Should the costs associated with the delivery of UKADS1 be classified as OPEX, this would simplify the cost recovery process and eliminate the potential need for adjustments to the existing en route RAB, or the creation of a new RAB (if a separate charge is created for cost recovery). Allocation to OPEX also enables NERL to recover the costs associated with the provision of the service in a timeframe that is closer to the actual delivery of the service. However, this approach places the entire cost burden for UKADS1 on current airspace users, as the costs are neither depreciated or amortised; instead they are recovered in the same year that they are incurred. Consequently, current airspace users pay the entire cost of airspace change, despite airspace modernisation also benefitting future airspace users. If UKADS1 costs are allocated to OPEX, NERL would not make a regulatory return on expenditure associated with its delivery of UKADS1.

Conversely, if UKADS1 costs are allocated to CAPEX, it would lead to the recovery of UKADS1 costs from both current and future airspace users due to depreciation/amortisation. This approach may better reflect the beneficiary pays principle, as airspace users operating in the future would also benefit from airspace change. Additionally, allocating UKADS1 costs to CAPEX would result in a significantly smaller immediate increase in unit charges. If treated as CAPEX and a new UKADS charge is established, a new RAB may be required to recover the costs associated with UKADS1. This would add additional complexity to the regulatory process. If UKADS1 costs are allocated to CAPEX, NERL would be able to make a regulatory return on the cost of UKADS1 provision.

It is expected that the costs associated with the UKADSF would be treated as OPEX as this does not involve NERL undertaking ACP work. We assume its function in relation to the fund would be to hold and administer the finance. It can be expected that the administration costs, any borrowing costs and the finance itself would be recovered from airspace users.

5.2 Treatment of NERL's existing ACP work

NERL has a programme of current airspace design work which is predominantly managed through its 'Airspace and Operational Enhancements' CAPEX programme, costing between £13m and £17m per annum in NR23. As a result, the interaction between the two programmes needs to be carefully considered, particularly in terms of resource management and cost allocation.

The overlap between NERL's ongoing work and UKADS1 creates the potential for challenges in how costs are distributed and accounted for. Keeping existing ACP work remain separate from UKADS1 creates a layer of complexity with regards to costs and resource allocation, as well as a risk of duplication or inefficiencies, especially where the same technical expertise may be required/conflicting for both initiatives. Furthermore, as NERL's current airspace work is recovered through the NR23 en route unit rate, this would create a diverging approach and inconsistency in how airspace design costs are recovered (at least, in NR23).

For the purpose of developing the cost estimates for UKADS1 defined in section 2, an assumption has been applied that UKADS1 would take on existing NERL ACP work which is within the London TMA region (except LAS which it is assumed would be mostly complete upon UKADS1 initiation). We have therefore assumed other ACP work NERL currently conducts outside of the London TMA region would remain with NERL's Airspace and Operational Enhancements CAPEX programme for NR23 and would continue to be recovered through the en route charge.

6 Charging

6.1 Introduction

NERL currently recovers the costs of providing air traffic services through three mechanisms:

- En-Route Charge for the provision of ATS in upper airspace. This charge is based on a combination of distance flown and the weight factor of the aircraft and collected by EUROCONTROL's Central Route Charges Office (CRCO).
- London Approach Charge for managing approach and departure flows in and out of London's major airports. This charge is determined based on the weight factor of the aircraft and is collected by NERL.
- Oceanic Charge for handling flights crossing the North Atlantic in Shanwick oceanic airspace. This charge is a flat amount per flight payable by the operator of every aircraft and is collected by NERL.

ANS charges must be set following key principles in line with international (ICAO) and EUROCONTROL guidelines aimed at ensuring fairness, efficiency, and cost recovery. These notably include:

- **Cost recovery:** Charges should be to recover the efficient costs of service provision, including operational costs and capital investments.
- **User pays:** Airspace users should be charged based on their actual use (and for UKADS, benefit) of services, ensuring that those who contribute to the funding are the beneficiaries.
- **Equity and non-discrimination:** Charges should be applied uniformly based on fair calculations, and no discrimination should be exercised between the various categories of users.
- **Proportionality:** Charges should be proportional to the benefit obtained from the services used.
- **Transparency:** Charges should be set and shared transparently so stakeholders can understand how they are calculated, ensuring accountability.

6.2 UKAD-C charging options

The Joint Consultation proposes that a separate, new UKAD-C would be levied to fund UKADS1 and the UKADSF. As noted in the consultation, such a charge must be fair, transparent and adhere to the 'user pays' principle. It would also need to reflect the ICAO and EUROCONTROL principles described above.

The new charge could be applied in several ways and two are discussed below:

- **Option 1:** A UKAD-C based on service units (SU) in upper airspace.
- **Option 2:** A flat UKAD-C per ATM in the UK FIR.

6.2.1 Option 1: Charge per en route service unit

This approach would charge airspace users based on distance flown through the airspace and the aircraft's maximum take-off weight (MTOW), in the same way the current en route charge is calculated based on SUs.

One of the advantages of this method is that it aligns with the proportionality principle. SUs are a proxy for both weight and distance, and ensure that charges are scaled according to the demands each flight places on the airspace system and the operator's ability to pay. The principles of such a charge are well established and accepted as the basis for ATS charging.

The charge would be calculated with a UKADS1 unit rate*, as follows:

$$UKAD - C = UKADS1\ unit\ rate\ \times Number\ of\ SUs$$

6.2.2 Option 2: Charge per ATM

This approach would charge airspace users per flight in UK airspace, in the same way the current Oceanic charge is calculated.

The primary advantage of this method is its simplicity. The charge is straightforward to calculate and administer, with a fixed fee applied to each movement irrespective of aircraft weight or distance flown. This approach eliminates the need for distance or weight data, streamlining the process and reducing the likelihood of disputes or confusion over calculation. However, this method has drawbacks in terms of proportionality, as it does not take into account airspace use or ability to pay. Smaller aircraft, shorter flights would pay a disproportionate amount compared to larger, longer-distance ones.

The charge would also be calculated with a UKADS1 unit rate as follows:

$$UKAD - C = UKADS1\ unit\ rate\ \times Number\ of\ ATMs$$

6.3 Illustration of the charge

The estimated costs to be recovered for both UKADS1 and the UKADSF are discussed in Section 2 and 3.

The first the below UKAD-C illustrations is to show the annual charges if a simplex OPEX recovery is applied "in-year". In this case, the estimate costs of UKADS1 and the UKADSF will be estimated in advance for a given year and recovered in that year through the charge. Differences due to variations between forecast traffic and cost would be recovered as true-ups in a subsequent year (year n+2).

The second illustration shows the charges assuming a split of cost recovery between CAPEX and OPEX. In this case, some costs are recovered in year and the remainder is added to a RAB and recovered over a longer period.

The following assumptions have been applied for this illustration:

- A middle range of costs is assumed for the UKAD-C illustration, representing an average annual cost of approximately £12.2 million for UKADS1 and £ 7.1 million for UKADSF.[2]
- UKADS1 costs are incurred as OPEX in the first illustration and in a split of 90% CAPEX to 10% OPEX in the second.
- UKADSF costs are incurred as OPEX.

* A unit rate could be calculated by dividing forecast UKADS1 costs by the forecast defined measure of traffic (SUs or ATMs), plus any adjustments (e.g. true-ups).

[2] Scenario 2, with 15% optimism bias.

- The regulatory rate of return (weighted average cost of capital, RPI-real) from the NR23 settlement is applied at 3.19% (with a tax uplift of 25% as per the NERL regulatory settlement).
- A simple model of the RAB has been prepared but due to the inherent levels of uncertainties around the costs, some complexities of the price settlement model have been excluded. Depreciation of the RAB is modelled using straight line depreciation over 15 years.
- Eurocontrol traffic forecast data has been for movements and SUs to 2030. After 2030, the average annual growth rate has been used extend the data. The SUs are forecast, for example, to increase from 12.5m in 2025 to 15.1 million in 2036.

The following charges would be required to recover this amount from airspace users and are illustrated as averages over a 10-year horizon in 2024 prices.

	Option 1: Charge per SU	**Option 2: Charge per ATM**
Based on OPEX recovery	£1.41 per SU	£7.08 per movement
Based on mix of CAPEX/OPEX recovery	£1.02 per SU	£5.13 per movement

Table 3: Illustrative ANNUAL AVERAGE UKAD-C

Whilst recovery via CAPEX/OPEX results in a lower charge on a per year basis, it extends over many more years than OPEX recovery, due to the gradual depreciation of the RAB.

Over the NR23 period, UKAD-C could be expected to be 40% to 45% higher under the OPEX treatment and 7% to 8% higher under the mixed treatment model due to the ramp-up nature of activities in these earlier years.

To put the above figures in context, the 2024 UK en route unit rate is £75.21.[3] Therefore, under Option 1, the average annual increment for the UKAD-C could be equivalent to 1% to 2% of the UK en route charge depending on the CAPEX/OPEX arrangement.

Note that these calculations are illustrative and based on a number of assumptions about the scope of UKADS1 and the UKADSF and do not include potential additional costs associated with the collection of the charge.

6.4 Collection of the charge

In the UK, en route ATS charges are collected by EUROCONTROL's CRCO and NERL respectively.

If EUROCONTROL were to collect UKAD-C, it would leverage the CRCO's effective cost recovery system, the costs of which are shared across over 40 states at € 0.12 per service unit.[4] This would reduce administrative burdens on NERL and airspace users by using a system that is already in place for detailed billing and likely lead to lower overheads. Airlines are familiar with receiving charges through EUROCONTROL, ensuring smoother, more

[3] https://www.eurocontrol.int/sites/default/files/2023-12/circ-2024-01-eurocontrol-route-charges-system.pdf - conversion based on EUR/GBP rate of 0.861581.

[4] https://www.eurocontrol.int/sites/default/files/2024-04/eurocontrol-crco-report-2023.pdf

efficient collection processes. However, EUROCONTROL was not consulted during this activity and has not confirmed if it would be able to collect UKAD-C.

Collection directly by NERL could increase administrative and cost burdens, especially if the charge is based on Service Unit calculations that NERL does not currently make (as the en route SU calculations are made by EUROCONTROL). Implementing collection by NERL could require them to establish new processes. While this would be fairly simple for Option 2, NERL would likely need to license databases from EUROCONTROL to obtain the additional data required under Option 1. Implementing these processes, as well as a new layer of invoicing could lead to higher overhead costs for setup and ongoing administration.

In summary, collecting the charge through EUROCONTROL might be more efficient and less burdensome than NERL collecting it, especially under the SU charging option.

APPENDIX – COST MODELLING APPROACH

The cost model was created to forecast costs of UKADS1 over ten years. The cost forecasts are intended to inform discussion and consultation on the form of control and charging, and it should be noted that the cost estimates are highly indicative and reflect the uncertainty inherent at this stage of the process. Figures are based on both:

- Current assumptions around the future operation of UKADS1, and
- Cost data (actuals, forecasts, estimates) provided by NERL and by masterplan airports.

Cost model inputs

The cost model is based on assumptions around the operation of UKADS1 provided by CAA, DfT and NERL. Key assumptions are listed in Section 2 and 3 of this document.

Cost calculations are driven by data shared by NERL and thirteen UK airports. This included a combination of actual spend to date on ACPs and cost forecasts for planned future spend on ACPs. Airports provided data in a number of different formats: some airports provided numbers on a spreadsheet; other airports gave verbal rough-order-of-magnitude costs during an online meeting. Most airports stressed that the information they provided was confidential and commercially sensitive.

Model input limitations

The data provided by airports was not fully comparable, either among themselves or with the data supplied by NERL. This discrepancy arises from differences in how airports manage their ACP work. Some airports utilise permanent employees who perform ACP tasks as part of a broader role, making it more difficult to attribute costs directly. In contrast, other airports engage external specialist support, resulting in more clearly defined and easily identifiable costs. Furthermore, ACP effort varied across airports, with several being required to repeat Stage 2 work and incur greater cost as a result. The airports' data was therefore applied in two ways:

a) Airport cost inputs were used as indicative costs to validate NERL's assumptions on the likely cost of running the UKADS1 service. NERL's assumptions were adjusted where the airports' costs were consistently higher or lower than the assumptions provided by NERL, and
b) Airport cost inputs were used to identify an average cost per ATM for undertaking ACP design, assessment, engagement and consultation. A separate cost per ATM was calculated for small, medium and large airports. These values informed the size of the UKADSF.

Airports did not provide a price base for their cost data. Data included actual spend (generally over the period 2018-2024) and forecast spend (2024 onwards). We have assumed that that all cost data is in 2024 prices for the purpose of obtaining indicative cost estimates. NERL provided cost estimates in 2024 prices and did not assume any inflationary increases. The cost model therefore forecasts costs over ten years (2025-2035) in 2024 prices.

Model calculations: UKADS1

The cost model forecasts costs for UKADS1 within two cost categories:

- **Staff costs:** The model assumes that most staff will be recruited as permanent FTE within the new UKADS1 organisation. Roles were identified through discussions with

NERL and the airports. Staff roles fell under one of three functions: Airspace Design Function, Communications Function and Supporting Function. The number of staff within each function/role was based on discussions with NERL and with the airports. Salary assumptions for each role were provided by NERL and recruitment and training costs are included within these staff cost assumptions.

The model assumes that some functions will be outsourced by UKADS1 (i.e. procedure design, environmental assessments and consultation expertise). Estimated costs for these services were provided by NERL and adjusted based on insights provided by the airports.

The model applies a bottom up approach to forecasting the majority of staff costs by applying the following calculation:

$$Staff\ cost = FTE\ \times Salary\ (including\ recreuitment\ and\ trainin)$$

However, some staff resources are assumed to be provided by an external supplier, or as a package from NERL. Assumptions for these packaged costs include:

- Development simulation (1 per ACP deployment);
- Validation simulation (1 per ACP deployment);
- Procedure design (2 per ACP deployment);
- Environmental assessment (2 per ACP deployment); and
- Consultation specialist support (1 per ACP deployment).

- **Other operating costs:** The model forecasts other operating costs by applying the following assumptions, most were provided by NERL and the remainder were based on typical industry costs.
  - Organisation set-up costs: Includes branding, organisational design, recruitment, IT, accommodation, website, initial resources to support set-up. Assume cost spread across years 1 & 2;
  - Facilities set-up costs: Includes additional simulation facilities. Assume cost spread across years 1 & 2;
  - Facilities ongoing costs: Annual operation & maintenance;
  - Office space: Per FTE per annum;
  - Use of NERL simulation Facilities: Per FTE per annum;
  - Licensing of Industry Toolsets: Annual cost for industry tools;
  - IT maintenance: Annual cost;
  - Website maintenance: Annual cost.

Model calculations: UKADSF

The cost model forecasts costs for the UKADSF within two cost categories:

- **Airport funding:** The base model assumes that a number of airports which will apply for funding from the UKADSF. The funding request for each airport is calculated using the following calculation:

$$Total\ fund\ size = Airport\ ATMs\ \times Cost\ per\ ATM$$

The Cost per ATM was devised by using the airports' cost data to obtain an average cost per ATM for three categories of airport:

- Small: <100,000 ATMs;
- Medium: 100,000-200,000 ATMS;
- Large: >200,000 ATMs.

  An assumed ACP start date, and duration is applied within the model to allocate the UKADSF request across the applicable years. The model also assumes that one to two additional ACPs are initiated each year, made up of a combination of level 1 and level 2 ACPs.

- **UKADSF operating costs:** The model calculates the costs of administering the UKADSF, including staff cost, office space and IT.

Scenarios

The model includes three different scenarios for the UKADS1 delivery of stakeholder engagement and consultation. The scenarios aim to capture the different options for accountability/responsibility for engagement and consultation set out within the UKADS consultation material. This area was found to be the largest cost driver of ACPs and therefore:

- **Scenario 1:** UKADS1 leads on all stakeholder engagement and consultation activities.
- **Scenario 2:** UKADS1 and the airports partner for stakeholder engagement and consultation activities, with UKADS1 responsible for producing the consultation strategy and consultation materials.
- **Scenario 3:** Airports lead on all stakeholder engagement and consultation activities, with support from UKADS1 on the production of consultation materials and attendance at events.

Three scenarios are included in the calculation of ADF costs, to capture the different options for airport eligibility for the fund. These are:

- **Scenario 3:** No more than the number of airports in the current AMS Masterplan will apply for ADF funding.
- **Scenario 2:** No more than the nummber of airports currently, or previously, in the AMS Masterplan will apply for UKADSF funding.
- **Scenario 1:** As Scenario 2, with one additional medium-sized airport applying for funding.

Finally, the model also applies three different levels of optimism bias (High, Medium and Low) to reflect the reflect the “confidence +/- 25%” stated within NERL’s assumptions and the inherent challenges of benchmarking efficient ACP costs:

- **High:** 25% optimism bias added
- **Medium:** 15% optimism bias added
- **Low:** No optimism bias added.

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