BUSINESS PLAN 2025-2029

PREPARED BY AIRNAV IRELAND COVERING BOTH EN ROUTE AND TERMINAL SERVICES

THIS DOCUMENT IS FOR SUBMISSION TO THE IAA AHEAD OF THE EUROPEAN PERFORMANCE AND CHARGING SCHEME'S RP4

28 June 2024

Document information

GENERAL INFORMATION

Reviewed by:	Paul Johnson, Chief Strategy Officer Economic Regulation & International Affairs, AirNav Ireland Juraj Jirku, Aviation Director, Egis
Date:	28 June 2024

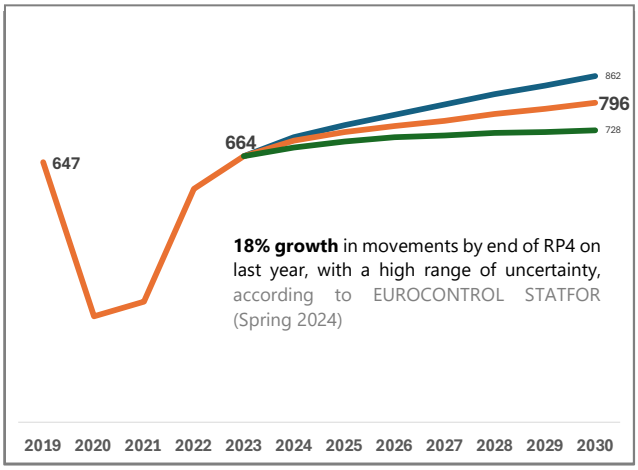
RP4 PLAN ON A PAGE – JUNE 2024

AirNav Ireland has prepared this Business Plan to cover en route and terminal services under the European Performance and Charging Scheme for the period 2025-2029.

It is a very detailed document as it has been developed to meet the evidential requirements of regulatory oversight bodies and customers, including to serve as reference material at the stakeholder consultation meeting, and it is complemented by more confidential and commercially sensitive information that has been submitted directly to the IAA in response to various information requests received in recent months.

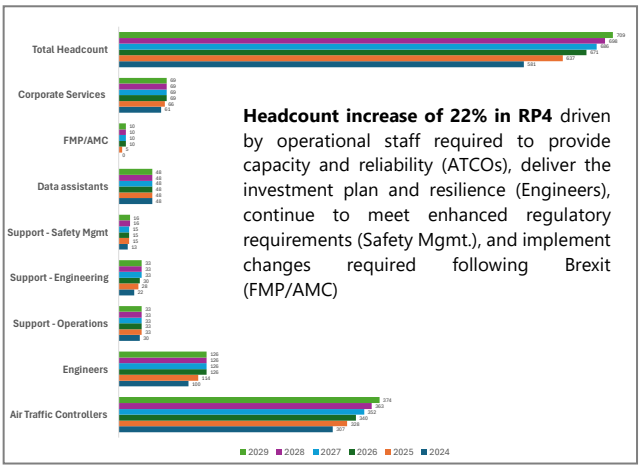
This page provides a high-level overview of what is contained in this Business Plan, and it identifies the resourcing and investment step changes that are required to continue to provide an excellent service to our customers in terms of safety, capacity, resilience and reliability.

Traffic Forecasts for Ireland 2025-2029 (IFR Movements)



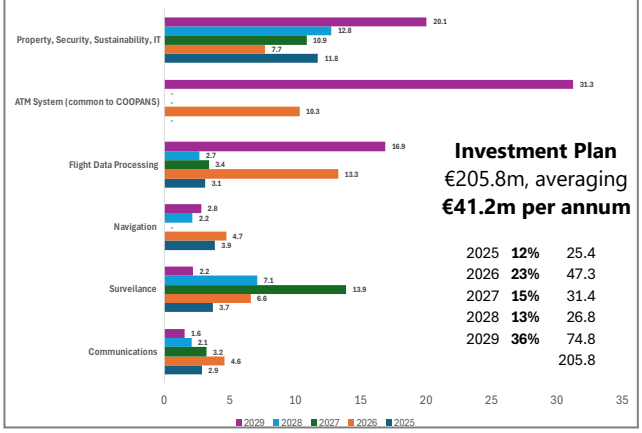
18% growth in movements by end of RP4 on last year, with a high range of uncertainty, according to EUROCONTROL STATFOR (Spring 2024)

Required Headcount to 2029



Headcount increase of 22% in RP4 driven by operational staff required to provide capacity and reliability (ATCOs), deliver the investment plan and resilience (Engineers), continue to meet enhanced regulatory requirements (Safety Mgmt.), and implement changes required following Brexit (FMP/AMC)

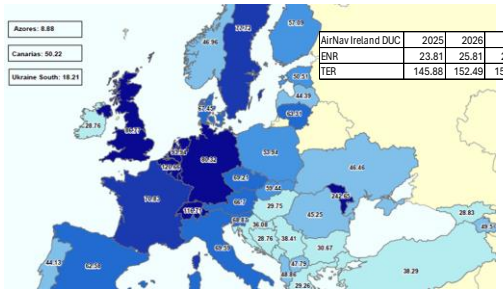
Total Capital Expenditure (Capitalised €m)



Investment Plan
€205.8m, averaging
€41.2m per annum

2025	**12%**	25.4
2026	**23%**	47.3
2027	**15%**	31.4
2028	**13%**	26.8
2029	**36%**	74.8
		205.8

Ireland continues to have one of the lowest charges in Europe



AirNav Ireland DUC	2025	2026	2027	2028	2029
ENR	23.81	25.81	26.36	26.66	27.53
TER	145.88	152.49	157.51	159.48	168.81

- When AirNav Ireland's costs are combined with NSA costs, MET costs, EUROCONTROL costs and other policy costs, Ireland would begin RP4 with one of the lowest unit rates in Europe, albeit outside the European cost efficiency target
- The estimated impact on a passenger flying through our airspace is an additional €0.10 on average above the RP4 targets for overflights and €0.22 for airport users (dep/arr).

Successfully implementing this Plan over the next five years will ensure our customer satisfaction scores remain excellent throughout RP4. It will allow us to further improve overall safety, security standards and provide for sufficient operational capacity and technical resilience to continue with the lowest rates of ATC delay in Europe, which in turn will drive environmental performance.

AirNav Ireland looks forward to continued engagement with stakeholders in July, August and September.

EXECUTIVE SUMMARY

In the RP3 regulatory period, we have been one of the best performing European ANSPs in terms of environmental performance and ATFM delay, whilst we charge our customers one of the lowest unit rates in Europe. These headlines are a testament to the efficiency of our business operation during RP3 and our dedication towards providing one of the best air traffic services in Europe. Building on these excellent achievements, we are now submitting our Business Plan for RP4 which is fully aligned with the vision for the European ATM Master Plan. It is heavily informed by the successes and challenges faced during RP3. It was built using a bottom-up approach and includes all resources needed to ensure that during RP4 we can continue to enhance safety levels, improve our service delivery, meet SES performance targets defined by the PRB and guarantee business continuity to our stakeholders.

Looking Back

Although our strong performance in RP3 should not be ignored, it is equally true that during RP3 we have faced a number of challenges as an organisation, which have increasingly put the quality of our service provision at risk:

Traffic

In the second half of RP3, traffic exceeded the October 2021 STATFOR forecast, surpassing initial projections for both IFR movements and service units, with this trend expected to continue into 2024. Between 2021 and 2023, traffic rebounded quickly from the Covid-19 induced decline. While the differences between the IFR movements trend and service units trend were marginal in 2021-2022, they diverged more significantly in 2023. IFR movements were almost 5% above the forecast in 2023, while en route service units were 1.5% below. In 2024, IFR movements are expected to be 9.2% higher than the revised RP3 plan, with en route service units only around 3% higher than the RP3 forecast.

Staffing and Operational Challenges

During RP3, our staffing profile across the organisation was very lean, with limited resilience for unforeseen circumstances. Recruitment of operational staff lagged behind the pace of traffic growth and was behind compared to our original plan, impacting our frontline operational staff. Unplanned ATCO losses, compounded by delays in ATCO training due to Covid-19 related cost containment measures, led to a heavy reliance on ATCO overtime to fill rosters. This reliance, while maintaining service efficiency most of the time, posed significant risks to service continuity during unexpected absences, particularly among ATCOs. These risks became more prominent during RP3, with instances of 'zero flow rates' effectively closing airspace within Irish airspace due to unplanned ATCO absences. These occurrences often went unrecorded in delay statistics, giving a misleading impression that capacity was not an issue, when in reality, the lack of resilience in staffing levels meant operations were precariously close to being impacted by unplanned absences.

Safety and Resource Allocation

Resource constraints were also evident in our RP3 safety performance. We missed our EoSM safety target (Effectiveness of Safety Management) for Safety Risk Management in 2022 and again in 2023, following a downgrade in the safety level from assured to managed due to insufficient ATM Occurrence Investigation (AOI) resources. Although safety remains our highest priority, delivering ATC capacity alongside maintaining a safe provision of service requires sufficient resources and associated costs. It is clear that achieving the required safety levels necessitates expenditure, which is reflected in our plan.

Environmental Performance

Although environmental performance indicators show a strong record, with Irish airspace consistently ranking among the top performing in Europe during RP3, we risk missing national performance targets in this area. Despite debating issues surrounding the KEA target for 2021 and the rigidity of the local reference value established by the PRB following input from EUROCONTROL Network Manager, our evidence was not taken into account by the PRB. In 2022, Ireland met the KEA target by a margin of 0.1%, and in 2023, we failed to meet the 1.13% target, achieving a value of 1.44%. Factors beyond our control, such as movements in the jet stream, airspace restrictions in neighbouring FIRs, and user-preferred trajectories, contributed to these

outcomes. Additionally, the Network Manager's requests to avoid offering shortcuts or direct routings to improve network function further complicated our ability to meet targets. This request effectively meant sacrificing Ireland's KEA scores to enhance the network, pushing us further from the targets set by the Network Manager.

Cost-Efficiency and Investment

Ireland has the lowest en route unit rates in Europe, matched only by Bosnia and Herzegovina, despite a smaller proportion of ANSP costs in the state's cost base compared to other countries. Benchmarking against our comparators shows we perform exceptionally well in many areas of ATM/CNS cost effectiveness. However, our Cost-Efficiency in RP3 has been significantly impacted by difficulties in delivering our investment programme. We struggled to meet the overall resourcing allowance during RP3, expecting to catch up several months behind schedule. This has affected actual depreciation, capital costs, and OPEX related to the investment plan. Despite past successes in delivering sizable investments like the Dublin tower, we underspent significantly compared to our regulatory allowance for CAPEX during RP3, necessitating a return of funds to airspace users. Additional demands on engineering resources due to compliance tasks from Commission Implementing Regulation (EU) 2017/373 and higher-than-expected inspection and maintenance demands further strained resources. Benchmarking confirms that we have the third-lowest number of technical staff per ATCO in Europe.

Operational Expenditure

While our non-staff OPEX will be broadly in line with the aggregate allowance for RP3, individual line items show variances due to forecast assumptions from 2021. Training delays led to underspending, mitigated to some extent by direct entry ATCOs, who are costlier than graduates but save on training costs. These variances were unforeseen during the 2021 planning period. Our training programme is only several months behind schedule, and ATCO numbers are expected to meet the 2024 allowance ahead of summer 2025. Future ATCO headcount requirements will need to increase further in RP4 to reduce reliance on overtime and support training for the implementation of TopSky ATC One, as well as to take account of other required step changes described in this document. Excluding training, there would be a significant overspend compared to the RP3 allowance, driven by higher-than-forecast inflation in areas like utilities, energy, and computing. Additionally, we incurred an impairment loss of €4.7 million in 2022. Without the training category, we would see a significant overspend of over €7.5 million across RP3, indicating that the regulatory requirement for non-staff operating costs was significantly underestimated in 2021.

Customer Feedback

Our Customer Care Programme revealed customer priorities for improving our service delivery, with a focus on reducing delays and enhancing efficiency, especially at Dublin Airport. Airlines highlighted ATCO shortages as a significant issue, despite praising our flexibility and support. They proposed an enhanced focus on future proofing the airspace to facilitate enhancements in sustainable flight operations. This feedback underscores the importance of balancing operational efficiency with proactive planning for future demands.

Looking Forward

The issues described above need to be resolved in RP4 to maintain our rank amongst the top European performers in all of the key performance areas. The RP4 period requires a significant investment in compliance, staffing, and infrastructure to ensure safe, efficient, and resilient ATC services. With one of the lowest en route unit charges in Europe, we cannot be unduly constrained in prioritising safety, capacity and environmental considerations, in addition to the range of other local and European regulatory requirements (e.g. CP1) simply because of a notion that Cost-Efficiency targets need to be challenging. The manner in which the RP4 Cost-Efficiency targets compare to the initial requirements identified by the European NSAs highlights that there will be undesired consequences in being unable to recover required costs. Our Business Plan reflects the need to adapt to evolving regulatory requirements and operational challenges while maintaining high standards of service delivery and sustainability. Implementation of the plan will require step changes, such as:

Compliance and Safety Costs

Delivering a safe ATC service incurs significant costs, including those associated with compliance to stringent regulations like (EU) 2017/373 and the more demanding EoSM for RP4. The resource cost of compliance during RP3 was much greater than anticipated, necessitating that sufficient costs are integrated into our RP4 plans.

Increased Staffing Needs

In RP4, our ATCO headcount will need to accommodate job-sharing, statutory leave, and annual leave changes, reduce reliance on overtime prevalent in RP2 and RP3, and enhance resilience against unexpected changes. Additional ATM Specialists for the Operational Support Group will be needed to support CAPEX delivery, along with increased numbers of Station Managers ✂. These staffing increases are not directly linked to traffic volumes, highlighting the necessity of transitioning to a more sustainable operational model rather than maintaining historically high productivity levels, as suggested by one customer during the RP4 Methodological Consultation.

CAPEX Under-delivery and Future Plans

During RP3, we underdelivered against the RP3 Investment Plan due to several factors, including unexpected staffing constraints. Staff were prioritised for day-to-day operations to avoid user delays, adversely affecting our CAPEX programme and compliance requirements. We forecast incurring €95.94m of capital expenditures compared to an allowance of €124.62m, representing a 23% underspend. Comparing ourselves to other ANSPs, we are not an outlier here with other ANSPs reporting similar issues to the ones we face. Unspent CAPEX in 2024 will be returned to users in 2025/2026 via lower en route and terminal charges. A significant increase in engineer numbers is needed in RP4 to deliver key CAPEX projects, address obsolescence, and support the implementation of the TopSky ATC One ATM System. The compliancFe workload has increased significantly, and this must be reflected in RP4 resource requirements. Benchmarking against other ANSPs shows we have one of the lowest numbers of engineers per ATCO in Europe, a critical consideration for RP4 planning.

Increased Non-Staff OPEX

Non-staff OPEX requirements are expected to rise in RP4, primarily due to significant training costs linked to a 26% increase in engineering headcount and capital project requirements such as CASDS and TopSky ATC One. Higher operating costs are also anticipated as large projects come online during RP4, including the CASDS, Radar replacement programme, and TopSky ATC One. However, other categories of non-staff OPEX are expected to remain relatively consistent with RP3 spend, taking into account existing contracts that we have in place.

Establishing FMP and AMC Functions

A Flow Management Position (FMP) is crucial for efficient air traffic flow management and airspace management, involving monitoring traffic volumes, applying regulations, and coordinating with the PRB under EU Regulation 255/2010. The Airspace Management Cell (AMC), mandated by EU Regulation 2150/2005, manages segregated airspace/FUA. Currently, NATS provides these functions for Ireland through their UKFMP position under the UK/Ireland FAB agreement. However, the Irish Regulator now requires the AMC to be provided from Ireland to comply with regulations mandating the function be carried out in an EU Member State. Regulation 255/2010 recommends co-locating FMP and AMC functions, and EUROCONTROL is developing a best practice document proposing amalgamation of these tasks. Consequently, AirNav Ireland intends to provide FMP & AMC functions during RP4.

Enhancing Cybersecurity

Effective cybersecurity risk management is essential to protect our ATC services, financial stability, and the privacy and security of our staff and customers. This Business Plan includes the necessary headcount and associated costs to support this compliance.

Property Investments

Many of our buildings have exceeded 20 years of operational life and require investment to maintain functionality and ensure we have sufficient space for additional staff to operate from. Key priorities for RP4 include investing in the Ballycasey, Dublin, and Cork Building Extensions and the Malin Head Radar Building

Replacement. Maintaining and expanding our property portfolio is essential for operational efficiency and headcount growth in the areas of operations, technical services, safety, compliance and other support roles.

Sustainability Goals

In RP4, we aim to deliver our sustainability management plan while complying with Irish Government regulatory obligations. Our climate action plan seeks to reduce our carbon footprint by 2030 and update infrastructure as it reaches the end of its lifecycle. Sustainability is increasingly important in aviation, and our projects will help to meet customer expectations and maintain our position as a leader in sustainability within European aviation.

Cost Allowance Required to Deliver our Business Plan

It is crucial that the regulatory allowance enables us to implement these changes without which our excellent performance and mandatory obligations will not be achievable.

The adopted European Cost-Efficiency targets however do not currently support this goal. Meeting the short-term annual DUC targets of -1.2% (AAGR) would result in nominal costs that could only increase by +2.1% on average. The real term costs would need to increase only by +0.5% annually (AAGR) while at the same time the traffic in terms of service units is expected to increase by +1.7% per annum on average. While such targets would be consistent with the European-wide short-term targets, such a cost base would increase the risk of our performance deteriorating in the near future. Reducing our unit rate by 1.2% each year will have detrimental impacts as it does not recognise already lowest unit rate and impact of the step changes. Compared to our bottom-up planning based on the real needs, the application of the adopted short-term DUC target would result in removing €131m in real terms from our en route cost base and €32m from the terminal cost base over RP4 while the impact on the passenger in terms of the costs would be negligible.

In addition, for RP3, the Irish NSA proposed targets which were more stringent than the Union-wide targets. While the revised EU-wide target suggested an average annual increase of real term costs by 0.98% (taking 2020 and 2021 as one year), IAA set the national targets that implied a CAGR rate of -0.4% over the same period. This meant that the national target was more stringent by +1.35% compared to the Union-wide target. FIGURE 1 below summarises that the national CAGR RP3 DUC target was the 9th most stringent in EU (excluding Austria which is under the cost recovery system) despite the fact that Ireland had the 4th lowest DUC in 2019 at 54% of the Union-wide average, i.e. €25.03 (2017) compared to the Union-wide average of €46.49. The approved DUC target for 2024 meant that Ireland would have the lowest DUC in the EU, i.e. €24.66 compared to the Union-wide average of €47.15 representing 52% of the average.

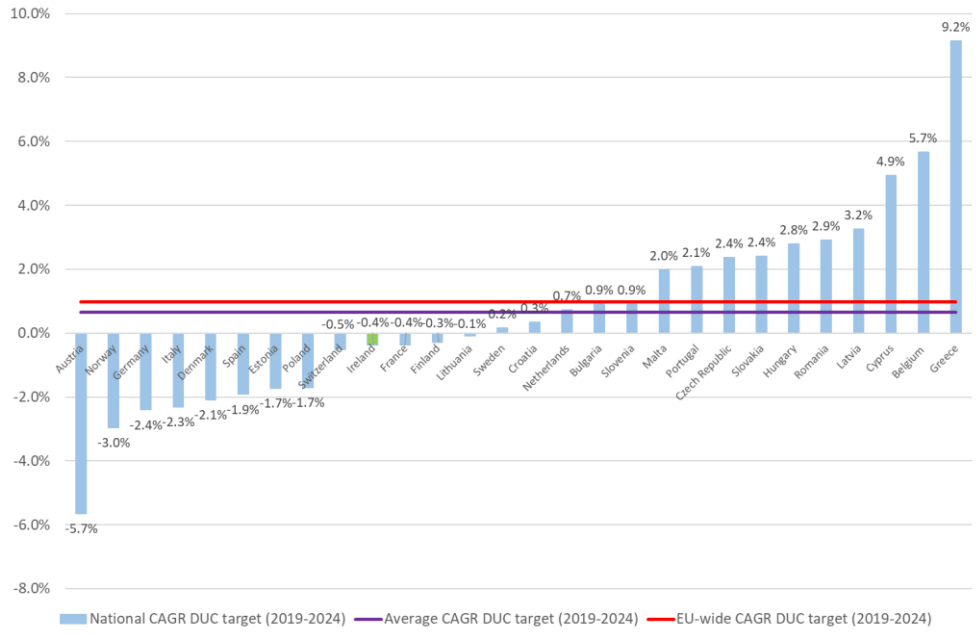


FIGURE 1: REVISED NATIONAL, AVERAGE AND UNION-WIDE CAGR DUC TARGETS IN RP3

If a similar approach is taken in RP4, and IAA again imposes a 1.35% more stringent target than the Union-wide target (i.e. -2.55% AAGR), this would result in targets which would allow for only a 0.7% increase of the nominal cost base while the long-term trend would reach -1.7% compared to the Union-wide target of -1%. This would impose a more significant threat to us being able to deliver our primary functions.

If the IAA chooses to apply more stringent targets than the Union-wide recommendations, it would mean removal of additional €23m in real terms from our en route cost base (€154m compared to our real needs) and additional €6m from the terminal cost base (€38m compared to our real needs) over RP4. This would have a severe impact several performance areas. This situation would be unsustainable for various reasons detailed in this Business Plan. Given that we have one of the lowest en route unit charges in Europe, we need flexibility to prioritize safety, capacity, and environmental considerations alongside other local and European regulatory requirements (e.g., CP1).

Instead of focusing on the need to meet the Union-wide targets that do not fully take into account the local context, our proposal for the RP4 cost base is based on a thorough analysis of real needs that are clearly described in this Business Plan and supported by the evidence detailed in the sections below. This cost base would enable us to cope with the forecasted traffic, implement our ATCO programme, train our staff for the major technology improvements, and solve all resource requirements and commitments to enable us to meet all our targets not only in RP4 but also beyond. It would allow us to solve most of our current issues while implementing a CAPEX programme that will prepare us for the future aligned with the European ATM Master Plan.

The success of our large-scale CAPEX investments demonstrates our capability to deliver. We have also successfully recruited towards the second half of RP3 and our engineer numbers during the last two years of RP3 will finally reach the allowance agreed in the RP3 plan, albeit considering trainees / recent graduates. With sufficient resources, we are confident in our ability to deliver capital projects.

Required En Route Costs

TABLE 1: REQUIRED COSTS FOR EN ROUTE SERVICES €'000, 2022 PRICES

	2023	2024	2025	2026	2027	2028	2029	RP4 TOTAL
Staff Costs	71,102	69,312	75,863	79,736	81,655	84,471	86,455	**408,180**
Other Operating	27,888	33,805	37,735	40,341	39,192	39,167	41,357	**197,793**
Depreciation	6,325	6,030	7,771	9,710	12,485	13,364	15,812	**59,143**
Cost of Capital	2,190	2,625	4,540	5,886	7,656	8,517	8,981	**35,580**
Total	**107,505**	**111,772**	**125,910**	**135,673**	**140,989**	**145,519**	**152,606**	**700,696**

Required Terminal Costs

TABLE 2: REQUIRED COSTS FOR TERMINAL SERVICES €'000, 2022 PRICES

	2023	2024	2025	2026	2027	2028	2029	RP4 TOTAL
Staff Costs	12,130	11,847	13,070	13,725	13,993	14,500	14,859	**70,147**
Other Operating	6,808	7,798	8,495	9,110	8,768	8,931	9,448	**44,752**
Depreciation	4,041	4,125	4,928	5,557	6,747	7,324	8,985	**33,541**
Cost of Capital	3,409	3,546	4,871	5,310	6,089	6,404	6,716	**29,390**
Total	**26,388**	**27,316**	**31,364**	**33,701**	**35,597**	**37,159**	**40,009**	**177,830**

The following table summarises the proposed determined costs and determined unit costs for AirNav Ireland in RP4:

TABLE 3: AIRNAV IRELAND'S PROPOSED DETERMINED COSTS AND DUC IN €'000, 2022 PRICES

EN ROUTE	2025	2026	2027	2028	2029
Determined Costs (real)	125,910	135,673	140,989	145,519	152,606
Service Units	5,289	5,256	5,349	5,458	5,544
Determined Unit Costs (real)	**23.81**	**25.81**	**26.36**	**26.66**	**27.53**
TERMINAL	**2025**	**2026**	**2027**	**2028**	**2029**
Determined Costs (real)	31,364	33,701	35,597	37,159	40,009
Service Units	215	221	226	233	237
Determined Unit Costs (real)	**145.88**	**152.49**	**157.51**	**159.48**	**168.81**

Impact of the Business Plan on the End User - Passenger

Many industries across Europe, from aviation to telecommunications, have shared the view that European policymakers have prioritised the avoidance of short-term price increases at the expense of long-term competitiveness. This Business Plan identifies the short, medium, and long-term requirements to deliver a continuation of the performance levels that our customers expect of us, and it does point to a required price increase in the short and medium term. However, critically this Business Plan will still lead us to having one of the lowest unit rates in Europe.

Our preliminary analysis shows that in nominal terms our largest customer, accounting for 12% of en route and terminal revenue in 2023, would incur a cost per passenger across the RP4 period that is approximately €0.10 higher per passenger for en route traffic than what the Cost-Efficiency targets would suggest, and €0.22 higher for terminal movements (departures and arrivals). This is negligible impact, especially if compared with airlines announcing surcharges to pass the costs of Europe's new emissions on to passengers (starting with a surcharge of between €1 to €72 per ticket from the next year[1]).

We do not believe that passengers would be materially impacted by this increase, whereas they would be disproportionately affected by a sub-optimal service, including increased delay for example, with delay projections in recent weeks from EUROCONTROL pointing to significant delays on average per flight in Europe over the period 2030-2040 (as shown in FIGURE 2) if the required investment in ATM (specifically for the European ATM Master Plan) is not appropriately timed. These recent projections of ATFM delay across Europe show the impact of not investing the required €5 billion for the European ATM Master Plan initiatives in RP4. Our share of this investment is approximately €80 million, i.e. around €16 million a year which we are expected to deliver on top of our day-to-day requirements. This compares with under €10 million of CAPEX per year in RP3 which we had delivered excluding the new Dublin tower. This fact further underscores the importance of getting the regulatory allowance which is fully aligned with our Business Plan.

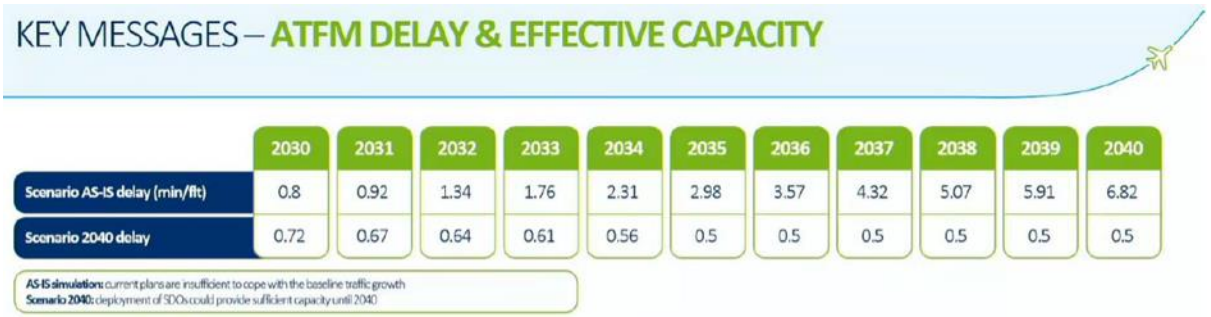


FIGURE 2: DEVELOPMENT OF ATFM DELAY IN EUROPEAN NETWORK WITH AND WITHOUT ATM MASTER PLAN

We look forward to continuing to engage with the IAA, customers, and other relevant stakeholders in relation to the evidence provided in this Business Plan.

[1] *Lufthansa to impose green surcharge in bid to pass on sustainable fuel costs, Financial Times, 25 June 2024*

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1 INTRODUCTION

AirNav Ireland was established after the Irish government's decision to separate Ireland's air traffic management and air safety regulation functions. On 1st May 2023, pursuant to the Air Navigation and Transport Act 2022, the Commission for Aviation Regulation (CAR) was dissolved, and its aviation regulatory functions were combined with the aviation regulatory functions of the IAA. Consequently, the IAA is now the single Irish NSA, with responsibility for the development and submission of an Air Navigation Services Performance Plan as provided by Commission Implementing Regulation (EU) 2019/317.

We are required by the IAA to produce a Business Plan from which the IAA can extract the inputs required to produce Ireland's Performance Plan for RP4, as required under the European Performance and Charging Scheme regulation 2019/317. This Business Plan has been produced with a focus on our activities that fall under the European Performance and Charging Scheme, covering only en route air navigation services and terminal services provided at Dublin, Shannon and Cork airports.

IAA has published a guidance document for AirNav Ireland providing the IAA's position on the information required within this Business Plan. The IAA has stated in the RP4 Methodological Consultation and Issues Paper:

"Our initial view is that this guidance, and the resulting content and level of detail in the published Business Plans from both entities, remain broadly appropriate for RP4". - IAA

As a consequence, this Business Plan is heavily influenced by the information contained in the revised RP3 Business Plan, with any changes included to account for those highlighted within the IAA's updated Business Plan guidance for RP4.

This version of the Business Plan is a version submitted to the IAA. We encourage the IAA and its consultants CEPA to make clear their position on this Business Plan at the draft decision stage following an evidence based approach that can be followed and understood.

The following compliance matrix summarises the IAA's key requirements from this guidance and provides references to the particular sections where the targeted information is included in this Business Plan:

TABLE 4: KEY POINTS FROM IAA RP4 BUSINESS PLAN GUIDANCE

Key points from IAA RP4 Business Plan Guidance		Section
General		
Paragraph 1.2	Underlying economic and other assumptions (including IMF Inflation projections) and how these relate to traffic and cost forecasts.	Section 8
	Description and justification of traffic forecast used, and how this affects cost projections.	Section 5.5
	Description of any adjustments beyond the provisions of the International Financial Reporting Standards adopted by the Union pursuant to Commission Regulation (EC) No 1126/2008.	Not/Applicable
	Description of change management practices and transition plans for the entry into service of major airspace changes or for ATM system improvements, aimed at minimising any negative impact on the network performance.	Section 3.4.3.3
	A description of the interdependencies and trade-offs between the KPAs.	Section 6.3
Paragraph 1.5	Provide a full description of the cost-allocation methodologies between en route, terminal, and unregulated. Provide overview of the application of this methodology in the BP and the full set of allocation keys and underlying rationale to the IAA.	Section 7
Paragraph 1.7	Confirm which price base the Business Plan figures are in (we assume that, as per the regulation, investment costs will always be provided in nominal terms in any case, and for OPEX a consistent price base approach will be used).	Section 8

Paragraph 1.10	It can also be noted that, in response to the Issues Paper, there has been a request that the Business Plan would demonstrate how it has been developed with stakeholder engagement and how this engagement has shaped the Business Plan. The IAA will engage with AirNav Ireland on these points during the business planning process.	Section, 5.1.3.1, 5.3
Capital Expenditure		
Paragraph 1.11	The BP should provide description and quantification of the existing asset base at the start of RP4, i.e. the 2025 opening RAB. This will hopefully be agreed and validated in advance with the IAA, analysis which is currently underway.	Section 8.3.5
Paragraph 1.12	The BP should set out and explain AirNav Ireland's position on any: - return of unspent CAPEX over RP3, including identifying which projects which unspent allowances relate to. - return of COOPANS incentive payment. - return of EU grants or other funding received	To be returned in accordance with regulatory requirements
Paragraph 1.14	For each project: - Description of the planned investment, in the context of the operations and technology strategy, and including any relevant references to cross-border initiatives, SESAR implementation and SES regulations. If the investment is mandated by a SES Regulation (i.e. PCP/CP1/Interoperability), please provide description/specific reference (this topic is addressed further below). - Lay out the Business Case. This will vary by project: Broadly, maintenance CAPEX proposals should identify the system or equipment that is End of Life (evidence of the same can be provided directly to the IAA). For a step change in business requirements, this should be set out and the benefit or necessity of this explained. For other projects, we would expect a quantified, evidence-backed business case either with reference to achieving efficiencies/productivity or a quantified impact on other KPAs. It may be best to provide just the key business case findings in the BP but provide the actual internal business cases to the IAA. - More specifically, for investments in new ATM systems and major overhauls of ATM systems only, provide information on the consistency of the investment with the European ATM Master Plan. Also, set out AirNav Ireland's view on the impact of the investment at network and/or local level, and the impact on each of the four KPAs, quantified where relevant and to the extent reasonably possible, and in any case identified as being one of the following for each KPA: o N/A o Negligible o Significant o Major - Overview of cost assumption(s) underpinning each project estimate. We understand that the detailed build-up of the cost estimate may be considered commercially confidential and provided directly to the IAA rather than in the BP. Where cost estimates are based (or partly based) on previous procurements (or 'off the shelf' prices), this procurement material should be provided directly to the IAA together with any reconciliation workings (e.g. adjustment for project scope differences or construction price inflation). - Proposed asset life and associated explanation/justification (where a blended asset life is proposed for a project, the asset life of the individual components, and the blend, should be set out). - Provide an OPEX interdependency estimate where relevant/non-negligible or confirm that AirNav Ireland's view is that the OPEX impact is negligible. In particular, provide quantification of any efficiencies expected to be generated by a capital project.	APPENDIX 1 PROPERTY/ SECURITY/ SUSTAINABILITY PROJECT SHEETS APPENDIX 2 APPENDIX 3 TECHNOLOGY AND OPERATIONS PROJECT

Paragraph 1.15	Provide details of optioneering of project solutions, where relevant, for substantial projects. It may be best to provide an overview of optioneering in the BP and provide any more detailed internal optioneering as supporting evidence provided to the IAA.	Please refer to the project sheets contained in the Appendices
Paragraph 1.16	Provide an overview in relation to the strategy for requests for funding from relevant EU programmes (or otherwise). How will AirNav Ireland seek such funding and to what extent, if any, is such funding assumed in the proposed project costings?	We will continuously evaluate the Calls from the relevant EU programmes and request funding in cases where we would see value. We would follow standard processes and would return the funds to users in line with the regulatory requirements.
Paragraph 1.17	Provide a detailed programme timeline and strategy for delivery. The strategy should have regard to the fact that both RP2 and RP3 have seen significant under-delivery of the assumed investment programme. For example, this might be addressed through a combination of less ambitious timelines as well as identifying factors which have led to under-delivery and demonstrating, in detail, how these factors will be addressed for RP4.	Section 8.5
Paragraph 1.18	Provide a proposal for reporting on delivery schedule of allowed CAPEX over the period (e.g. publishable reports to be sent to the NSA at defined intervals). We note that Ryanair suggested reporting on CAPEX delivery at least every quarter in its response to the RP4 methodological consultation and issues paper published in January 2024.	We will continue to comply with regulatory reporting requirements, we request that the benefits of any additional reporting requirements are clearly specified. Across Europe quarterly reporting on CAPEX delivery is not commonplace, due to the time and resource consuming nature of producing such reports.
Paragraph 1.19	AirNav Ireland may wish to provide details on its proposed financing/ capital structure strategy, including with regards to the upgrade of its ATM system during RP4.	We have been liaising with the IAA in relation to information requests on this topic.
Paragraph 1.20	AirNav Ireland may wish to set out its position for future treatment of CAPEX outturn expenditure over RP4, with appropriate reference to the Regulation (e.g. should underspends or overspends be grouped, in whole or in part, or considered on a project-by-project basis).	Section 8.5
Operating Expenditure		
Paragraph 1.22	Description and justification of forecast staff costs, as follows: - Annual average FTE/headcount estimates. - Staff costs and pension cost assumptions.	Section 8 (confidential material shared directly with IAA)
Paragraph 1.23	In relation to the level of granularity of FTE/headcount categories, the categorisations in Table 11 of the revised RP3 BP are appropriate with the exception of:	Section 8

	- ATCOs. There should be a split between operational and non-operational (i.e. in project delivery) and, within operational ATCOs, also a split between en route and terminal. In addition, trainees should also be separate. - Corporate Services. This should be split at a further level of granularity (e.g. HR, Finance, Senior Management etc).	
Paragraph 1.24/1.25	These categories were not included in the revised RP3 BP and should be included in the RP4 BP. For each category: Quantified analysis of the proposed FTE/headcount: - Provide evidence as to the specific efficiency of proposed step-changes. For example, rather than just 'FTEs need to increase from X to X+5 due to a particular reason', also set out how X+5 has been identified as the required number. This might be done either through explaining forecasting assumptions linked to traffic forecasts or some other driver (e.g. ATCOs) or setting out a business case for a change in headcount in a particular category. - Where any expected impact on other KPAs forms part of the business case, this should be explained and quantified to the extent possible. - Identify and provide quantified analysis of any proposed step changes within the period, with reference to the specifics of the step change. Consider whether any proposed step change is genuinely additional or might already be explicitly or implicitly captured within the forecast trend. - If a new or changing regulation is being cited, describe the planning assumption (e.g. consideration of whether the change is additive, or certain aspects replace other regulatory requirements). If the requirement is identified as additive this should be clearly demonstrated (noting that in certain cases regulatory changes tend to replace earlier requirements and thus may not be additional or not fully additional). Explicitly account for any CAPEX interdependencies as set out above. Outline unit payroll costs and pension cost forecasts, and forecasting assumptions. Highlight any overtime assumptions.	Section 8 (confidential material shared directly with IAA)
Paragraph 1.27	Provide quantified analysis as to how the figures have been specifically arrived at. Including business case analysis for any step changes – particularly providing details on any interrelatedness with the other KPAs	Section 8
Paragraph 1.28	Where relevant (such as in relation to energy costs), provide particular detail/substantiation in respect of any proposed real price effects, i.e. costs increasing faster than inflation. We would expect any RPE claim to be a) material, b) forward-looking and c) treated symmetrically.	✂
Cost of Capital		
Paragraph 1.29	Description and justification of the methodology proposed to calculate the return on equity, interest rate on debt, and gearing assumption, and the resulting proposed Cost of Capital. It is suggested that, where methodological differences are proposed relative to the WACC set by the NSA in 2021, particular attention should be paid to associated justifications.	✂
Paragraph 1.30	Confirm the status and include detail of any current actual debt or drawdown credit facilities in place.	Please, refer to First Economics' assessment "AirNav Ireland's En Route and Terminal Services Cost of Capital", Prepared for AirNav Ireland, 6 March 2024
Other		
Paragraph 1.31	With regard to target setting, AirNav Ireland should provide detail on: - Proposed targets for the Safety, Environment, and Capacity KPAs, including for their respective KPIs;	Specified throughout and through direct

	- Any proposals in respect of other metrics; - Justification for these proposals; - The main measures put in place/proposed to be put in place in order to meet these targets; and - A proposed approach to incentive schemes	correspondence with the IAA
Paragraph 1.32	With regard to Restructuring Costs, AirNav Ireland should provide detail on any proposals it has (if any) in this respect, in accordance with the definition established in Article 2(18) of Commission Implementing Regulation (EU) 2019/317.	Please refer to sections on FMP/AMC
Paragraph 1.33	With regard to cross-border provision, identify any cross-border area or group of adjacent cross-border areas of a size above 500 km2, unless the area or group of areas concerned has fewer than 7,500 controlled flight movements on average per year. For such areas, provide detail on: - The geographical scope of the cross-border area(s); - The rationale for establishing the cross-border area, including any performance benefits; - The size of the cross-border area in square kilometres; - The estimated annual number of flights per year in the cross-border area(s); - The estimated annual number of service units in the cross-border area(s), if available; - The nature of services provided by AirNav Ireland in the cross-border area(s), and - An estimate of associated costs by nature related to the cross-border arrangement, and how these costs have been estimated.	Section 2.2, information also provided to IAA in response to requests for information on this topic.
Paragraph 1.34	With regard to Common Project 1 (CP1) investments, for each sub-ATM functionality (s-AF), provide detail on: - The date of actual past or the expected future deployment of each s-AF; - A description of realised and/or planned investments related to the deployment of each s-AF; and - An estimate of costs within each investment project associated with delivering each s-AF.	APPENDIX 4 ATM MASTER PLAN AND CP1 COMPLIANCE, Information also provided to IAA in response to separate information requests, including the provision of a quarterly status update on CP1.

The structure of this document is as follows:

- **Section 1: Introduction** – An introduction to this document, providing the document structure and introducing the IAA's RP4 Business Plan guidance.
- **Section 2: Overview of AirNav Ireland** – A high level summary of the services we provide.
- **Section 3: Review of RP3** – An in-depth review of our performance during RP3, covering the traffic environment, and our performance against the European Performance and Charging scheme's four KPAs: Safety, Environment, Capacity, Cost-Efficiency (including Cost-Efficiency benchmarking against our RP3 and RP4 Comparators)
- **Section 4: AirNav Ireland's Strategic Direction** – Introducing our company strategy ahead of RP4.
- **Section 5: Context for RP4** – A detailed description RP4 regulatory context, the prevailing market trends within the ATM sector, customer priorities for RP4, the key challenges we are likely to face during RP4 and the forecasted Irish traffic environment.
- **Section 6: Core Elements of RP4 Plan** – A description of how the targets for each of the KPAs will be met during RP4.
- **Section 7: Cost Allocation** – A description of the cost allocation methodology applied to the cost base contained in this plan, including the methodology applied for allocating costs between en route and terminal services.
- **Section 8: Required Costs** – The costs required to deliver an Air Traffic Service during RP4.
- **Appendices** – Additional information for the reader's interest.

2 OVERVIEW OF AIRNAV IRELAND

2.1 Services Offered

We provide ATM and AIS services in the 451,000 km^2 of airspace controlled by Ireland. This airspace forms a crucial gateway for air traffic between Europe and North America, providing both terminal and en route services.

For en route services, our Shannon ACC, handles over 90% of all air traffic within the North Atlantic region. This equates to approximately 1,400 – 1,500 aircraft every 24 hours during the busy summer months. Airlines are charged for the air traffic control services that we provide to facilitate their journey.

For terminal services, we provide air traffic control services at the state airports of Dublin, Cork and Shannon. The busiest of these airports is Dublin and its controllers are responsible for an airspace block of approximately 20,500 km^2, the vertical limit of which is approximately 24,000ft.

Our North Atlantic Communications Centre provides communications services on the eastern half of the North Atlantic and is located in Ballygirreen. These services are outside of the scope of this RP4 Business Plan.

2.2 Area of Responsibility

We are responsible for providing ATC services within the Shannon FIR/UIR which covers the airspace over Ireland. We are responsible for providing ATC services within oceanic airspace to the west of Ireland. We provide ATC services in NOTA & SOTA and communications services in the remaining Shanwick oceanic airspace.

Alongside the services we provide in the Shannon FIR, we are also delegated responsibility to provide a full ATC service to some portions of airspace within the London and Scottish FIRs described below.

2.2.1 Delegated Airspace

The responsibility for providing Air Traffic Services (ATS) can be delegated from one state to another, enabling ATS to be provided within a clearly defined area of airspace without the need to move FIR boundaries. We deliver an ATS in some parts of UK airspace under various delegation arrangements. These are subject to the regulatory oversight by the UK CAA. There are ongoing overheads associated with the activities needed to comply with the terms of UK certification, including provision of information and facilitation of regular inspections by the CAA, as well as notifying and gaining approval from the CAA of any changes in procedures required by the terms of the certification.

3 REVIEW OF RP3

3.1 Overview

In the RP3 regulatory period, we have been one of the best performing European ANSPs in terms of supporting environmental performance and delivering low ATFM delay, whilst we charge our customers one of the lowest unit rates in Europe. These headlines are a testament to the efficiency of our business operation during RP3 and our dedication towards providing one of the best air traffic services in Europe.

Although our strong performance in RP3 should not be ignored, it is also the case that during RP3 there have been a number of challenges within our organisation, and these have increasingly put the quality of our service provision at risk.

During RP3, across the organisation our staffing plan was very lean, with limited resilience included in the event of unforeseen circumstances, this was partially attributable to the difficulty in recruiting operational staff at the same pace as traffic grew and in line with our original plan. The impact of this has been felt by our frontline operational staff in particular. In the second half of RP3, traffic exceeded the October 2021 STATFOR forecast used to guide our revised RP3 Performance Plan, this combined with unplanned ATCO losses has meant that we have heavily relied on ATCO overtime ✂. This means that although our service is efficient most of the time, as demonstrated by our strong performance, unexpected absences (particularly ATCOs) pose a significant risk to the continuity of our services.

During RP3 this became more prominent, with occurrences of 'zero flow rates' being imposed within Irish airspace due to unplanned ATCO absences. The impact of instances of 'zero flow' are not always captured in delay statistics which could imply that capacity is not an issue when in fact the lack of resilience in staffing levels means that operations are only a small number of unplanned absences away from zero flow rates being imposed. Resourcing concerns were also reflected in other areas, for example we missed our EoSM safety target (Effectiveness of Safety Management) for Safety Risk Management in 2022 and 2023, after the safety level was downgraded from assured to managed. This occurred in 2022 due to insufficient ATM Occurrence Investigation (AOI) resources being available to ensure occurrence reports were investigated within the required timeframes. Safety will always be our highest priority, however, the missed safety target in RP3 demonstrated the clear trade-off between capacity and safety performance. Although safety remains our highest priority, resources are required to deliver ATC capacity alongside maintaining a safe provision of service, and resources have an associated cost.

Environmental performance is another area where the achieved performance does not reflect the full picture. Although environmental performance indicators show a strong performance, with Irish airspace, being one of the best performing in Europe during RP3, we are still at considerable risk of missing national performance targets in this area. Despite debating issues surrounding the KEA target for 2021 and the rigidity of the local reference value established by the PRB following input from EUROCONTROL Network Manager, our evidence was not taken into account by the PRB. Consequently, in 2022, we only met our KEA target by a margin of 0.1% and in 2023 the KEA performance did not meet the target of 1.13% with the actual value of 1.44%.

The main reasons for missing the target are driven by factors beyond our control, given significant investments we have made to improve our routing offerings to implement FRA. In addition, we have faced calls from the Network Manager to avoid offering shortcuts or direct routings to ensure the network functions better. In other words, we were requested by EUROCONTROL Network Manager to deliberately sacrifice our KEA scores to improve the functioning of the network, which would have pushed us further from the targets put in place by the Network Manager in the first place.

In the remainder of this section, we describe our RP3 performance in more detail, covering the RP3 traffic growth compared to the forecast used to guide the revised RP3 Business Plan, our performance against the Safety, Capacity, Environment and Cost-Efficiency KPIs, and benchmarking aspects of our service delivery against our European counterparts.

3.2 Traffic

3.2.1 Revised Forecasts

There were several revisions to the STATFOR forecasts during RP3. In our revised RP3 Performance Plan in 2021, the October 2021 forecast was used, and the below figure clearly illustrates the respective accuracy of the various forecasts during RP3, with actual traffic higher than all the forecasts other than the June 2022 forecast. The traffic in 2023 was 2.6% higher than 2019 levels in terms of IFR movements and 4.7% higher than expected in our RP3 Performance Plan. The latest STATFOR base scenario from February 2024 now forecasts the traffic in 2024 to be 9.2% higher than the projections contained within our RP3 Performance Plan. The accuracy of these STATFOR forecasts is essential in our resource planning, as it places an increased demand on our services. Alongside our ATCO losses, traffic exceeding the forecast during RP3 has placed an increased demand on overtime usage, impacting our service resilience in the event of unforeseen issues.

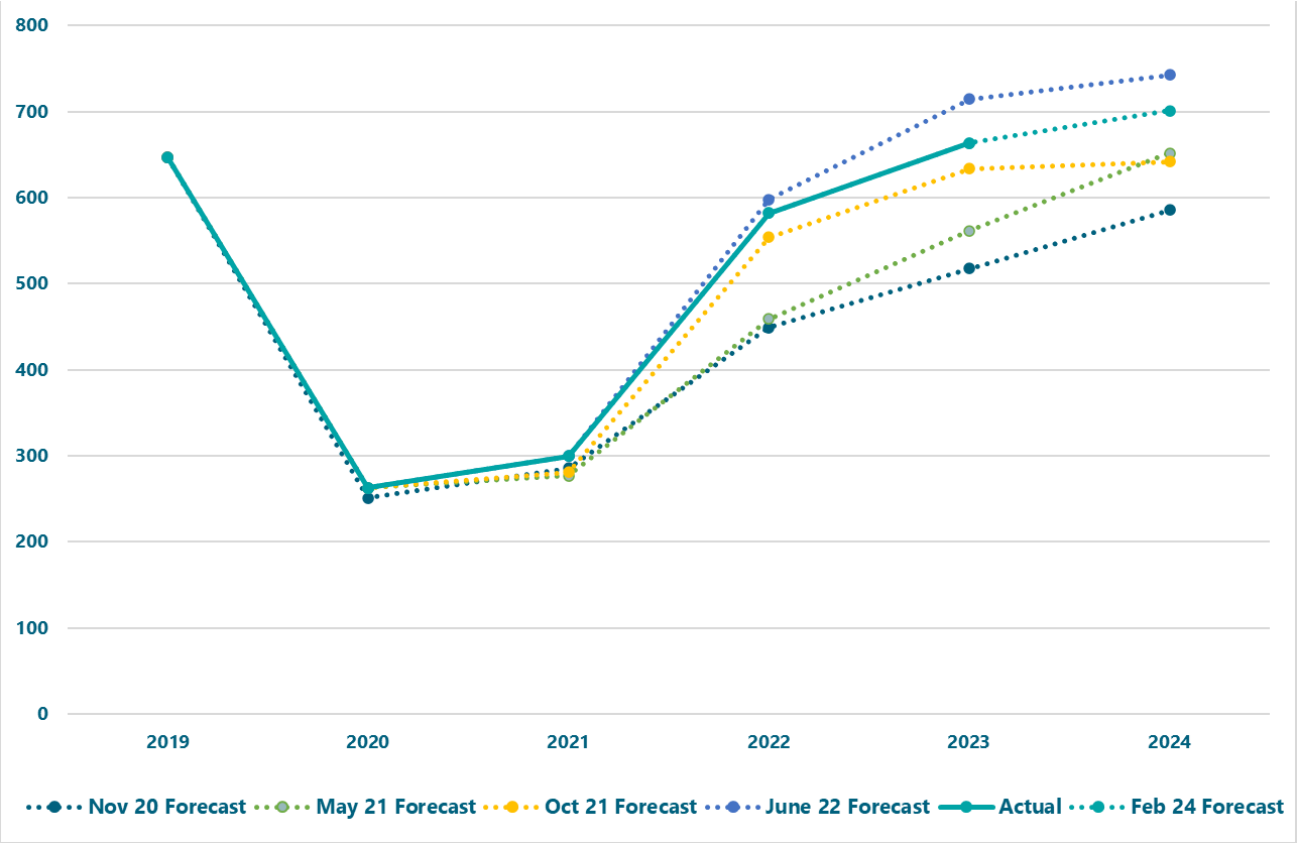

FIGURE 3: CHANGES IN BASE STATFOR FORECASTS ACROSS RP3 ('000)

3.2.2 IFR Movements

During RP3, the PRB initially advised ANSPs to take their traffic forecasts from the STATFOR Scenario 2 from the November 2020 publication. Following this, the PRB then advised ANSPs to prepare revised RP3 plans after publishing revised PRB targets in March 2021 using the STATFOR May forecast. The following consultation resulted in a decision to use the October 2021 STATFOR base scenario projections, and these formed the basis of Ireland's revised RP3 plan. Through 2020 and much of 2021, EUROCONTROL explicitly cautioned ANSPs of the uncertainty of the traffic forecasts given the wider implications of a Covid-19 recovery, however the use of the October 2021 forecast turned out to be closer to the actual development than the former forecasts. Our RP3 IFR Movements to 2023 are illustrated in the below figure, against the revised STATFOR forecast from October 2021.

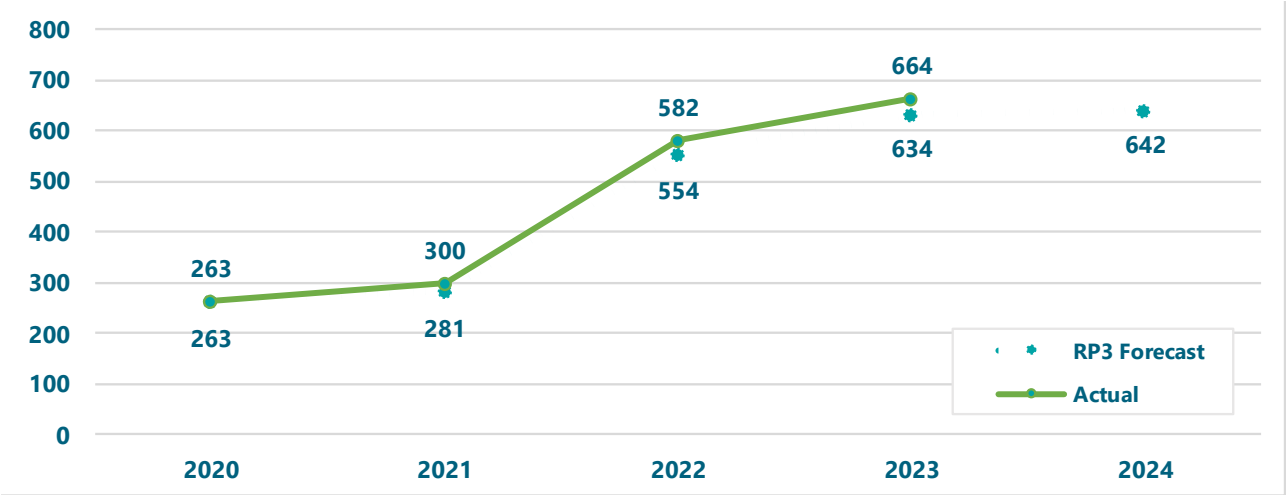

FIGURE 4: RP3 IFR MOVEMENTS – RP3 FORECAST VS ACTUAL ('000)

Following our 2021 service delivery and Business Plan, using these revised forecasts, we experienced a higher level of traffic across RP3 than originally anticipated, owing to an accelerated rate of recovery from Covid-19 across our airspace. In 2021, Irish traffic immediately exceeded the forecast, with actual movements reaching 300,000, driven by traffic growth in the second half of the year and reflecting a 6.8% increase from the value which was only forecasted in October of that year.

In 2022 we saw another substantial leap in IFR movements, with actual movements hitting 582,000, marking a 5.1% increase over the RP3 forecast. Continuing the upward trend, in 2023, actual movements reached 664,000, a 4.7% increase from the forecasted value. By 2024-year end, a further climb against the initial forecast is expected, with 701,000 movements predicted, marking a 9.2% increase over the forecasted traffic levels.

3.2.3 Service Units

Service units also exceeded our planned figures in our 2021 Service Delivery and Business Plan, and the current forecast is to end RP3 with en route and terminal service units in the region of 9% greater than at the end of 2019, despite the downturn faced by Covid-19. We are one of a few ANSPs to experience traffic levels returning to pre-Covid levels of service during RP3.

- Across RP3, both en route and terminal service units have surpassed initial projections.
- As with IFR movements there was a fast recovery between 2021 and 2023, nearly doubling in 2022. While the differences between the IFR movements trend and service units trend was marginal in 2021-2022, the service units differed significantly less from the forecast in 2023 and 2024 (according to the STATFOR February 2024 forecast). So, while the IFR movements were almost 5% above the forecast in 2023, the en route service units were actually 1.5% below the forecast. In 2024, we are expected to serve 9.2% more IFR movements than according to the plan while the en route service units are expected to be only around 3% higher than the RP3 forecast.
- Terminal service units were 10.3% higher in 2023 than forecasted in the October 2021 STATFOR forecast.

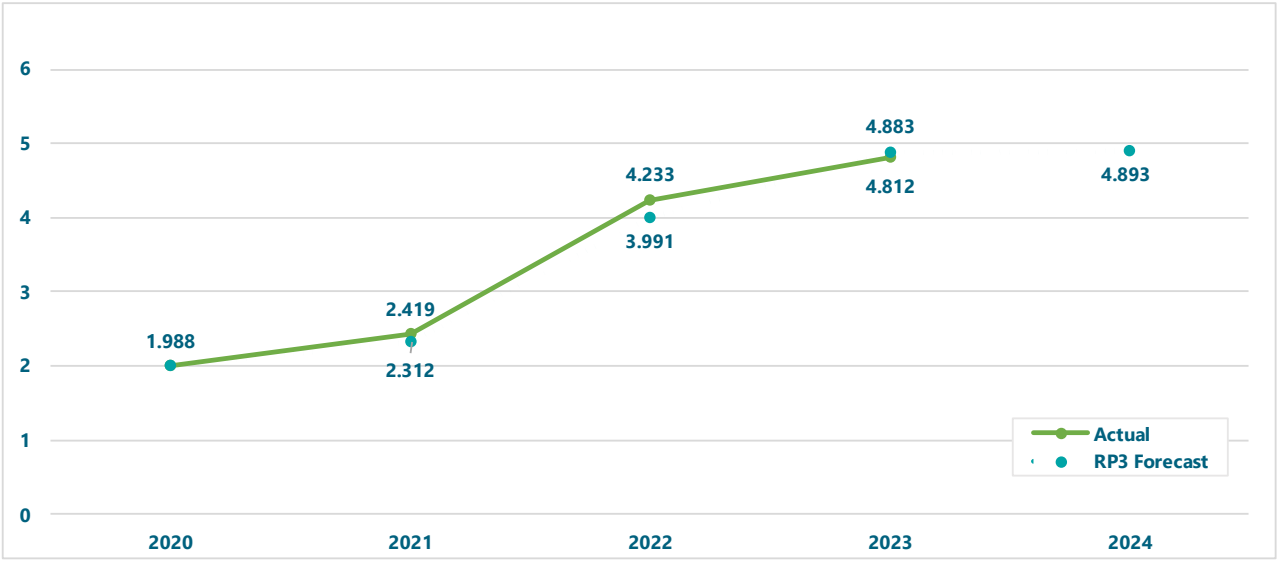

FIGURE 5: RP3 EN ROUTE SERVICE UNITS – RP3 FORECAST (2021) VS ACTUAL ('000,000)

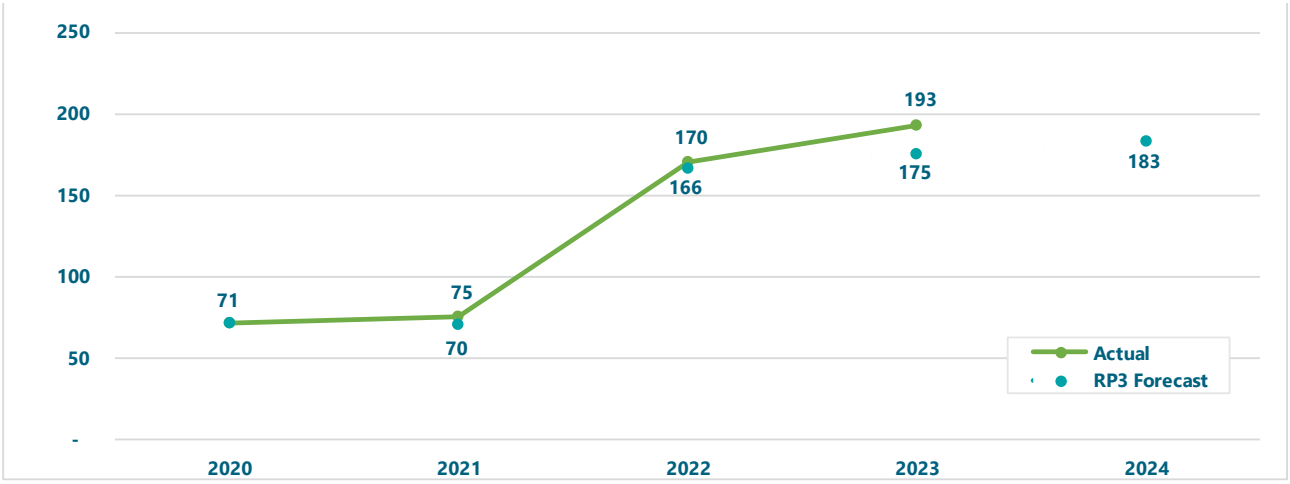

FIGURE 6: RP3 TERMINAL SERVICE UNITS – RP3 FORECAST VS ACTUAL ('000)

3.3 Summary of RP3 Performance

In this section we summarise our performance during RP3 against the KPIs defined by the European Commission under each of the KPAs (Safety, Environment, Capacity, Cost-Efficiency).

Safety KPI

TABLE 5: SAFETY KPI RP3 TARGETS AND PERFORMANCE

MANAGEMENT OBJECTIVE	CULTURE	POLICY AND OBJECTIVES	RISK MANAGEMENT	ASSURANCE	PROMOTION
RP3 EoSM Target	C	C	D	C	C
2022 EoSM Performance	C	C	C	C	C

Environment KPI

TABLE 6: ENVIRONMENT KPI RP3 TARGETS AND PERFORMANCE

KPI		2020	2021	2022	2023	2024
KEA	**Targets**	1.56%	1.13%	1.13%	1.13%	1.13%
	Performance	1.11% (-0.45%)	1.01% (-0.12%)	1.12% (-0.01%)	1.44% (+0.31%)	

Capacity KPIs

TABLE 7: CAPACITY KPIS RP3 TARGETS AND PERFORMANCE

KPI		2020	2021	2022	2023	2024
En Route ATFM Delay (min) per Flight	**Targets**	0.07	0.01	0.03	0.03	0.03
	Performance	0.00 (-100%)	0.00 (-100%)	0.00 (-100%)	0.02 (-33%)	-
Terminal ATFM Delay (min) per Flight	**Targets**	0.25	0.25	0.20	0.20	0.20
	Performance	0.11 (-56%)	0.01 (-96%)	0.15 (-25%)	0.30 (+50%)	-

Cost-Efficiency KPIs

TABLE 8: COST-EFFICIENCY KPIS RP3 TARGETS AND PERFORMANCE

KPI		2020/2021	2022	2023	2024 (FORECAST)
En Route	**DUC (AirNav Ireland)**	38.51	24.67	20.63	20.35
	Actual (AirNav Ireland)	36.97 (-4.0%)	20.53 (-16.8%)	20.06 (-2.7%)	20.00 (-1.7%)
Terminal	**DUC (AirNav Ireland)**	248.50	146.49	150.83	147.39
	Actual (AirNav Ireland)	231.44 (-6.9%)	151.13 (+3.2%)	125.61 (-16.7%)	122.77 (-16.7%)

3.4 Safety

3.4.1 Safety KPI

Safety is our absolute priority, and the PRB monitors ANSP safety performance through measuring performance against the Effectiveness of Safety Management (EoSM), based upon a survey of 29 questions to determine the minimum level of maturity across each objective. The PRB set maturity targets for each of these Management Objectives (MOs) that ANSPs must reach by the end of the reference period.

3.4.2 RP3 Safety Performance

3.4.2.1 EoSM Safety KPI Performance

In 2022 we met our EoSM target of "managed" (level C) in Safety Policy and Objectives, Safety Assurance, Safety Promotion and Safety Culture. However, in relation to our EoSM target for Safety Risk Management, our performance was downgraded from "assured" (level D) to "managed" (level C) following annual oversight by the NSA.

The Competent Authority identified the under-resourcing of AOIs resulting in occurrence reports not being investigated within the required timeframes as one of the main reasons we missed our EoSM safety targets in 2022. ATM Occurrence Investigators (AOIs) are ATCOs and engineers who operate on a rotational basis between operations and AOI duties. On occasion, AOIs are diverted to frontline operational duties to cover temporary unplanned staff shortages leading to timeframes being missed. From 2025 onwards, we plan to appoint staff permanently to AOI roles in order to address these issues.

In 2023, we again missed the EoSM target but we have a project plan for meeting the objectives going forward. The project plan has identified Hazid and Hazlog rationalisation as key enablers and we are reviewing the software solutions. We continue to finalise, document and introduce all the enablers to successfully introduce an integrated management system. The project is slightly behind the schedule and we anticipate that it will be fully incorporated in 2024. We are also in the process of updating our SMS Training Programme to include Safety Assessment of Change Management Training within the programme which will facilitate the assurance that staff are trained and competent to perform their functions. In addition, we need to review trending of audits and surveys, as while our system is effective and robust for occurrence reporting, work is required in the area of trending analysis.

Our EoSM survey results for 2023 are summarised in the table below:

TABLE 9: EOSM SURVEY RESULTS 2023

MANAGEMENT OBJECTIVE	SAFETY CULTURE	SAFETY POLICY AND OBJECTIVES	SAFETY RISK MANAGEMENT	SAFETY ASSURANCE	SAFETY PROMOTION
RP3 EoSM Target	C	C	D	C	C
2023 EoSM performance	C	C	C	C	C

The achievement against each of the MOs described above is attributed a score based on the response to the survey questions related to each of these MOs. The scores for each area are summed to provide an overall EoSM score.

Our overall EoSM score across RP3 compares favourably compared with other European ANSPs. We achieved an EosM score of 96% in 2020, 91% in 2021 and 91% in 2022 (latest available). The table below illustrates how this performance compares with the rest of the European Union.

TABLE 10: COMPARISON OF EOSM SCORES

	AIRNAV IRELAND EOSM SCORE	UNION-WIDE AVERAGE EOSM SCORE
2020	96%	88%
2021	91% (-5%)	88% (-)
2022	91% (-)	89% (+1%)

3.4.2.2 Other Safety PIs

The EoSM indicator is the sole safety KPI for which Union-wide targets are set and ANSP performance monitored against. However, for RP3 the PRB introduced two performance indicators related to occurrences for the purpose of monitoring only. These were as follows:

- Rate of runway incursions (RIs) which describes the total number of RIs with a safety impact that occurred at regulated airports in a Member State, divided by the total number of IFR and VFR airport movements.
- Rate of separation minima infringements (SMIs) which describes the total number of SMIs with a safety impact that occurred within the airspace of all air traffic service units in a Member State.

Although there are no specific targets to meet against these performance indicators, these are still salient metrics for monitoring safety performance over the reference period. Our performance against these two performance indicators is shown below:

TABLE 11: ✂

✂

TABLE 12: ✂

✂

Our performance in terms of RIs improved in 2022 compared to 2021, despite an increase in traffic, and this was also the case for SMIs. Our performance in both performance indicators in RP3 was significantly better than the Union-wide average, achieving, on average, over 25% fewer RIs compared to the Union-wide average and roughly a third as many SMIs compared to the Union-wide average.

3.4.3 Safety Policies and Procedures

Our Safety performance in RP3 has been influenced by a series of policies and procedures that we developed, some of examples of which are detailed in the section below.

3.4.3.1 HF and Fatigue Policy

Human Factors and Human Performance have become increasingly important areas of analysis when considering ATM safety performance. To reflect this, we have developed a Human Factors Strategy which describes the steps that are required to integrate Human Performance into our SMS procedures to ensure regulatory compliance and safety performance. This strategy covers how we can implement the assessment of human performance into the following elements:

- HF assessment of changes to the functional system
- HF safety assessment
- HF investigation of occurrences
- HF education and training

Fatigue management is a crucial aspect of Human Factors in ATM, particularly due to the demanding nature of shift work required for 24/7 ATC services in Irish controlled airspace. Fatigue needs to be suitably managed to ensure it does not prevent the delivery of a safe ATC service. The following bullet points summarise how we have sought to address these issues up to now:

- We updated our Fatigue Risk Management Manual in 2023, including an ATCO Fatigue Policy aligned with EU Regulation 2017/373, aimed at identifying and managing ATCO fatigue to ensure safe operations through proactively and systematically monitoring ATCO fatigue.
- Additionally, we have an ATCO Stress Management Policy under the same EU regulation, focusing on mitigating stress in air traffic control to enhance safety performance.
- These policies demonstrate our commitment to actively monitoring and managing fatigue and stress among ATCOs, ensuring compliance with regulations and operational requirements for a safe ATC service delivery.

3.4.3.2 Safety Culture

At AirNav Ireland we understand the critical importance and value of embedding a positive safety culture within our organisation. In the sections below we describe our Just Culture Policy and Safety Culture Survey, which are critical components to ensuring staff are at the centre of our safety culture.

Just Culture Policy

Our Just Culture Policy sits within our Safety Investigation of Occurrence Manual and demonstrates our commitment to develop and embed a Just Culture at AirNav Ireland. Just Culture is recognised across the aviation industry (as well as other safety-critical industries) as the foundation of a healthy organisational Safety Culture. We have developed our Just Culture policy in coordination with professional staff organisations to ensure our organisation considers Just Culture from the perspective of the whole range of front-line human operators within our organisation.

We define Just Culture as:

> "*A culture in which front-line operators or other persons are not punished for actions, omissions or decisions taken by them that are commensurate with their experience and training, but in which gross negligence, wilful violations and destructive acts are not tolerated*" - EU Reg 376/2014.

We are committed to creating the kind of organisational Safety Culture, where we have an honest, self-analytical approach which promotes frequent open reporting and one where safety lessons learned from experience are applied to make the present and the future safer. We understand that promoting such a culture comes from examples demonstrated at the leadership level within the organisation and has to be promoted through training personnel at all levels of seniority within the organisation.

To support this, we recognise the importance of ensuring that Just Culture is applied appropriately within our organisation and that this is only facilitated by staff being able to recognise the line between acceptable and unacceptable behaviour in the course of delivering a safe ATC. Consequently, we have issued to staff a 'Just Culture Information Handbook'. This material provides practical guidance to staff on how we ensure that a Just Culture is an embedded element of our overall Safety Culture.

Our Just Culture process and supporting activities continue to be validated annually by CANSO Global Standard of Excellence 'Optimised Best Practice'.

Safety Culture Survey

In 2022, we launched our third Safety Culture Survey, which was completed throughout our business between October and November 2022. The survey was designed as a piece of self-reflective analysis to gain insight into the Safety Culture within our organisation, including Just Culture and reporting, management commitment to safety, communication, collaboration, risk handling and procedures and training. The survey distribution was split into two, with the same set of 17 questions delivered separately to operational personnel and senior management.

The questions in the survey were developed and approved by EUROCONTROL and were designed to cover our current safety culture, including staff perceptions of the process by which fatigue reports are submitted and to identify any new actions and/or develop existing methods which could be taken to improve our safety culture.

To provide feedback to staff on the survey results, workshops were set-up with operational personnel and senior management from our different business units to review the outcomes of the survey, including the recommendations resulting from it.

3.4.3.3 Change Management

All change management processes are contained within our SACM (Safety Assessment Change Manuals). For individuals with safety & functional system accountabilities change management is covered in our Safety

Procedure SP100/101, for those individuals with non-functional accountabilities, change management is covered under HRD100/101. SP100 & HRD100 are currently under ANSD review, and SP101 is approved.

We also have procedures for changes that don't affect the functional system, these are ANI-030, 031 and 033. They will be replaced by a new procedure, ANI-034, which is currently with the regulator for approval with a decision expected around the time of the stakeholder consultation planned for 2nd August.

3.5 Capacity

3.5.1 Capacity KPIs

As set out in (EU) 2019/317 the Capacity KPA is monitored through two KPIs, one to monitor en route delay and one to monitor terminal delay.

For en route delay, the KPI used is the average minutes of en route ATFM delay per flight attributable to air navigation services. Union-wide capacity targets are only set for this KPI. En route ATFM delays are pre-departure delays, which occur when the traffic demand exceeds airspace capacity in a block of airspace or at the destination airport. As a result, the indicator measures the difference between the time an aircraft was estimated to leave its parking stand (Estimated Off-Block Time, EOBT) at the airport and the actual time it left the parking stand (Actual Off-Block Time, AOBT) to meet its allocated Calculated Take-off Time slot (which begins 5 minutes before CTOT and ends 10 minutes after). These differences are averaged over the number of flights which flew in the airspace under IFR.

For terminal delay, the KPI used is the average minutes of airport ATFM delay per arrival. The European Commission does not define capacity targets for average Terminal ATFM delay, with targets only set and monitored at a local level. Consequently, our own national targets are set and monitored by IAA at the three Irish airport's that fall under the regulation of the European Performance and Charging Scheme. These airports are Dublin, Cork and Shannon.

The following section details the RP3 ATFM delay for both en route and terminal services, with supplementary performance data found in Appendix 1.

3.5.2 RP3 Capacity Performance

3.5.2.1 En Route ATFM delay

In RP3, our performance in relation to the en route capacity KPI was one of the strongest in Europe, averaging 0.01 min/flight of ATFM delay, despite a sharp traffic rebound following the Covid-19 pandemic. This KPI, in essence, measures the lack of capacity provided by an ANSP, and hence is an indicator of underperformance. In 2023, we started to incur a marginal delay, sometimes even outside of the summer season, resulting in an average ATFM delay of 0.02. However, this was still below our national RP3 target.

Our performance in relation to average en route ATFM delay across RP3 is summarised below:

TABLE 13: AVERAGE EN ROUTE ATFM DELAY TARGETS AND PERFORMANCE

	2020	2021	2022	2023	2024
Target[2]	0.07	0.01	0.03	0.03	0.03
Actual	0.00	0.00	0.00	0.02	-
Difference	-0.07	-0.01	-0.03	-0.01	-

The following chart from EUROCONTROL's PRU shows that the main reasons for the ATFM delay in 2023 were ATC staffing and ATC capacity, both contributing approximately 0.01 min of ATFM delay.

[2] *Monitoring Report 2022 – Ireland, Third Reference Period (2020-2024)*

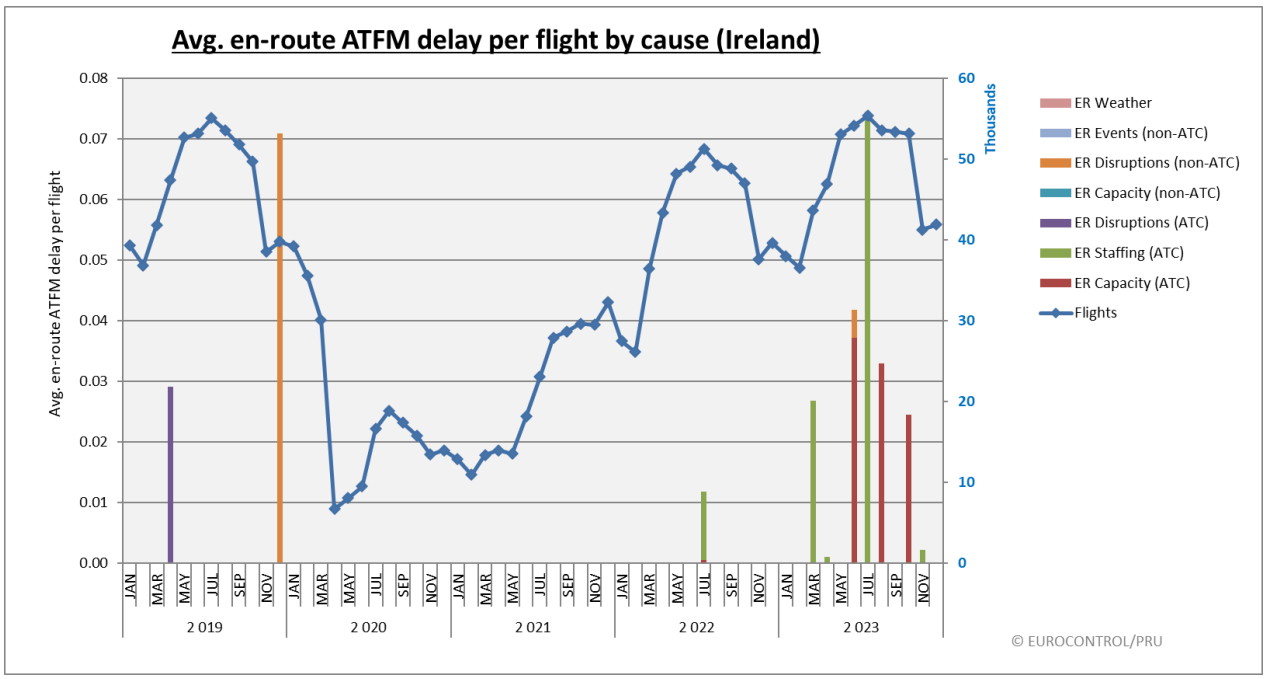

FIGURE 7: ATFM DELAY PERFORMANCE IN RP3 BY CAUSE

3.5.2.2 Terminal ATFM delay

The total performance of the three monitored airports (Dublin, Cork and Shannon) in relation to ATFM delay is summarised in the table below:

TABLE 14: AVERAGE TERMINAL ATFM DELAY TARGETS AND PERFORMANCE

AVERAGE ATFM DELAY TARGETS AND PERFORMANCE	2020	2021	2022	2023	2024
Target[3]	0.25	0.25	0.20	0.20	0.20
Actual	0.11	0.01	0.15	0.30	-
Difference	-0.14	-0.24	-0.05	+0.10	-

The overall performance shown above is driven by the performance at the three Irish airports included in the SES performance scheme. The performance of these airports over RP3 is shown in the graph below:

[3] *Monitoring Report 2022 – Ireland, Third Reference Period (2020-2024)*

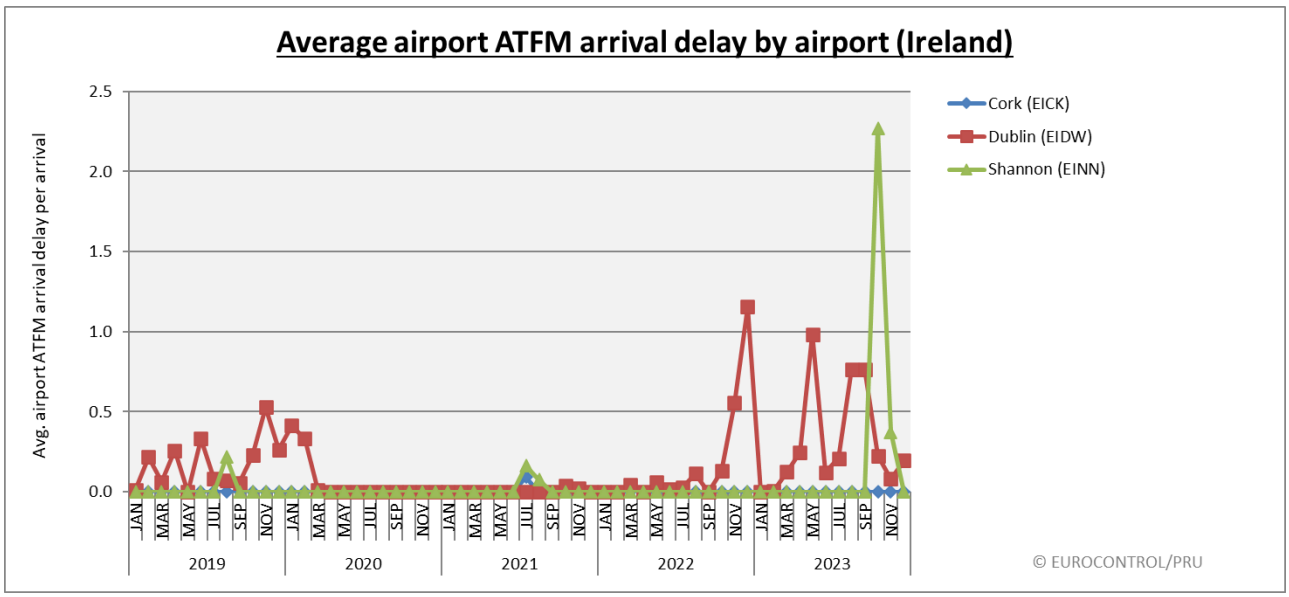

FIGURE 8: AVERAGE AIRPORT ATFM ARRIVAL DELAY BY AIRPORT

It is evident that the majority of terminal ATFM delays originate from Dublin, which is expected given it is the most capacity constrained airport due to traffic levels and infrastructural issues. In 2023, the average ATFM arrival delay at Dublin reached 0.34 minutes followed by Shannon which incurred 0.23 minutes per flight which means that we missed the terminal ATFM delay target by 0.30 minutes per flight. As IAA rightly noted in the 2023 Monitoring Report, the ATFM delay was largely caused by weather and aerodrome related issues. Consistent with historic patterns, only a small proportion of ATFM arrival delay was attributable to the ANSP, with 0.01 minutes per flight relating to ATC staffing.

3.5.2.3 Adherence to ATFM Slots

This indicator shows the percentage of flights which depart inside the slot tolerance window of [-5, +10 min]. The ATFM slot adherence is continuously monitored and the ANSP reports to unit management on a weekly basis. ATFM compliance is discussed regularly with the NSA, all units are constantly well above 90%.

In 2023, the adherence reached 96.5% in Ireland with the same performance achieved at Dublin and Cork; and 95.6% at Shannon. This is a marginal improvement from 96.2% in 2022 and a marginal deterioration compared to 2020 (96.8%) and 2021 (97.6%) which are however not directly comparable due to Covid-19 traffic drop.

3.5.2.4 ANSP Capacity Constraints

Although our capacity performance against the en route and terminal KPIs would signal that we are not capacity constrained, this is not the case as this indicator does not reflect factors such as the amount of ATCO overtime and other operational staff working to facilitate a continuity of service under increasing traffic growth.

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3.5.2.5 6th November 2023 Case Study

The ultimate consequence of a lack of ATC capacity is the imposition of a 'zero flow rate' which increasingly started to occur in 2023. As an example, this was the case on 6th November 2023, when an unexpected staff absence resulted in two 50-minute zero flow rates in/out of Dublin Airport being applied. This was necessary as the unplanned ATCO absences meant there were insufficient ATCOs to maintain a service delivery whilst still providing the required fatigue breaks to staff. As a result of this, approximately 20 flights were impacted.[4]

[4] 20231106 Operational Flexibility at Dublin Airport .docx

Due to the way capacity is measured, the impact of 'zero flow rates' is not sufficiently captured. A low level of ATFM delay could imply capacity is not an issue, however a lack of resilience in staffing levels means that operations are only a small number of unplanned absences away from zero flow rates being imposed causing flights being cancelled flights. This is not captured by our capacity performance against the KPI, but this significantly impacts our customers, and provides further reason for not solely judging ATC service capacity based upon ATFM delay performance.

The amount of overtime to achieve this outcome, and consequently required to ensure the resilience of the service to these types of unexpected issues or unexpected traffic above the forecast, should be considered, and EUROCONTROL support this approach from a Network Manager perspective.

3.6 Environment

3.6.1 Environment KPI

In line with the EU's environmental targets and ambitions, the PRB placed a priority on the environmental performance of ANSPs during RP3 and beyond. The European Commission (through the European Performance and Charging Scheme regulation) measures performance in relation to the Environment KPA through the Horizontal Flight Efficiency (KEA) KPI, which measures the average en route flight efficiency of the actual trajectory, aiming to reduce the additional distance flown compared to the great circle route.

3.6.2 RP3 Environment Performance

Ireland is continuing to reap the benefits of the introduction of FRA which has facilitated high KEA performance compared to EU counterparts. In 2022, Ireland was the best performing country in Europe in terms of KEA, with the KEA value of 1.12% equating to 3.7km of additional distance flown compared to the great circle route. ✂ It is notable that despite being the best performing European country in terms of environmental performance in 2022, national KEA targets were only met by a margin of 0.01%. This highlights the demanding nature of the national targets set for RP3.

Moreover, in 2023 Ireland missed its KEA target by 0.31%, this was despite our efforts to invest in improved routings and implementation of FRA. The KEA target was primarily missed due to factors outside of our control, and such known issues with the KEA indicator for assessing ANSP environmental performance are reflected in the ongoing work by the PRB to consult on alternative KPIs for this purpose. However, for RP4 KEA will continue to be the sole KPI, with additional performance indicators for the purpose of monitoring finalised during the drafting of this Business Plan. In addition, we faced requests from the Network Manager to avoid offering shortcuts or direct routings in order to ensure the network functions better. Adhering to such a request, resulted in part to AirNav Ireland contributing to Ireland's missing KEA targets.

Ireland's KEA performance is summarised below:

TABLE 15: KEA TARGETS AND PERFORMANCE

	2020	2021	2022	2023	2024
Target[5]	1.56%	1.13%	1.13%	1.13%	1.13%
Actual	1.11%	1.01%	1.12%	1.44%	-
Difference	-0.45%	-0.12%	-0.01%	+0.31%	-

[5] *Monitoring Report 2022 – Ireland, Third Reference Period (2020-2024)*

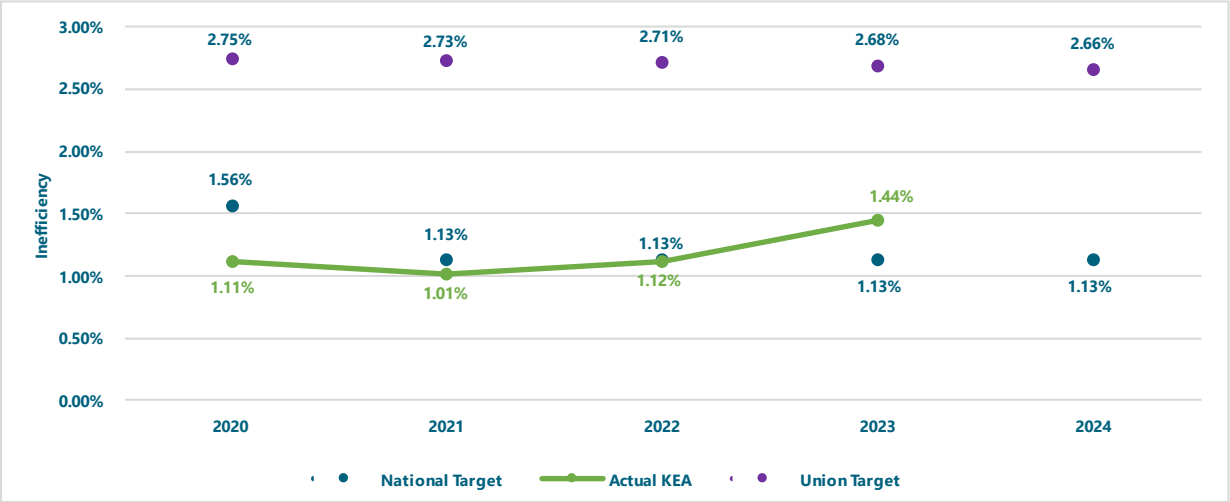

FIGURE 9: EN ROUTE HORIZONTAL FLIGHT EFFICIENCY KEA

3.7 Cost-Efficiency

3.7.1 Cost-Efficiency KPIs

As set out in (EU) 2019/317, targets are set by the European Commission for ANSPs for the Cost-Efficiency KPA based upon the year-on-year change of the average Union-wide 'Determined Unit Cost' (DUC) for en route air navigation services. This is calculated as the ratio between the en route determined costs in real terms and the en route forecast traffic, expressed in en route service units, expected during each year of the reference period at Union level.

The actual unit costs for ANSPs are monitored separately for en route and terminal services, with the weighted average of the sum of the DUC for each Member State for air navigation services and any adjustments taken into account. Consequently, at a national level the real en route unit costs and real terminal unit costs are reported.

3.7.2 RP3 Cost-Efficiency Targets

Following the impact of the Covid-19 pandemic, Commission Implementing Decision (EU) 2021/891 revised the Union-wide targets for the Cost-Efficiency KPA from the annual reduction of real-term DUC trend of -1.9% (CAGR) to +120.1% increase for the combined years of 2020 and 2021, followed by the reduction by -38.5% in 2022, -13.2% in 2023 and -11.5% reduction in 2024. This implied a compound annual growth rate (CAGR) of +0.78% over the five-year period of RP3.

As shown in FIGURE 10, the Irish NSA however proposed RP3 targets which were more stringent than the Union-wide targets and set the national targets that implied a CAGR rate of -0.3% over the same period, meaning the targets were 1.08% more stringent than the Union-wide target. The following chart summarises that the national CAGR RP3 DUC target was the 9th most stringent in EU (excluding Austria which is under the cost recovery system) despite the fact that Ireland had the 4th lowest DUC in 2019 at 54% of the Union-wide average, i.e. €25.03 (€$_{2017}$) compared to EU-wide average of €46.49. The DUC target for 2024 would take Ireland to the lowest DUC in EU, i.e. €24.66 compared to the Union-wide average of €47.15 representing 52% of the average.

If the IAA chooses to apply more stringent targets than the Union-wide recommendations, this would have a severe impact on several performance areas. This situation would be unsustainable for various reasons detailed in this Business Plan. Given that we have one of the lowest en route unit charges in Europe, we need flexibility to prioritize safety, capacity, and environmental considerations alongside other local and European regulatory requirements (e.g. CP1).

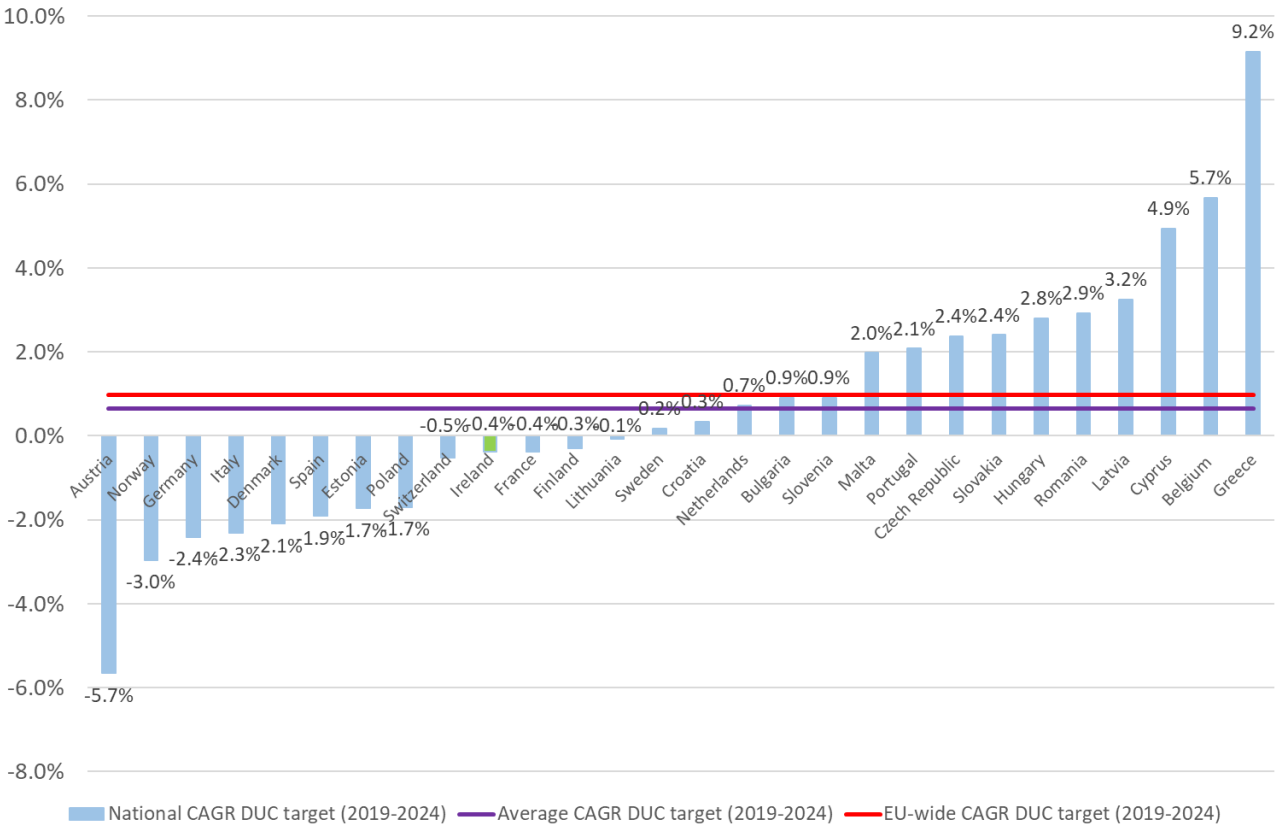

FIGURE 10: NATIONAL, AVERAGE AND EU-WIDE CAGR DUC AGGREGATED TARGETS IN RP3

3.7.3 RP3 Cost-Efficiency Performance

The following table summarises our performance against the RP3 targets in the area of Cost-Efficiency.

En Route

TABLE 16: EN ROUTE COSTS, SERVICE UNITS AND UNIT COSTS €'000, 2017 PRICES

		2020/2021	2022	2023	2024 (FORECAST)
En Route Costs (AirNav Ireland)	Target	165,630	98,451	100,714	99,566
	Actual	162,933 (-1.6%)	86,903 (-11.7%)	96,528 (-4.2%)	100,336 (+0.8%)
En Route Service Units	Target	4,300.6	3,991.0	4,882.8	4,893.1
	Actual	4,407.5 (+2.5%)	4,233.5 (+6.1%)	4,811.8 (-1.5%)	5,091.4 (+4.1%)
Unit Costs (AirNav Ireland)	DUC	38.51	24.67	20.63	20.35
	Actual	36.97 (-4.0%)	20.53 (-16.8%)	20.06 (-2.7%)	19.71 (-3.1%)

Terminal

TABLE 17: TERMINAL COSTS, SERVICE UNITS AND UNIT COSTS €'000, 2017 PRICES

		2020/2021	2022	2023	2024 (FORECAST)
Terminal Costs	Target	34,907	24,344	26,452	27,011

(AirNav Ireland)	Actual	33,607 (-3.7%)	25,687 (+5.5%)	24,288 (-8.2%)	25,137 (-6.9%)
Terminal Service Units	Target	140.5	166.2	175.4	183.3
	Actual	145.2 (+3.4%)	170.0 (+2.3%)	193.4 (+10.3%)	205.0 (+11.9%)
Unit Costs (AirNav Ireland)	DUC	248.50	146.49	150.83	147.39
	Actual	231.44 (-6.9%)	151.13 (+3.2%)	125.61 (-16.7%)	122.62 (-16.8%)

We contributed to meeting Ireland's en route Cost-Efficiency targets both in 2022 and 2023; and are also expecting to meet the target in 2024. In 2022, this was helped by 6.1% higher service units compared to the plan and was mainly due to lower actual real term costs which was further propelled by high inflation (8.1%) resulting in our actual en route real term unit costs being 16.8% below the DUC. The main contributor was lower other operating costs, partially reflecting the delay of several months in ATCO recruitment; and depreciation and cost of capital reflecting delays in the implementation of the investment programme due in part to staff shortages and pandemic related supply issues.

In 2023, service units were marginally below the plan while the actual real term costs were lower by -4.1% compared to the plan, which resulted in the actual unit costs -2.7% below the average. ATCO numbers are expected to meet the RP3 approved figures for 2024 ahead of summer 2025, and this slight delay has impacted training costs. With this number being bridged to a certain extent by direct entry ATCOs, this has also had a bearing on the approved training costs. While direct entry ATCOs typically have a higher cost compared to graduates, there is a notable saving on the training costs, this could not have been anticipated during the 2021 planning period. ✂

In terminal ANS, our actual costs in 2022 were higher by 5.5% than the determined costs in real terms, which combined with marginally higher traffic compared to the plan resulted in 3.2% higher actual real term unit costs. The performance was however negatively impacted by an impairment loss of €4.7 million in 2022 due to an asset installed becoming no longer viable due to emerging technology and a change in operational processes. When the impairment is excluded, operating costs were €1.5 million lower than expected, and in this case the target would be achieved.

We are expected to meet the targets with the 2023 actual real term costs being -8.2% below the planned costs in 2023 and forecasted 2024 real term costs expected to be -6.9% lower compared to the plan. In the same time, the traffic was higher by +10.3% in 2023 and is expected to be up by +11.9% in 2024 which resulted in lower actual unit cost in 2023 (-16.7%) and the same is expected in 2024.

The status of the CAPEX delivery against the plan has also had a significant bearing on non-staff OPEX and particularly in relation to maintenance and spares. This is further discussed in Section 3.7.5 below.

3.7.4 Development of Our OPEX

3.7.4.1 Headcount and Staff Costs

The following table summarises our actual headcount figures during RP3 together with the forecast for 2024.

TABLE 18: RP3 HEADCOUNT BREAKDOWN

		2020A	2021A	2022A	2023A	2024F
En route	**ATCOs**	262	253	250	254	264
	Engineers	62	64	68	73	84
	Data Assistants	34	33	33	40	43
	Ops Mgmt. & Support	49	43	42	49	55
	Corporate Services	43	40	41	46	51

	Total	**450**	**434**	**434**	**463**	**497**
Terminal	**ATCOs**	42	41	41	41	43
	Engineers	11	11	12	14	16
	Data Assistants	5	5	4	5	5
	Ops Mgmt. & Support	8	6	7	7	10
	Corporate Services	9	8	8	9	10
	Total	**75**	**71**	**72**	**77**	**84**
TOTAL	**ATCOs**	303	293	290	296	307
	Engineers	73	76	80	87	100
	Data Assistants	39	37	38	45	48
	Ops Mgmt. & Support	57	50	48	56	65
	Corporate Services	52	48	50	55	61
	Total	**524**	**505**	**506**	**540**	**581**

**Totals may not align due to rounding (FTE more appropriate where staff are allocated to en route and terminal)*

The following table summarises the differences compared to the approved RP3 Performance Plan. The main difference is in the ATCO category due to delay in training. ATCO numbers are expected to meet the RP3 approved figures for 2024 ahead of summer 2025.

TABLE 19: DIFFERENCE COMPARED TO THE ALLOWANCE IN THE RP3 PERFORMANCE PLAN

	2020A	2021A	2022A	2023A	2024F
ATCOs[6]	2	3	-11	-23	-22
Engineers	1	4	-7	-3	10
Data Assistants	0	-2	0	7	10
Ops Mgmt. & Support	-3	-10	-18	-10	-2
Corporate Services	-16	-20	-7	-2	4
Total	**-16**	**-24**	**-43**	**-31**	**0**

The following tables summarise the development of the staff payroll costs during RP3.

TABLE 20: ✂

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TABLE 21: ✂

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TABLE 22: ✂

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[6] *ATCO allowance has trainees at advanced stage to meet this figure in early 2025*

TABLE 23: RP3 EN ROUTE STAFF COSTS, ('000 EUR)

	2020	2021	2022	2023	2024F
En Route Staff Costs - Nominal Determined Costs	54 049	49 428	61 144	65 556	66 864
En Route Staff Costs - Nominal Actual Costs	55 417 (+2.5%)	49 662 (+0.5%)	61 880 (+1.2%)	74 799 (+14.1%)	74 652 (+11.6%)
En Route Staff Costs - Real Term Determined Costs	53 194	47 880	58 125	61 097	61 095
En Route Staff Costs - Real Term Actual Costs	54 541 (+2.5%)	47 731 (-0.3%)	55 017 (-5.3%)	63 217 (+3.5%)	61 626 (+0.9%)

TABLE 24: RP3 TERMINAL STAFF COSTS, ('000 EUR)

	2020	2021	2022	2023	2024F
Terminal Staff Costs - Nominal Determined Costs	9 182	7 698	9 724	11 436	12 161
Terminal Staff Costs - Nominal Actual Costs	9 336 (+1.7%)	8 451 (+9.8%)	10 642 (+9.4%)	12 761 (+11.6%)	12 760 (+6.6%)
Terminal Staff Costs - Real Term Determined Costs	9 036	7 457	9 244	10 659	11 111
Terminal Staff Costs - Real Term Actual Costs	9 188 (+1.7%)	8 122 (+8.9%)	9 462 (+2.4%)	10 785 (+1.2%)	10 533 (-5.2%)

3.7.4.2 Non-Staff OPEX

The tables below provide a summary of non-staff operating costs during RP3 comparing the modelling approach by Steer with actual costs to 2023 and forecast for 2024. Steer recognised limitations in modelling each category of non-staff OPEX in 2021, and noted at the time that it was illustrative of how Steer arrived at its overall decision, rather than the regulated entity being constrained by any particular line item.

Overall, the non-staff OPEX is broadly in line with the aggregate allowance for RP3. However, a closer look at the individual modelled line items shows variances due in part to the shortcomings associated with forecasted assumptions in 2021 – such variances were inevitable given the manner in which Steer modelled on a line-by-line basis. Steer noted that its model had been developed to enable stakeholders and the NSA to have access to an independent assessment of the operating costs and key drivers of costs so that an informed analysis of an efficient level of operating costs can be established. The NSA confirmed that the regulated entity is best placed to manage that allowance.

TABLE 25: RP3 EN ROUTE NON-STAFF OPERATING COSTS, ('000 EUR)

	2020	2021	2022	2023	2024F	RP3 TOTAL
En Route Non-Staff OPEX - Nominal Allowance	22 577	24 618	30 734	29 750	30 069	**137 748**
En Route Non-Staff OPEX - Nominal Actual Costs	22 171 (-1.8%)	20 654 (-16.1%)	25 939 (-15.6%)	29 465 (-1.0%)	36 536 (+21.5%)	**134 765 (-2.2%)**
En Route Non-Staff OPEX - Real Term Allowance	22 220	23 847	29 217	27 727	27 474	**130 485**
En Route Non-Staff OPEX - Real Term Actual Costs	21 821 (-1.8%)	19 851 (-16.8%)	23 063 (-21.1%)	24 902 (-10.2%)	30 161 (+9.8%)	**119 798 (-8.2%)**

TABLE 26: RP3 TERMINAL NON-STAFF OPERATING COSTS, ('000 EUR)

	2020	2021	2022	2023	2024F	RP3 TOTAL
Terminal Non-Staff OPEX - Nominal Allowance	4 892	5 581	6 999	6 763	6 822	**31 057**
Terminal Non-Staff OPEX - Nominal Actual Costs	4 830 (-1.3%)	4 779 (-14.4%)	10 156 (+45.1%)	7 162 (+5.9%)	8 399 (+23.1%)	**35 326 (+13.7%)**
Terminal Non-Staff OPEX - Real Term Allowance	4 815	5 406	6 653	6 303	6 233	**29 410**
Terminal Non-Staff OPEX - Real Term Actual Costs	4 754 (-1.3%)	4 593 (-15.0%)	9 029 (+35.7%)	6 053 (-4.0%)	6 933 (+11.2%)	**31 362 (+6.6%)**

TABLE 27: RP3 TOTAL NON-STAFF OPERATING COSTS, ('000 EUR)

	2020	2021	2022	2023	2024F	RP3 TOTAL
Total Non-Staff OPEX - Nominal Allowance	27 469	30 199	37 733	36 513	36 891	**168 805**
Total Non-Staff OPEX - Nominal Actual Costs	27 001 (-1.7%)	25 433 (-15.8%)	36 095 (-4.3%)	36 627 (+0.3%)	44 935 (+21.8%)	**170 091 (+0.8%)**
Total Non-Staff OPEX - Real Term Allowance	27 035	29 253	35 870	34 030	33 707	**159 895**
Total Non-Staff OPEX - Real Term Actual Costs	26 575 (-1.7%)	24 444 (-16.4%)	32 092 (-10.5%)	30 955 (-9.0%)	37 094 (+10.0%)	**151 160 (-5.5%)**

The following table provides a breakdown of the actual non-staff operating expenditures in nominal terms into the individual categories during RP3 together with the forecast for 2024.

TABLE 28: ✂

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Please refer to Section 8.3.3 where RP4 forecasted training costs are set out.

TABLE 29: ✂

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When we look at other categories ✂, we find a significant overspend compared to the RP3 allowance. This is despite the delay of the CAPEX programme and its impact on related OPEX. Most of these overspends are linked to the higher than forecast inflation (e.g. for utilities, energies, and computing, as well as other categories that are sensitive to inflation such as cleaning, staff-related services, etc.). We also incurred an impairment loss of €4.7 million in 2022 as set out in the consultation in 2023.

"Other costs" includes items such as office supplies, postage, furniture and fittings, file storage, shredding, couriers, bad debt and incidentals. While the forecasted allowance for this was overestimated, the RP3 revenues required for this category is aligned with actual costs.

If the training category is excluded, we would incur a significant overspend of over €7.5m across RP3 which confirms that the regulatory requirement for non-staff operating costs was significantly underestimated by the model in 2021.

TABLE 30: ✂

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All of these factors have been duly considered in the RP4 plan for non-staff OPEX which is provided in Section 8.3.3. The requirement for non-staff OPEX is expected to increase by 4.1% in real terms on average during RP4, primarily due to significant training costs (related to increased engineering headcount of circa 26% over RP4 and due to requirements for capital projects such as CASDS and TopSky ATC One, and increased ATCO headcount 22%) and higher other operating costs due to the increased capital spend with some large projects coming into operation during RP4 e.g. CASDS, Radar replacement programme and TopSky ATC One.

3.7.5 Delivery of the CAPEX Programme

Our Cost-Efficiency performance in RP3 has been largely impacted by our ability to deliver our investment programme. This is an area where in the revised RP3 Business Plan, we significantly overestimated our ability to deliver the CAPEX programme and this impacted both the actual depreciation and cost of capital, as well as OPEX related to the investment plan. Despite having experience with successes in delivering the sizeable investments (e.g. Dublin tower and ACC contingency centre), we have underspent significantly compared to our regulatory allowance for CAPEX during RP3. The CAPEX underspend incurred in RP3 will be returned in RP4. All unspent CAPEX will be returned via lower en route and terminal charges to users.

In RP3, we forecast that we will only incur €95.94m of the capital expenditures compared to the allowance of €124.62m which represents a 23% shortfall. Comparing ourselves to other ANSPs, we are not an outlier here with other ANSPs reporting similar issues to the ones we face, as can be seen from the following figure from the PRB's Monitoring Report 2022.

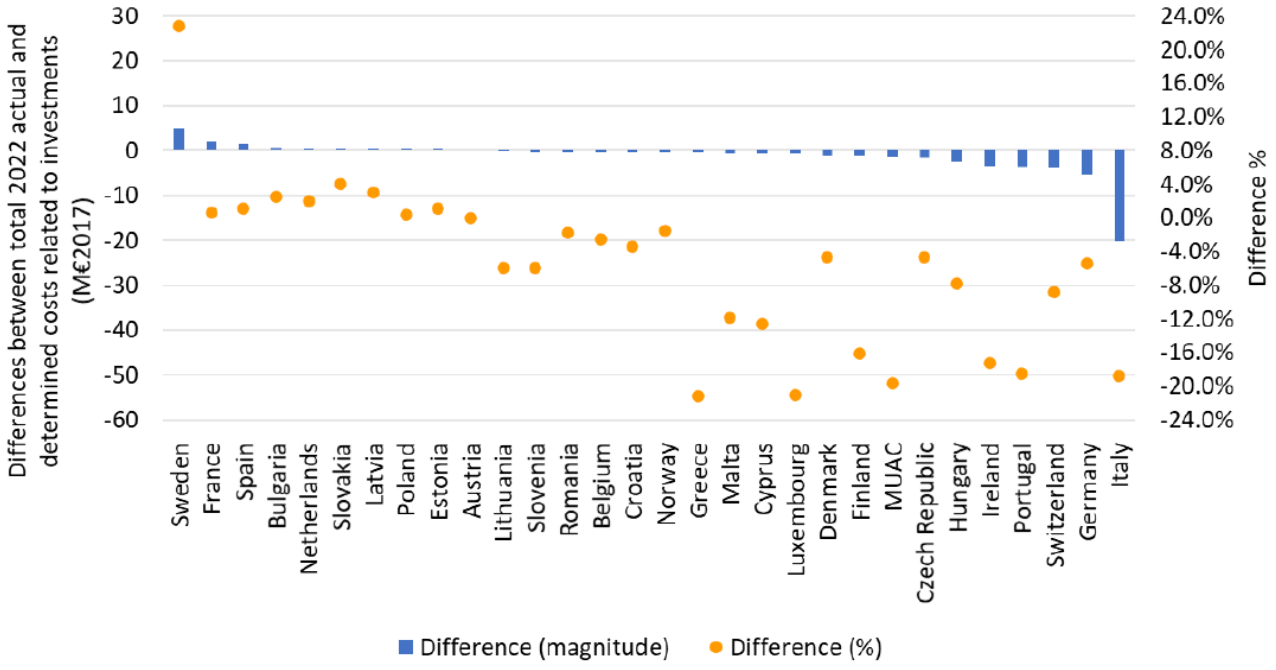

FIGURE 11: EN ROUTE AND TERMINAL ACTUAL COSTS RELATED TO INVESTMENTS COMPARED TO THE DETERMINED COSTS, SOURCE: PRB MONITORING REPORT 2022

We are required to return all of our unspent CAPEX from RP3. We estimate that €14.36m of capital-related costs (depreciation and cost of capital) will not materialise since the beginning of the performance scheme which represents 16.3% of the approved determined costs. This underspend is a result of:

- Under-delivery of lower value CAPEX projects due to the prioritisation of resources to deliver the major CAPEX projects listed above.
- Difficulty in procuring and retaining engineering resources during RP3 (due to a number of challenges such as Covid-19).

- Restructuring of the organisation (following separation) resulted in insufficient resources to the deliver investment to the full extent of the regulatory allowance[7].

Another constraint on engineer resources to deliver capital investments has been the additional demands on engineer resourcing due to a higher workload associated with compliance tasks stemming from Commission Implementing Regulation (EU) 2017/373 than expected in our revised RP3 plan, and the increased demand for inspections and maintenance resulting from the investment in large scale infrastructure projects expanding our capital asset base. The benchmarking against other ANSPs confirms that we have the 3rd lowest number of technical staff per ATCO in Europe (see Section 3.7.6.2).

TABLE 31: BREAKDOWN OF CAPEX-RELATED COSTS, (€M NOMINAL)

	PLANNED CAPEX	ACTUAL CAPEX	PLANNED DEPRECIATION	ACTUAL DEPRECIATION	PLANNED RETURN ON CAPITAL	ACTUAL RETURN ON CAPITAL
Property and Security	31.28	25.29	12.00	9.59	6.57	4.07
Dublin Tower	49.86	47.46	8.05	6.30	8.59	8.87
ICTS	6.09	4.78	5.42	3.97	0.68	0.44
Comms and Network	14.17	12.63	9.46	8.29	3.18	2.51
Air Traffic Management	19.91	14.93	15.49	13.68	4.97	5.15
Surveillance	10.44	6.20	6.84	5.43	1.99	1.51
Navigation	7.80	3.74	3.60	3.06	1.01	0.59
TOTAL	**139.56**	**115.03**	**60.85**	**50.32**	**26.98**	**23.15**

The success of our large-scale CAPEX investments demonstrates our capability to deliver, we have also successfully recruited towards the second half of RP3 and our engineer numbers during the last two years of RP3 will finally reach the allowance agreed in the RP3 plan. With sufficient resources we are confident in our ability to deliver capital projects due to our proven track-record of delivering significant major investments that offer largescale benefits to our customers.

3.7.6 European Benchmarks

3.7.6.1 Comparator Group

In accordance with (EU) 2019/317, together with the adoption of the Union-wide performance targets ahead of the reference period, the European Commission establishes comparator groups of ANSPs with a similar operational and economic environment for the purpose of assessing performance targets for the Cost-Efficiency KPA.

In March 2024, the European Commission published a draft implementing decision on the RP4 Union-wide performance targets for the air traffic management network. For RP4 planning purposes, there will be Union-wide change to comparator groups based on ANSPs with a similar operational and economic environment considering the airspace complexity, traffic variations and levels in addition to financial indicators, such as the cost of living and the rate of inflation. The below table summarises these changes.

[7] *Engineering attrition was much higher than planned with experienced engineers remaining with the IAA upon restructuring.*

TABLE 32: CHANGES TO COMPARATOR GROUPS FOR RP4

RP3 COMPARATOR GROUP	RP4 COMPARATOR GROUP
AirNav Ireland	AirNav Ireland
ANS Finland	DCAC (Cyprus)
Avinor (Norway)	MATS (Malta)
LFV (Sweden)	NAV Portugal
NAVIAIR (Denmark)	-

For the purpose of benchmarking our RP3 performance against our European counterparts, we have shown the performance against both our RP3 and RP4 comparator groups, to provide both a review of RP3 performance and also a look ahead to understand the suitability of our new comparator group in benchmarking Cost-Efficiency during RP4.

Compared to our comparators, Ireland's DUC is 53% of the RP3 comparator group's average in 2019 and 54% in 2024, as can be observed in the chart below.

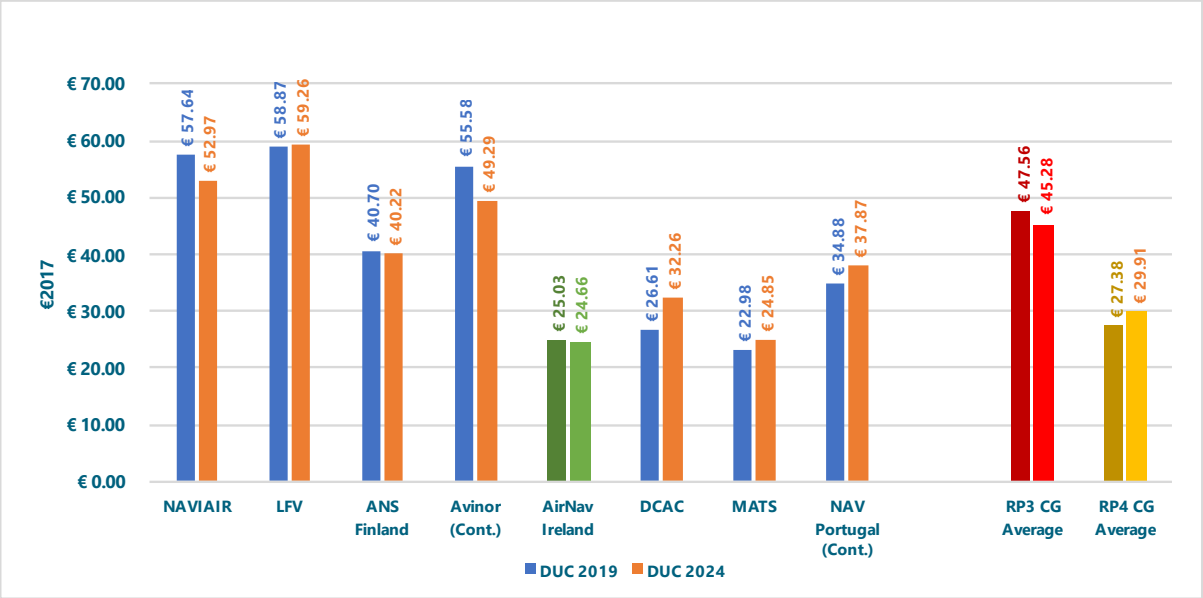

FIGURE 12: DUC IN 2019 AND 2024 IN IRELAND'S COMPARATOR GROUPS

The following map (FIGURE 13) summarises how this is reflected in the national unit rates after all the adjustments. With €28.76, Ireland has the lowest unit rate in the EU and only matched by Bosnia and Herzegovina in wider Europe. Additionally, it is expected in 2025 that we will continue to have one of the lowest national unit rates in Europe, €34.36, in 2025 if the required costs in this Business Plan are approved (see FIGURE 14).

	2024	
Ireland	**28.76**	52%
Sweden	**77.72**	140%
Finland	**57.09**	103%
Denmark	**67.45**	121%
Norway	**46.96**	84%
Average	**€55.60**	

❖ Note: includes full Capex Plan

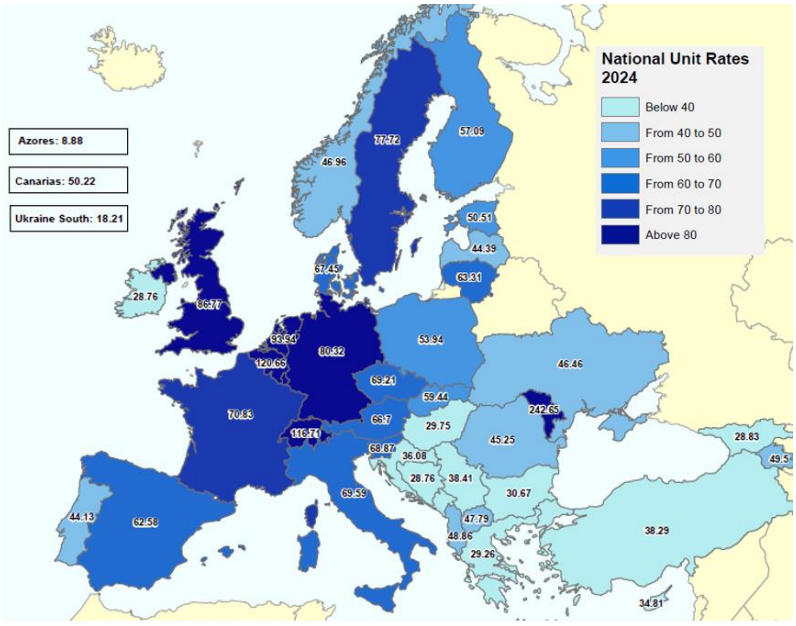

FIGURE 13: MAP SUMMARISING THE EFFECT IN NATIONAL UNIT RATES AFTER ADJUSTMENTS

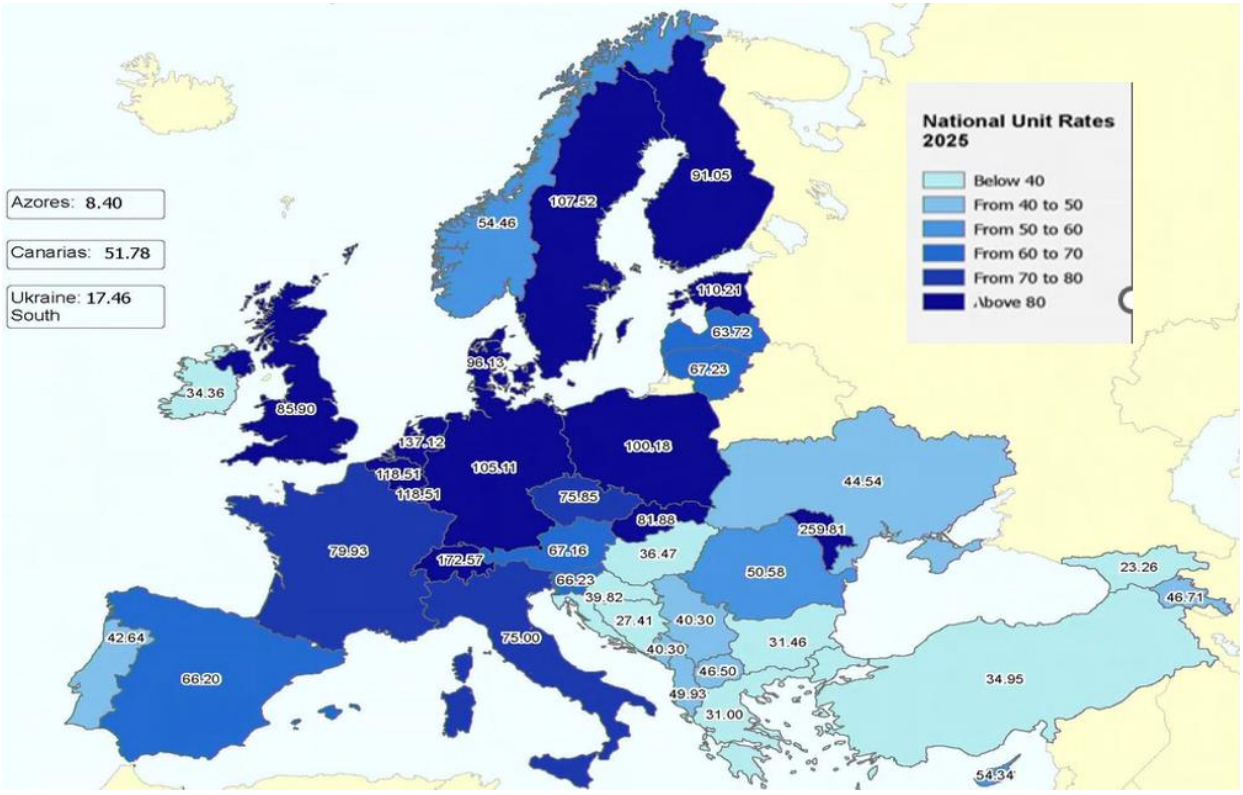

FIGURE 14: MAP SUMMARISING 2025 UNIT RATES PRESENTED AT 122ND ENLARGED COMMITTEE

3.7.6.2 ATM/CNS Cost-Effectiveness (ACE) Benchmarking Against RP4 Comparators

The 2024 edition of the ACE Benchmarking Report 2022 was published by EUROCONTROL's PRU in May 2024 and it reconfirms our strong performance and continued Cost-Efficiency against a range of metrics.

The following chart (FIGURE 15) shows that we achieved the best economic gate-to-gate cost effectiveness (which takes into account also the cost of delay and flight inefficiencies) from within our RP3 comparator group with €358 per composite flight hour (87% of the average of the group) and ranked as the 5th best performer in Europe (61% of the European average for the sample of ANSPs covered by ACE benchmarking). For our new

RP4 comparator group, we have the third highest cost effectiveness after NAV Portugal, with 7% above the comparator group average.

Note: The charts refer to AirNav Ireland even though we were still a part of IAA in 2022.

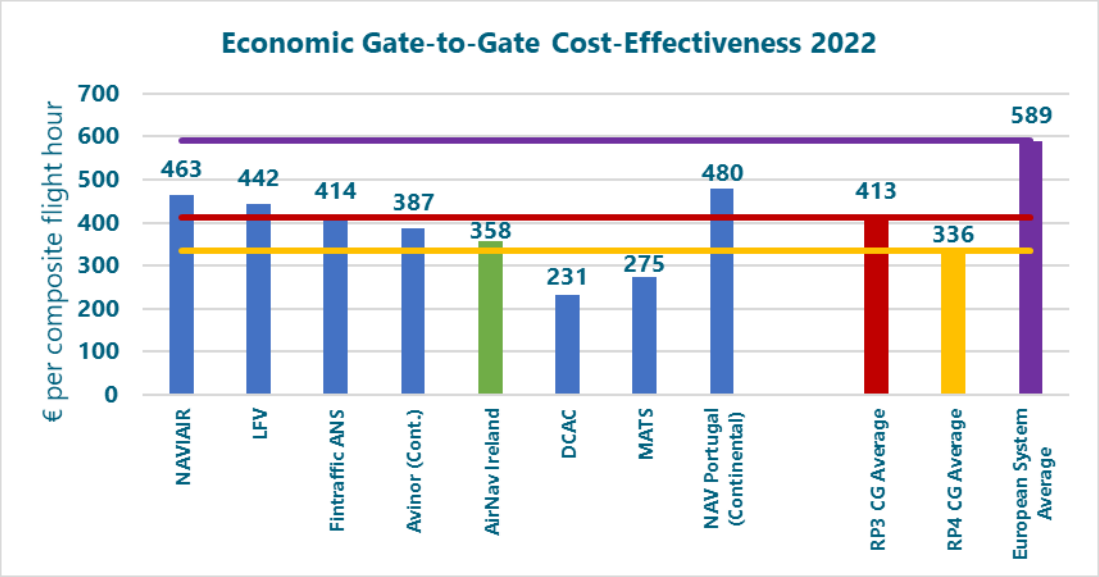

FIGURE 15: ACE 2022 (2024 EDITION) ECONOMIC GATE-TO-GATE COST-EFFECTIVENESS

Similarly, in the financial gate-to-gate cost-effectiveness (FIGURE 16) we also scored the highest from within our RP3 comparator group with €352 per composite flight hour (86% of the average of the group) and were ranked as the 9th best performer in Europe (75% of the European average for the sample of ANSPs covered by ACE benchmarking). In terms of the new RP4 comparator group, we have the lowest financial gate-to-gate cost-effectiveness, 25% above the comparator group average.

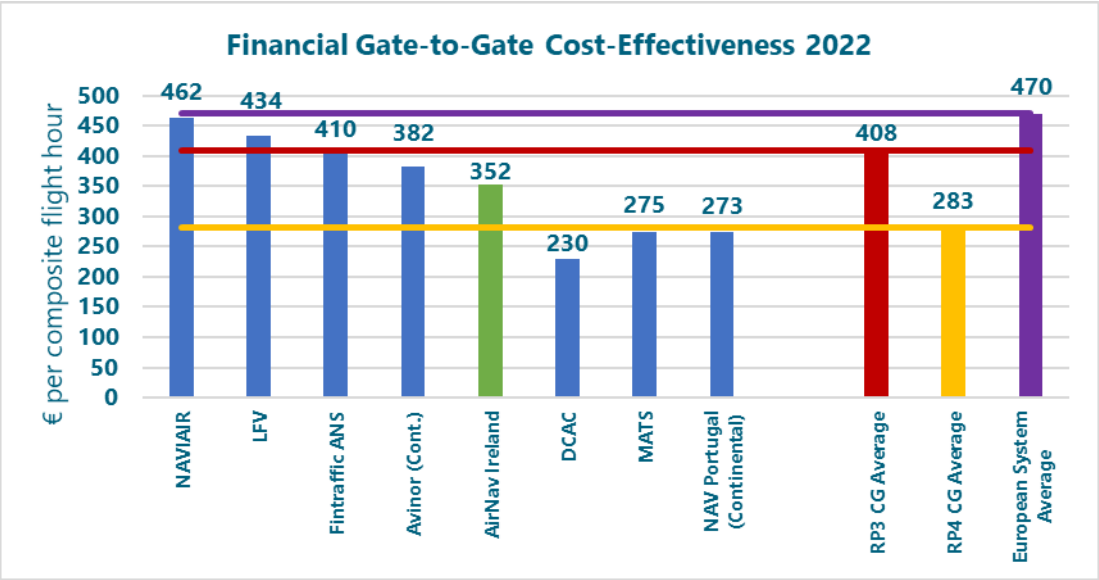

FIGURE 16: ACE 2022 (2024 EDITION) FINANCIAL GATE-TO-GATE COST-EFFECTIVENESS

We also score high when ATCO productivity is taken into account (FIGURE 17), we are above average for both comparator groups. We had one of the highest numbers of composite-flight hours per ATCO-hour within the RP3 comparator group with a value of 0.94. This compares with the average of the group of 0.78 and the European average of 0.88, which ranks us as the 5th best performing ANSP within the ACE sample. Our productivity is also closely aligned with the RP4 comparator group where the average is being lifted by NAV Portugal which is however specific in terms of being both a continental and oceanic services provider impacting the methodology for calculation in their case.

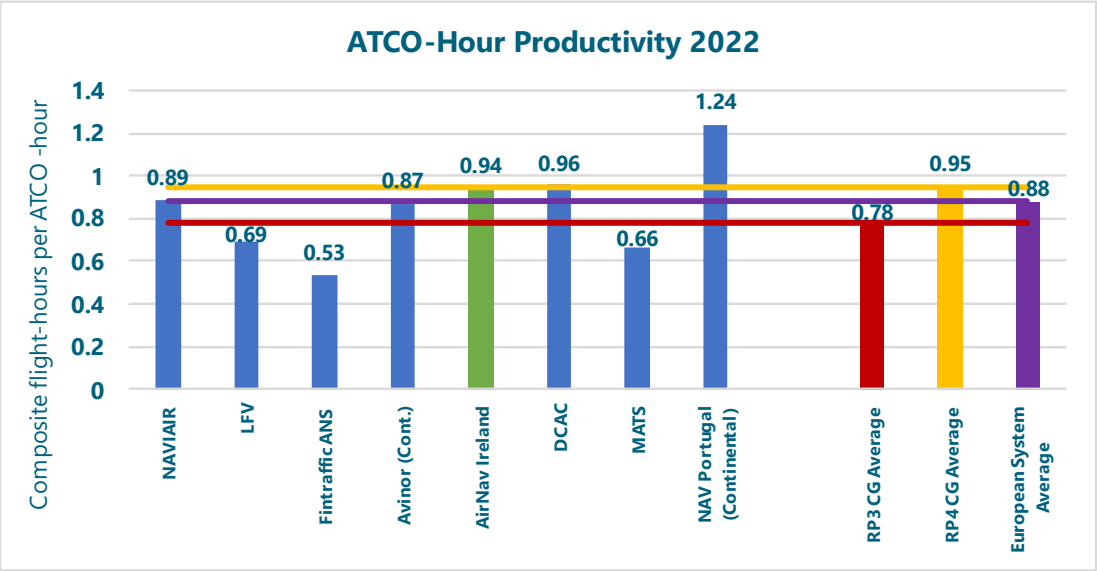

FIGURE 17: **ACE 2022 (2024 EDITION) ATCO-HOUR PRODUCTIVITY**

At the same time, we have had below average employment costs per ATCO-hour with €105 per ATCO-hour which compares with the RP3 comparator group average of €117 per hour and European average of €133 per ATCO-hour for the ACE sample (FIGURE 18). For our RP4 comparator group, we have the second highest employment costs per ATCO hour, giving a cost of around 13% above the comparator group average.

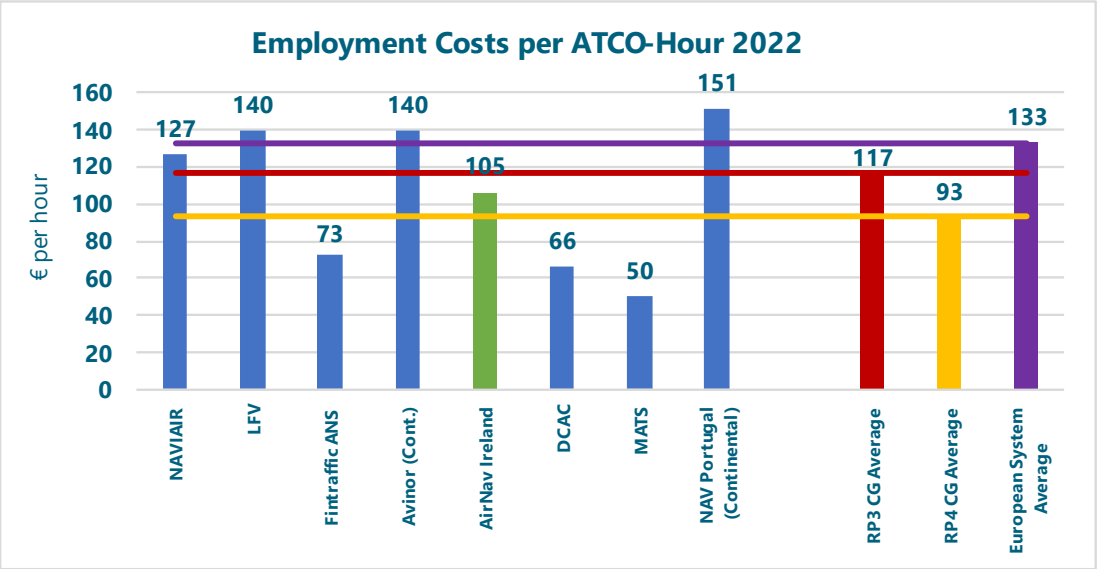

FIGURE 18: **ACE 2022 (2024 EDITION) ATCO EMPLOYMENT COSTS PER ATCO-HOUR**

We also experienced below average support costs per composite flight-hour with €240 per hour, compared the RP3 comparator group average of €256 per composite flight-hour and European average of €320 per composite flight-hour, meaning we had the 10th lowest within the ACE sample (FIGURE 19). Our support cost per composite flight hour are however 28% above the RP4 comparator group average.

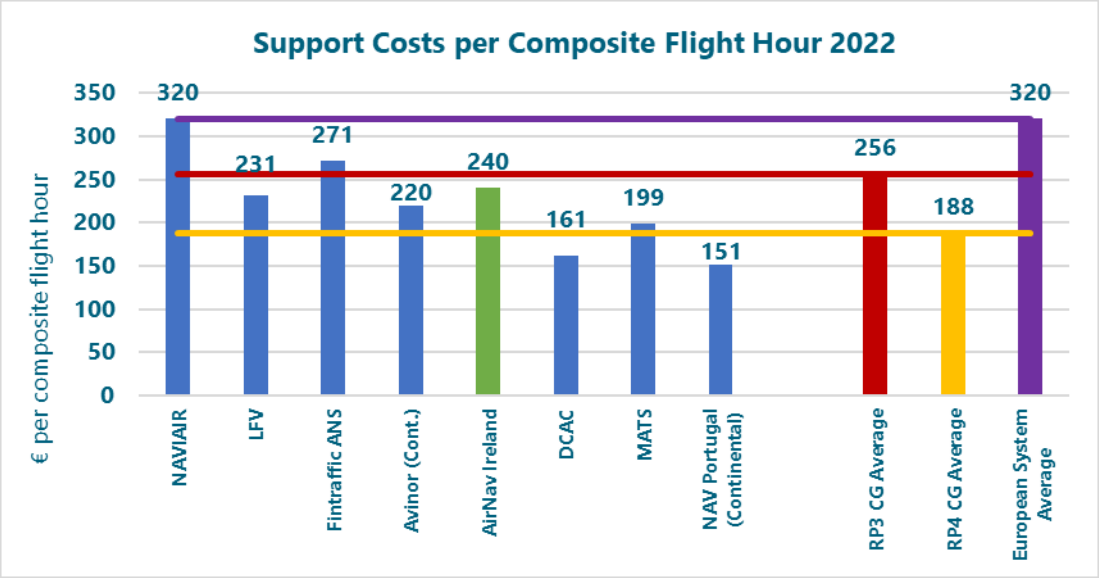

FIGURE 19: ACE 2022 (2024 EDITION) SUPPORT COSTS PER COMPOSITE FLIGHT HOUR

When considering the support costs ratio, one important influencing factor is the ratio of technical support staff per ATCO-in-OPS. The data shows that we had the 3rd lowest number of technical support staff in 2022 in the European system (ACE sample) with 0.33 TEC staff per ATCO-in-OPS. This compares with the RP3 comparator group's average of 0.38, ✂ and the European system average of 0.80 within the ACE sample. For the RP4 comparator group, we have the lowest number of technical support staff per ATCO in OPS, with only 42% of the comparator group average (DCAC seems to outsource TEC services completely as they keep reporting no technical staff).

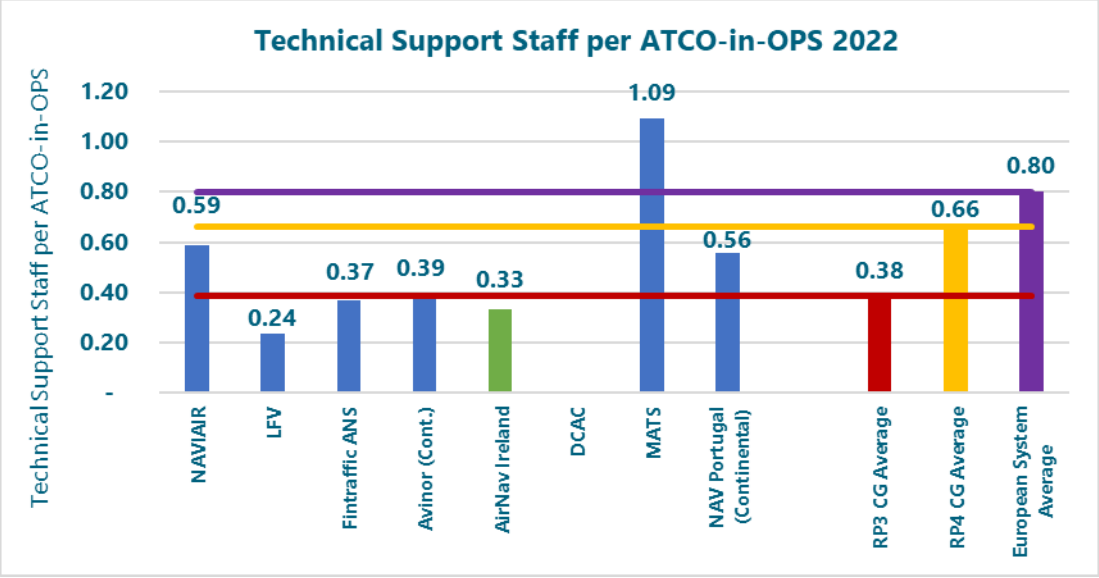

FIGURE 20: ACE 2022 (2024 EDITION) TECHNICAL SUPPORT STAFF PER ATCO-IN-OPS

The following chart (FIGURE 21) shows a more detailed breakdown of technical staff and its relation to the number of ATCOs-in-OPS. This shows that not only did we have one of the lowest numbers of technical support staff per ATCO-in-OPS, but the proportion of technical staff used for planning & development (23% of the technical support staff) is also below the European average within the ACE sample (26% on average excluding DCAC Cyprus which does not report any technical staff). The relatively low number of technical support staff available for planning and development is one of the key contributors to the delay of the CAPEX programme and was taken into account when the manpower planning for technical services was done for RP4.

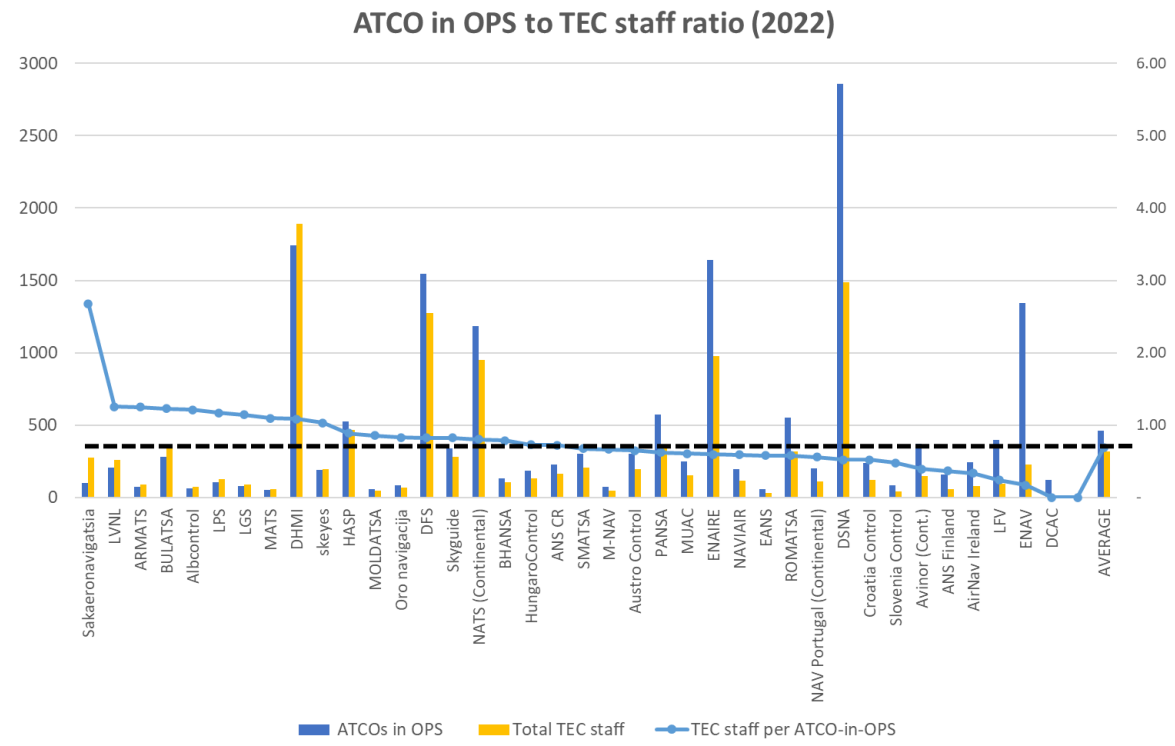

FIGURE 21: ACE 2022 (2024 EDITION) ATCO IN OPS TO TEC STAFF RATIO

3.7.6.3 Implications for RP4

The benchmarking against RP3 and RP4 comparators and against other European ANSPs shows that we perform well in many of the areas of ATM/CNS cost effectiveness. Should the NSA decide to apply more stringent targets than the EU-wide targets would suggest, this would have a negative impact on a number of performance areas, for many reasons described in detail in this Business Plan.

With one of the lowest en route unit charges in Europe, we cannot be unduly constrained in prioritising safety, capacity and environmental considerations, in addition to the range of other local and European regulatory requirements (e.g. CP1) simply because of a notion that Cost-Efficiency targets need to be challenging. The manner in which the Cost-Efficiency targets compare to the initial requirements identified by the European NSAs highlights that there will be undesired consequences in being unable to recover required costs.

The above-mentioned squeeze for lower cost-effectiveness targets is likely to be heightened by our new RP4 comparator group, where for many of the metrics described above the average cost effectiveness of the RP4 comparator group is better than that of the RP3 comparator group. This means against many of the ACE metrics we sit above the RP4 comparator group average. The ACE performance shows under metrics such as employment costs per ATCO hour we perform worse than our RP4 comparator group average, but such a factor is heavily influenced by the local labour market conditions and economic landscape and is therefore largely outside of the control of an ANSP.

For RP4 there is a concern that benchmarking AirNav Ireland against ANSPs operating in countries with significantly different economic landscapes will lead to even further Cost-Efficiency pressures, at a time where we will need to invest to provide the future ATC capacity that our customers expect. For these reasons as well as operational similarities, we still believe that the RP3 comparator group was more appropriate for the benchmarking than the newly proposed group in RP4.

4 AIRNAV IRELAND'S STRATEGIC DIRECTION

4.1 Our Mission, Vision and Values

Since we were established in 2023 as AirNav Ireland, we have developed our own strategy to guide the delivery of our ATS. The following infographic shows the mission, vision and values that we have adopted which focus on safety, efficiency and sustainability. Alongside our safety policy, we take a proactive approach to our ANS and ATM activities, following our 'SKIES' values to ensure consideration to our people and customers. We believe that we have a duty to act with integrity and to seek ways to lessen our environmental impact and believe this can be achieved in tandem with our safety goals.

FIGURE 22: OUR MISSION, VISION AND VALUES

4.2 Strategic Objectives

We have three overarching objectives: **Safety of Operations**, **Financial Stability** and **Business Transformation** as we develop into RP4. Alongside our values, these guide our daily delivery of service, aligning with our safety focused mission.

4.2.1 Safety of Operations

Safety is the highest priority for AirNav Ireland, and all of our activities are delivered against this objective. Safety ensures that our services are optimising the safe handling of aircraft, passengers, flight crew and property within our airspace. Our Safety Directorate, established in 2022, helps us in ensuring this, alongside maintaining compliance with all requirements of (EU) 2017/373 and (EU) 2020/469), the regulations underpinning ATM safety.

Our organisational safety culture is supported by our four pillars of safety*: planning*, *achievement*, *assurance* and *promotion*. We strive to enable continual improvement of our safety performance while developing our expertise through a positive safety and compliance culture, maintaining our resource safety.

4.2.2 Financial Stability

Our primary objective is Safety of Operations, however, this is dependent on a strong financial position to facilitate sufficient investment in safety. The Covid-19 pandemic highlighted the need for resilience in our operations, and this is built upon by our core investments in both operational services and people. Financial stability and resilience ultimately ensures we can deliver a high quality of service. To support us in this, our ANS

activities are regulated by (EU) 2019/317 and (EU) 2020/1627 (SES Performance and Charging Scheme), providing us strict targets for Cost-Efficiency.

4.2.2.1 Performance and Charging Scheme

We operate under the European Performance and Charging Scheme overseen by the PRB and the IAA. We perform excellently across the Safety, Environment, Capacity, and Cost-Efficiency targets, and are committed to delivering a safe and efficient service, ensuring sufficient resourcing while prioritising customer needs for safety, efficiency, minimal delays, and environmental sustainability. We strive to maintain positive stakeholder relations by adhering to evidence-based planning, regulatory compliance, and stakeholder engagement. By supporting the European ATM Master Plan initiative (see Appendix 4), we can recover eligible costs via the Performance and Charging Scheme, and provide dividends aligned with shareholder expectations. Through consistent communication, resilience, and stakeholder engagement, we aim to uphold our commitment to excellence in air traffic management.

4.2.2.2 International Affairs

We are dedicated to collaboration with our international partners and stakeholders to promote and enhance safety in line with PRB targets, as well as ensuring our environmental targets are met. Collaboration allows us to be at the forefront of innovation and efficiency, and ultimately, improve as an organisation.

COOPANS

- We are a founding member of the COOPANS partnership of 6 ANSPs which has been widely recognised in Europe as a means of providing a more cost-effective approach to procurement of systems in ATM. The alliance has explored system upgrades aligned with the European ATM Master Plan and Digital European Sky, aiming for capacity enhancements and compliance with future regulations.
- The TopSky ATC One project, a flagship initiative within the COOPANS partnership, not only drives innovation but also aligns seamlessly with the COOPANS Business Concept. With the new TopSky ATC One system, we are strategically positioned to reduce technical debt and obsolescence, ensuring cost savings of approximately 30% compared to individual procurement as with previous procurement projects, while ensuring collaboration and future-proofing air traffic management concepts like Exodus8 in Ireland.

We play pivotal roles across various boards and groups within the COOPANS Alliance and contributed to the successful application for co-funding for a Digital Sky Demonstrator (€34.3m).

SESAR 3 JU

- Our involvement in SESAR 3 JU ensures that we can contribute at a senior governance level to decisions that impact our business and European aviation generally, and we also participate in projects of interest to us. This is of significant value to us as an ANSP and as a COOPANS partner as we become aware and can help to influence the direction and speed at which both business and technological problems are analysed, and proposals developed for their resolution.
- Through SESAR 3 JU, our expertise can be deployed in exploratory research (ER) and industrial research (IR) projects and our experts can then bring back knowledge and learning on new innovations and technologies being considered or implemented by partners in the European aviation family. Access to EU funding is an important element which helps us to fund our initiatives and pass this on to our end users in adjusted unit rates.

CANSO

- We have maintained an active engagement with CANSO through RP3, hosting the CANSO Global Safety Conference in November 2023, focusing on enhancing safety in ATM.

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[8] *The EXODUS Digital Sky Demonstrator (DSD) project will showcase business continuity scenarios in different airspaces using a new ATS operating model based on the geographic decoupling of ANS and ADS (ATM Data Services). The project is partially funded by the SESAR 3 JU following a call issued in September 2022 by the Connected Europe Facility*

- The conference covered diverse topics including safety investigations, human performance, and cyber safety, with our pivotal role in global aviation safety being highlighted.
- We have also participated in various CANSO working groups and international initiatives, including Airspace World, contributing to discussions on European ATCO licensing and training through ANSB Chairmanship and as part of the EASA Steering Group.

The Wider European Network

- We engage and encourage cooperation between ANSPs. In addition, we have played active roles with memberships in key European groups including the Network Management Board (NMB), the Network of Directors of Operations (NDOP) the Network of Directors of Technical Services (NDTECH) and the European Aviation Crisis Coordination Cell (EACCC).

Not only do we seek to comply with international safety standards, but we also aim to lead the continuous improvement of safety in the global ATM environment. We support this through our active participation and engagement with CANSO Europe and Global, EUROCONTROL Safety Teams and associated workgroups. Through our work with the Safety Team's workgroups and CESAF Advisory Board we also strive to influence the European Commission and EASA with respect to proportionate regulation and realistic and meaningful performance scheme targets. Moreover, by participating in performance benchmarking and Standard of Excellence (SOE) safety maturity questionnaire developments, we share our own best practices while implementing those developed in peer organisations, that maintains us both in Europe and globally as a leading ANSP with respect to operational safety performance and maturity.

4.2.3 Business Transformation

To maintain our status as a leading ANSP, our business and operations must dynamically evolve and adapt to the challenges and opportunities within both our organisation and the wider aviation system. Our transition to AirNav Ireland forms a part of this, alongside our role in addressing the sustainability concerns surrounding aviation. As the regulatory environment changes and global events put pressure on aviation, the ability to adapt to these changes becomes increasingly important for us.

Staff are at the heart of what we do, and as we transform, corporate values and staff integration must be prioritised, ensuring we produce a positive working environment that maintains a focus on technology and innovation to support us in our wider business objectives. As our strategy progresses, we will look to the external environment when we analyse our business outlook, ensuring we remain a key player within our strategic partnerships while enhancing our influence at national level.

Aligning our management and staff objectives with a focus on sustainability ensures that the transformations that we make can continue to provide benefits to the company, our staff and our customers. There is an inherent link between our transformation against regulation, our strategy and our business requirements (KPIs), and in order to achieve our goals of being a global environmental practice and sustainability leader in the aviation sector, we must balance these well.

We initiated our pursuit of sustainability by formulating a comprehensive Sustainability Management Plan spanning a period of six years (2024-2029). This plan encompasses various critical sectors, including the enhancement of energy efficiency and the adoption of renewable sources for electricity procurement. Our dedication remains strong in adhering to international sustainability objectives and maintaining our status as a leader in sustainable aviation initiatives.

The objective of the Sustainability Management Plan is to delineate the strategies and measures that we intend to use to attain carbon neutrality by the year 2030. Additionally, it aims to establish a comprehensive strategy for biodiversity conservation and facilitate the adoption of environmentally sustainable practices in public procurement. The following infographic details our approach to our Sustainability Management Plan, and our objectives that will guide us as we develop through RP4.

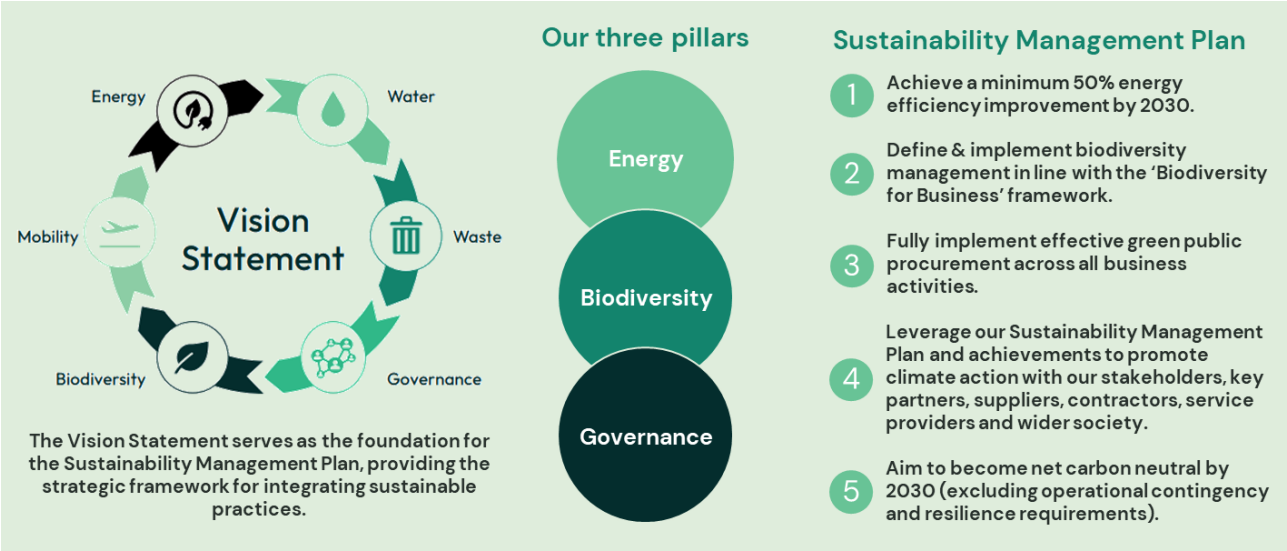

FIGURE 23: VISION STATEMENT, THREE PILLARS AND SUSTAINABLILTY MANAGEMENT PLAN

The Sustainability Management Plan includes the execution of goals under three fundamental pillars, namely Energy, Biodiversity, and Governance. These are explored in more detail below:

Energy

The Climate Action and Low Carbon Development (Amendment) Act 2021 establishes a legal framework for a "national climate objective" by the year 2050, for an economy that is resilient to climate change, abundant in biodiversity, ecologically sustainable, and carbon neutral. The main requirements of commercial semi-state companies in terms of energy are to reduce carbon emissions by 51% by 2030 and improve energy efficiency by 50% by 2030. The key objectives of our energy pillar are to:

1. Target improvements that will have the biggest impact on emissions and energy reduction.
2. Reduce energy consumption and fossil fuel use.
3. Recover energy where possible.
4. Produce onsite renewable electricity.
5. Offset remaining hard-to-mitigate emissions after all other objects are met.

Biodiversity

Through careful management of our land, operations, and supply chain, we can positively impact biodiversity. Legal frameworks such as the EU Habitats and Birds Directives, as well as initiatives such as the Biodiversity Strategy to 2030, aim to protect designated sites and improve water quality to address the biodiversity crisis. The below figure outlines some key targets from several drivers that we intend to contribute positively towards:

Have restoration completed or underway on **at least 30%** of degraded terrestrial inland waters, and coastal and marine ecosystams	**90%** of Business for Biodiversity platform members have conducted and assessment of impacts and dependencies on biodiversity **by the end of 2027, with at least 60% by the end of 2025**
Eleminate, minimise, reduce and or mitigate biodiversity and ecosystems services... **by at least 50% by 2030**	At least 25,000km of free-flowing rivers are restored **by 2030**

FIGURE 24: KEY BIODIVERSITY TARGETS

Governance

We are dedicated to environmental protection, biodiversity preservation, and adopting a circular economy approach. Recognising that a significant portion of carbon emissions stem from production, we view a circular economy as crucial for meeting emission reduction goals. We prioritise Green Public Procurement (GPP) as a key strategy for transitioning to a more sustainable, and low-carbon operation, integrating environmental considerations into our purchasing and procurement practices, while aiming for continuous improvement and promoting green supply chain practices. To embed GPP effectively and responsibly, we will generate a suite of realistic and achievable targets and KPIs, completed in conjunction with the Sustainability Task Force.

5 CONTEXT FOR RP4

5.1 Regulatory Background for RP4

5.1.1 Overview

This RP4 plan has been developed during a time of significant change, in terms of regulatory amendments that are in the pipeline and expected to come into effect during the RP4 period. There have been a dozen consultations including international and European on RP4 since the IAA's first consultation on the timeline in 2023, with Steer involved in assessing, Union-wide targets, future incentive schemes, and financing a minimum service. In addition, there has recently been an EASA consultation in relation to RP4 SKPI Guidance Material, EASA published the guidance material on 14th June 2024, whilst this Business Plan was being finalised. There have also been proposals in relation to much more rigorous monitoring requirements for RP4, these have recently been approved by Amendment of Implementing Regulation (EU) 2019/317 regarding new and revised monitoring indicators for the performance and charging scheme in the Single European Sky. Separately, there is some uncertainty in relation to whether the CP1 regulation will be amended following the AF6 maturity gate.

5.1.2 Commission Implementing Regulation (EU) 2019/317

The current performance planning is still driven by requirements defined in the Commission Implementing Regulation (EU) 2019/317 laying down a performance and charging scheme in the Single European Sky.

There have also been numerous discussions about new indicators including Steer's study on new or revised indicators and incentive mechanisms, minimum services and new technologies. The outcome of the discussions is that the KPIs will be not modified for RP4, but additional monitoring indicators have been adopted through a change of the Annex I of Performance and Charging Implementing Regulation following discussions on this topic held at the 88th Single Sky Committee meeting on 18th/19th June 2024.

5.1.3 Approach for Developing the Irish Performance Plan for RP4

5.1.3.1 RP4 Methodological Consultation and Issue Paper

On 22 January 2024, IAA published the RP4 Methodological Consultation and Issues Paper, which presents the NSA's proposed methodology in arriving at an RP4 Performance Plan ahead of the NSA's expected submission in October 2024 of a draft State Performance Plan to the PRB. The Issues Paper started the process of engagement with stakeholders, seeking submissions on how IAA should develop the Performance Plan and what issues should be taken into account. Parties were invited to comment on the regulatory policies that should be adopted, the methodologies to be applied and the data sources to be used.

Our response to this consultation was submitted on 23 February 2024 and included our views on IAA's questions. There were instances where follow ups were required in relation to, for example, developments in relation to cost of capital and cost allocation principles. Additional information on these elements is provided in this Business Plan, including the detailed CAPEX project sheets which are included in the Annexes.

Following the Issues Paper we engaged with IATA to present our RP4 Business Plan with a focus on the CAPEX elements.

The following bullets summarise the key points raised in our response:

- We are of the view that the current arrangements for en route and terminal charging zones are regulatory compliant and appropriate.
- We will continue to follow guidance material in relation to safety very closely in our Business Plan for RP4, with the aim of meeting all RP4 safety targets and in a manner that optimises service provision from an environment and capacity perspective.
- We request that the IAA and PRB consider all KPA interdependencies from the perspective of actual performance in recent years, factors outside of the ANSP's control, and how the Cost-Efficiency targets

may place unreasonable constraints on AirNav Ireland in terms of delivering the expected performances during RP4.

- We recognise the importance of horizontal flight efficiency being included in any Key Performance Area connected to the environment, and that this is unlikely to change even if there is the adoption of more innovative solutions in the future such as those reflecting optimal flight trajectories in place of actual flight trajectories.
- We request that any evolution of the Environment KPA reflects factors within our control of influence, and that it does not unnecessarily penalise top performers.
- We have previously explained that we are at the limits of what can be achieved in terms of the performance metric, KEA, or actual flight trajectory. This has since been confirmed by EUROCONTROL and is reflected in our RP3 performance to date. Ireland's Free Route Airspace concept of operations means that its KEA performance is largely determined by the actions of the airspace users. We consider it to be futile to introduce a financial incentive or penalty programme in relation to the local reference value for the environment KPA.
- While this consultation highlights the key RP3 outturn issues to date, it remains the case that there has just been one full calendar year (2022) since the RP3 Performance Plan was approved and finalised for Ireland. 2022 was characterised by many abnormalities affecting the business as the industry began to recover from the pandemic, and it does not reflect a sound basis upon which to project forward on a standalone basis to cover the period 2025-2029. Similarly, in 2023 the restructuring of the IAA and AirNav Ireland went ahead, and the traffic outturn was more closely reflective of 2019.
- The retention of ATCOs is an existing issue that has come to the fore since the previous Business Plan was prepared. In a post pandemic environment, there have been certain demands of staff across Europe and further afield, and in Ireland this has resulted in an ex-post adjustment to certain payroll reduction measures during 2021, and it has also resulted in more acute requests from staff in relation to a better work life balance, ranging from job sharing opportunities, to less restrictive summer leave polices.
- There have also been noteworthy developments from engaging with staff in relation to pension entitlements, for both existing and prior staff.
- The concept of direct entry operational staff, particularly for ATCOs and engineers, is a new concept from a business planning perspective arising from actual events during RP3.
- Despite having an excellent performance during RP3 to date that has been in line with customer expectations for the most part, we are not satisfied with our performance relative to the RP3 targets, and request assistance and guidance from the NSA in relation to how we can deliver a service in RP4 that consistently meets the range of targets being set for RP4. We are certainly best placed and prepared to determine how to deliver a service, but we are not responsible for setting the targets and the recent past has shown that operational stakeholders, such as ourselves, have limited influence over the relevant targets. With one of the lowest en route unit charges in Europe, we cannot be unduly constrained in prioritising safety, capacity and environmental considerations, in addition to the range of other local and European regulatory requirements (e.g. CP1) simply because of a notion that Cost-Efficiency targets need to be challenging. The manner in which the Cost-Efficiency targets compare to the initial requirements identified by the European NSAs highlights that there will be undesired consequences in being unable to recover required costs.
- We agree with STATFOR forecasts from spring 2024 forming the basis for RP4 planning and request a commitment to avoid a repeat of the situation during the pandemic whereby the traffic forecasts were updated following the business planning process and consultation process.
- We are satisfied with the overall approach to cost allocation from the perspective of en route and terminal services. However, in light of the restructuring process which resulted in a legal separation in 2023, in addition to new infrastructure that has been delivered in RP3, we have revisited our cost allocation methodology with a view to establishing if it is reflective of best practice (covered in section 7 of this Business Plan).

- We do not support the NSAs methodology used in 2021 for forecasting operating expenditure and evidence provided in this regard in 2021. We believe the level of complexity is unnecessarily high (e.g., protected model) and regulatory burden of proof is extremely high when it comes to the modelling approach by Steer. We consider this to not be in line with the approach taken by the other NSAs in Europe.

At the same time, other stakeholders provided their opinions on the questions raised. We have reviewed these responses in detail and the following bullets summarise their views:

Airline Views:

- Aer Lingus and Ryanair agree with the use of the latest STATFOR forecast for forecasting RP4 traffic.
- Ryanair states that there is no specific need to separate the terminal charging zone between Dublin, Cork and Shannon. This is consistent with our position and we have provided the IAA sufficient detail to overcome the demands being placed upon NSAs across Europe to separate terminal charging zones.
- Aer Lingus expressed concern that current ANS proposals do not meet the PRB recommendation for cost reduction and that the NSA is correct to question what the driver of any variation from allocated budget, and suggest some tests for assessing whether variation from allocated budgets should be allowed. Aer Lingus suggests the burden of proof should be on the regulated entity to prove any variation from allocated budgets is efficient, this is something we have addressed in this Business Plan.

  Our position is that the high environment being above the forecast has implications on the ability to reduce costs. We believe the level of complexity is unnecessarily complicated (e.g., protected model) and regulatory burden of proof is extremely high when it comes to the modelling approach by Steer. Consequently, we continue to request the IAA to provide sufficient evidence of any changes to our Business Plan, and on what basis, particularly at the Draft Decision / Consultation phase.
- Aer Lingus agree with the NSA's bottom-up approach to estimating efficient costs and their initial position is that staffing resilience is unnecessary as proper workforce planning should be included as a BAU function ✂.
- Aer Lingus agree with the NSA that RP3 was overly ambitious. Aer Lingus asks the IAA to look again at its proposed gearing, and whether such a difference from PRB recommendations is acceptable. They also agree with IAA that an aiming up allowance is unnecessary.
- Ryanair states that the lack of ATCOs in 2023 led to a worsening of ATFM delays – yet they identify that the staff cost per employee has remained above forecast levels. To increase the accuracy of the forecasted number (which should include, for example, trainees, attrition, productivity, etc.), Ryanair supports a granular level analysis. Ryanair expect the IAA outcome to strike the balance between resilient staffing number and high-performance productivity giving the traffic stability for the coming years.

  Our position on this topic is that cost per employee in 2023 cannot be looked at in isolation due to the connection to the pandemic. We are able to support a granular level of analysis, in this plan and in consultation with the IAA and its consultants CEPA.
- Whilst Ryanair understand operation prioritisation over CAPEX, they have expressed concerns over CAPEX delivery. Given the nature of the CAPEX spent, Ryanair suggest there should be a continuous monitoring and reporting on CAPEX delivery, for example at least every quarter to update on the timeline and investment plan. Ryanair also state that considering that RP2 and RP3 investment plans were not properly deployed, it would be beneficial to realise a thorough cost-benefits analysis for RP4 plan, so that it is properly deployed on a realistic timeline based on historical data.

  Our view is that whilst operations prioritisation was one of reasons behind the CAPEX delivery in RP3, there were many factors at play as described in this plan and published on a biannual basis. This was primarily driven by factors such as unanticipated effects following the pandemic, supply chain issues and project management shortcomings.

Staff Panel Views:

- In accordance with the airline views, the staff panel believes the STATFOR forecast should continue to be used but given the traffic was significantly above the forecast in RP2 and RP3, they suggest the use of the 'High' traffic scenario.
- The staff panel believe that the current Unit Charge of AirNav Ireland, which is amongst the lowest in Europe, is strongly correlated with the current high levels of staff attrition, both in ATCO and support staff grades. The staff panel identify attrition as the biggest issue resulting from RP3 performance to date.
- The staff panel identified that throughout RP2, and seemingly into RP3, ANSPs have prioritised cost effectiveness to the detriment of delivery of CAPEX projects and capacity.
- The staff panel states that it is disappointing to see that the PRB is still insisting that the union wide costs should decrease year on year while insisting that capacity increases significantly, with positions not mutually exclusive in their view.
- Similarly to AirNav Ireland and Ryanair's view, the staff panel believes that the current en route and terminal charging zones work effectively.
- The staff panel expresses concern that whilst the IAA acknowledges the interdependencies of Safety, Cost-Efficiency, Environment and Capacity it would seem that when discussing KEA and, further in the issues paper, other KPIs such as cost effectiveness, the interdependency with safety is not acknowledged.
- The staff panel states that as AirNav Ireland already has free route airspace implemented, any factors affecting the KEA are generally outside of its control. Therefore a financial incentive scheme is not appropriate for the Environment KPA.
- The staff panel believes that the forecasting model used for RP3 ignored very real concerns highlighted by AirNav Ireland in its first RP3 submission. Capacity was delivered in RP2 by deferral of annual leave, reliance on overtime, and postponing CAPEX projects and the same situation has arisen in RP3. A significant portion of current capacity is delivered by AirNav Ireland being unable to deliver on contractual obligations to staff. The staff panel identify that this was not accounted for by the IAA in RP3, nor did it consider the high levels of overtime in RP2 to be abnormal.
- The staff panel believes additional resilience is vital given that traffic forecasts have been significantly ahead of forecast and AirNav Ireland has correspondingly underdelivered in CAPEX projects to provide capacity, with a sustainable service, one that has appropriate staffing levels to deliver on all obligations.

5.2 Prevailing Market Trends for RP4

This section describes some of the general prevailing market trends within the European ATM sector and assesses their potential implications on our RP4 plans, including on the unavoidable costs identified in this plan.

5.2.1 Ensuring Capacity to Meet Future Traffic Growth

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As shown in detail in section 5.5, like our European counterparts, traffic through Irish controlled airspace is forecast to grow significantly over RP4, although there is some uncertainty in how this may materialise as demonstrated below (See Figure 25 below).

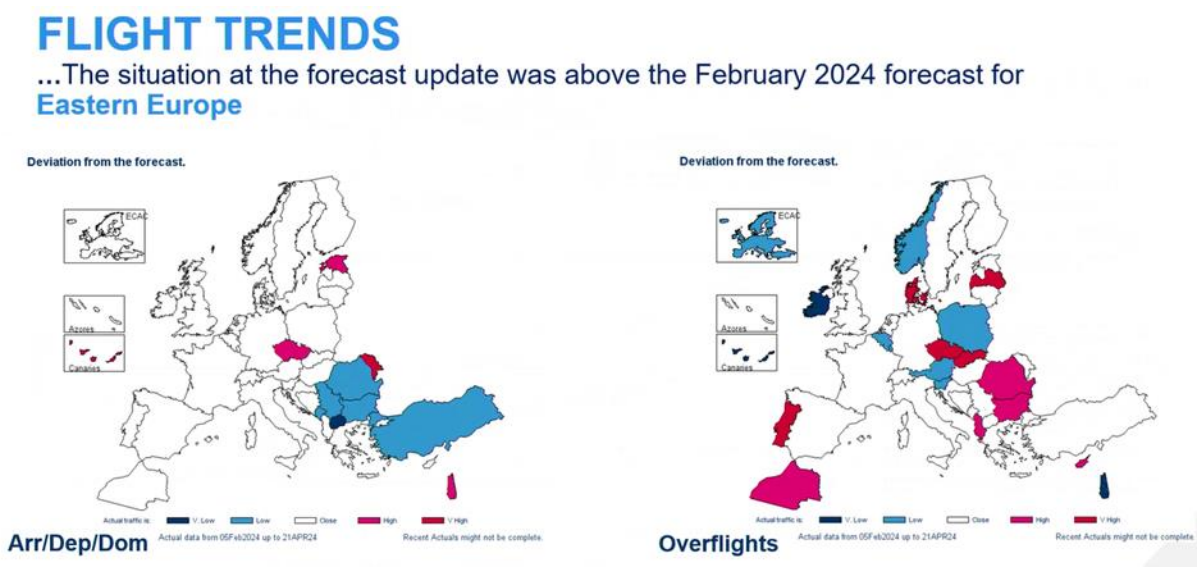

FIGURE 25: COMPARISON FEB-APR 2024 ACTUALS VS FEBRUARY FORECAST

We will need to be able to provide sufficient ATC capacity during RP4 to cope with this expected traffic growth trend. However, we will not be the only ANSP attempting to do this, and the global supply shortage of ATCOs will increasingly have ramifications both for the terms and conditions that ANSPs will need to offer to attract and retain ATCOs, and on capacity provision where global demand for ATCOs (driven by traffic growth) starts to outstrip supply.

5.2.2 Environment Performance Increasing in Importance

Sustainability has become increasingly prominent in aviation in recent years and is also seen as one of the highest priorities by the PRB for RP4. Currently, direct, and indirect CO_2 emissions account for 3% of the EU's total greenhouse gas emissions and 13% of transport related emissions. The EU's commitment to reduce greenhouse gas emissions by 55% by 2030 and to be carbon neutral by 2050 highlights the absolute need for all sectors to effectively contribute. Reducing the environmental impact of transport has been a key contributor to reaching the European Green Deal objectives for the European Union. This policy also highlights that it is not only emissions that are a key environmental impact of aviation but also noise-related impacts, with research in recent years bringing the health impacts of aircraft noise into increasing focus. As traffic levels increase, carbon emissions and noise related impacts are likely to grow, unless the industry finds ways to facilitate cleaner and quieter flights, through the evolution of the traffic fleet mix, more environmentally efficient operating procedures and changes to airspace to facilitate more environmentally friendly routings.

The impact of this market trend for RP4 is significant for us, as environmental performance is becoming an increasingly important objective for the PRB. The PRB proposes to prioritise the achievement of ambitious targets for the environment KPA. However, there is a limit to the extent to which we are able to improve our environmental performance, with factors outside our control also impacting the KEA KPI. In addition, we will always prioritise safety over other KPAs, and due to the interdependencies between the KPAs this limits the extent to which we are able to prioritise environmental performance improvements. At times during RP3 we have had to prioritise capacity over other KPAs as set out in this Business Plan.

5.2.3 Digitalisation of ATM Services

Ensuring the seamless incorporation of digital technology, a pivotal element within the technology segment of SES Reference Periods, is essential for the successful transition to the 'Digital European Sky.' This transition is defined by the integration of digitalisation and automation into ATM.

Digitalisation has become an increasingly significant part of developments in the ATM sector in recent years. It has brought about a shift in the way air traffic is managed, enabling the industry to become safer, more efficient, and sustainable. Digitalisation is taking place in a variety of forms through the use of big data and analytics to gain insights into air traffic patterns and helping to optimise operations. This is beginning to lead

to a reduction in fuel consumption and has made the industry more sustainable. The implementation of new technologies such as artificial intelligence and machine learning algorithms have the potential to enable ATCOs to predict potential conflicts between aircraft, improving safety in ATM. ✂

These digital technologies continue to evolve over time, and the challenge for the industry is to refine how digital technologies are used so they are successfully implemented widespread within European aviation. This requires a number of challenges to be addressed such as how ADSPs (ATM Data Service Providers) can be integrated within the existing ATM system, ensuring that cybersecurity aspects from implementing innovative digital concepts are addressed.

The major upgrade of our ATM system during RP4, through our TopSky ATC One project (as detailed in section 8.4) is aligned with the European ATM Master Plan and Digital European Sky initiatives, leveraging digital technologies to improve the efficiency, safety, and sustainability of aviation operations.

5.2.4 ATM Resilience

The European Performance and Charging scheme tackles some elements of resilience through its capacity KPA, however the challenge of ensuring that ANSP systems, processes and personnel can effectively cope with disruptions is critical. This is a distinct challenge to the capacity concerns the industry is facing described in section 5.2.1.

Historically, resilience in the industry has tended to focus on operational resilience, and this is what has led to resilience and capacity being treated together within the capacity KPA from a Performance planning perspective. The challenge for the industry in terms of operational resilience is to keep finding new ways to reduce the impact on operations of disruptive events. In 2023, the FAA system outage in January, NATS' system outage in August and Gatwick's temporary capacity limits imposed in September are just a selection of events that caused significant disruption to flights and highlighted the ongoing challenges to ensuring operational resilience. ✂

Although operational resilience is imperative, other aspects of resilience are also critical such as financial and cybersecurity resilience. Financial resilience is important because financial solidity is the basis of any business operation and offers the foundations from which a quality service can be provided to customers. The Covid-19 pandemic highlighted the industry's financial vulnerability, stressing the importance of preparing for external factors that could affect the financial stability and/or the ability to manage revenue changes or cost increases without risking their future. Conscious of this, ahead of RP4 we are conducting a financeability assessment with the support of our external consultants to ensure full visibility of the potential impacts of externalities on our financial stability. A further fundamental aspect of resilience in the context of a business operation is cybersecurity resilience, which is also a key enabler to operational and financial resilience described above. Cybersecurity is a growing concern as the industry becomes increasingly interconnected and digitalised. Ensuring that processes are in place to protect, detect, respond and recover from cybersecurity events is critical to the safety of the ATM system and to sustain the ATM business operation.

A number of our capital expenditure projects will enhance the resilience of our ATM operations as described in more detail in section 8.5.2.1. Notably, the TopSky ATC One upgrade which offers resilience benefits, particularly in terms of operational and cybersecurity resilience through improved software, safety, and security resilience. This helps to ensure better business continuity of service, minimising disruptions due to technical failures or security breaches. In addition, our new Dublin Contingency Centre will deliver increased resilience to Dublin Operations and will cater for a major system failure and/or event that requires the evacuation of the Dublin ACC. Although, the construction of the building for the facility was completed in RP3, the conversion into an operational contingency room will take place in RP4 and complete in RP5. The new facility will be physically independent from the Dublin ACC and will remove the requirement for Dublin in Shannon contingency operations. In addition, our ICT CAPEX programme will seek to improve our cyber resilience, and the resilience of our ICT infrastructure.

5.3 Customer Priorities for RP4

This Business Plan has been formulated during a period where customer expectations are changing to reflect many of the evolving industry trends described in section 5.1. Customers expect ANSPs to help facilitate the industry transitions towards a lower carbon footprint, while growth in traffic is expected for RP4, on top of the faster than anticipated traffic recovery after Covid-19 in RP3. It is imperative that we provide the ATC capacity to meet the expected future demand of our customers. ✂

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FIGURE 26: ✂

Ahead of RP4 we have engaged with our customers through our customer care programme and we have used the feedback received from our customers through this programme to guide the formulation of this plan for RP4.

5.3.1 Customer Care Programme

Our Customer Care Programme is an approach we have used successfully for many years to engage with our airline customers. It is a mechanism for airlines to provide detailed feedback in face-to-face meetings and through an independently administered online survey. This programme ensures we fulfil our obligations as an ANSP under Commission Implementing Regulation (EU) 1035/2011.

Each year, we meet with a representative sample of our customers (28 airlines) from across Europe, North America and the Middle East, the most important markets for our business operation. These airlines cover all the major passenger and freight business models, from Ultra-Low-Cost Carriers to Full-Service Airlines. This sample represented over 80% of our business by ATM revenues by Q1 2024.

Customers were asked to provide their opinions on our ATM operation in the safety, financial and service delivery areas. The survey measured customer attitudes, their perception of change and scores for overall customer service. We contracted Schuman Associates to collate the data from the survey responses and compile a report. Schuman contacted our customers directly and asked them to complete an online survey/questionnaire which was hosted on the European Union's survey website.

The results of the 2023 independent survey show that the overall level of Customer Satisfaction with AirNav Ireland was 87.7%. This performance reflects our consistently low user charges, excellent delay performance, highly efficient airspace, ongoing support of the commercial aviation industry and high levels of customer engagement.

A summary of the survey feedback from our customers is shown below.

FIGURE 27: SUMMARY OF 2023 INDEPENDENT SURVEY OF THE CUSTOMER CARE PROGRAMME

5.3.1.1 Overview of Survey Results

The key findings are summarised in the bullets below:

- On the whole, we have performed excellently across most categories, with Safety, Customer Service and Service Delivery being the highest rated.
- Almost all responses ranked us between excellent and good across all categories.
- Almost all (99%) customers said that the quality of our ATM services had either not changed from an existing high level or had improved.
- Support for Sustainability, Value for Money and Customer Service were the categories which our customers viewed as having most improved.

5.3.1.2 The Views of Our Customers

The survey asked our customers to rank, in order of importance to their businesses, six factors which are reflective of where we interact with their operations, and which are largely aligned with the pillars of the SES Performance and Charging regulation. We use these findings to help us determine how best to allocate our resources to ensure our operation meets or exceeds their expectations. FIGURE 28 sets out these findings:

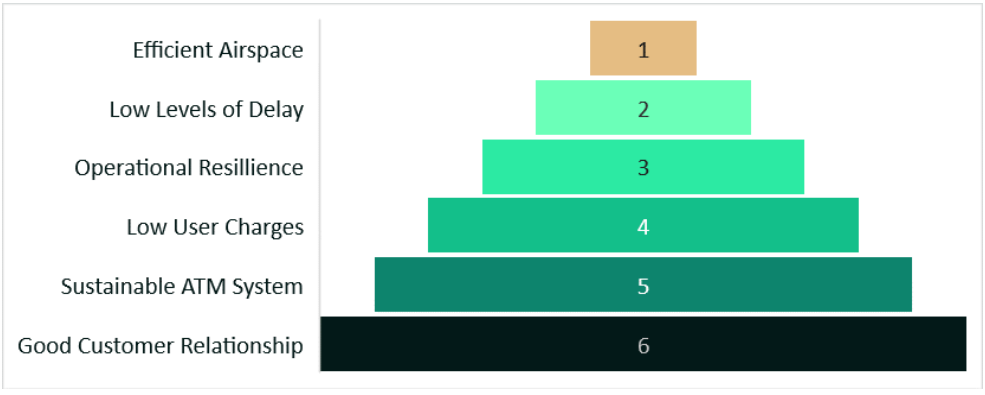

FIGURE 28: WHAT IS IMPORTANT TO OUR CUSTOMERS?

Customers were also asked the following questions and were given the opportunity to provide free form responses to them. The key takeaways from these responses are provided below:

What can AirNav Ireland do better to help your airline achieve its sustainability goals?

Modernising ATM Systems

Several airlines emphasised the importance of investing in modern ATM systems to allow for the optimisation of flight trajectories, reducing fuel consumption and emissions as well as maximising the utilisation of technological advancements in both ATC and NAV services.

Efficient Airspace Utilisation

Airlines emphasised their desire for increased FUA implementation, as well as CCO/CDO usage at airports, allowing for a reduction in delays. Airlines pointed out a desire for reduced route restrictions to allow for an increased capacity and reduced delay whilst also limiting the environmental impact.

Collaboration

Collaboration amongst stakeholders, including airlines and airports, is highlighted as crucial for achieving sustainability goals. Suggestions include closer collaboration through web meetings, round table discussions, and working together on ATM visions. Some airlines either provided no response in this area or suggested that there was already a high level of support, and that this should be continued.

Focus on Route Efficiencies and Emission Reduction

As with airspace utilisation, airlines are ultimately seeking the most efficient routings, as well as some ground improvements such as taxi times. Airlines placed a focus on the emissions aspect of sustainability over noise concerns. Airlines also stressed the desire for flight level and route flexibility.

What has AirNav Ireland done over the past 12 months that has been useful to your airline?

Operational Improvement

Our initiatives such as implementing Free Route Airspace, optimising flight routes, and addressing labour issues to limit operational impacts are recognised as beneficial actions.

Effective Communication and Customer Relations

We received praise for our continued strong communication with airlines, our prompt addressing of operational disruptions and our open dialogue with airlines when issues, such as disruption to service, arise. We were acknowledged for our support during challenging times, such as transitioning from Covid-19 impact years to normality, and for actively engaging in discussions and meetings to address various issues faced by airlines.

Efficient Operations and Safety

We were commended for maintaining safe and efficient airspace operations, ensuring timely communication regarding safety incidents, and keeping airlines delay-free through Irish airspace.

What can AirNav Ireland do in the future to better serve your airline?

Reduce Delays and Enhance Efficiency

We received suggestions to tackle issues faced by airlines, particularly at Dublin, with airlines commenting on issues faced with ATCO shortages. One respondent suggested that we could provide airspace performance reports to airlines that would provide a further communication channel and support AirNav Ireland in implementing future initiatives with the support of airlines. Airlines also suggested that operational improvements could be made to ATM infrastructure and SIDs/STARs.

Maintain Effective Communication and Collaboration

Airlines expressed their appreciation of our communication with them and wished for this to be maintained going forward. Some airlines stated they would like to see a further engagement with future initiatives and integrate new entrants to airspace operations, such as rocket launches and unmanned aerial systems (UAS). Ryanair suggested that AirNav Ireland would benefit from implementing A-CDM in Dublin.

Ensure Flexibility and Sustainability

We were praised for our flexibility and support, however some airlines proposed an enhanced focus on future-proofing airspace operations to facilitate enhancements in sustainable flight operations.

5.3.1.3 Implications of Customer Feedback on Our RP4 plan

- Our RP4 plan faces significant implications based on customer feedback. Airlines have highlighted concerns about ATCO shortages, suggesting measures like providing airspace performance reports and improving navigation resources.
- Future plans must ensure flexibility and sustainability. While praised for flexibility, we must focus on future-proofing airspace operations to accommodate changes such as future proofing the airspace to facilitate enhancements in sustainable flight operations while maintaining safety, capacity and service levels.
- We must continue to prioritise safety and focus on reducing delays, enhancing efficiency, maintaining effective communication and collaboration, and ensuring flexibility and sustainability in our RP4 plan.

5.4 Key Drivers and Challenges for RP4

In RP4, our attempts to continue to address the feedback of our customers is dependent on addressing some of the key challenges that our organisation has faced during RP3, as well as meeting external demands to evolve our service provision in accordance with the Air Traffic Management development priorities defined in the European ATM Master Plan. There are unavoidable costs that we require for this, as specified in section 8.

5.4.1 Continuing to Build on Our Excellent Safety Track-Record

The ultimate driver of everything we do at AirNav Ireland is to provide a safe and efficient ATC service. As a consequence, our primary driver in RP4 is to build on our excellent safety track record (notwithstanding the changes from assured to managed in our RP4 EoSM scores). We are appreciative of the fact that past performance is no guarantee of future success when it comes to aviation safety, this has guided our approach for RP4. A key challenge is the trade-off between safety and cost effectiveness, and at AirNav Ireland we choose to prioritise safety whenever such judgements need to be made.

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5.4.3 Staffing and Recruitment

✂, in RP3 we also experienced several direct losses of front-line operational staff to other ANSPs and European agencies. A number of these ATCOs moved to ANSPs based in the Middle East, who can offer better financial packages. This has also impacted our ability to recruit front-line operational staff, with such competition making it very difficult to attract direct entries, which is also limited by the restrictions attached to ATCO licenses outside of the EU. Increasing staffing levels via direct entries is an approach we have relied on more since

Covid-19, as we attempt to rebuild our staff base quickly to provide the airspace capacity that our customers demand to cope with the sharp traffic rebound since 2021.

Another concern is the expected loss of experienced staff during RP4 and the difficulties in replacing them. Given our experienced ATCOs tend to be multi-rated, the loss of experienced ATCOs can significantly reduce our roster flexibility as more inexperienced staff tend to have fewer multi-authorisations. Additionally, it takes time to replace what these staff offer in terms of experience in the role and the benefits they provide in terms of knowledge transfer to more inexperienced staff. With a considerable number of retirements expected towards the end of RP4 and early in RP5, the RP4 staffing approach will need to take this into account to ensure continuity and quality of service into future reference periods.

The retention challenge due to work-life balance and retirements is not only a challenge facing ANSPs, this is a much broader challenge across the aviation industry more broadly affecting airlines as well. It is also a challenge being faced by other sectors in Ireland such as in education and healthcare.

5.4.4 Implementing Our New ATM System

Our existing ATM system has been in operational service for over 17 years, and due to technological advancements and changes in the aviation industry, this current system is less effective and efficient compared to modern solutions. This is reflected in the Gartner Report which identified the existing COOPANS system as being obsolete. As a result, maintaining the existing system whilst aligning with the SES vision would require significant costs in comparison to acquiring a new system, such as our new TopSky ATC One ATM system, anticipated to have the capacity to handle an increased volume of flights, providing sufficient headroom for traffic growth into the future. It is also expected to facilitate more environmentally efficient flight profiles and support the implementation of future developments to reduce aviation's environmental impact. This enhanced resilience and support directly contributes to maintaining the safety and security of air traffic operations and is expected to become available for operations in Ireland in 2029.

The new TopSky ATC One system removes the technical debt and obsolescence built up in the existing system and places us on sound strategic footing alongside its COOPANS partners. Historically acquiring through the COOPANS alliance has resulted in roughly a 30% cost saving compared to acquiring as an individual ANSP. A key challenge during RP4 will be facilitating the transition from the old ATM system to the new ATC One ATM system. Not only will the purchase and installation of the new system result in a sizeable CAPEX outlay during the RP4 period, but also there will be an impact on OPEX from the engineering resources required to install the new system and the cost of training front-line staff to use it.

5.4.5 CP1 Compliance

European aviation's future is shaped by regulations developed through an inclusive process involving the European Commission and aviation stakeholders. At the heart of this drive towards ATM modernisation is (EU) 2021/116, also known as Common Project 1 (CP1). CP1 was established to support the implementation of the European ATM Master Plan by defining mandatory investments for all ATM stakeholders. This critical regulation is composed of multiple areas, each earmarked with specific deadlines.

Our progress against each of the S-AF targets for CP1 is described in more detail in APPENDIX 4.

The compliance with regulatory standards and requirements is crucial for maintaining operational integrity and safety within the aviation sector. In RP4 we will need to implement a series of CAPEX projects to ensure CP1 compliance. Our new TopSky ATC One ATM system described above will incorporate features and capabilities that better align with the CP1 standards.

5.5 Traffic Forecasts

5.5.1 IFR Movements

This RP4 Business Plan has been developed in line with the EUROCONTROL STATFOR 7-Year traffic forecast, disseminated in February 2024. Below illustrates the predicted growth for IFR flight movements, using the base

forecast by EUROCONTROL, noting that 2024 remains a forecast to the year end. The PRB's Union-wide targets for Cost-Efficiency, Capacity, Safety and Environment have been set considering this February 2024 STATFOR base forecast. As a result of more pessimistic economic forecasts for 2024, the volume of flights through to 2027 have been revised downwards in-line with this more negative view.

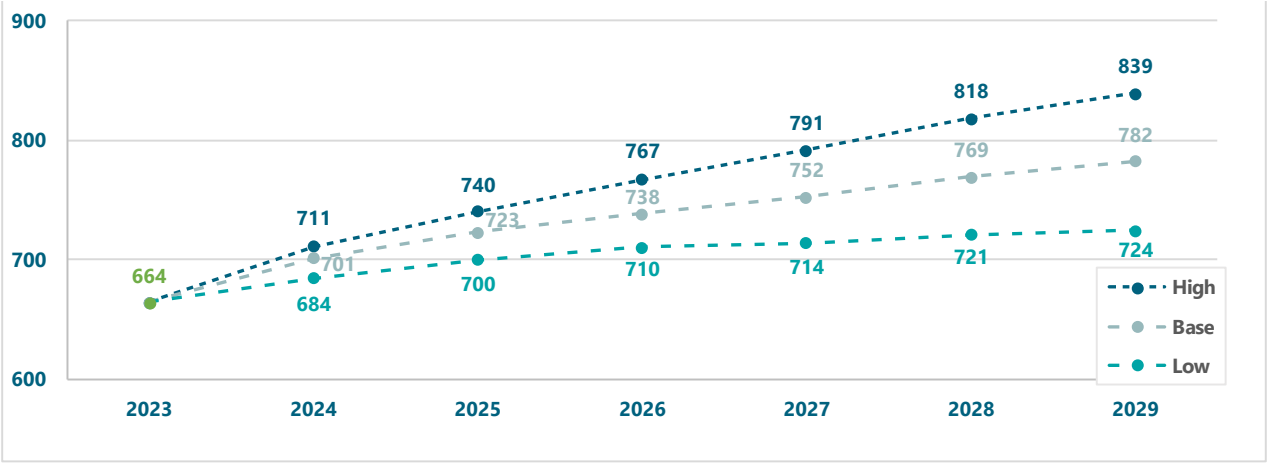

FIGURE 29: IRELAND IFR MOVEMENTS 2023-2029 ('000)

The following bullet points summarise some of the key takeaways:

- Overall, the RP4 traffic outlook is positive for Ireland, with the sharp post-Covid RP3 recovery expected to smooth into a sustained traffic increase over RP4, with IFR movements expected to increase by +17.8% by 2029 compared to movements in 2023 under the base scenario.
- During RP4, the highest traffic growth is expected to be in 2025, with predictions of +4.1% (High), +3.1% (Base) and +2.3% (Low).

The following table summarises the breakdown of the STATFOR base forecast for the IFR movements into the overflights, arrivals/departures and internal movements. The proportion of overflights is expected to slightly decrease from 55.3% in 2024 to 54% in 2029 while the share of arrivals/departures is anticipated to increase from 43.9% in 2024 to 45.1% in 2029. The proportion of domestic IFR movements is projected to stay at a similar level growing from 0.83% to 0.88% by the end of RP4.

TABLE 33: BREAKDOWN OF STATFOR BASE FORECAST FOR IFR MOVEMENTS

	2024	2025	2026	2027	2028	2029
Overflights	387,387	396,269	402,105	408,973	416,777	423,098
Arrival/ Departures	307,463	321,065	329,294	336,213	345,399	351,697
Internal	5,841	5,953	6,179	6,406	6,644	6,836
TOTAL	**700,690**	**723,288**	**737,578**	**751,591**	**768,820**	**781,631**

5.5.2 En Route Service Units

During the Covid-19 pandemic, the ratio of en route service units per IFR movement spiked from 7.17 in 2019 to 8.06 in 2021 and then steadily continued to decrease back to pre-Covid levels achieving 7.25 in 2023. In RP4, this ratio is expected to continue to gradually decrease to 7.08 in 2029 according in STATFOR base scenario (7.01 in the low scenario and 7.15 in the high scenario). This goes against the trend of average en route service units per flight increasing across Europe due to heavier aircraft flying longer routes but it is aligned with the increasing share of arrivals/departures in the total traffic mix. The following chart shows the three STATFOR forecasts for en route service units. The compound annual growth rate of en route service units is expected to be marginally lower by around 0.3% compared the average growth of IFR movements because of the decreasing ratio of service units per IFR movement.

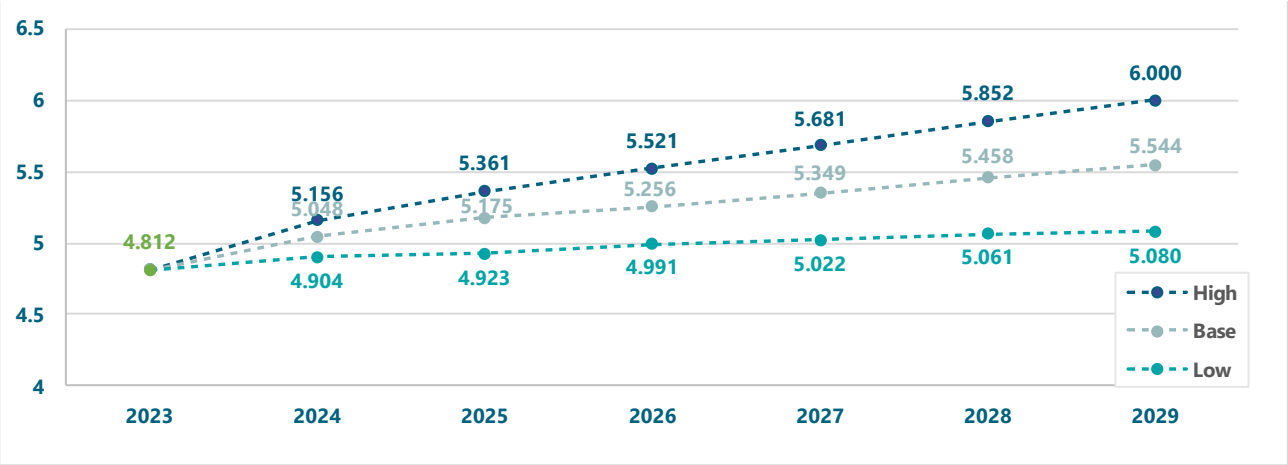

FIGURE 30: IRELAND EN ROUTE SERVICE UNITS 2023-2029 ('000,000)

In May 2024, EUROCONTROL published a revised STATFOR forecast for en route service units covering 2024 and 2025. This revised forecast was based upon actual en route service unit developments between January and May 2024. For Ireland, the revised base forecast for en route service units in 2024 and 2025 was between the base and high scenario forecasts from the February 2024 STATFOR forecast shown in FIGURE 30. The following table summarises the difference between these two forecasts:

TABLE 34: SUMMARY OF STATFOR BASE FORECASTS FOR EN ROUTE SERVICE UNITS

	RP3		RP4				
	2023 Actual	2024 Forecast	2025 Forecast	2026 Forecast	2027 Forecast	2028 Forecast	2029 Forecast
STATFOR Base February 2024	4,812,000	5,048,000	5,175,000	5,256,000	5,349,000	5,458,000	5,544,000
STATFOR Base May 2024	4,812,000	5,091,000	5,289,183	-	-	-	-

The following bullets summarise some of the key takeaways:

- Based on the February 2024 forecast, the AAGR for ENR SUs is forecast to be to +1.9% in RP4 in the base traffic scenario, with the AAGR for both the base and high scenarios outperforming the expected equivalent AAGR for RP3, even though the trends are not directly comparable due to the traffic drop and bounce due to Covid-19. Only under the low scenario is the AAGR in RP3 expected to outperform the AAGR in RP4 (+1.1% RP3, +0.7% RP4).
- Based on the February 2024 forecast, as with IFR movements, the greatest increase in RP4 for ENR SUs is expected in 2025, with +2.5% in the base scenario. However, under the low scenario the peak growth is in 2026 instead when +1.4% growth is forecast, compared to +0.4% in 2025.
- The May 2024 forecast revises the expected traffic growth under the base scenario in 2024 to 5.8% and in 2025 to 3.9%. This compares with 4.9% in 2024 and 2.5% in 2025 under the February 2024 forecast. These short term changes in the base forecast (and associated high, low scenarios) show the uncertainty in traffic forecasting and reflects the fact that we need to plan for a range of uncertainty ahead of RP4 (It is also worth considering a further update to the STATFOR forecast is expected in October 2024, at which point NSAs may be informed that RP4 Performance Plans will need to be adjusted to take this into account).

5.5.3 Terminal Service Units

Similarly, as for en route traffic, the ratio of terminal service units per IFR departure spiked from 1.30 in 2019 to 1.43 in 2021 and then steadily continued to decrease back to pre-Covid levels achieving 1.33 in 2023. In RP4,

this ratio is expected to marginally increase to 1.35 in 2029 according in STATFOR base scenario (1.34 in the low scenario and 1.35 in the high scenario). This assumes a slightly higher proportion of commercial traffic compared to general traffic and is aligned with the higher increase of terminating traffic compared to overflights.

The following table summarises the STATFOR base forecast for terminal service units:

TABLE 35: SUMMARY OF STATFOR BASE FORECAST FOR TERMINAL SERVICE UNITS

	RP3		RP4				
	2023 Actual	2024 Forecast	2025 Forecast	2026 Forecast	2027 Forecast	2028 Forecast	2029 Forecast
STATFOR Base February 2024	193,000	205,000	215,000	221,000	226,000	233,000	237,000

The following chart shows the three STATFOR forecasts for terminal service units. The compound average annual growth rate of terminal service units is expected to be marginally higher by around 0.2% compared to the average growth of departures (+0.5% in the high scenario, 0.2% in the low scenario) because of the increasing ratio of service units per IFR departure.

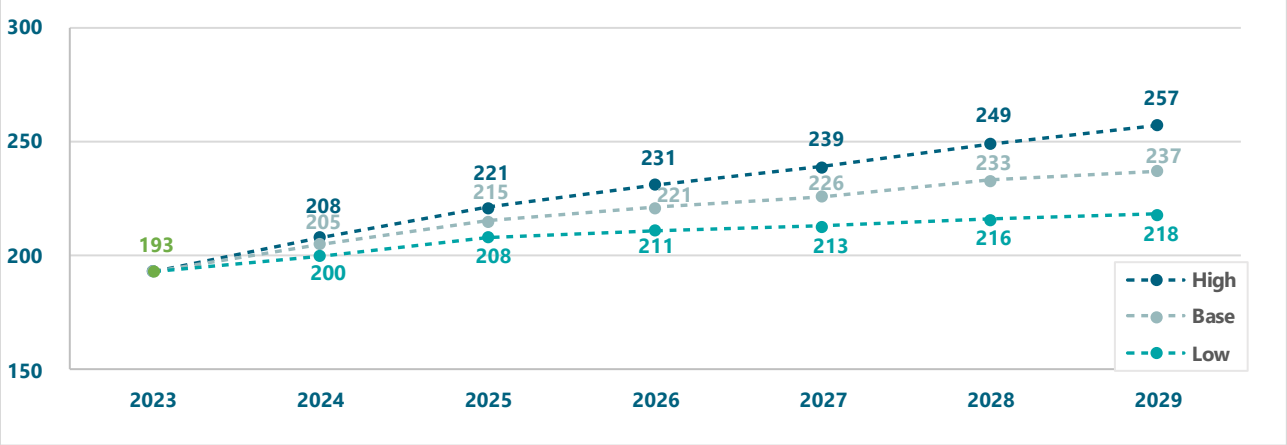

FIGURE 31: TERMINAL SERVICE UNITS 2023-2029 ('000)

The following bullets summarise some of the key takeaways:

- Ireland's Terminal Service Units (TER SUs) under the STATFOR base scenario are predicted to increase by +15.6% by 2029 against projected 2024 traffic. The AAGR in TER SUs for RP4 is expected to be +2.8% under the base scenario, +1.5% under the low and +4.1% under the high scenario.
- TER SUs growth in RP4 is expected to be the strongest at the start of the reference period, with the largest RP4 growth in 2025. In 2025, the base scenario predicts +4.7% growth, the high scenario predicts +5.9% growth, and the low scenario forecasts +3.9% growth.

5.5.3.1 ✂

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5.5.4 Delivering a Service to Meet Expected Traffic Demand

Based upon the EUROCONTROL STATFOR forecast, it is evident that the post-Covid traffic rebound is expected to continue into RP4. Sufficient airspace capacity will be required to ensure the expected traffic demand can

be met which will be a key priority for our airline customers. Capacity will need to be facilitated through our ATS provision, the ability for us to meet traffic demand is heavily influenced by the number of airspace sectors that we are able to open, as this determines the number of aircraft that we are able to manage at a given period of time. The number of airspace sectors we are able to open and the time for which they can be opened, is heavily influenced by the number of ATCO resources we have available.

A key factor to take into account when considering EUROCONTROL's traffic forecasts which make projections on a yearly basis, is that the traffic experienced in Irish airspace is subject to seasonal variations, which means we have to set staffing levels to cope with the busiest times of year. The way we account for this non-linear demand on resources throughout the year is to focus our training programme on the winter months, where the lower traffic demand compared to the summer provides a window of opportunity to deliver essential refresher training, and to train new staff. An added constraint in our ability to deliver a service to meet the traffic demand is the level of substitutability between staff. For example, the skillset, qualifications and equipment of en route, approach and control tower ATCOs is very different, as are the geographical considerations across different airports. Although, where possible we maximise multiple ATCO ratings and roster flexibility, it is not possible to have a completely flexible pool of ATCOs that are able to substitute easily for one another. This is a critical factor when considering how to efficiently build a staff roster to cater for the significant traffic increases forecast during RP4.

As much as traffic demand has a large influence on our ability to provide an ATC service, it is also the case that a proportion of our staff are required irrespective of traffic demand in order for us to provide air traffic control services on a 24-hour basis in Irish controlled airspace. For instance, mandatory safety and security requirements dictate that some ATCO supervisory positions must be open irrespective of traffic levels.

6 CORE ELEMENTS OF RP4 PLAN

6.1 Union-Wide Targets and Priorities for RP4

The PRB released their advice on the Union-wide targets for RP4 in March 2024, detailing their objectives and recommendations during RP4 for confirmation by the European Commission. This is summarised below:

- In the upcoming reference period, safety remains the primary focus, accounting for impacts from other KPAs, controlling the impact of changes to ATM systems across the network and ensuring regulatory compliance, much like their aims and objectives during RP3.
- Following safety, environmental concerns take precedence, aligning with the European Union's emphasis on reducing CO_2 emissions. The PRB suggests that ANSPs must optimise flight trajectories, reduce emissions, and enhance environmental efficiency through RP4, urging ambitious yet attainable targets.
- To sustain environmental performance and traffic growth, capacity improvements are essential, with the PRB urging member states to minimise delays to further reduce CO_2 emissions. Cost considerations are crucial to ensure the efficient delivery of safety, environmental, and capacity improvements, whilst remaining at a cost-efficient level. The below tables detail the RP4 targets for the Union.

Originally, this plan has been produced in the absence of adopted Union-wide performance targets or an update to Annex 1 of the performance and charging regulation, however, it took into account the PRB priorities (e.g. see the project details in Appendices 1-5). After long delays, the European Commission adopted Union-wide performance targets for RP4 through publication of its Implementing Decision setting the RP4 Union-wide performance targets for each of the KPIs on 12th June 2024. The following tables summarise the final adopted EU-wide targets for RP4.

Safety KPIs

TABLE 36: UNION-WIDE SAFETY TARGETS

MANAGEMENT OBJECTIVE	SAFETY CULTURE	SAFETY POLICY AND OBJECTIVES	SAFETY RISK MANAGEMENT	SAFETY ASSURANCE	SAFETY PROMOTION
2029 Maturity Levels	C	C	D	C	C

Environment KPIs

TABLE 37: UNION-WIDE ENVIRONMENT TARGETS

KPI	2025	2026	2027	2028	2029
KEA	2.80%	2.75%	2.71%	2.68%	2.66%

Capacity KPIs

TABLE 38: UNION-WIDE CAPACITY TARGETS

KPI	2025	2026	2027	2028	2029
En route ATFM Delay min/flight)	0.9	0.7	0.6	0.5	0.5

Cost-Efficiency KPIs

TABLE 39: UNION-WIDE COST-EFFICIENCY TARGETS

2024 BASELINE	DUC €55.07 2022 / DC €7,100M 2022				
KPI	**2025**	**2026**	**2027**	**2028**	**2029**
Annual Change of DUC	-1.2%	-1.2%	-1.2%	-1.2%	-1.2%

6.2 Proposed Local Reference Values and RP4 Plan to Meet Them

6.2.1 Safety

In RP4, we will continue to prioritise safety over all other KPAs. Whilst we always prioritise safety, some stakeholders increasingly view environmental performance as a top priority whereas other stakeholders continue to consider capacity as being a top priority, due in part, to the manner in which environmental performance depends on it. For us safety really is the highest priority, and we will not cut corners on safety to meet other targets.

The local targets in the Safety KPA are expected to be in line with the EU-wide targets. The EoSM KPI is undergoing changes ahead of RP4[9]. Prior to the commencement of the target setting exercise, an EASA RP4 S(K)PI drafting group proposed to retain the EoSM as the safety KPI and to align the EoSM to the CANSO Standard of Excellence (SoE) revision February 2023 and amending this to reflect European standards. Members of the drafting group included EASA, the PRB, ANSPs and NSAs. The PRB and EASA jointly performed a comparative analysis of the difference between the revised CANSO SoE and the RP3 EoSM to determine the expected level of maturity ANSPs should achieve at the end of RP4 applying the updated questionnaire. Tracing questions from the RP3 EoSM to the revised CANSO SoE indicated that some questions, which in the EoSM were allocated to a maturity level D (Assured), in the revised CANSO SoE would now be allocated to maturity level C (Managed). As a consequence, for RP4 the EoSM will become more demanding, and the requirements on ANSPs to meet each level of maturity will be much higher. However, the management objectives and scoring levels will remain the same from RP3, as will the Union-wide targets for each of the management objectives.

The advice from the PRB on the EoSM questionnaire becoming more onerous is that this may result in the minimum maturity levels achieved by ANSPs at the start of RP4 may being reduced and that this should be viewed through the lens of driving improvements in safety as opposed to a degradation of ANSP performance. Ahead of RP4 the guidance from the PRB is clear that although EoSM is assessed at the end of the reference period, NSAs should not allow ANSP's maturity levels to slip at the start of RP4, this despite the more demanding nature of the EoSM questionnaire and the Union-wide targeted maturity levels remaining consistent with the RP3 targets. We support the need for continuous improvements in safety performance, but the additional demands placed upon resources in providing sufficient supporting evidence to meet a higher threshold of EoSM integrity in RP4 will need to be factored into our SMU resource plan, and the associated cost reflected in our RP4 OPEX plans.

This is reflective of the fact that delivering a safe ATC service comes at a cost, and we not only have to consider the cost of ensuring we meet EoSM targets, but also the cost of compliance with safety regulation such as (EU) 2017/373 (see appendix 5 for detailed case studies). The resource cost of compliance was much greater than expected during RP3, and this cost needs to be factored into our RP4 plans, for which the IAA is fully aware of. Facilitating safety also requires investment in the infrastructure and resources that we require to deliver a safe ATC service. There is a material and recurring cost to ensuring the consistent provision of safe ATM operations, reflected in terms of both OPEX and CAPEX:

[9] SES_performance_review_body_target_ranges_annex-1.pdf (europa.eu)

- To deliver a safe air traffic management service in RP4, investment is required in our infrastructure through our CAPEX programme to replace obsolete systems and equipment, and deliver general system improvements to ensure safety performance.
- Expenditure is also required through our OPEX programme to deliver corrective maintenance if systems malfunction and to perform compliance tasks through our dedicated Safety Management Unit. Maintaining our systems is a critical component to ensure we provide a safe ATC service.

The interdependency between safety and Cost-Efficiency and how we plan to approach it in RP4 is described in section 6.3.1.

6.2.2 Capacity

The local reference values are prepared by the Network Manager in response to the requirements stipulated in the Performance and Charging Regulation. In response to this regulation the PRB has defined the following reference values for the Capacity KPA for RP4 for Ireland.

TABLE 40: CAPACITY KPA LOCAL RP4 REFERENCE VALUES, (MIN/FLIGHT)

KPI	2025	2026	2027	2028	2029
En Route ATFM Delay (state level)	0.08	0.06	0.05	0.03	0.03
En Route ATFM Delay (Dublin ACC)	0.08	0.06	0.04	0.03	0.03
En Route ATFM Delay (Shannon ACC)	0.07	0.05	0.04	0.03	0.03

The en route delay reference value is calculated based upon:

- A reference value based on information from the Network Operations Plan of the Network Manager;
- The capacity plan established by the en route air navigation service provider(s) as reflected in the Network Operations Plan of the Network Manager.

The local reference values calculated for AirNav Ireland in relation to En Route ATFM delay are broadly commensurate with our national RP3 performance targets defined by the NSA.

As was the case in recent reference periods, we have been one of the best performing ANSPs in terms of capacity. Our national capacity targets for RP3 set by the NSA were significantly below the Union-wide targets published by the European Commission in June 2021. Although, we have contributed to meeting the national targets in RP3, we believe that if national targets are set to a similar level of stringency for RP4, our RP4 plan will need to account for the following factors:

- Key investments will be required for us to continue to deliver such low levels of delay whilst accommodating for the continued expected rise in traffic through RP4 (as displayed in section 5.5).
- In RP3, delivering the capacity required to meet our national targets was only possible due to an overreliance on overtime and dependency on the goodwill of our staff. This is not an efficient approach for RP4 as it impacts staff morale which impacts our ability to recruit and retain staff. Crucially, relying on high levels of overtime inhibits the resilience of our service, limiting our ability to maintain capacity when reacting to unforeseen circumstances such as ATCO illness. Consequently, this RP4 plan assumes a standard approach to overtime whereby overtime is only required to cover unplanned absences. However, this does mean that a significant step-change in the amount of resources is required in RP4 to facilitate the expected traffic numbers. This is particularly true for ATCO resourcing requirements as covered in section 8.2.1.

- In December 2022, EASA[10] commissioned a research study on the Impact Analysis, Prevention and Management of ATCO Fatigue in the European Union. We were involved as one of 6 ANSP participants in the study. EASA recently published the results from this innovative study, one of the key findings associated with supporting fatigue management was to avoid last minute changes to the roster. In our RP4 plan, we have therefore considered that a rostering approach that relies less heavily on overtime should contribute to fewer last minute changes to the roster. FIGURE 33 below highlights the critical factors that affect ATCO fatigue with the associated percentage increase in fatigue beyond the average maximum values. This helps to demonstrate the criticality of factors such as minimising consecutive days worked, breaks and rest periods within the roster cycle. For RP4, cognisant of the outcomes of this study, it is critical that we reduce our reliance on overtime to fill the roster, as this will support minimising the impact on many of the critical fatigue factors shown below. We also need to build resilience in our ATCO staffing, so that if traffic levels are higher than forecast or ATCOs leave unexpectedly, the below critical factors do not become excessively high.

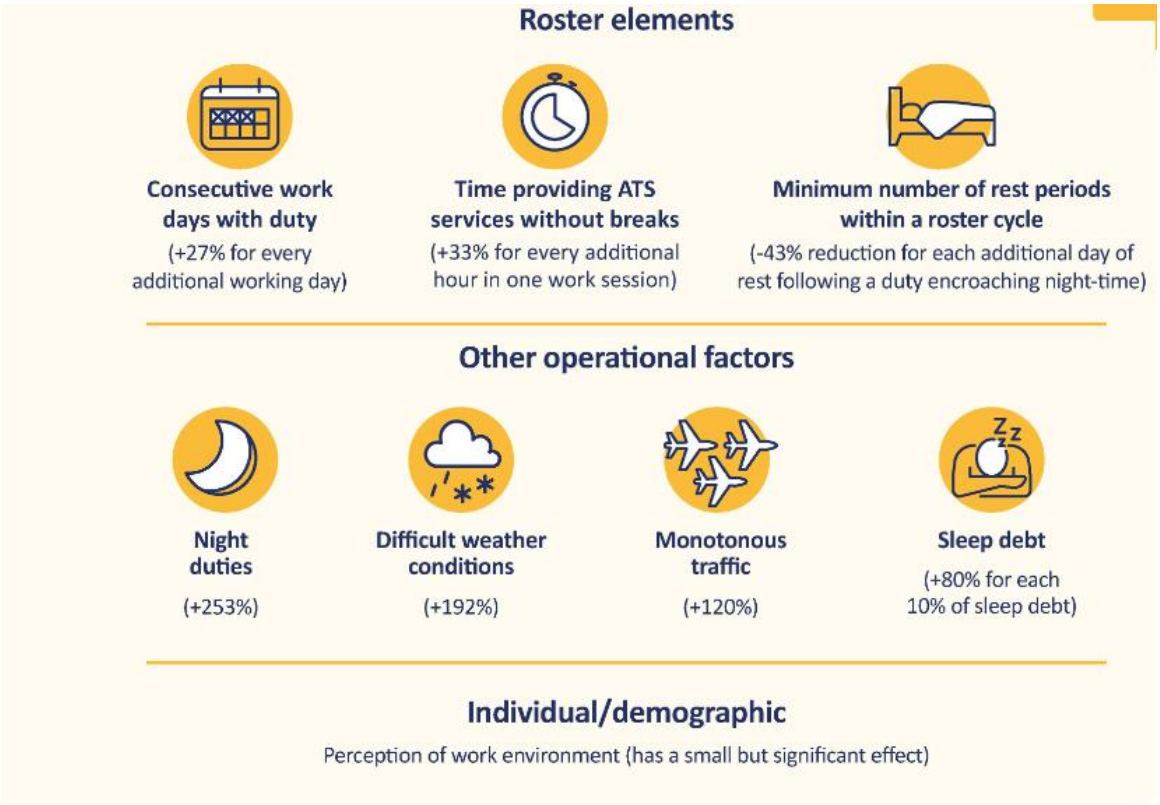

FIGURE 32: TOP CONTRIBUTING FACTORS TO CRITICAL FATIGUE (% OF INCREASED RISK BEYOND AVERAGE MAXIMUM VALUES)

- We have also received advice from EUROCONTROL to account for a small amount of additional staffing resilience for RP4. In its function as Network Manager, EUROCONTROL produces capacity requirement profiles for each ACC (to achieve the level of capacity required to meet the European capacity target) and provides support to ANSPs to work them into the local capacity plans. In the Network Operations Plan, EUROCONTROL has advised ANSPs to foresee a buffer in the expected traffic demand (from a staffing perspective) to avoid sudden capacity problems.

All of these aspects have been duly taken into account when developing the ATCO staffing plan, including necessary step changes that will impact us in RP4. These are further described in Section 8.2.1.

6.2.3 Environment

The PRB's position is that after safety, environmental performance is the priority for RP4, as it is necessary to support the EU's move towards a carbon-neutral economy. Reflecting on the interdependency between

[10] Air Traffic Controller (ATCO) fatigue | EASA (europa.eu)

environmental performance and capacity, the proposed environment target ranges are dependent on ambitious capacity performance, as adequate capacity provision enhances horizontal flight efficiency.

The environment KPA is subject to a number of uncertainties that have made planning for RP4 difficult. The deficiencies with the KEA metric are well known, an aircraft may fly a route other than the great circle route is often due to factors outside of an ANSP's control, such as weather conditions, ATFM regulations in other jurisdictions or airspace users' preferred trajectories. Concerns around the efficacy of the KEA KPI for monitoring ANSP environmental performance have been the subject of PRB research supported by Steer into alternative KPIs that could be used as well as other initiatives such as the ATM/ANS Environmental Transparency Working Group (EUROCONTROL, EASA and NATS). Despite KEA's shortcomings, it was decided for RP4 there will be no changes and the KEA metric will still be the sole KPI for measuring environmental performance. Additional PIs have been added for monitoring through an update to the Performance and Charging Regulation. We recognise the importance of horizontal flight efficiency being included as a KPI connected to the environment, and that this is unlikely to change even if there is the adoption of more innovative solutions in the future such as those reflecting optimal flight trajectories in place of actual flight trajectories. However, the limitations we have in influencing the KEA value, particularly when we are already operating at a high level of efficiency needs to be reflected in the setting of national targets.

Alongside the Union-wide targets, local reference values are prepared by the Network Manager in response to the requirements stipulated in the Performance and Charging Regulation. Those reference values are required for the assessment of the local Performance Plans and targets, as stipulated by the Performance and Charging Regulation. The reference values for the KEA indicator are defined based upon the following requirements:

- Comparison with historical performance achieved in previous years;
- Comparison with a reference value based on information provided by the Network Manager;
- Consistency with the European Route Network Improvement Plan developed by the Network Manager.

The local reference values for the environment KPI for Ireland are shown below:

TABLE 41: ENVIRONMENT KPA RP4 LOCAL REFERENCE VALUES

KPI	2025	2026	2027	2028	2029
KEA	1.42%	1.40%	1.38%	1.38%	1.34%

Meeting these targets will be challenging given that in 2022, Ireland only met its KEA target by a margin of 0.1% and in 2023 the KEA performance did not meet the target of 1.13% with the actual value of 1.44%. The IAA will recall the debate surrounding the KEA target for 2021 and the rigidity of the local reference value established by the PRB following input from EUROCONTROL Network Manager. Despite this debate, the targets were not modified, and we are subsequently missing the target due to factors outside of our control, as expected.

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Regardless of these challenges, there are planned projects which will have a positive impact on our environmental performance:

- **Projects in EUROCONTROL Network Operations Plan:** The European Network Operations Plan included a project to introduce NADP-2 at Dublin Airport to improve both noise and fuel consumption performance during RP4, in addition to new sectorisation in Dublin ACC and a reorganisation of airspace for Shannon ACC which will be implemented when needed. Given that EUROCONTROL expects Ireland to meet the reference values for delay (min/flight) in RP4, these enhancements to Irish airspace will contribute to our KEA values remaining at the low levels they currently are, allowing us to both ensure regulatory compliance and to remain as leaders in this metric. Should this be achieved, our horizontal flight efficiency is expected to improve in line with our other capacity and Cost-Efficiency KPIs, although the impact of improvements done by AirNav Ireland (especially those related to Dublin Airport) will have likely limited impact, as it largely depends on changes in the wider region.

- **Common Project 1 (CP1):** CP1 related projects, are helping to support our KEA environmental performance. Out of the total CO_2 emissions from CP1, 80% of the total savings originate from AF3 functionalities (flexible airspace management and FRA). Alongside this, savings/reductions in taxi-out time will support reductions in our CO_2 output, both contributing to achieving our Sustainability Management Plan as well as network wide targets across RP4.
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6.2.3.1 Environmental Incentive Scheme

The PRB has recommended that Member States define an environmental financial incentive scheme. Given our RP4 planning is already underway, and there are doubts over the robustness of the KEA metric to measure the influence an ANSP has on environmental performance, we do not support the introduction of a financial incentive in this reference period for these reasons:

- We have previously explained that it is at the limit of what can be achieved in terms of the performance metric, KEA, or actual flight trajectory. This has since been confirmed by EUROCONTROL and is reflected in our RP3 performance to date.
- Ireland's Free Route Airspace concept of operations means that its KEA performance is largely determined by the actions of the airspace users.
- We consider it to be futile to introduce a financial incentive or penalty programme in relation to the local reference value for the environment KPA. The ANSP has gone from missing its performance targets during RP2 ✂ to being one of the best performing ANSPs in Europe during RP3, while missing its target.
- We are nonetheless aware that the European Commission is proposing additional Performance Indicators for monitoring in Annex I to Implementing Regulation (EU) 2019/317 and some of them might be suitable in the future for the incentive scheme once more experience is gained with collection and assessment of the data.
- Alternative indicators exist, but it is imperative that we avoid a situation where ATCOs are suddenly faced with having to prioritise a routing based on any given weather circumstance as this could have a bearing on safety factors.

6.2.4 Cost-Efficiency

The benchmarking against RP4 comparators (but also against other European ANSPs) shows that we perform particularly well in many of the areas impacting the ATM/CNS cost effectiveness. Should the NSA decide to apply more stringent targets than the Union-wide targets would suggest, this would have a negative impact on a number of performance areas as the situation is not sustainable for many reasons described in detail in this Business Plan. With one of the lowest en route unit charges in Europe, we cannot be unduly constrained in prioritising safety, capacity and environmental considerations, in addition to the range of other local and European regulatory requirements (e.g. CP1) simply because of a notion that Cost-Efficiency targets need to be challenging. The manner in which the Cost-Efficiency targets compare to the initial requirements identified by the European NSAs highlights that there will be undesired consequences in being unable to recover required costs.

The following quote from the staff panel summarises the concerns that our staff has with respect to further development of our company should the Cost-Efficiency targets be too stringent:

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✂. Although we have one of the lowest unit rates in Europe, this is unlikely to continue into the future. This is due to a number of key step changes that have occurred over RP3 which are causing underlying challenges within our organisation that have not yet resulted in a significant drop in performance against the targets, but

are impacting performance at the resolution of our day-to-day operation. We are also impacted by the Irish economic landscape, according to a recent report Irish consumer prices are the second highest in the EU[11].

In this document, we have provided details on a number of issues we are facing. If these issues are left unresolved, they will degrade our service provision in RP4 and will lead to a systemic decline in service provision in subsequent reference periods. This will have a significant impact on our ability to adapt to meet customer expectations. They need to be solved in the next couple of years to make sure that we can continue to rank amongst the top European performers in all of the key performance areas. Coping with the projected traffic increase while solving these issues, together with the implementation of requirements stemming from the European ATM architecture vision (incl. artificial intelligence, system upgrade, sustainability, cyber security, regulatory compliance), will require significant resources and step changes, such as:

- Delivering a safe ATC service comes at a cost, and we have to consider not only the cost of ensuring we meet the demands of a more stringent EoSM, but also the cost of compliance with safety regulation such as (EU) 2017/373. The resource cost of compliance was much greater than expected during RP3, and this cost needs to be factored into our RP4 plans.
- ATCO headcount requirements will need to increase in RP4 to account for, job-sharing, statutory leave and annual leave changes as well as address the overreliance on the use of overtime resource that became a feature of our RP3 service delivery and add some buffer to improve our resilience to unexpected changes. This also includes increased ATM Specialists for the Operational Support Group (OSG) to support CAPEX delivery and increased Station Managers as a fatigue management measure and to support improved communications.
- In RP3 we under-delivered against our CAPEX plan for reasons already explained in this Business Plan. In the recovery phase, staff have prioritised to day-to-day operations to avoid user delays, however this has come at the cost of our CAPEX programme and delays in meeting compliance requirements. A significant step change in RP4 is required to bolster our engineer numbers to deliver the RP4 Investment Plan addressing obsolescence as well as to support the delivery of the TopSky ATC One ATM System which will require resources across all technical services domains. In addition, the compliance workload has increased significantly on our technical services staff during RP3, and this is reflected in our RP4 resource requirements. A benchmarking against other ANSPs shows that we have one of the lowest number of engineers per ATCO in Europe and this needs to change if we are finally to deliver the required investment.
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- Without appropriate cybersecurity risk management, a cyber-attack on AirNav Ireland would have the potential to compromise the safety of ATC services, the financial stability of our organisation and risk the privacy and security of our organisation's staff and customers. Cybersecurity risk management is a continuous process which is required to develop as our business grows, as we implement new technologies and to meet the challenges of the evolving cyber threat landscape. Consequently, included in this Business Plan are the required headcount and associated costs to support this.
- In RP4 we aim to improve sustainability aspects while also facilitating compliance with our regulatory obligations as defined by the Irish Government. In tandem with our property projects, our climate action plan aims to reduce our carbon footprint by 2030, as we are mandated to do so, and supports us in updating our current infrastructure as they reach their end of life. Sustainability is an increasing area of focus for the aviation industry and our projects will support us in maintaining our position as a leader of sustainability in European aviation.

It is very important that the regulatory allowance enables us to implement these step changes without which our excellent performance is not sustainable. The adopted European Cost-Efficiency targets however do not currently support this goal. Meeting the short-term annual DUC targets of -1.2% (AAGR) would result in nominal costs that could only increase by +2.1% on average. The real term costs would need to increase only by +0.5% annually (AAGR) while at the same time the traffic in terms of service units is expected to increase by +1.7% per annum on average. Reducing our unit rate by 1.2% each year would have detrimental impacts as it

[11] Irish prices second highest in EU last year

does not recognise already lowest unit rate and impact of the step changes. Compared to our bottom-up planning based on the real needs, the application of the adopted short-term DUC target would result in removing €131m in real terms from our en route cost base and €32m from the terminal cost base over RP4.

In addition, for RP3 the Irish NSA proposed targets which were more stringent than the Union-wide targets. While the revised Union-wide target suggested an average annual increase of real term costs by 0.98% (taking 2020 and 2021 as one year), IAA set the national targets that implied a CAGR rate of -0.4% over the same period. This meant that the national target was 1.35% more stringent than the Union-wide target. The following chart summarises that the national CAGR RP3 DUC target was the 9th most stringent in EU (excluding Austria which is under the cost recovery system) despite the fact that Ireland had the 4th lowest DUC in 2019 at 54% of the Union-wide average, i.e. €25.03 (2017) compared to the Union-wide average of €46.49. The approved DUC target for 2024 would take Ireland to the lowest DUC in the EU, i.e. €24.66 compared to the Union-wide average of €47.15 representing 52% of the average.

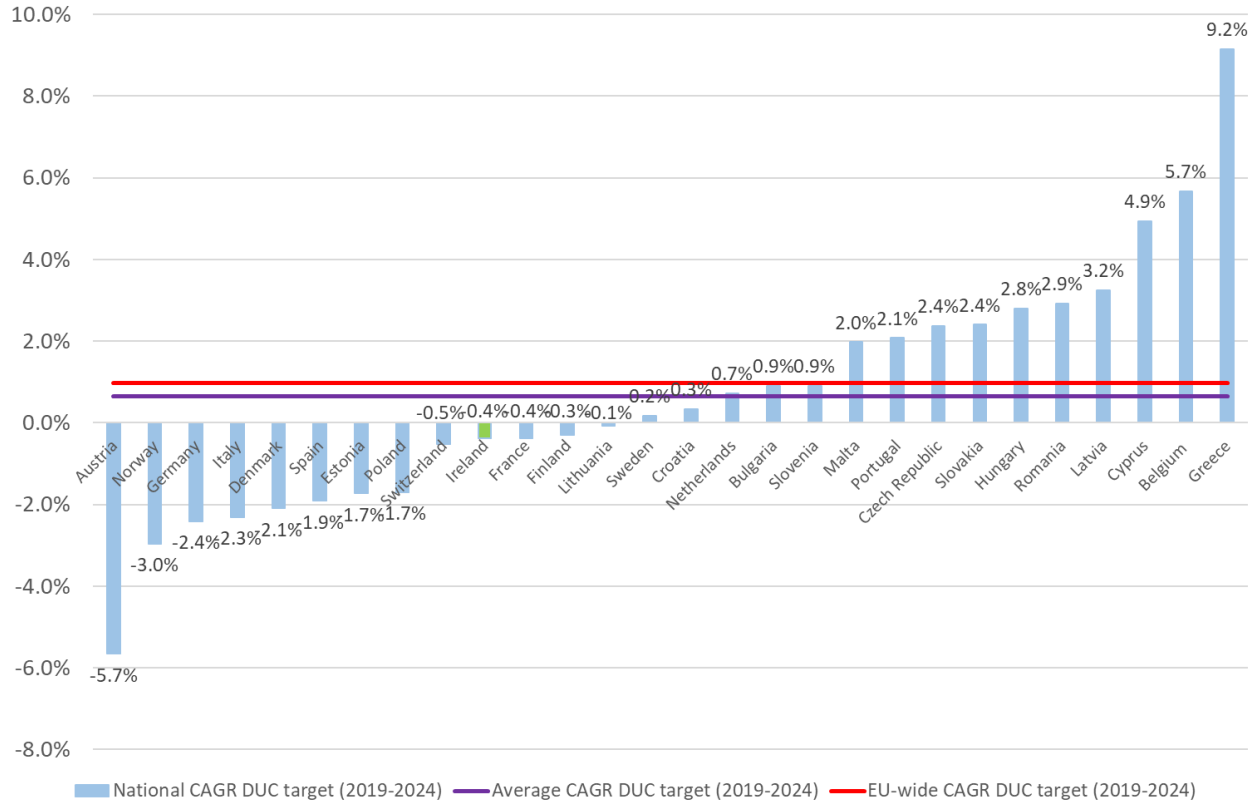

FIGURE 33: REVISED NATIONAL, AVERAGE AND EU-WIDE CAGR DUC TARGETS IN RP3

If a similar approach is taken in RP4, and IAA again imposes a 1.35% more stringent target than the Union-wide target (i.e. -2.55% AAGR), this would result in targets which would allow for only a 0.7% increase of the nominal cost base while the long-term trend would reach -1.7% compared to the Union-wide target of -1%. This would impose a more significant threat to us being able to deliver our primary functions.

If the IAA chooses to apply more stringent targets than the Union-wide recommendations, it will mean a removal of additional €23m in real terms from our en route cost base (€154m compared to our real needs) and additional €6m from the terminal cost base (€38m compared to our real needs) over RP4. This would have a severe impact on several performance areas. This situation is unsustainable for various reasons detailed in this Business Plan. Given that we have one of the lowest en route unit charges in Europe, we need flexibility to prioritize safety, capacity, and environmental considerations alongside other local and European regulatory requirements (e.g., CP1).

Instead of focusing on the need to meet the Union-wide targets that do not fully take into account the local context, our proposal for the RP4 cost base is based on a thorough analysis of real needs that are clearly

described in this Business Plan and supported by the evidence detailed in the sections below. This cost base would enable us to cope with the forecasted traffic, implement our ATCO programme, train our staff for the major technology improvements, and solve all resource requirements and commitments to enable us to meet all our targets not only in RP4 but also beyond. It would allow us to solve most of our current issues while implementing a CAPEX programme that will prepare us for the future aligned with the European ATM Master Plan.

The success of our large-scale CAPEX investments demonstrates our capability to deliver. We have also successfully recruited towards the second half of RP3 and our engineer numbers during the last two years of RP3 will finally reach the allowance agreed in the RP3 plan, albeit considering trainees / recent graduates. With sufficient resources, we are confident in our ability to deliver capital projects.

6.3 Interdependencies Between KPAs

The KPAs covered under the European Performance and Charging Scheme regulation (Safety, Capacity, Cost-Efficiency and Environment) cannot be considered solely in isolation, and an ANSP has to consider the various interdependencies at play when deciding the best approach to meet the Union-wide targets described in the previous section. For instance, for RP4, the PRB has taken a firmer stance towards ANSPs improving environmental performance. However, this will not be achieved in isolation because there are interdependencies between Environment, Capacity and Cost-Efficiency that need to be considered in their globality when setting target ranges. The PRB's recent study into the interdependency between the capacity and environment KPAs represents a good start in quantifying the impact of capacity shortfalls and hence delays on additional flight distances. The environmental performance targets can only be achieved with sufficient investment in staffing to ensure sufficient capacity to facilitate fuel optimum routes and avoid re-routings. The associated costs need to be taken into consideration.

The PRB has issued guidance material to cover some of the interdependencies between these KPAs. This Business Plan accounts for impact of trade-offs between the KPAs on our performance against the RP4 targets for each KPA. The sub-sections below cover the various interdependencies in more detail.

6.3.1 Safety and Other KPAs

There is a clear interdependency between the safety KPA and the other KPAs of the performance and charging scheme, recognising that safety management acts as a control mechanism ensuring that exogenous or endogenous factors impacting the safety of ANS provision are duly identified and addressed. Consequently, a specific focus should be placed on further enhancing capabilities in the area of safety risk management, which should be subject to a more ambitious targeted level of performance than the other safety management areas, similarly as in RP3[12].

The recent events across the US and Japan have highlighted the need for continuous attention and investment towards safety:

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Safety is our ultimate priority, and we are committed to complying with all relevant safety regulatory requirements. We work closely with the IAA to monitor our compliance with all safety related regulations. We recognise that the IAA has increased the number of inspectors available for audits/inspections, we support the regulator in applying a thorough approach to monitoring safety compliance, but it should be considered that an increase in resource deployment on the regulator side has to be matched by ourselves to facilitate inspections. ✂

[12] Aviation – EU-wide performance targets for 2025-2029 (Single European Sky) (europa.eu)

The additional resources required have been factored into our resource planning for RP4. This is exacerbated by the fact that following the submission of our RP3 Performance Plan, we learned that we would be subject to dual regulation in the form of UK CAA oversight in relation to delegated ATC service provision. To date there has been a very pragmatic and low-cost approach in place in relation to CAA oversight, whilst the performance benefits facilitated by delegated ATC provision such as enhanced capacity, operational efficiency and environmental performance continue to be delivered. However, it is uncertain to what extent audits will increase ahead of RP4 or the extent to which EASA and UK CAA regulations will diverge over the course of RP4 or whether there will be mutual recognition from a regulatory perspective.

6.3.2 Capacity and Environment

As explained on the previous page, in June 2023, the PRB issued a guidance document[13] which studies the interdependency between the capacity and environment KPIs contained within the European Performance and Charging Scheme. The analysis contained in this study demonstrates that high ATFM delays from various contributing factors have a negative impact on Horizontal Flight Efficiency, proving the existence of an interdependency between the environment and capacity KPIs. Statistical models were developed to investigate the influence of different delay variables on Horizontal Flight Efficiency. The models found that an increase of one minute of average en route ATFM delay per flight causes an increase of 0.14 percentage points to Horizontal Flight Efficiency.

The report also found that without any delays, the Union-wide Horizontal Flight Efficiency is estimated to be on average around 2.6% within the sample assessed, suggesting that this residual amount of Horizontal Flight Efficiency is attributable to other factors than delay (e.g. inefficient route networks, airspace restrictions, airspace user route preferences).

In addition, the report made a number of other conclusions, in particular it was found that the impact on Horizontal Flight Efficiency depends on the cause of the delay, and the season in which the delay occurs.

A cornerstone of our Business Plan is to increase our resilience and capacity, including planning sufficient number of ATCOs, to be able to deal with the forecasted demand. Sufficient capacity should then contribute to positive performance in the environment KPA.

6.3.3 Cost-Efficiency and Capacity

The PRB monitors the interdependency between the Cost-Efficiency and Capacity KPIs through examination of the ratio of the capacity (sector hours per year) provided to the costs associated with providing this capacity (actual en route costs). Key to this is how investments in ATM systems and other elements of infrastructure affect the capacity provision. However, the PRB have highlighted[14] that it is a challenge to identify a direct link between investment and performance for this interdependency, particularly when the number of ATCOs and traffic levels vary during the investment periods.

In our case, the key cornerstones to providing sufficient capacity include sufficient ATCO resources including addressing all step changes (reduced reliance on overtimes, ✂, allowances for job-sharing, statutory and annual leave, etc.), as well as our CAPEX programme which includes investments that are a prerequisite for our ability to cope with the forecasted demand. All of this has been duly considered in our Business Plan and the required costs are detailed in Section 8. Given that our current resources are below the required levels, RP4 cost base that would be lower than our requirements would lead to deterioration of our performance, notably in the Capacity KPA.

New guidance material on trade-offs between Capacity and Cost-Efficiency is expected from the PRB, however, this document is still not available at the time of finalising this Business Plan.

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[13] PRB report on the interdependency between the environment and capacity KPIs - European Commission (europa.eu)

[14] Performance Review Body Monitoring Report 2021

7 COST ALLOCATION METHODOLOGY

7.1 Introduction

The European Commission initiated audits of the ANSPs and states in 2022/2023. Nine States/ANSPs have been audited by EY and the detailed reports are now being finalised which should also result in publication of number of guidance materials or an update of the RP4 Guidance for which the draft is available. Our understanding is that the issues EY were looking at included cost-allocation between en route and terminal ANS and ensuring that there are no cross-subsidies between the different classes of users.

Our cost allocation methodology has been independently reviewed and confirmed that it is aligned with the best practice. This section describes the main principles and steps in our allocation process, including the resulting cost allocation keys.

7.2 Main Steps in the Current Cost Allocation Methodology

We allocate our costs to 'cost centres' based on the geographical location in the first step. The locations include the Headquarters, Dublin Airport, Ballycasey (Shannon ACC), Cork Airport, Shannon Airport and Ballygireen (North Atlantic Communications which are however charged for separately and are not part of the en route and terminal cost bases).

In the second step, the costs are allocated to a particular 'Activity' depending on its nature. 'Activities' include:

- **Technology/Projects:** This category includes staff costs (including labour costs, travel and subsistence and pensions) and other operating costs (e.g. rent, energies, etc.) related to ongoing projects.
- **ATC Operations:** This category includes staff costs (including labour costs, travel and subsistence and pensions) and other operating costs (e.g. rent, energies, etc.) related to the ATC Operations.
- **ATC Engineering:** Costs related to technical staff (including labour costs, travel and subsistence and pensions) and CNS/ATM infrastructure, which is however allocated to en route and terminal cost bases directly.

There is a dedicated allocation key defined for each 'Activity' for each 'Location'. The activities have assigned codes and sub-codes but often use the same allocation key based on the 'Location'/'Activity'. Some direct operating costs (e.g. rent) are first split between the 'Activities' using a dedicated key (e.g. floorspace or headcount for staff working on projects vs. operational tasks) before they are allocated to the particular cost base using the assigned allocation key. The costs allocated to a particular cost base can again be broken down 'by nature' into staff costs, other operating costs, depreciation, and cost of capital.

'Support costs' have a dedicated cost centre, and the costs are divided into additional categories, including IT, Finance, Internal Audit, HR, Procurement, Property/Security, Executive, Corporate Affairs, Marketing, Board, Operations HQ, Safety Management Unit. Each category has its defined allocation key.

These principles apply to all cost categories except for depreciation which is allocated directly for each asset depending on its purpose. The cost of capital follows the depreciation. Allocation of assets is discussed separately below.

7.3 Allocation Keys for Main Operational 'Cost Centres' and their 'Activities'

We use the cost allocation keys that reflect the extent to which the particular activity is related to en route or terminal activity. Even though the activities are split into sub-categories, mostly the same allocation key is used for the costs assigned to the particular cost centre and activity. The allocation keys currently used and their rationale are further discussed in the subsequent sub-sections.

The allocation keys which are used for ATC Operations are defined using an estimate of how much of the services are provided to en route and terminating flights. This is based on an estimation of the average distance for the different hand-over points between the ACC sectors, APP sectors and aerodrome control positions. The

proportion that is inside of the 20-km is considered to be terminal cost. Our understanding is that most of the ANSPs use some rule to allocate the costs based on the 20-km rule and we consider this to be the best practice.

7.3.1 Dublin ATC Unit

'Dublin ATC Unit' cost centre covers the costs of both the ACC/APP unit and the TWR unit that are collocated in one facility at Dublin Airport. The unit is predominantly a terminal control unit mainly providing approach and aerodrome services; however, it also provides area control services to en route traffic in the lower airspace. The costs allocated to 'Dublin' are allocated using the following keys:

- A ratio of 76:24 (en route to terminal) is used for 'ATC Operations' and 'ATC Engineering' based on the 20km-rule.
- A ratio of 85:15 (en route to terminal) is used for 'Technology/Projects'. This ratio is estimated based on the involvement of staff assigned to projects and purpose of the projects.
- 80:20 (en route to terminal) is used for training costs (this category is discussed separately below).

We would like to highlight that staff costs for ATCOs at Dublin TWR are also allocated using the allocation key of 76:24 (en route to terminal). This is justifiable from the point of view that most ATCOs employed by the ATC centre are multi-licensed for two out of three ATS services (ACC, APP and TWR) and there is a significant group of ATCOs that provide both APP and TWR services. In RP3, this was not considered when an increase in staffing was proposed because of the new Dublin TWR and in the Steer's model, all costs related to additional ATCOs were allocated to terminal cost base. This was a departure from our cost allocation methodology and it should be done correctly in RP4.

7.3.2 Ballycasey

'Ballycasey' cost centre includes the Shannon ACC unit located in Ballycasey. The unit almost exclusively provides services to overflights, Shannon handles over 90% of all air traffic on the North Atlantic route. The following allocation keys are used:

- A ratio of 100:0 (en route to terminal) is used for 'ATC Operations'. This is consistent with an assumption that all ATC services provided from Shannon ACC are provided to en route traffic (approach services to Shannon Airport are provided from the Shannon Tower).
- A different ratio of 94:6 (en route to terminal) is used for 'Technology/Projects' and 'ATC Engineering'. This is consistent with the assumption that some of the CNS/ATM infrastructure involved in the technical staff/project staff members' tasks are also partly used for terminal ATC services.
- 80:20 (en route to terminal) is used for training costs (this category is discussed separately below).

7.3.3 Cork Airport

The 'Cork Airport' cost centre includes costs of the APP/TWR unit at Cork Airport. The costs of APP/TWR unit are not split into APP and TWR services but are allocated jointly. The following allocation keys are used:

- A ratio of 60:40 (en route to terminal) is used for both 'ATC Operations' and 'ATC Engineering'. This is based on a rough estimate of proportion of the services provided to en route and originating/terminating flights using the 20-km rule.
- 80:20 (en route to terminal) is used for training costs (this category is discussed separately below).

7.3.4 Shannon Airport

The 'Shannon Airport' cost centre includes costs of the APP/TWR unit at Shannon Airport. The costs of the APP/TWR unit are not split into APP and TWR services but are allocated jointly. The following allocation keys are used:

- A ratio of 60:40 (en route to terminal) is used for 'ATC Operations'. This is based on a rough estimate of proportion of the services provided to en route and terminating flights. There are no costs allocated to 'ATC Engineering' as these costs are picked up through an allocation of 6% of costs at Ballycasey.

- 80:20 is used for training costs (this category is discussed separately below).

7.4 Allocation of Capital Assets

We currently allocate the depreciation costs and the cost of capital using the following principle: "Where capital assets are providing only services to en route, then depreciation is charged 100% to en route; where the asset is providing a service to terminal only then depreciation is charged 100% to terminal; where assets are used jointly in the provision of both en route and terminal services, depreciation is charged 75% to en route and 25% to terminal. This allocation was originally based on the number of ATC positions at Dublin and Ballycasey." This principle is followed for all 'Activities'.

In practice, for each asset in the asset registry there is a location allocated based on where the asset is located or for which purpose it is used. In addition, it is defined whether the asset is used for en route, terminal or joint purpose. All assets allocated as serving the 'en route' purpose are allocated 100% to the en route cost base, those that are assigned as 'terminal' are allocated 100% to the terminal cost base. For the assets assigned as 'joint', the allocation key depends on the location. For Dublin ATC unit and Shannon ACC, 75% of the joint costs are allocated to the en route cost base, while 50% of the joint costs at Cork are assigned to the en route cost base. The assets for the headquarters are assigned 73% to the en route cost base, as well as 80% of assets related to the training facilities. The assets used for North Atlantic Communications (not in RP4 scope) are allocated separately and are charged for separately.

Looking at the particular CNS/ATM systems, these are allocated using the following principles:

- The COOPANS ATM system is allocated 75% to the en route cost base on an assumption that it is used mainly for en route services while it is also used by the APP/TWR units.
- Radars: Those radars that are used for en route ATC are allocated 100% to the en route cost base while terminal radars (including SMRs) are allocated 100% to the terminal cost base. Those radars for which the feeds are used by both ACC and APP/TWR units are allocated 75% to the en route cost base.
- Navaids: All ILSs are allocated entirely to the terminal cost base while DVOR/DMEs are split allocated 75% to the en route cost base, on assumption that they are used predominantly for en route navigation.
- Communication infrastructure: The COM equipment as well as the network equipment is allocated 75% to the en route cost base on an assumption that it is used mainly for en route services while it is also used by the APP/TWR units.

The tower buildings are allocated 100% to the terminal cost base, including cabling and other local infrastructure.

These assumptions used for allocation of the ATM/CNS costs are fully compliant with the CRCO's "Principles for Establishing the Cost-Base for En Route Charges and the Calculation of the Unit Rates" which provides a guidance that where the utilisation of ATS facilities between en route services on the one hand and terminal services on the other cannot be allocated on a statistical basis, the said facilities shall be allocated using the ratios of 25% (if mainly en route), 50% (same extent) and 75% (if mainly terminal) allocated to the terminal cost base. While there is no such explicit requirement in the Performance and Charging Regulation, this guidance is also consistent with the ICAO Manual on ANS Economics.

7.5 Allocation of Joint Costs

There are a variety of methods amongst ANSPs used to allocate joint costs, ranging from simple percentages to complex activity-based costing systems. The simple methods have the advantage of being straightforward and transparent, while the more complex system may make it difficult to follow a cost audit trail, but the latter do enable costs to be allocated on a more specific basis.

We use different cost allocation keys for different categories of joint costs, and these are further discussed below.

7.5.1 Support Costs

We assign a proportion of our corporate support costs to both en route and terminal costs, as well as to the North Atlantic Communications (not in RP4 scope) which is charged for separately. We historically used allocation keys that were based on the individual share of total revenues. This is used for most of the sub-categories and results in 73% of the costs being allocated to the en route cost base and 14% to the terminal costs base. These ratios are based on estimates of resource requirements related to the en route and terminal activities.

7.5.2 Training Costs

We allocate the ATCO training costs 80% to the en route and 20% to the terminal cost base. This is broadly consistent with the fact that most of the ATC Operations costs are allocated to the en route cost base, with 85% of the ATC Operations costs being currently allocated to the en route cost base.

The costs of technical staff training follows the key for ATC Engineering activity for a particular unit which is consistent with how technical staff costs are allocated.

7.5.3 AIS Costs

We currently allocate all AIS costs to the en route cost base. There is no requirement for allocation of these costs in the regulations and there is a mixture of practice in allocating AIS costs with some ANSPs splitting AIS costs between en route and terminal, whereas others allocate them entirely to en route. EUROCONTROL's guidance on AIS costs is that they should "either be charged to en route services or apportioned between en route services and other services, the latter according to national practice".

7.6 Costs of Exempted VFR Flights

The costs of services to exempted VFR flights have been assessed in the past and since the volume of such flights is not changing, we continue to use this historical method and allocate €127k each year to this service. These costs are excluded from the cost base for charging and are excluded from the calculation of the determined costs.

7.7 Splitting Terminal Costs

We have considered whether a more granular methodology should be developed for splitting terminal costs between the three airports (Dublin, Cork, Shannon) in the Terminal charging zone. Our view is that the approach to the Terminal Charging Zone in RP3 continues to reflect best practice and it is therefore appropriate to continue with RP4 on this basis. ✂

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TABLE 42: ✂

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8 REQUIRED COSTS

8.1 Overview

This section provides a detailed breakdown of the forecast costs that are required for us to meet the RP4 performance targets described above and ensure we can continue to deliver a safe, reliable, resilient and efficient ATC service to our customers. To support this, the section starts by detailing the required headcount breakdown for RP4 to deliver the service customer expect, alongside a description of the assumptions underpinning these FTE projections. Following this the section details the required staff OPEX and pension costs, non-staff OPEX, and CAPEX together with other information and evidence underpinning these forecasts.

8.2 Headcount Requirements

Our headcount requirements are a critical aspect of this RP4 plan, and these are summarised in the following sections for ATCOs, Engineers, Data Assistants, Ops Management & Support and Corporate Services. We have been liaising with IAA regarding the relevant unit costs for each of the planned changes in headcount.

8.2.1 ATCOs

Our required ATCO headcount for RP4 is accounted for based on our expected ATCO headcount at the end of RP3 (the baseline), plus additional ATCOs required due to a number of key step changes detailed below.

8.2.1.1 ATCO Baseline

The baseline used for our ATCO projections for RP4 is the number of ATCOs that we expect to have by the end of RP3 (307[15]). This will be below the forecast of 328 ATCOs included in our revised RP3 submission in 2021 due to a higher number of ATCOs leaving our organisation than expected. ✂

It is important not to be misled into thinking that the lower than expected ATCO numbers by the end of RP3, coupled with higher than forecast traffic against the October 2021 STATFOR forecast used to guide our revised RP3 Business Plan, indicates our RP3 headcount requirements were overestimated to provide the airspace capacity to meet traffic demand. Such a myth is dispelled by our high rates of ATCO overtime, which has been consistently used throughout RP3 to make up for the ATCO shortfall on the roster compared to the plan and allow sufficient capacity to cope with the higher than anticipated traffic demand since the Covid-19 pandemic.

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FIGURE 34: ✂

8.2.1.2 Drivers Behind RP4 ATCO Requirements

8.2.1.2.1 Daily Roster Requirements

At AirNav Ireland we utilise a "crew to workload" principle whereby duty start times are staggered to provide for increased ATCO numbers during busier periods with reduced staffing in quieter times. This rostering principle maximises the efficient use of available resources. This is an approach that has resulted in efficient use of ATCO staff in previous reference periods and is one which we will continue to utilise in RP4.

We also make use of ATCO multi-rated, whereby ATCOs are typically trained and authorised to operate a number of unit-endorsements, which leads to greater flexibility and staffing efficiencies as it means most ATCOs are not limited to a specific geographically defined sectors or controlling positions.

Another contributing factor in the efficiency of our rostering is the use dynamic sectorisation rather than a fixed sector plan. Dynamic sectorisation allows sectors to be opened, combined and closed dynamically in

[15] *During the process of drafting this business plan, our 2024 headcount forecast fell from 310 to 307. This was a result of resignations and delays in securing direct entries for the summer.*

response to traffic loadings, ensuring ATC capacity closely matches traffic demand. Other ANSPs are also seeking to introduce dynamic sectorisation to benefit from the efficiencies that it brings.

Pursuant to Regulation (EU) 2017/373, we are required to "ensure that it is able to provide its services in a safe, efficient, continuous and sustainable manner, consistent with any foreseen level of overall demand for a given airspace. To this end, it shall maintain adequate technical and operational capacity and expertise". EASA provide guidance[16] on the definition of *technical and operational capacity* stating that it "should include a sufficient number of personnel to perform its tasks and discharge its responsibilities".

A significant consideration in defining ATCO requirements for RP4 is the operational requirement to support an increase in traffic over the period in addition to other factors listed in the rest of this section. We have estimated our ATCO headcount requirements in accordance with the February 2024 STATFOR base forecast and sufficient ATCOs are required for us to deliver an ATC service that meets the demands of our customers over RP4. Critically, due to dynamic sectorisation, an increase in ATCOs over RP4 tracking uniformly to the percentage traffic growth assumed in February 2024 STATFOR forecast will not provide the required costs to improve ATC capacity. This is because our ATCOs work in teams and our rostering approach (particularly at Dublin ATC and Shannon ATC) needs to reflect that the most efficient way to maximise the extra capacity that an additional ATCO brings is to increase ATCO numbers via a stepped approach over the period. This philosophy enables more sectors to be opened more easily, and it is the opening of more sectors that helps us to handle increases in traffic demand.

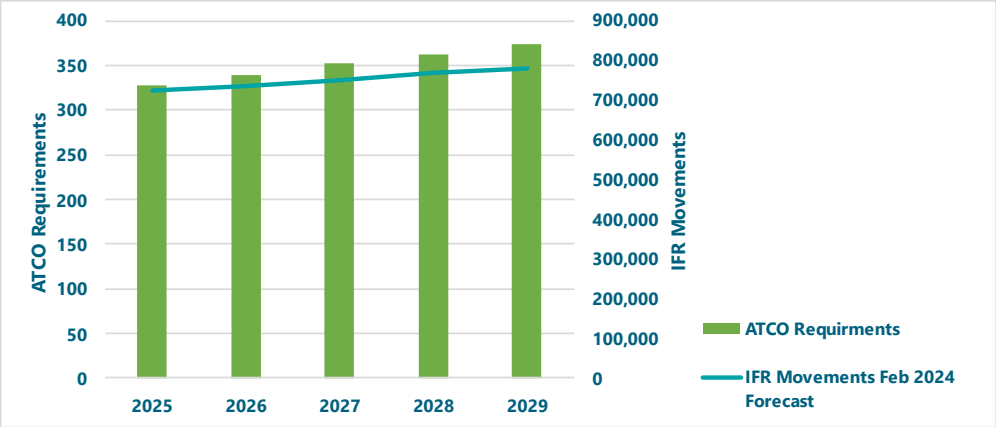

FIGURE 35: RP4 ATCO REQUIREMENTS VS TRAFFIC[17]

In our headcount requirement detailed in section 8.2, we have shown the impact of step changes in roster requirements needed to meet the expected traffic demand across our different ATC units. Critically, since we formulated our headcount plans, EUROCONTROL have published a revised May STATFOR en route service unit forecast for 2024 and 2025. Interestingly, the base forecast for the revised May forecast is between the base and high forecast scenarios contained in the February STATFOR forecast (shown in TABLE 34). It is evident that whilst we have been making our ATCO plans for RP4, forecasts around the traffic levels for RP4 are already increasing based on traffic developments so far in 2024.

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8.2.1.2.3 Statutory Leave and Job Sharing

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[16] *EASA Easy Access Rules for ATM/ANS (Regulation (EU) 2017/373): Annex III ATM/ANS.OR.B.001 Technical and Operational Competence and Capability*

[17] *In May 2024 EUROCONTROL subsequently published a revised en route service unit forecast reflecting traffic materialisation from January – May 2024*

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8.2.1.2.4 Roster Resilience

Currently we staff to the minimum levels required to safely provide our ATC services. In RP3 as described in section 8.2.1.1, the level of overtime increased significantly. This increase was due to the ATCO headcount being below the requirement specified in our revised RP3 plan which was mostly caused by an unexpectedly high rate of ATCO attrition since 2022 and delays to training (e.g. in Summer 2023 a training course was suspended as the instructors were required on the roster). This attrition coupled with higher traffic than the October 2021 STATFOR forecast, which was used to guide our headcount in the revised RP3 Business Plan, has resulted in significant pressure on our ATCO staffing, with overtime and ATCOs being diverted from other duties being used to fill the ATCO roster.

Under our crew to workload rostering approach, overtime is necessary and inevitable to cover unplanned staff shortages due to sickness, provisional inability, etc. However, using overtime to fill the roster at publication has the effect of reducing the resilience of our ATC service provision. This is because as we will never use overtime to the point where our service provision is unsafe due to fatigue management, etc. If there are unexpected ATCO absences with overtime already used to fill the roster, there is an increased likelihood of not having sufficient numbers of staff available to provide the additional cover necessary. For example, this was experienced on 6th November 2023 when unexpected staff absences resulted in two 50-minute zero flow rates in/out of Dublin Airport being applied. This was necessary as unplanned ATCO absences meant there were insufficient ATCOs on duty to maintain a service delivery whilst still providing the required fatigue breaks to staff.

In addition, the high use of overtime has been identified as a contributory factor to ATCO retention. Given the societal change towards a greater focus on work-life balance, the impact of employees demanding a better work-life balance is already being experienced in our organisation, with ATCOs citing this as a reason for leaving the organisation. There is a significant risk that if overtime use remains persistently high throughout RP4, our ATCO attrition rate will increase further thereby limiting our ability to increase overall numbers.

In RP4 we have planned our ATCO headcount with a greater focus on resilience to ensure that if traffic is above the February 2024 STATFOR base forecast (which is now increasingly likely based on STATFOR's revised May en route service unit forecast for 2024 and 2025 (see TABLE 34)), if we experience high levels of sickness or if we lose a greater number of ATCOs during RP4 than planned, we have a limited amount of extra resilience built-in before these issues lead to persistently high levels of overtime. This roster resilience will be built into the Dublin roster from 2026 and at Shannon from 2027, this is the earliest that we can feasibly recruit and train to provide such limited resilience. Roster resilience will not only support our own operation as described above but will facilitate the operational resilience and efficiency of the overall European network. As described in detail in section 5.2.4, issues arising in other European countries often require us to adapt our operation at short notice to cope with unexpected changes in traffic flows. Our ability to successfully support this is heavily influenced by the resilience of our own roster and the extent to which we have capacity in our ATCO headcount to be able to use overtimes at such short notice to cover such eventualities, as opposed to using overtimes as a permanent feature of our daily roster requirements. As described in section 8.2.1.2 we already make use of dynamic sectorisation to ensure airspace is managed as efficiently as possible, but this is still dependent on having sufficient ATCOs to respond to changes in traffic flows. ✂

8.2.1.2.5 ATCO Instructor Time

In addition to day-to-day ATCO duties, ATCO FTEs will also be required to deliver ATCO training. In RP3, approximately 15% of ATCO time was spent on non-operational tasks such as training, instructing and supporting the delivery of projects. For the majority of RP4, this is not expected to change significantly as the ATCO time allocated to these activities is expected to increase proportionately to the ATCO headcount

requirements. However, during 2028 and 2029, the demand for instructor time will increase due to training to prepare ATCOs for the operationalisation of the new TopSky ATC One, ATM System. This step change has been factored into our RP4 planning.

8.2.1.2.6 ATM Occurrence Investigator (AOI) and Operational Support Group (OSG) Staffing

In relation to AOI & OSG staffing, rather than having ATCOs allocated on a rotational basis to these functions, in RP4 we will instead allocate ATCOs permanently to these functions. The main driver for this is that during RP3, unit management regularly had to draw on these resources to fill gaps in the roster, this interrupted and restricted the work done within these two critical functions.

In the case of AOI resourcing, this had a direct impact on our EoSM performance against the Safety Risk Management Objective, as described in section 3.4.2.1. By allocating staff on a permanent basis to these functions, they will no longer be available to fill the roster. The other main driver for this change is that by having staff permanently allocated to these functions, staff will become more specialised in these areas leading to more consistent work output.

OSG provides support to ATC Operations and Technical Services, in RP3 it was mainly resourced by a combination of ATCOs who are permanently assigned to the OSG and current operational ATCOs who work with the OSG on a rotational basis as required. In RP4, instead of a small number of ATCOs permanently assigned to the OSG supplemented 12 months a year by rotational ATCOs, an increased number of ATCOs will be permanently assigned to the OSG which will be supplemented by rotational ATCOs outside of the core summer months. This change will have the effect of guaranteeing the OSG an increased minimum number of staff all year round. The OSG plays a critical role in ATM-system-related projects from concept, system specification, liaising with system suppliers, factory testing for pre-deployment software releases, onsite testing and transition activities associated with the update of the online ATC operational systems through to deployment. The OSG are responsible for managing the local dataset configuration for each system. Other functions include assisting with occurrence investigations which have an ATM system element, and the implementation of required changes to ensure compliance with the CP1 regulation. Given the importance of OSG to the successful delivery of our CAPEX programme, it is essential we have OSG resources ring-fenced in RP4, to help mitigate the resourcing challenge we faced in RP3 and the consequence of this on the delivery of CAPEX projects.

In addition, staff permanently allocated to AOI and OSG functions, will help staff become more specialised in these areas leading to more consistent work output and an improvement in productivity.

8.2.1.2.7 Departure ATCO Requirement at Dublin

An additional departure ATCO position is required at Dublin to help facilitate the parallel runway operations that were introduced with the operationalisation of Dublin's new runway (28R/10L) in 2022, and to facilitate the RP4 traffic growth assumptions at Dublin airport. Provision has been made for 6 additional ATCOs from 2027 to fill this new position.

8.2.1.2.8 Productivity

We are currently investigating a number of factors which may enable us to improve productivity during RP4. This includes factors such as improving our data analytics, leveraging productivity gains from our COOPANS ATM System, ✂. However, the nature of the potential impact of these activities on productivity is uncertain and therefore has been factored into our RP4 plan using our best possible expert judgement at this time.

Flight Data Control Position Efficiencies at Shannon

The flight data control position at the Shannon ACC performs an essential support function, as it processes messages which the ATM system has been unable to process automatically mainly due to formatting issues in the message text or the absence of an associated flight plan. Such important messages [e.g. Oceanic Clearance Messages from Shanwick, automated pre-estimates & estimates from adjacent ACCs, etc.] are identified by the ATM system and have to be manually corrected for automatic processing. In addition, the flight data position deals with certain coordination calls from adjacent ACC and regional airports and other support functions

similar in nature. In late 2022, following the implementation of changes with how oceanic clearances for Irish departures to North America are handled, operations explored the possibility of having data assistants staff the flight data control position at the Shannon ACC. This position was previously staffed exclusively by ATCOs, and this change would have the effect of freeing up a limited number of ATCOs for frontline operational duties. The change was progressed through our change management processes with new procedures and associated training modules developed and the regulator was notified of the change in January 2023. Additional data assistants were recruited for this role, and training was successfully completed over the course of 2023. ✂

8.2.1.3 ✂

8.2.1.3.1 ✂

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TABLE 43: ✂

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8.2.1.3.2 ✂

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TABLE 44: ✂

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8.2.1.3.3 ✂

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TABLE 45: ✂

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8.2.1.3.4 ✂

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TABLE 46: ✂

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8.2.1.3.5 ✂

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TABLE 47: ✂

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8.2.1.3.6 ✂

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TABLE 48: ✂

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8.2.1.3.7 ✂

TABLE 49: ✂

8.2.2 Engineers

8.2.2.1 Engineers Baseline

During RP3 we have been marginally behind on our engineering recruitment campaign but will still have exceeded the allowance at the end of RP3. This has caused a shortage through RP3, and only by the end of 2024 we anticipate that our engineer headcount will finally reach the levels forecasted in our revised RP3 Business Plan submission.

TABLE 50: BREAKDOWN OF ENGINEER HEADCOUNT

	2020	2021	2022	2023	2024
RP3 Performance Plan Engineer Headcount	72	72	87	91	91
RP3 Actual Engineer Headcount	73	76	80	87	100

8.2.2.2 Drivers behind RP4 Engineer Headcount Requirements

8.2.2.2.1 Engineers to Address The CAPEX Backlog

In RP3 we underdelivered against our CAPEX plan due to staff constraints, originating from the Covid-19 recruitment freeze and associated recovery which was faster than anticipated and a number of other factors. In the recovery phase, staff have prioritised day-to-day operations to avoid user delays, however this has come at the cost of our CAPEX programme and delays in meeting compliance requirements. The CAPEX backlog relates primarily to obsolescence. When we run old systems, we increase the risk of system outages which will only lead to increased risk of ATM delay.

Below is a high-level list of our End of Life (EOL) systems.

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In RP4, it is a necessity that we start to work through this extensive backlog of obsolescence driven projects. However, these cannot be the sole focus and we will need to continue to deliver innovative projects that focus on meeting the future demands of our ATC service. We have produced a CAPEX plan for RP4 from the bottom-up, planning the programme to ensure that projects are prioritised based on need, and that with engineer resource requirements defined in this section we have sufficient capacity to deliver, ensuring that we have done everything possible to ensure the under-delivery of CAPEX in RP3 is not repeated in RP4.

8.2.2.2.2 Engineers to Support the Delivery of TopSky ATC One

A significant step change from RP3, will be the delivery of the TopSky ATC One ATM System which will require significant engineer resources to deliver across all technical services domains, and require support from other facets of our organisation such as our Safety domain and our Operational Support Group (OSG). This significant modernisation project kicks off this year and will run through RP4. Such a significant upgrade is approximately a once in a decade implementation for us, and it will facilitate the modernisation of our main ATM system to

align with the European ATM Master Plan and our COOPANS partners. More details of this major investment are included in section 8.5.

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8.2.2.3 Engineer Requirements for RP4

Our engineer headcount in RP4 is a function of the key drivers described above. Our approach to estimating the engineers we require for RP4 is based on the combination of bottom-up and top-down estimation. The bottom-up approach is facilitated by tracking our historic resource utilisation for planned maintenance, corrective maintenance, safety, security, quality, change and training for each domain. We have used this historic data to estimate future requirements.

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FIGURE 36: ✂

For example, historic data for the surveillance domain is shown in ✂. It shows 13.2 engineers are needed for day-to-day operations in 2029 to facilitate the continued running of our business. For our CAPEX programme, we have engaged in bottom-up planning at the level of each individual project, to establish the engineer resources needed for each project.

A top-down view of our engineer requirements illustrates even further that we are under-resourced. In RP3, our technical resources were significantly below the headcounts of our European ANSP counterparts, this is shown in section 3.7.6.2 by our low numbers of technical staff per ATCO in operations. Our RP4 resource planning approach aims to progress towards correcting this trend, and ensure we have sufficient engineers to deliver the improvements to our ATC service that need to be made. This is not a simple task due to the competitive labour market for engineer staff since Covid-19, conscious of this we have presented an RP4 plan that we can deliver with the below resource requirements.

TABLE 51: BREAKDOWN OF REQUIRED NUMBER OF ENGINEERS

	END OF 2024 BASELINE	2025	2026	2027	2028	2029
Engineers	100	114	126	126	126	126

8.2.3 Data Assistants

The number of Data Assistants required for RP4 is unchanged from our headcount baseline for the end of 2024.

TABLE 52: BREAKDOWN OF REQUIRED NUMBER OF DATA ASSISTANTS

	END OF 2024 BASELINE	2025	2026	2027	2028	2029
Data Assistants	48	48	48	48	48	48

8.2.4 FMP/AMC

A Flow Management Position (FMP) is responsible for the efficient management of airspace, largely through the monitoring of traffic volumes, applying regulations (flow control) or short-term ATM measures (STAMs) where required, and the coordination of these measures with the EUROCONTROL Network Manager. This is governed by EU Regulation 255/2010. The Airspace Management Cell (AMC) is a state function in accordance with EU Regulation 2150/2005, which is responsible for the management of segregated airspace / FUA. The FMP and AMC functions for Ireland are currently provided by NATS through their UK FMP position. This arrangement was made under the UK/Ireland FAB agreement, largely to allow the ANSPs/States demonstrate to the European Commission an operational benefit arising from the FAB.

EU Regulation 255/2010 recommends that FMP and AMC functions are collocated and EUROCONTROL is currently working on a best practice document which proposes that the tasks of the FMP and AMC are amalgamated. It is important that our flow management function provides the best strategic and tactical management for Irish airspace to help ensure the ANSP can reach its environmental and other targets as well as benefiting our customers operational and environmental needs. While the UK FMP provides an appropriate service to Ireland, its primary focus is the management of the network within the UK, while meeting NATS's operational and environmental targets, and therefore a return of the FMP/AMC provision to AirNav Ireland would ensure a more effective, Ireland focused service for this country.

European Regulation (2150/2005) requires that the AMC function for a Member State is carried out in a Member State. As the UK is no longer a Member State, we are potentially not compliant with this regulation.

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Staff will be required in RP4 for the return of the FMP/AMC provision to AirNav Ireland. This will start in 2025 with the addition of five staff, who will assist with setting up our provision, completing initial training and possibly starting provision for a limited number of hours per day. The second tranche of five additional staff from 2026 is required to expand our hours of service provision towards full service provision by AirNav Ireland.

TABLE 53: BREAKDOWN OF REQUIRED NUMBER OF FMP/AMC STAFF

	END OF 2024 BASELINE	2025	2026	2027	2028	2029
FMP/AMC	-	5	10	10	10	10

8.2.5 Ops Management & Support

The increase in Ops Management & Support staff required for Operations is due to an increase in admin support at Dublin Ops and an increase in admin support for Ops HQ.

Ops Management & Support staff required for engineering will increase to maintain a sufficient number of staff to support CAPEX delivery. The breakdown of the drivers behind the OMS engineering increase is presented below, with increases in staff required to fill management positions as well as to fill the reintroduction of a General Manager, and the bolstering of administrative staff. The increase in managers is required to ensure there are enough managers to direct and control the delivery of the CAPEX programme.

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We also plan to increase the number of administrative staff as engineers are increasingly being pulled into admin and documentation related tasks. As engineers are high cost resources relative to admin staff, increasing admin staff will offload admin work to admin experts, freeing up engineers to work on tasks which only certified ATSEPs can complete. The alternative approach would be to recruit an additional four engineers, but this would come at increasing cost and would be less efficient.

The table below provides a breakdown of the increases in Ops Management & Support for Engineering:

TABLE 54: OPS MANAGEMENT & SUPPORT - ENGINEERING HEACOUNT BREAKDOWN

OPS MANAGEMENT & SUPPORT - ENGINEERING	END OF 2024 BASELINE	2025	2026	2027	2028	2029
Manager	11	12	14	17	17	17
Head	1	1	1	1	1	1
General Manager	0	1	1	1	1	1
Director	1	1	1	1	1	1
Admin	4	8	8	8	8	8
Remote Site Caretaker	4	4	4	4	4	4
Stores	1	1	1	1	1	1
Total	**22**	**28**	**30**	**33**	**33**	**33**

The implementation of the TopSky ATC One programme will crucially rely on dedicated Ops management support staff.

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FIGURE 37: ✂

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TABLE 55: BREAKDOWN OF REQUIRED NUMBER OF OPS MANAGEMENT & SUPPORT STAFF

OPS MANAGEMENT & SUPPORT BREAKDOWN	END OF 2024 BASELINE	2025	2026	2027	2028	2029
Ops Management & Support - Operations	30	33	33	33	33	33
Ops Management & Support - Engineering	22	28	30	33	33	33
Ops Management & Support – Safety Management	13	15	15	15	16	16
Total	**65**	**77**	**79**	**82**	**83**	**83**

8.2.6 Corporate Services

TABLE 56: BREAKDOWN OF REQUIRED CORPORATE SERVICES STAFF

CORPORATE SERVICES BREAKDOWN	END OF 2024 BASELINE	2025	2026	2027	2028	2029
IT	11	13	14	14	14	14

CORPORATE SERVICES BREAKDOWN	END OF 2024 BASELINE	2025	2026	2027	2028	2029
Finance[18]	11	13	13	13	13	13
Internal Audit	3	3	3	3	3	3
Human Resources	6	6	7	7	7	7
Procurement	5	5	5	5	5	5
Property and facilities	3	3	4	4	4	4
Executive	4	4	4	4	4	4
Corporate Affairs	7	7	7	7	7	7
Sustainability	1	2	2	2	2	2
Security	7	7	7	7	7	7
Quality	3	3	3	3	3	3
Total	**61**	**66**	**69**	**69**	**69**	**69**

8.3 Determined Costs

Our determined costs for RP4 are comprised of staff costs, other operating costs, depreciation, and cost of capital. In total, determined costs for RP4 (2022 prices) amount to €700.7 million for en route and €177.8 million for terminal.

TABLE 57: REQUIRED COSTS FOR EN ROUTE SERVICES €'000, 2022 PRICES

	2023	2024	2025	2026	2027	2028	2029	RP4 TOTAL
Staff Costs	71,102	69,312	75,863	79,736	81,655	84,471	86,455	**408,180**
Other Operating	27,888	33,805	37,735	40,341	39,192	39,167	41,357	**197,793**
Depreciation	6,325	6,030	7,771	9,710	12,485	13,364	15,812	**59,143**
Cost of Capital	2,190	2,625	4,540	5,886	7,656	8,517	8,981	**35,580**
Total	**107,505**	**111,772**	**125,910**	**135,673**	**140,989**	**145,519**	**152,606**	**700,696**

TABLE 58: REQUIRED COSTS FOR TERMINAL SERVICES €'000, 2022 PRICES

	2023	2024	2025	2026	2027	2028	2029	RP4 TOTAL
Staff Costs	12,130	11,847	13,070	13,725	13,993	14,500	14,859	**70,147**
Other Operating	6,808	7,798	8,495	9,110	8,768	8,931	9,448	**44,752**
Depreciation	4,041	4,125	4,928	5,557	6,747	7,324	8,985	**33,541**
Cost of Capital	3,409	3,546	4,871	5,310	6,089	6,404	6,716	**29,390**
Total	**26,388**	**27,316**	**31,364**	**33,701**	**35,597**	**37,159**	**40,009**	**177,830**

[18] *Headcount in finance is due to increase by 2. There are material new reporting and compliance requirements in finance activities during RP4, including the corporate sustainability reporting directive, CSRD, which is effective from 1 January 2026*

The following table summarises the proposed determined costs and determined unit costs for AirNav Ireland in RP4:

TABLE 59: AIRNAV IRELAND'S PROPOSED DETERMINED COSTS AND DUC IN €'000, 2022 PRICES

EN ROUTE	2025	2026	2027	2028	2029
Determined Costs (real)	125,910	135,673	140,989	145,519	152,606
Service Units	5,289	5,256	5,349	5,458	5,544
Determined Unit Costs (real)	**23.81**	**25.81**	**26.36**	**26.66**	**27.53**
TERMINAL	**2025**	**2026**	**2027**	**2028**	**2029**
Determined Costs (real)	31,364	33,701	35,597	37,159	40,009
Service Units	215	221	226	233	237
Determined Unit Costs (real)	**145.88**	**152.49**	**157.51**	**159.48**	**168.81**

8.3.1 Staff Costs

TABLE 60: STAFF COSTS FOR EN ROUTE AND TERMINAL OPERATIONS €'000, 2022 PRICES

	2023	2024	2025	2026	2027	2028	2029	RP4 TOTAL
Total	83,233	81,159	88,933	93,462	95,648	98,972	101,313	**478,328**

8.3.2 Pension Costs

We have four pension schemes:

- Employees who joined the company prior to 1 April 2008 and employees who joined between 1 April 2008 and 31 December 2011, are members of a defined benefit contribution scheme. This scheme is subject to an actuarial valuation every three years. The pension valuation on 1 January 2024 is currently underway, but the final outcome is not yet known. Arising from an independent binding arbitration process, concluded in February 2023, on a number of pension issues, the company agreed to review its current position in relation to the payment of pension increases. Recent high inflation coupled with the improvement in the financial condition of the scheme underpins the intention of the company to develop a policy which will outline the conditions necessary to support a discretionary increase to pensions in payment.
- For employees who joined the company from 1 January 2012 to 30 April 2023, we operate a hybrid pension scheme, i.e. a defined benefit scheme up to a cap, currently €69,525, and a defined contribution scheme thereafter. The triennial valuation as on 1 January 2024 is underway.
- For employees who exceed the hybrid defined benefit cap, they can participate in a Defined Contribution Scheme. Employees may contribute 3% or 4% or 5% of their pensionable salary above the cap and the Company will pay 6% or 8% or 10% respectively.
- For employees who joined the company from 1 May 2023 the company operates a Defined Contribution Scheme, employees may contribute either 4%, 5% or 6% and the company will pay double the contribution, i.e. the employee pays 6% and the company pays 12%.

The company also makes provision for supplementary ex-gratia pension payments, up to age 65, outside of the AirNav Ireland pension schemes, to bridge the gap for certain employees who are eligible to retire between the ages of 60 and 65 and are not eligible for the State pension until they reach the State retirement age.

The total cost of pensions included in the Business Plan is as follows:

TABLE 61: PENSION COSTS IN NOMINAL AND REAL TERMS (2022 PRICES) IN €'000

	2025	2026	2027	2028	2029
Pension costs (nominal)	14,838	15,674	16,123	16,596	16,992

Pension costs (real)	13,507	13,995	14,119	14,251	14,305

8.3.3 Other Operating Costs

Other operating costs comprise training, systems and equipment maintenance, spares, telecommunications, and administration costs including rent and rates, insurance, security, building repairs and maintenance, cleaning etc. These costs can be broken down between en route and terminal as follows:

TABLE 62: OTHER OPERATING COSTS FOR EN ROUTE AND TERMINAL OPERATIONS €'000, 2022 PRICES

	2023	2024	2025	2026	2027	2028	2029	RP4 TOTAL
En Route	27,888	33,805	37,735	40,341	39,192	39,167	41,357	**197,793**
Terminal	6,808	7,798	8,495	9,110	8,768	8,931	9,448	**44,752**
Total	**34,695**	**41,603**	**46,231**	**49,451**	**47,960**	**48,097**	**50,805**	**242,544**

The above total other operating costs are broken down in detail in ✂.

TABLE 63: ✂

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8.3.3.1 Travel Costs

Travel costs have returned to pre-pandemic levels during 2023. All travel and subsistence costs are paid at rates approved by the Department of Finance. This plan makes provision for costs of travel associated with domestic travel by our employees to our offices and facilities, and for the cost of international travel for work purposes.

TABLE 64: ✂

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8.3.3.2 Training Costs

Commission Regulation (EU) 2015/340 lays down technical requirements and administrative procedures relating to ATCO licences and certificates. This regulation applies to student air traffic controllers, air traffic controllers, persons and organisations involved in the licensing, training, testing, medical examination, and assessment of applicants.

Commission Regulation (EU) 2017/373 lays down specific requirements covering ATSEP [Air Traffic Safety Electronics Personnel] training related to 'any authorised personnel who are competent to operate, maintain, release from, and return into operations equipment of the functional system'.

Ensuring compliance with these regulations has necessitated increased resources to conduct the following training-related activities:

- Training development,
- Training regulatory approval process,
- Training delivery,
- Training attendance and,
- Unit competence scheme.

Our RP4 training plan includes:

- ATSEP training [pursuant to Regulation (EU) 2017/373].
- ATCO Initial, Unit, Continuation and Practical/Assessor training [pursuant to Regulation (EU) 2015/340].
- Safety training.

Continuation training is mandatory training designed to maintain the validity of endorsements of ATCO licences and consists of refresher training and conversion training.

Refresher training is specifically designed to review, reinforce, or upgrade existing knowledge and skills of ATCOs, and is required to contain training in standard practice and procedures, training in abnormal and emergency situations and human factors training [i.e. stress management, fatigue management and team resource management]. ANSPs are required to provide annual refresher training for each unit endorsement. Refresher training is also provided at least once every three years for all other positions such as Station Manager, Coordinator, etc.

Conversion training provides knowledge and skills appropriate to a change in the ATCO operational environment, and covers training associated with changes such as the new TopSky ATC One, CASDS, etc.

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Our RP4 training programme is required to ensure that we will have sufficient numbers of trained, competent and licenced ATCOs and Engineers, to provide "services in a safe, efficient, continuous and sustainable manner, consistent with any foreseen level of overall demand for a given airspace" as required pursuant to Regulation (EU) 2017/373. Failure to appropriately train sufficient numbers of staff will directly impact on the ability of our ATCOs and engineers to perform key functions required for the provision of ATM/ANS services and impact our ability to meet capacity and environmental targets.

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TABLE 66: ✂

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TABLE 67: ✂

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TABLE 68: ✂

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TABLE 69: ✂

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TABLE 70: ✂

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TABLE 72: ✂

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TABLE 73: ✂

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TABLE 74: ✂

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8.3.3.7 ✂

TABLE 75: ✂

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TABLE 76: ✂

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Rent and Rates

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Computing

Computing costs comprise costs of computer hardware and software maintenance, agency costs of frontline ICT staff, ICT security and disaster recovery costs, costs of back-up and storage of data and costs of consumables. Prior to Separation, a share (c20%) of ICT costs were allocated to SRD. These costs are now being borne by us. Costs are estimated to increase as we negotiate new contracts post separation, all of which are impacted by significant increases in inflation. Additionally, technological advancements and the need for upgraded equipment and software are increasing costs. Expanding operations, launching new projects, and new services introduced in 2023 (e.g. SIEM/SOC), require additional financial resources, leading to increases.

Regulatory changes and compliance requirements, in particular regarding cyber security, have increased costs as funds are required to meet cyber and regulatory obligations.

Consultancy

We typically engage external consultancies when specialised expertise is required. This could be in the fields of safety management, flight procedures, technology resilience, pay and pensions. This Business Plan assumes a relatively small increase over budget 2024 for RP4.

Insurance

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Building repairs

The operational buildings we occupy are in continuous need of repair, maintenance, and upgrade as well as the life-cycle renewal of building plant and equipment. Our main centre at Ballycasey is over 20 years old, while at Dublin and Shannon airports the buildings are approximately 28 years old. The Plan includes capital projects for some of these expansions at some of these locations, however all locations will continue to require maintenance. We have many remote operational sites around the country of varying ages which require a complete review in terms of structural integrity and regulatory compliance e.g. fire safety and health and safety obligations to ensure that they remain fit for purpose and meet our operational requirements. It is known that the cost of buildings repairs will be higher in RP4 compared to RP3 due to the ageing property portfolio.

Security

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Staff Related

Staff related costs comprise of medicals, employee wellbeing, health and safety and recruitment costs. As noted previously, the Business Plan allows for the recruitment of SCP and associated recruitment costs are included here. ✂

Cleaning

The increasing cost of labour in the Irish economy is causing an upward trend in the costs of labour-intensive services such as cleaning. We are currently in a 5-year contract and will tender, as part of our facilities management contract, for cleaning services for our sites in 2028. ✂

PR

PR costs comprise of CSR activities, educational initiatives, crisis management costs, communication contract, annual report, attendance, and support at aviation events.

8.3.3.8 Summary of Costs of Step Changes in Non-Staff OPEX

The following table summarises the costs related to step-changes in the non-staff OPEX in real terms:

TABLE 77: ✂

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8.3.4 Depreciation

The following table summarises the depreciation costs resulting from our CAPEX programme included in our cost bases. As The inflation does not apply so the same values are included in our cost bases expressed in real terms.

TABLE 78: PLANNED RP4 DEPRECIATION COSTS (NOMINAL AND 2022 PRICES, '000 EUR)

	2024	2025	2026	2027	2028	2029
En route depreciation	6 030	7 771	9 710	12 485	13 364	15 812
Terminal depreciation	4 125	4 928	5 557	6 747	7 324	8 985

8.3.5 Cost of Capital

We have contracted First Economics to assess the en route and terminal services Cost of Capital. ✂

TABLE 79: ASSUMED NOMINAL WACC RATES

YEAR	EXPECTED INFLATION	NOMINAL WACC
2025	2.00%	7.19%
2026	1.95%	7.13%
2027	1.96%	7.15%
2028	1.98%	7.17%
2029	2.00%	7.19%

The following table summarises our Regulatory Asset Base used including Net Book Value of fixed assets for calculation of the cost of capital. It also includes the opening RAB as of 2024.

TABLE 80: PLANNED RP4 REGULATORY ASSET BASE

	2024	2025	2026	2027	2028	2029
En route Regulatory Asset Base (nominal and 2022 prices, '000 EUR)	46 552	63 137	82 547	107 080	118 788	124 916
Terminal Regulatory Asset Base (nominal and 2022 prices, '000 EUR)	62 890	67 751	74 471	85 156	89 322	93 410

The following table summarises the resulting Cost of Capital included in our proposed cost bases. As inflation does not apply so the same values are included in our cost bases expressed in real terms.

TABLE 81: PLANNED RP4 COST OF CAPITAL

	2024	2025	2026	2027	2028	2029
En route Cost of Capital (nominal and 2022 prices, '000 EUR)	2 625	4 540	5 886	7 656	8 517	8 981
Terminal Cost of Capital (nominal and 2022 prices, '000 EUR)	3 546	4 871	5 310	6 089	6 404	6 716

8.4 Inflation Assumptions

Our inflation assumptions are in accordance with the PRB guidance material for the development of draft RP4 Performance Plans which is in line with Implementing Regulation 2019/317. Consequently, this plan assumes an inflation forecast for 2024 to 2029 based on the International Monetary Fund's (IMF) Consumer Price Index (CPI). The latest World Economic Outlook has been published on 16 April 2024. The following table summarises

the average inflation of average consumer prices according to IMF, including the inflation index recalculated taking 2022 as the base year for calculation of real prices.

TABLE 82: AVERAGE INFLATION OF AVERAGE COMSUMER PRICES FOR RP4 INCL. BASELINE YEARS

		2019	2024	2025	2026	2027	2028	2029
Inflation, average consumer prices	**Percent change**	0.86	2.38	2.00	1.95	1.96	1.98	2.00
Inflation, average consumer prices	**Index**	90.77	107.70	109.86	112.00	114.20	116.46	118.80

8.5 Capital Expenditure Requirements

8.5.1 Overview

Despite delivering significant CAPEX projects such as the Dublin Tower and new Dublin Contingency Centre building, our CAPEX programme under-delivered against the allowance approved by the NSA. Reflecting on this, we have placed an increased focus on project prioritisation and resource planning, to ensure that we deliver a capital expenditure programme that provides the greatest possible benefits to our service delivery, and one we are capable of delivering in RP4 with the resources we expect to have available (detailed in section 8.2.2.2). ✂

In addition, we have restructured our Project Management Office to support improved project management and control of delivery. This restructuring will not only support the delivery of projects but is also advised by our Safety Regulator.

Additionally, for RP4 we have been able put in place dedicated managers to lead the sustainability, property and security domains and their associated projects. Previously these roles were all performed by the same person. Having separate dedicated managers to lead these areas should provide better oversight and leadership to these domains and provide better oversight as their respective CAPEX investments are led to completion.

In line with our response to the issues paper, we believe the regulatory approach to the CAPEX allowance in RP3 remains appropriate i.e. flexibility afforded to us across the various suites of projects.

Our position on the treatment of unspent CAPEX for RP4 is unchanged from RP3, we will return all unspent CAPEX to users in RP+1. The unspent CAPEX will be grouped as a whole, as this better supports medium term panning and flexibility to adjust to unanticipated developments.

8.5.2 Technical Services

Our Technical Services division implement CAPEX projects associated with the systems we require to deliver our ATM service. This includes Communications, Navigation and Surveillance equipment, Network and Security installations and Flight Data Processing Systems. Conscious of the CAPEX under delivery in RP3, we have worked closely with our Technical Services staff to develop a plan that is more achievable during RP4.

In our RP4 CAPEX plan, there are a number of projects of sizeable value, and which are a clear priority due to their scale, potential customer benefits and the consequences to our service provision if they are not implemented. These projects are the ones which are over €5,000,000. In addition, we plan to implement a larger number of projects below €5,000,000. Although these projects tend to be smaller in scale, they are still necessary, the key drivers for the projects are shown in the project sheets in Appendix 3.

TABLE 83: ✂

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A key driver behind our CAPEX programme for RP4 is our continued membership of the COOPANS alliance. The influence our membership of COOPANS has had on this RP4 CAPEX plan is described in more detail in the following section.

8.5.2.1 SESAR 3 JU and COOPANS Projects

To support the COOPANS 2020 strategy and maintain compliance with the evolving regulatory landscape within the European air traffic industry, our main ATM Systems are set to undergo a modernisation programme. Such investment will bring about improvements to our resilience and our ability to provide sufficient capacity, whilst aligning with the European ATM Master Plan including supporting CP1 compliance.

We recognise the need for continuous progress in the journey to improve aviation capacity and resilience and meet pressing environmental targets. As a member of the COOPANS alliance, we are a partner in several proposals already submitted under SESAR 3 2022 call, which are linked to the DES flagships. These include the following projects:

EXODUS

EXODUS will demonstrate the viability of a common system for members of the COOPANS Alliance based on a virtual centre (VC) model that geographically separates the ATM data service provider (ADSP) from the location of the Air Traffic Service Unit (ATSU). The goal is to prove the operational and business viability of a future common COOPANS operating model based two SESAR Solutions on the rationalisation of infrastructure (PJ.16-03) and delegation of ATM services (PJ.10-W2-93A) for test and training including supervisory positions. The scope of EXODUS will be to develop a COOPANS environment, including the deployment of:

- Minimum two central data centres installed at two different ANSP premises.
- Several controller and pilot working positions as well as supervisory positions at each of the 6 COOPANS ANSP member sites in Austria, Croatia, Denmark, Ireland, Portugal, and Sweden.

All COOPANS partners will install the necessary local components and connect via a shared infrastructure.

ISLAND

The project encompasses the industrial research aimed to timely and efficiently create and use airspace capacity, in combination with targeted, effective demand and/or capacity measures. It will focus on advanced levels of dynamic airspace configuration, leveraging different virtualisation models, digital INAP applications, as well as Network-wide monitoring, all with high levels of automation.

ATC TBO

The project proposes to validate TBO SESAR Solutions for flights in the tactical execution phase for en route and TMA operations, thus contributing to the finalisation of the SESAR Phase C developed in SESAR 2020 and the realisation of the Digital European Sky vision in SESAR Phase D.

The below table illustrates the CAPEX requirements across the projects we are undertaking as a part of the COOPANS partnership.

As stated, these projects will aid us in ensuring our continued capability to meet demand, while ensuring we operate in line with our regulatory requirements. The following table summarises how the projects above deliver benefits under the KPAs of the European Performance and Charging Scheme, and consequently how as an organisation we benefit from the COOPANS partnership and associated projects.

TABLE 84: BENEFITS OF COOPANS PROJECTS IN LINE WITH KPAS

Benefit	Detail
Safety	• Upgrading our ATM system will enhance our operational safety through several new features that will benefit our ATCOs through increased situational awareness and decision-making capability. • Our current system is reaching the end of its operational life and to provide a continued and competitive service, we must adapt to the technological advancements the new system provides. • The upgrades are expected to improve the resilience and security of our systems through an improved cyber security, ensuring business continuity.
Cost-Efficiency	• Upgrading to the TopSky One system is compatible with previous COOPANS CAPEX programmes and provides a cost-effective means of achieving compliance and capacity demands through a lower investment rater per ANSP thanks to the partnership. • Not undertaking this project alongside our COOPANS partners could lead to a higher CAPEX requirement in procuring this system due through an engagement in a competitive tender process and would undermine our involvement in the EXODUS project. • These new systems will empower ATCOs to manage more flights per ATCO hour through a suite of productivity and operational tools that will advance the capabilities of our staff.
Environment	• The European ATM Master Plan details the need for the ability to optimise trajectories through strategic de-confliction and coordination, and investment in the new TopSky ATC One system will support us in achieving this. • The updated system will deliver increase flight efficiency, further driving our KEA down, improving our standing amongst our European counterparts.
Capacity	• Our upgraded systems are set to enable a greater capacity to be managed. The forecasts from STATFOR clearly indicate a need to adapt to an increased traffic volume over RP4 and beyond, and these systems will grant us the capability to do so.

Regulatory Compliance

Achieving CP1 compliance requires modernisation, and these projects will support us in doing so. As the new system is a unified solution, rather than our current bespoke system, we are able to achieve future standards in a more streamlined way, for changes such as software quality and security regulation. Thales have maintained that the new system will align with CP1 requirements and EU regulations going forward. If we were to not procure this system, we would be forced to resolve issues of compliance ourselves, increasing our CAPEX requirement whilst remaining at risk of not achieving full compliance with CP1. We would also be at risk of missing CP1 deadlines such as AOP/NOP integration (AF4) and Information Sharing (AF6) which are at present, part of the TopSky ATC One package due at the end of 2027.

Further to CP1 compliance, these projects will bring the wider COOPANS partnership in line with the European ATM Master Plan and the DES initiative. The TopSky ATC One system allows us to collaborate with SESAR to

secure further funding as a part of the COOPANS partnership for future developments to the system, thanks to its adherence to the SES vision. Our involvement with the EXODUS programme has proven the ability for us to leverage our position within the European ATM sector, and the new interoperable system has the potential to generate benefits to airspace users through ATM data service provision, whilst also improving our efficiency and safety performance.

8.5.2.1.1 ATM System Upgrade

Our ATM system is at the core to the delivery of our operational service, and since 2011, has been provided by a Thales system procured in partnership originally with two other ANSPs and now five other ANSPs. The system is due a major upgrade which will help address the technical debt and obsolescence built up in the existing system and places COOPANS on a strategically sound footing for the future.

Crucially, alongside our COOPANS partners implementing this new system, the TopSky ATC One upgrade is a key enabler for us to contribute to the investment required to support European ATM Master Plan initiatives. Recent projections by EUROCONTROL (FIGURE 38) have demonstrated the impact on ATFM delay across Europe of not investing the required €5 billion for the European ATM Master Plan initiatives in RP4. Our share of this investment is approximately €80 million, i.e. around €16 million a year which we will need to deliver on top of our day-to-day requirements to support the implementation of the European ATM Master Plan. The investment in our new TopSky ATC One system is essential to ensure we keep up the level of investment that is required.

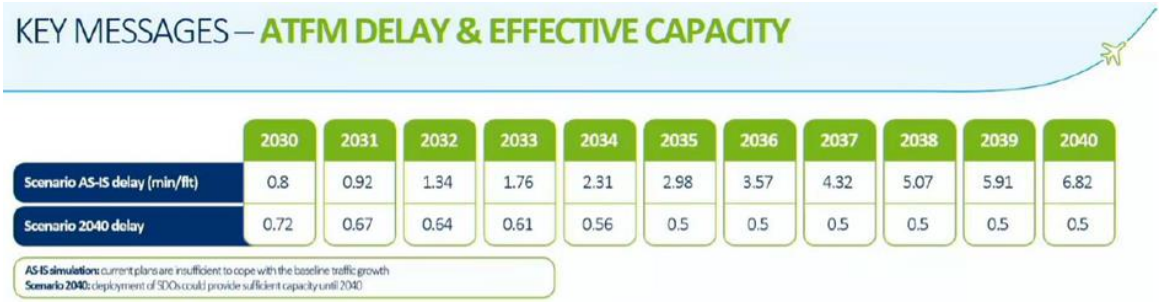

FIGURE 38: DEVELOPMENT OF ATFM DELAY IN EUROPEAN NETWORK WITH AND WITHOUT ATM MASTER PLAN

At this stage, given the level of maturity of the revised version of the Master Plan, it is not possible to link this investment or other investments in our CAPEX programme to the SDOs contained within it. However, as a member of the COOPANS alliance we are in a position to influence the development path of the TopSky ATC One system as part of a strategic performance group and as stated in the draft contract. This means we have the ability to shape the product along the lines of the SDOs contained within the Master Plan update within the contracted price. Thales will adapt the TopSky ATC One product to meet customer needs via an iterative process, through a series of software releases. This also contributes to the difficulty in linking CAPEX to the SDOs at this stage. It also remains to be seen which SDOs are common to all COOPANS partners, and which will only impact a select few. In addition, there are likely to be a number of SDOs outside the scope of RP4 investments such as UTM. Despite this, it is clear that the investment in the TopSky ATC One upgrade will contribute significantly to our ability to align with the SDOs and the European ATM Master Plan's overarching objectives.

Other key benefits to us from delivering the project include:

- Safety: The new ATM system will provide a safe, resilient & secure system to satisfy customer needs at an economical cost.
- Addressing obsolescence: The existing ATM system has been in operational service for over 17 years, making it outdated and at the end of its operational life. The technological advancements and changes in

the aviation industry have rendered the current system less effective and efficient compared to modern solutions.

- Compliance: Modernisation is necessary to achieve the CP1 (Common Project 1) compliance. The compliance with regulatory standards and requirements is crucial for maintaining operational integrity and safety within the aviation sector.
- Resilience: The new ATM system is expected to be more resilient in terms of software, safety, and security. This enhanced resilience directly contributes to maintaining the safety and security of air traffic operations and ensures business continuity.

Implementation of TopSky ATC One during RP4 will allow the above benefits to be introduced in the RP4 period, putting us in a strong position to evolve its service and provide increasing value to airlines and other stakeholders. TopSky ATC One is the major programme for our RP4 capital expenditure programme both in terms of value and operational importance.

8.5.2.2 Radar Upgrade

Our National Radar Upgrade project is a substantial capital infrastructure upgrade targeting eight Mode-S radar sites. These sites were installed between 2005 and 2011, and consequently many of their components are at the end of their life. Throughout RP3 and RP4, our National Radar Upgrade project targets the upgrade of these radar sites. In RP4, capital expenditure is required to upgrade these radar sites ensuring they continue to be operational, providing a radar service in RP4 and future reference periods.

- Shannon
- Cork
- Dublin Radar 3
- Mount Gabriel 2
- Woodcock Hill
- Malin
- Dooncarton
- MT Gabriel 1

This upgrade project has been timed to ensure it follows the most commercially sensible approach for AirNav Ireland and its customers. Although, many of the radar systems are obsolete and require an upgrade, some radar subsystems, such as radar antennae and ancillaries have not degraded or have already been upgraded. These subsystems are able to be maintained, meaning this project can simply focus on upgrading obsolete systems. If this project was postponed until future reference periods, these subsystems may also require an upgrade, meaning the whole radar site may need replacing. This would come at a significantly higher cost.

Phase 1 of the radar upgrade project already commenced during RP3, this phase will upgrade half of the radar sites and will be completed during RP4 alongside phase 2 which is targeting the second half of the eight radar sites.

8.5.2.3 Compliance Upgrades

The ATM system upgrade will address many compliance requirements particularly those related to CP1. However, a number of other projects are required to address International and European regulations, including regulations such as (EU) 2017/373, (EU) 2023/203 and ICAO requirements. If these projects are not implemented, we will risk being non-compliant with regulatory requirements.

8.5.2.4 Addressing Obsolescence

Elements of our infrastructure is ageing and needs replacement with various degrees of urgency. Failure to replace some of the systems in RP4 will lead to operational limitations which could impact on the capacity and efficiency of our service. The main obsolescence concerns are addressed in section 8.2.2.

8.5.2.5 General Infrastructure Upgrade

Alongside the projects listed above, the remaining elements of our CAPEX programme are desirable because they bring additional benefits related to safety, operational capacity and efficiency, and resilience.

8.5.3 Property

At present, we have a stock of buildings that are exceeding 20 years of operational life and require investment to continue their operation. Our highest CAPEX project, the Ballycasey Building Extension, requires an extension from the current administration block to alleviate the current space limitations, catering for growth in recent years, coupled with ongoing and expected growth. This falls hand in hand with our growth plans, allowing us to deliver training through the increased classroom capacity. Across our property projects, there are key connections with our sustainability aims, particularly with our EV Charging Installations project. The projects under our property scope are detailed in the following table:

TABLE 85: ✂

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8.5.4 Sustainability

The sustainability projects planned for RP4 improve our reputation concerning sustainability while also facilitating compliance with our regulatory obligations as defined by the Irish Government. In tandem with our property projects, our climate action plan aims to reduce our carbon footprint by 2030, as we are mandated to do so, and supports us in updating our current infrastructure as they reach their end of life. Sustainability is an increasing area of focus for the aviation industry and our projects, listed below, will support us in maintaining our position as a leader of sustainability in European aviation.

TABLE 86: ✂

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TABLE 87: ✂

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TABLE 88: ✂

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APPENDIX 1 PROPERTY/ SECURITY/ SUSTAINABILITY PROJECT SHEETS

RP4-PROP-01: Ballycasey Building Extension **Timescale:** ✂

Category
RP4 – Properties and Facilities, En Route

Project Cross-dependencies
✂

Total CAPEX Requirement
✂

Project Summary **Ballycasey Building Extension**

Construction of an extension from the administration block of the Ballycasey centre due to current space limitations. The new building consists of new office accommodation for engineering staff, rest rooms for operations staff, new equipment test and proving facility and new strategic spare stores (current facility rented offsite).

This extension will cater for growth at the Ballycasey ACC, through providing classroom capacity for refresher training needed to support training of existing staff on new systems being implemented through other CAPEX projects implemented in RP4 by technical services.

The installation of TCD (Technical Control Desks) for the equipment rooms, are currently in 2 locations in Ballycasey, one of which is a temporary room and the evolution of equipment in this room over time has meant that it is no longer suitble to support future upgrades. This extension project will provide a dedicated TCD adjacent to the new test and proving facility.

The inclusion of technical and server rooms in this building will require a higher standard of fire resilience, which adds to the cost of the project.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**			
	Compliance	**X**		Compliance with current building standards related to the additions of plant and equipment regulations
	ATM Masterplan & DES Alignment			
	Resilience	**X**		Extension allows the Ballycasey ACC capacity to cater for upgrades and new systems
	Safety			
	Capacity	**X**		Increase capacity for test and proving facilities needed to implement new systems. The classroom capacity is also necessary to deliver the future ATC service
	Productivity		**X**	Centralised TCD and new test and proving facilities will lead to an improvement in productivity

	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits	Ensure provision of appropriate accommodation and storage space at the Ballycasey ATC centre. Centralized TCD and new test and proving facilities will lead to an improvement in productivity. Increase capacity for testing and proving facilities needed to implement new systems. The classroom capacity is also necessary to deliver the future ATC service.
Project Output	• Increased office space • Centralized TCD • New test and proving facilities • New strategic stores for spares onsite • Staff refresher training facilities
Non-staff OPEX Impacts	None foreseen
Deliverables	• Increased office space • Centralized TCD • New test and proving facilities • New strategic stores for spares onsite • Staff refresher training facilities
Asset Life	20 years
Deliverability Risks	Planning permission required, construction resource limitations in the market, inflationary pressures in the construction market

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Assumptions behind total CAPEX requirement	Construction costs are currently significant due to significant inflationary pressure in the construction sector. Estimates for buildings are being validated through quantity surveyor analysis to ensure they are robust prior to obtaining detailed quotations.
Continuing From RP3?	No

Reason for continuation

RP4-PROP-02: Dublin ATC Building Extension **Timescale:** ✂

Category
RP4 – Properties and Facilities, Infrastructure – Buildings

Project Cross-Dependencies
✂

Total CAPEX Requirement
✂

Project Summary **Dublin ATC Building Extension/ Separate Building**

Construction of an extension from the existing ACC building or a separate block due to current space limitations. New space consists of strategic parts stores, relocation of TCD from existing equipment room, office accommodation and training rooms for new incoming engineering staff, canteen facilities for increased site numbers.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**			
	Compliance	**X**		Compliance with current building standards related to the additions of plant and equipment regulations
	ATM Masterplan & DES Alignment			
	Resilience	**X**		Extension allows the Dublin ACC capacity to cater for upgrades and new systems
	Safety			
	Capacity	**X**		Increase capacity for test and proving facilities needed to implement new systems. The classroom capacity is also necessary to deliver the future ATC service
	Productivity		**X**	Centralised TCD and new test and proving facilities will lead to an improvement in productivity
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits	• Ensure provision of appropriate accommodation and storage space at the Dublin ATC centre. • New canteen facilities to carter for larger numbers • Centralized TCD and new test and proving facilities will lead to an improvement in productivity • Increase capacity for testing and proving facilities needed to implement new systems. The classroom capacity is also necessary to deliver the future ATC service
Project Output	1. Increased office space 2. New Canteen 3. Centralised TCD 4. New test and proving facilities 5. New strategic stores for spares onsite 6. Staff refresher training facilities
Non-staff OPEX Impacts	• None identified
Deliverables	• Increased office space • Centralised TCD • New test and proving facilities • New strategic stores for spares onsite • Staff refresher training facilities
Asset Life	20 years
Deliverability Risks	Planning permission required, construction resource limitations in the market, inflationary pressures in the construction market

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Assumptions behind total CAPEX requirement	Construction costs are currently significant due to significant inflationary pressure in the construction sector. Estimates for buildings are being validated through quantity surveyor analysis to ensure they are robust prior to obtaining detailed quotations.
Continuing From RP3?	No
Reason for continuation	

RP4-PROP-03: Flood Mitigation Works CEROC **Timescale:** ✂

Category
RP4 – Properties and Facilities

Project Cross-dependencies
N/A

Total CAPEX Requirement
✂

Project Summary **Flood Mitigation Works CEROC**

Implementation of flood mitigation measures for the aerial farms and associated buildings at CEROC. Sites has been identified as been at risk of Fluvial flooding from Shannon Estuary <100-year event risk.

The primary and most significant flood risk to the CEROC site is from tidal flooding associated with the Fergus Estuary.

Works for both sites include:

- Diversion of existing drainage/culverts away from critical areas.
- 2.8m flood protection wall.
- Flood proofing of electrical rooms.
- Raising of access road.
- Stormwater system upgrades; pumps, non-return/sluice valves.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**			
	Compliance			
	ATM Masterplan & DES Alignment			
	Resilience			
	Safety	**X**		If works do not go ahead CEROC facility could experience flooding events due to climate change. Flood mitigation/ Climate Change preparedness.
	Capacity			
	Productivity			
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits

- Protection from unplanned flooding events.
- If works do not go ahead CEROC facility could experience flooding events due to climate change.

Project Output	Protection from unplanned flooding events.
Non-staff OPEX Impacts	OPEX assistance in project delivery. Engineering, procurement, and finance.
Deliverables	• Diversion of existing drainage/culverts away from critical areas. • Receiver mast base protection measures. • 2.8m flood protection wall. • Flood proofing of electrical rooms. • Raising of access road. • Stormwater system upgrades; pumps, non-return/sluice valves.
Asset Life	20 years
Deliverability Risks	Significant planning process, environmental impact assessments required as enabler for design and implementation.

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Assumptions behind total CAPEX requirement	Costs have been advised by AirNav Ireland contracted Quantity Surveyors via a Framework Agreement
Continuing From RP3?	No
Reason for continuation	

***RP4-PROP-04: Malin Head Radar Building* Replacement** **Timescale:** ✂

Category
RP4 – Properties and Facilities, en route services

Project Cross-dependencies
✂

Total CAPEX Requirement
✂

Project Summary **Malin Head Radar Building Replacement**

Replacement of / Significant structural works to the Malin Head radar building due to MICA throughout the building structure. Building replacement only. ✂

The building was showing signs of cracking to the upstand wall under the main dome which houses the antennae and radar equipment for the site. Tests determined a MICA content of approx. 10.3% across the samples provided which is just within the upper limit to classify as 'High Risk' and presents a long-term risk to the structure. Continuous assessment and remedial works are ongoing to ensure availability of the equipment pending replacement.

Application is for funding to replace complete structure whilst maintaining existing building.

Due to the remote location of the infrastructure, it is expected that planning consent and construction will require the full duration of the RP4 period. Equipment fitout and commissioning of the building is expected to take place under RP5

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**	**X**		Replacement facility is necessary to ensure coverage and prevent disruption.
	Compliance			
	ATM Masterplan & DES Alignment			
	Resilience			
	Safety	**X**		Addresses Structural integrity issues related to existing radar enclosure. Prevents related risk to customers by loss of radar service due to loss of building
	Capacity	**X**		Long term failure of existing structure. Loss of Radar.
	Productivity	**X**		Removal of necessity of ongoing maintenance costs and stabilization works to slow down deterioration of building.
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits	• Replacement facility is necessary to ensure coverage and prevent disruption. • Removal of necessity of ongoing maintenance costs and stabilization works to slow down deterioration of building. • Addresses Structural integrity issues related to existing radar enclosure • Prevents related risk to customers by loss of service
Project Output	1. Replacement of existing building. Removal of risk associated with building decay.
Non-staff OPEX Impacts	• No additional OPEX costs – facility is a direct replacement. • Reduction in regular MICA progression assessments and stabilization works which are currently ongoing.
Deliverables	• New radar building – so it is ready for equipment to be installed in RP5.
Asset Life	20 Years
Deliverability Risks	Planning consent from local planning authorities, available space for construction.
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Assumptions behind total CAPEX requirement	• Costs based on construction of new radar facility in Dublin 2023. The Malin Radar is located withing an area of conservation. Obtaining planning will require significant environmental assessments over multiple seasons. Possible public consultation process. • Current site may not accommodate and a standalone facility adjacent to existing. Technical and logistical interference. Additional land may/new site may be required.
Continuing From RP3?	No
Reason for continuation	

RP4-PROP-05: Plant Upgrade Works **Timescale:** ✂

Category
RP4 – Properties and Facilities, Infrastructure – Buildings

Project Cross-dependencies
N/A

Total CAPEX Requirement
✂

Project Summary **Plant Upgrade Works**

Replacement programme for building plant, systems, and equipment. End of life replacement of building plant and equipment. Works include replacement of HVAC, fire systems, electrical switchgear, access systems.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**	**X**		Current plant and equipment have reached end of life based on operational hours.
	Compliance			
	ATM Masterplan & DES Alignment			
	Resilience			
	Safety			
	Capacity		**X**	HVAC systems required to support operational system hardware.
	Productivity	**X**		Failure of HVAC Systems could lead to secondary failures on operational systems.
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits

- Replacement of plant and equipment which supports operational hardware systems. Existing systems have reached end of life based on operational hours.
- Scheduled replacement of equipment prevents unplanned failures. Reactive replacement to unplanned failures would result in delays in replacement due to lack of funding, State procurement requirements and engineering support.
- Planned maintenance allows for scheduling of resources. An unplanned failure would have the knock-on effect of bulling engineering resources from other projects.

Project Output

1. Replacement of plant items identified as to have reached to end of life
2. HVAC systems
3. Fire suppression media & systems
4. Consumer switchgear (non-incomer)

Non-Staff OPEX Impacts	• Property and facility department; planning & procurement. • Engineering dept support during works.
Deliverables	• Resetting of operation hours on critical plant and equipment (non-operational). • Improved resilience • Expanded capacity to support introduction of additional operational systems.
Asset Life	15 years
Deliverability Risks	Delivery of project is dependent on Enginering support and system capacity to allow system components to be replaced whilst maintaining operational support. Retrofit of temporary systems may have to be engineered and proven to support works.

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Assumptions behind total CAPEX requirement	High level costings based on initial estimates from similar works under RP3.
Continuing From RP3?	No
Reason for continuation	

RP4-PROP-06: Upgrade of Energy MIC **Timescale:** ✂

Category
RP4 – Properties and Facilities, Infrastructure – Buildings

Project Cross-dependencies
N/A

Total CAPEX Requirement
✂

Project Summary

Insert Increase in power capacity for critical locations

Historical introduction of technology upgrades has reduced spare capacity/ resilience in electrical power supplies to sites. Power supplies to be increased on multiple sites to reinstate resilience and accommodate introduction of new technology servers & supporting air-conditioning.

Works to be coordinated with Energy provider to increase capacity into incoming supplies, this will include possible upgrade of supply power transformers, incoming cabling and switchgear.

Sites will be assessed based on current maximum demand + planned equipment installations + resilience factor.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**		**X**	If additional power not available to sites, technology upgrades will not be possible.
	Compliance			
	ATM Masterplan & DES Alignment			
	Resilience	**X**		Operating at high load factors increases risk of loss of power supplies. Current best practice places resilience factor between 70-80% of maximum allowable.
	Safety			
	Capacity		**X**	Planned technology upgrades will require additional power for core equipment and supporting equipment such as air-conditioning.
	Productivity			
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits

- Additional power required to support installation of technology upgrades/new equipment.
- If additional power not available to sites, technology upgrades will not be possible.

Project Output	1.	Increase Maximum Import Capacity (MIC) to meet demand.
Non-staff OPEX Impacts	•	No additional OPEX impact associated with the upgrades. • Utility bill may increase due to other equipment upgrades.
Deliverables	•	Final MIC will be set at 70% of usage. This will future proof facility and facilitate future updates to equipment.
Asset Life	20 years	
Deliverability Risks	Upgrades will depend on availability in local power grid.	

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Assumptions behind total CAPEX requirement	Cost estimates are based on initial discussions with ESB networks.
Continuing From RP3?	No
Reason for continuation	

Cork ATC Extension: Budget Ref U016 **Timescale:** ✂

Category
RP4 – Properties and Facilities, Infrastructure – Buildings

Project Cross-Dependencies
N/A

Total CAPEX Requirement
✂

Project Summary **Cork ATC Extension**

This project provides for a 225sq.mt. extension to the existing Cork ATC Tower building which will address the long-term shortage of required space. This extension provides for the following: Office spaces, equipment storeroom, rest room, meeting room, Welfare facilities and alterations/expansion of the TCD areas.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**			
	Compliance	**X**		Compliance with current building standards related to the additions of plant and equipment regulations
	ATM Masterplan & DES Alignment			
	Resilience	**X**		Alteration of the TCD will increase equipment room capacity to cater for upgrades and new systems
	Safety			
	Capacity		**X**	Increase capacity for test and proving facilities needed to implement new systems. The classroom capacity is also necessary to deliver the future service/continuous/refresher training.
	Productivity	**X**		Centralised TCD and new test and proving facilities will lead to an improvement in productivity
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits

- Ensure provision of appropriate accommodation and stores space at the Cork Air Traffic Control Tower building
- Existing space is not sufficient resulting in strategic spares being stored off site and staff occupying temporary cabin accommodation.

Project Output	1. Provision of required additional space at the Cork Air Traffic Control Tower building
Non-staff OPEX Impacts	• Project duration - Supervision by IAA Engineering personnel for duration of works (irregular) • Project duration - Internal resources for management, procurement, and finance services
Deliverables	• Additional Floor space, • Optimized layout of existing building
Asset Life	20 years
Deliverability Risks	Previous project was deferred due to Covid-19.

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Assumptions behind total CAPEX requirement	Construction costs are currently significant due to significant inflationary pressure in the construction sector. Estimates for buildings are being validated through quantity surveyor analysis to ensure they are robust prior to obtaining detailed quotations.
Continuing From RP3?	Yes
Reason for continuation	Works already deferred in 2021 due to Covid-19.

***Conditional Survey Works*: Budget Ref W006** **Timescale:** ✂

Category
RP4 – Properties and Facilities, Infrastructure – Buildings

Project Cross-Dependencies
N/A

Total CAPEX Requirement
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Project Summary

Conditional Survey Works

Building upgrade works to 5 no. sites.

Continuation of RP3 W006. Ongoing maintenance of facilities - structural, building fabric works, building regulation compliance.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**			
	Compliance			
	ATM Masterplan & DES Alignment			
	Resilience			
	Safety			
	Capacity		**X**	Ongoing investment reduces potential for issues to escalate to a major or emergency status
	Productivity	**X**		Prolong the longevity of the buildings and their contents
	Cost-effectiveness			
	Lack of a cost-effective alternative	**X**		Better value for money achieved by planned expenditure as opposed to reactionary repairs / maintenance

Key Information and Benefits

- Prolong the longevity of the buildings and their contents
- Ongoing investment reduces potential for issues to escalate to a major or emergency status
- Better value for money achieved by planned expenditure as opposed to reactionary repairs / maintenance

Project Output

1. Essential new and replacement works over a 5-year programme
2. Assurance that critical AirNav Ireland Operational equipment is protected from damage due to deterioration of the buildings
3. Assurance that all works are completed by competent contractors providing conditionally sound buildings which will sustain for an estimated 10-year life for all upgrades

Non-staff OPEX Impacts	• Supervision by AirNav ireland Engineering personnel
Deliverables	• Planned repairs to buildings • Malin – ongoing MICA programme • Dooncarton – waterproofing, stabilization • Shannon tower – CAB glazing, fall arrest systems. • Dublin Contingency tower – Glazing, fire compliance, • Shannon Contingency tower – CAB glazing, Fire escape, waterproofing, facilities (bathroom, food, rest facilities)
Asset Life	8 years
Deliverability Risks	Estimates compiled by AirNav Ireland appointed QS under framework agreement.

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Assumptions behind total CAPEX requirement	Estimates compiled by AirNav Ireland appointed QS under framework agreement.
Continuing From RP3?	Yes
Reason for continuation	Works are a continuation of works carried out in RP3. The scope is expanded to locations not included in previous submission.

Plant Upgrade Works: Budget Ref W008 **Timescale:** ✂

Category
RP4 – Properties and Facilities, Infrastructure – Buildings

Project Cross-dependencies
E.g. (FDPS, OSG)

Total CAPEX Requirement
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Project Summary **Plant Upgrade Works**

The replacement of end-of-life essential mechanical plant and equipment as well as associated electrical/civil works at AirNav Ireland HQ. Works deferred due to review carried out in 2023 in relation to a decision to remain in existing building post 2024.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**	**X**		Plant and equipment has reached end of life
	Compliance			
	ATM Masterplan & DES Alignment			
	Resilience			
	Safety			
	Capacity	**X**		Failure of HVAC Systems could lead to secondary failures on operational systems.
	Productivity			
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits

- Replacement of plant and equipment which supports operational hardware systems. Existing systems have reached end of life based on operational hours.
- Scheduled replacement of equipment prevents unplanned failures. Reactive replacement to unplanned failures would result in delays in replacement due to lack of funding, State procurement requirements and engineering support.
- Planned maintenance allows for scheduling of resources. An unplanned failure would have the knock-on effect of bulling engineering resources from other projects.

Project Output Replacement of plant items identified as to have reached to end of life:

- HVAC systems
- Fire suppression media & systems
- Consumer switchgear (non-incomer)

Non-Staff OPEX Impacts	• Property and facility department; planning & procurement. • Engineering dept support during works.
Deliverables	• Resetting of operation hours on critical plant and equipment (non-operational). • Improved resilience • Expanded capacity to support introduction of additional operational systems.
Asset Life	15 years
Deliverability Risks	Delivery of project is dependent on engagement with building Landlord (IAA)

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Assumptions behind total CAPEX requirement	• High level costings based on initial estimates from similar works under RP3 • Detailed evaluation of Times Building carried out in 2023 as part of tenure review process.
Continuing From RP3?	Yes
Reason for continuation	Works deferred in Times Building due to review of lease tenure and possible relocation.

EV Charging Installations: Budget Ref V002 **Timescale:** ✂

Category
RP4 – Properties and Facilities Infrastructure – Buildings

Project Cross-Dependencies
E.g. (FDPS, OSG)

Total CAPEX Requirement
✂

Project Summary

EV Charging Installations

Previous provision in RP3 Climate change funding.

Works deferred in some locations due to lack of capacity in local power supplies. CEROC and Cork ATC sites.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**			
	Compliance	**X**		Provision of vehicles charging facilities is in line with Government requirement to provide 10% of car parking spaces to be EV enabled.
	ATM Masterplan & DES Alignment			
	Resilience			
	Safety			
	Capacity			
	Productivity			
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits

- The provision of vehicles charging facilities is in line with Government requirement to provide 10% of car parking spaces to be EV enabled.
- EV charging facilities for staff to commute to work. Both cork ATCC and CEROC are not serviced with public transport.

Project Output

1. Delivery of EV charging infrastructure to CEROC and Cork ATC sites

Non-Staff OPEX Impacts	No OPEX impacts identified
Deliverables	Delivery of EV charging infrastructure into the CEROC and CATCC sites.
Asset Life	15 years
Deliverability Risks	Delivery of infrastructure is dependent on Delivery of increased Power capacity into the CEROC and Cork ATC sites.

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Assumptions behind total CAPEX requirement	Costings based on delivery of projects in Dublin ATCC, Ballycasey & Shannon ATC.
Continuing From RP3?	Yes
Reason for continuation	Previous provision in RP3 Climate change funding. Works deferred in some locations due to lack of capacity in local power supplies.

ATC Chairs: Budget Ref Y008 **Timescale:** ✂

Category
RP4 – Properties and Facilities, Infrastructure – Buildings

Project Cross-dependencies
N/A

Total CAPEX Requirement
✂

Project Summary **ATC Chairs**

Replacement programme for ATC 24-hour operator chairs as part of an ongoing programme for Fatigue management.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**		**X**	New chairs will be selected to replace older models.
	Compliance			
	ATM Masterplan & DES Alignment			
	Resilience			
	Safety	**X**		H&S places obligations on employer to ensure workstations are fit for purpose and suitable for extended occupation.
	Capacity			
	Productivity	**X**		Continuous replacement of equipment. Existing chairs have defined lie and are occupied on 24/7 basis. Chairs selected to minimise user fatigue.
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits

- Chairs selected to reduce operator fatigue
- Employer responsibility to provide suitable workstation equipment

Project Output	• Continuous replacement of operator chairs. Replacement on a continuous rollout programme.
Non-staff OPEX Impacts	None foreseen
Deliverables	• Scheduled replacement of existing equipment ensures that workstations are fully available.
Asset Life	5 years
Deliverability Risks	None

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Assumptions behind total CAPEX requirement	Costs based on expenditure on chairs in RP3 period
Continuing From RP3?	Yes
Reason for Continuation	Continuous replacement of equipment. Existing chairs have defined lie and are occupied on 24/7 basis. Chairs selected to minimise user fatigue.

***RP4-SUST-01: Climate Action Plan* - Heating / Cooling Upgrades** **Timescale:** ✂

Category
RP4 – Corporate Affairs, Sustainability, Terminal and En Route

Project Cross-Dependencies
N/A

Total CAPEX Requirement
✂

Project Summary

Climate Action Plan – Heating and Cooling Upgrades

Heating/Cooling upgrades Ballycasey, Cork ATC, CEROC, Times Building. - These projects are proposed as part of ongoing necessary efforts to reduce energy usage in accordance with Government Regulatory Requirements.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**		**X**	Replacement of obsolete equipment is necessary for the continued safe operation of AirNav Ireland installations.
	Compliance	**X**		Mandated by Irish government to meet carbon footprint reduction and energy efficiency targets by 2030
	ATM Masterplan & DES Alignment			
	Resilience			
	Safety			
	Capacity			
	Productivity			
	Cost-Effectiveness		**X**	Instances where the project deals with the replacement of less efficient legacy equipment this will be done in a way that leads to lower running costs in the long run
	Lack of a cost-effective alternative			

Key Information and Benefits

- Replaces & upgrades obsolete equipment
- Energy efficiency benefit
- Greenhouse gas reduction in line with Irish National and EU regulation
- Contributes towards carbon emission targets and reduces running costs

If the project is not implemented there is a risk of equipment failure and higher energy consumption

Project Output	1. Heating/Cooling upgrades Ballycasey, Cork ATC, CEROC, Times Building
Non-Staff OPEX Impacts	It is not expected that this project will have any additional OPEX cost impact.
Deliverables	1. Heating/Cooling upgrades Ballycasey, Cork ATC, CEROC, Times Building
Asset Life	15 years
Deliverability Risks	Sufficient engineering support will be required for integration with existing infrastructure (project management support is generally outsourced).

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Assumptions behind total CAPEX requirement	Based upon consultant reports.
Continuing From RP3?	No

Timescale: ✂

Category
RP4 – Corporate Affairs, Sustainability, Terminal and En Route

Project Cross-Dependencies
N/A

Total CAPEX Requirement
✂

Project Summary **Climate Action Plan**

- **Lift upgrade Cork ATC, Times Bldg.** - The current equipment is obsolete and has high energy demand.
- **Radiator & Pipe Infrastructure CEROC, Ballygirreen** - to replace obsolete inefficient infrastructure with better performing low energy waste infrastructure.
- **Low energy lighting at Unmanned Sites** - This project is designed to replace high energy demand lighting with more efficient low energy lighting in accordance with Government requirements to reduce energy usage and carbon footprint.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**		**X**	End of life replacement of a number of assets which will be replaced with lower energy usage equipment.
	Compliance	**X**		Mandated by Irish government to meet carbon footprint reduction and energy efficiency targets by 2030
	ATM Masterplan & DES Alignment			
	Resilience			
	Safety			
	Capacity			
	Productivity			
	Cost-effectiveness		**X**	Instances where the project deals with the replacement of less efficient legacy equipment this will be done in a way that leads to lower running costs in the long-run
	Lack of a cost-effective alternative			

Key Information and Benefits	• Replacement of obsolete equipment • Energy efficiency and Carbon emission reduction • Lower running costs as less unexpected maintenance requirements can be expected. This project involves a series of investments to protect and enhance the reputation of AirNav in relation to sustainability concerns. These projects also facilitate compliance with regulatory obligations defined by the Irish Government.
Project Output	1. Lift upgrade Cork ATC, Times Building. 2. Radiator & Pipe Infrastructure 3. Low energy lighting, Unmanned Sites.
Non-Staff OPEX Impacts	There is no additional maintenance impact and consequently no additional cost implication associated with this project.
Deliverables	1. Lift upgrade Cork ATC, Times Building. 2. Radiator & Pipe Infrastructure 3. Low energy lighting, Unmanned Sites.
Asset Life	8 years
Deliverability Risks	Sufficient engineering support will be required for integration with existing infrastructure (project management support is generally outsourced)
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Assumptions behind total CAPEX requirement	Based on consultant report.
Continuing From RP3?	No

***RP4-SUST-03: Climate Action Plan* – PV Installation** **Timescale:** ✂

Category
RP4 – Corporate Affairs, Sustainability, Terminal and En Route

Project Cross-Dependencies
N/A

Total CAPEX Requirement
✂

Project Summary **Climate Action Plan – PV Installation**

PV Installation CEROC & Ballycasey. The PV installation will be used to power CEROC, and the excess produced will be used to offset the power used at other AirNav installations.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**			
	Compliance	**X**		Mandated by Irish government to meet carbon footprint reduction and energy usage reduction targets by 2030
	ATM Masterplan & DES Alignment			
	Resilience			
	Safety			
	Capacity	**X**		Reduces dependence on National Grid and will produce renewable energy which drives energy efficiency and carbon emission reduction efforts in line with National policy.
	Productivity			
	Cost-effectiveness		**X**	Will produce cost efficient renewable electricity reducing energy charges.
	Lack of a cost-effective alternative			

Key Information and Benefits

- Reduces dependence on National grid
- Produces green renewable energy
- Reduces costs

If the project is not implemented this will lead to a continued total dependence on grid electricity with no energy cost saving (Note: CEROC PV installation will require planning permission which may impact output, hence exact cost savings cannot be estimated at this time)

Project Output	1. PV Installation CEROC & Ballycasey
Non-Staff OPEX Impacts	The PV installation will require a cleaning and maintenance contract. It is estimated that this aspect of the project will be OPEX net neutral given excess power produced will be sold back into the national grid. For the remaining aspects of the project it is expected that these will not lead to any increase in OPEX above existing costs associated with already planned and scheduled maintenance.
Deliverables	PV Installation Ballycasey
Asset Life	20 years
Deliverability Risks	The main delivery risks are associated with the PV installation. An environmental impact assessment required, and planning permission will need to be granted. In addition, sufficient export capacity on grid cabling will be required. Sufficient engineering support will be required for integration with existing infrastructure (project management support is generally outsourced)

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Assumptions behind total CAPEX requirement	Based upon consultant reports.
Continuing From RP3?	No
Reason for continuation	

APPENDIX 2 ✂

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APPENDIX 3 TECHNOLOGY AND OPERATIONS PROJECT SHEETS

RP4-SURV-01: Air Traffic Control Centre (ATCC) Generators & Switchgear **Timescale:** ✂

Category

RP4 – Technical Services, En route and Terminal services

Project Cross-Dependencies

None

Total CAPEX Requirement

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Project Summary

Generator Replacements at ATCCs in Ballycasey and Dublin.

The generators and switchgear delivering the required power supply resilience and availability to support safe and reliable Air Traffic services at Ballycasey En route and Dublin Air traffic Control centres are now over 24 years old. This project is to make provision for their replacement.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**	**X**		Replacement of ageing generators and switchgear equipment (over 24 years old)
	Compliance			
	ATM Masterplan & DES Alignment			
	Resilience	**X**		Ensure resilient power supply to all ATM systems Dublin and Ballycasey, to maintain business continuity
	Safety	**X**		Through ensuring a resilient power supply, this project ensures power to safety critical ATM systems and ensures Ballycasey and Dublin ATCCs remain operational during times of grid power failures or interruption.
	Capacity			
	Productivity			
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits

Completing this project will ensure the Dublin and BCY ATCCs will continue to have adequate maintainable backup power generation and distribution systems servicing all ATM systems in the ATCCs. If this project was not completed this would mean the Dublin and BCY ATCCs may not have sufficiently reliable backup power to ensure ATC services can be provided during mains power interruptions or failures. With the climate change related increase in the number and severity of storms, AirNav Ireland must rely more frequently on our own power supplies.

Project Output	1. 3 x 800KVA generators in BCY 2. 2 x 400KVA generators in Dublin 3. 6 x power distribution switchgear cabinets in Dublin and in BCY
Non-Staff OPEX Impacts	None - There will be ongoing support requirements for these generators, it is envisaged that the support required will be the same as current OPEX support
Deliverables	▪ 3 x 800KVA generators in BCY ▪ 2 x 400KVA generators in Dublin ▪ 6 x power distribution switchgear cabinets in Dublin and in BCY
Asset Life	8 years
Deliverability Risks	Replacing the power distribution systems and switches will be complex and will require careful planning with cross domain support and ATC approvals to ensure no operational impact.

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Assumptions behind total CAPEX requirement	Figures based on specialist internal knowledge and proposed scope.
Continuing From RP3?	No

RP4-SURV-02: Modular Uninterrupted Power Supply (UPS) supporting TopSky Timescale: ✂

Category
RP4 – Technical Services, En route and Terminal services

Project Cross-Dependencies
None

Total CAPEX Requirement
✂

Project Summary

Modular UPS Supporting TopSky ATC One Positions

Currently all ATC positions in Shannon and Dublin Area Control Centre (ACC) are backed-up by individual mini-UPS systems. The modular UPS will provide more resilient and scalable back-up power supplies to all ATC positions and will be more scalable to support TopSky ATC One systems. The modular UPS also has improved remote control and monitoring power over mini-UPS systems. This project is a key enabler for the TopSky ATC One ATM system upgrade being delivered through the COOPANS alliance.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**			
	Compliance			
	ATM Masterplan & DES Alignment			
	Resilience	**X**		Resilience of power supply to ATC positions, assuring business continuity.
	Safety	**X**		This replacement project ensures the same level of safety is maintained as was in RP3. Being an enabler for the TopSky ATC One system it improves the safety of all supported ATM systems, bringing safety on par with other COOPANS members
	Capacity			
	Productivity			
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits

Completing this project will ensure modular UPS systems are in place to facilitate TopSky ATC One installation and operations. Furthermore, the mini-UPS systems will eventually replace the existing UPS systems in BCY and DUB ATCCs. If this project is not implemented, business continuity will be impacted as back-up power systems will not be in place to support both platforms with an uninterrupted power supply (UPS) solution.

The key benefits of implementing the modular UPS are:

- Improved resilience and scalable back-up power supply.
- Improved remote control and monitoring

Project Output	1. 2 redundant modular UPS systems in Dublin 2. 2 redundant modular UPS systems in Ballycasey
Non-Staff OPEX Impacts	None - There will be ongoing support requirements for the UPS systems, it is envisaged that the support required will be the same as current OPEX support
Deliverables	▪ 2 redundant modular UPS systems in Dublin ▪ 2 redundant modular UPS systems in Ballycasey
Asset Life	8 years
Deliverability Risks	No risks foreseen

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Assumptions behind total CAPEX requirement	Figures based on specialist internal knowledge and proposed scope.
Continuing From RP3?	No

RP4-SURV-03: National Clock Systems **Timescale:** ✂

Category
RP4 – Technical Services, En route and Terminal Services

Project Cross-Dependencies
FDPS, NET SEC, COMMS NAV

Total CAPEX Requirement
✂

Project Summary

Network Time Protocol (NTP) and Clock Replacement, BCY(4), DUB(4), SNN(2), CRK(2), CEROC(2)

ATM systems require resilient, reliable, and consistent synchronisation systems to operate. Up until now, synchronisation has often been delivered independently for each system leading to inconsistent reliability of synchronisation systems. Recent political events have also highlighted that GPS clocks are vulnerable to jamming/spoofing and added resilience in our ATM System synchronisation is required.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**	**X**		Dealing with expected obsolescence of multiple synchronisation system
	Compliance			
	ATM Masterplan & DES Alignment			
	Resilience	**X**		Delivering consistent/reliable level of synchronisation and better protection for ATM systems against jamming/spoofing attacks.
	Safety	**X**		Safety is improved as ATM systems better synchronised and are protected from jamming and spoofing attacks. This should help to ensure AirNav's safety performance does not deteriorate, particularly in relation to the rate of separation minima infringement KPIs, with a separation service reliant on radars working correctly.
	Capacity			
	Productivity			
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits

This project helps to deal with obsolescence of multiple synchronisation systems at once, whilst offering clear benefits in terms of ATM system resilience by ensuring the consistent synchronisation of ATM systems. The necessity for this project has been heightened by recent political events, with GPS clocks vulnerable to jamming/spoofing. If this project is not undertaken, it will likely result in more failures related to synchronisation.

Project Output	1. 20 x Time servers: ▪ Six Time servers in Dublin ▪ Four Time servers in Ballycasey ▪ Two Time servers in Cork ▪ Two Time servers in Shannon ▪ Two Time servers in CEROC. ▪ Four spare Time servers 2. 60 x Clock Displays: ▪ Ballycasey ONL - 16 Clock displays. ▪ Ballycasey CVF - 6 clock displays. ▪ TCDs - 6 Clock displays. ▪ Dublin ONL - 10 Clock displays. ▪ Dublin CVF - 4 Clock displays. ▪ Towers Dub, SNN Cork and Contingency -10 Clock displays. ▪ Eight Spare Clock Displays
Non-Staff OPEX Impacts	None - There will be ongoing support requirements for the time servers, it is envisaged that the support required will be the same as current OPEX support.
Deliverables	As specified in Project Output.
Asset Life	8 Years
Deliverability Risks	Requires close coordination required between all domains and ATM operations

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Assumptions behind total CAPEX requirement	Figures based on similar historical purchases for CEROC.
Continuing From RP3?	No

RP4-SURV-04: Radar Upgrade Phase 2 **Timescale:** ✂

Category
RP4 – Technical Services, Terminal, and En Route Services

Project Cross-Dependencies
NET SEC

Total CAPEX Requirement
✂

Project Summary

Radar upgrades, SNN, CRK, DUB3, MTG2, new antennas and 6 radomes.

Phase 1 of the National Radar Upgrade project includes the upgrade of 4 radar sites (Woodcock Hill, Malin, Dooncarton and Mount Gabriel 1) and has been addressed in a separate project summary as this project commenced in RP3.

Phase 2 includes the upgrade of the remaining four radar sites (Shannon, Cork, Dublin Radar 3, Mount Gabriel 2) to RSM 970 NG models, including the three combined airport radars. The radar subsystems, such as radar antennas, radomes and ancillaries at all 8 radar sites (including those in Phase 1) will be addressed in this phase.

Without sufficient secondary surveillance radar coverage and ATC coverage, AirNav cannot provide an ATC service.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**		**X**	A significant number of radars are at the end of their life this project upgrades eight radars to replace components that have reached the end of their life.
	Compliance			
	ATM Masterplan & DES Alignment			
	Resilience		**X**	Radar upgrade required due to risk of radar component failure to ensure continuity of surveillance provision from these locations.
	Safety	**X**		Any potential radar failure due to component failure could potentially have a negative impact on safety. The upgrade should help to ensure AirNav's safety performance does not deteriorate, particularly in relation to the rate of separation minima infringements KPIs, with a separation service reliant on radars working correctly.
	Capacity		**X**	While procedures are in place to cope with loss of radars, in most instances these procedures increase separations, leading to reduced capacity
	Productivity			

	Cost-effectiveness	**X**		It is more cost-effective to upgrade these radars than wait for their components to deteriorate further to the point where a complete replacement is required.
	Lack of a cost-effective alternative		**X**	Upgrade of eight radars to replace components that have reached the end of their life. This National Radar Upgrade project will therefore better support the aim of reducing en route determined costs in comparison to the alternative of not implementing the project.

Key Information and Benefits	Completing this project will result in 4 Mode-S Radars and 3 co-located Primary radars upgraded to next generation model. Mechanical parts and radomes will also be refurbished on 8 radars extending operational use for 15 years. AirNav Ireland cannot provide a 5NM or 3NM radar separation service to airlines without sufficient reliable radar coverage.
Project Output	This project will ensure all AirNav radars will be upgraded, ensuring AirNav has sufficient, reliable, and accurate surveillance coverage of AirNav Airspace in order to maintain 5NM and 3NM horizontal separation of Aircraft.
Non-Staff OPEX Impacts	€700,000 OPEX requirement for spares. There will be ongoing support requirements for the radars, it is envisaged that the support required will be the same as current OPEX support
Deliverables	▪ 4 Mode-S Radars ▪ 3 co-located primary radars upgraded to next generation model. ▪ Mechanical parts and radomes will also be refurbished on 8 radars
Asset Life	12 years
Deliverability Risks	Radar upgrades require each of the existing radars to be out of service during the upgrade and the subsequent safety assurance phase. Coordination and mitigations need to be agreed with operations and this may be challenging.

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Continuing From RP3? Radar upgrade phase 1 started in RP3, this is covered under a separate project sheet

RP4-SURV-05: Surveillance Data Distribution System (SDDS) & Rec **Timescale:** ✂

Category
RP4 -Technical Services, Terminal, and En route Services

Project Cross-dependencies
FDPS

Total CAPEX Requirement
✂

Project Summary

Surveillance Data Distribution and recording systems are required for Dublin, Ballycasey and CEROC ATCCs.

The EUROCONTROL Surveillance Data Distribution System (SDDS) is a versatile, high-performance communication gateway that provides value-added services for the safe and secure distribution of Surveillance information in (but not limited to) EUROCONTROL's All-purpose structured surveillance Information exchange (ASTERIX) format. EUROCONTROL provide the software license for free, the purpose of this project is to purchase the associated hardware.

SDDS enables Air Navigation Service Providers (ANSPs) to exchange surveillance data in an efficient manner, contributing to the reliable and efficient operation of the pan-European ATM network. Surveillance Data distribution and recording systems are required in our Dublin, Ballycasey and CEROC ATCCs to support the delivery of radar and ADS-B data to our Surveillance Data Processing System (SDPS) systems and recorders. New Surveillance Data recorders are required to support the Surveillance Performance validation requirements as Surveillance Analysis Support System for ATC-Centre (SASS-C) is now focused on surveillance data analysis rather than surveillance data recording.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**			
	Compliance		**X**	Supports AirNav in meeting surveillance performance and interoperability requirements
	ATM Masterplan & DES Alignment			
	Resilience	**X**		Provides redundant radar data flows
	Safety	**X**		The system error checks the data and it is cybersecure
	Capacity		**X**	Capacity maintained through provision of redundant radar data flows, which ensures minimum separation services can be maintained
	Productivity			
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits	New Surveillance Data recorders are required to support the Surveillance Performance validation requirements as SASS-C is now focused on Surveillance data analysis rather than Surveillance data recording. **This project is an enabler to the delivery of the TopSky ATC One upgrade which is being worked on through the COOPANS alliance.**
Project Output	1. Two SDDS systems in each of Dublin, Shannon and CEROC
Non-Staff OPEX Impacts	None foreseen
Deliverables	▪ 2 SDDS systems in Dublin ACC ▪ 2 SDDS systems in Shannon ACC ▪ 2 SDDS systems in CEROC ATCC
Asset Life	8 years
Deliverability Risks	Transition to SDDS will need to be managed carefully, a transition plan and a risk assessment will be required.
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Assumptions behind total CAPEX requirement	Figures based on RP3 project estimates as SDDS hardware is very similar to ARTAS/SASS-C hardware.
Continuing From RP3?	No

RP4-SURV-06: ARTAS and SASS-C **Timescale:** ✂

Category
RP4 – Technical Services, Terminal and En Route

Project Cross-Dependencies
FDPS, OSG

Total CAPEX Requirement
✂

Project Summary

Air Traffic Management Surveillance Tracker and Server (ARTAS) AND Surveillance Analysis Support System for ATC Centres (SASS-C) RP4 COOPANS Upgrade and new TopSky ATC One platform ARTAS systems.

ARTAS is the main Surveillance Tracker system used to combine all the surveillance information from all radar and ADS-B sensors to produce an accurate air situation picture for use by Air Traffic Controllers.

The Surveillance Data Tracking Systems (ARTAS) and Surveillance Performance Validation Systems (SASS-C) in Dublin, Ballycasey and CEROC must be upgraded to the supported EUROCONTROL release versions in the RP4 period. Also, additional ARTAS systems are required for the TopSky ATC One platforms.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**		**X**	Upgrade required to maintain system integrity and operation
	Compliance	**X**		Provides assurance that AirNav can meet EU regulatory requirements
	ATM Masterplan & DES Alignment			
	Resilience	**X**		Impacts COOPANS and TopSky ATC One systems
	Safety	**X**		This upgrade project will ensure surveillance tracking and performance validation systems are in compliance and supported by the latest EUROCONTROL release versions, helping support low rates of separation minima infringements
	Capacity		**X**	This project will ensure that AirNav is able to continue to provide 5NM and 3NM radar separation, and thereby maintain the capacity of airspace as it was in RP3.
	Productivity			
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits	This project will ensure that the Surveillance-Data Tracking systems (ARTAS) and Surveillance performance validation systems (SASS-C) in Dublin, Ballycasey and CEROC are upgraded to the supported EUROCONTROL release versions in the RP4 period. If this project is not undertaken, AirNav Ireland may not be able to provide either 5NM or 3NM radar separation service to airlines. AirNav are required to operate a supported version of ARTAS to ensure timely system support in the event of ARTAS issues. AirNav may be unable to verify the performance of surveillance infrastructure to meet EU regulatory requirements without the current release of SASS- C.
Project Output	1. New ARTAS, Surveillance Tracker systems at the Dublin, Ballycasey and CEROC Air Traffic Control Centres for both COOPANS and TopSky platforms (Completed 2028). 2. New SASS-C, Surveillance Performance Analysis systems at the three ATCCs and two mobile systems (Completed 2028).
Non-Staff OPEX Impacts	None foreseen - There will be ongoing support requirements for the ARTAS and SACC-C, it is envisaged that the support required will be the same as current OPEX support.
Deliverables	Twenty-four new ARTAS server systems & nine SASS-C analysis servers to be installed at the following locations: ▪ Dual ARTAS at Ballycasey COOPANS ONL & CVF (4 x ARTAS) ▪ Dual ARTAS at CEROC COOPANS (2 x ARTAS) ▪ Dual ARTAS at Dublin COOPANS ONL & CVF (4 x ARTAS) ▪ Dual ARTAS spares at Dublin and Ballycasey ATCCs (4 ARTAS) ▪ Dual ARTAS at Ballycasey TopSky ONL & ONL-C (4 x ARTAS) ▪ Dual ARTAS at CEROC TopSky ONL-C (2 x ARTAS) ▪ Dual ARTAS at Dublin TopSky ONL & ONL (4 x ARTAS) ▪ SASS-C at Ballycasey ONL & CVF (2 x SASS-C) ▪ SASS-C at CEROC (1 x SASS-C) ▪ SASS-C Dublin ONL & CVF (2 x SASS-C) ▪ SASS-C spares at Dublin and Ballycasey ATCCs (2 SASS-C) ▪ Mobile SASS-C systems (2 SASS-C)
Asset Life	8 years
Deliverability Risks	No significant risks

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Assumptions behind total CAPEX requirement	Figures based on RP3 project estimates + expanded scope
Continuing From RP3?	No

BMS Upgrade Dublin/ Ballycasey: Budget Ref T010 **Timescale:** ✂

Category
RP4 – Technical Services, Terminal & En route Services

Project Cross-Dependencies
None

Total CAPEX Requirement
✂

Project Summary

Building Management System (BMS) Upgrade Dublin / Ballycasey

This project will ensure that Dublin ACC and tower, and Ballycasey administration block building management systems continue to safely, effectively and efficiently manage the building support systems. This ensures these locations maintain the optimum environmental conditions for both people and equipment within the buildings.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**		**X**	Replacement of building management systems that are at the end of their life
	Compliance			
	ATM Masterplan & DES Alignment			
	Resilience		**X**	System resilience enhanced through provision of appropriate working temperatures for equipment, reducing system outages due to overheating
	Safety	**X**		Replacement will assure the safety of the building management systems
	Capacity			
	Productivity		**X**	Optimum environmental conditions for staff working within the buildings
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits

The Building Management Systems in the Dublin and Ballycasey ATCCs are at end of life and must be upgraded to ensure the effective management of the building support systems maintaining the optimum environmental conditions for both people and equipment within the buildings.

Project Output

1. Dublin ACC and Low tower BMS operating with up-to-date supportable control systems.
2. Ballycasey administration building BMS operating with up-to-date supportable control systems.

Non-Staff OPEX Impacts

Maintenance of systems - €10K per annum above current OPEX

Deliverables	▪ BMS Upgrades Dublin ▪ BMS Upgrades Ballycasey
Asset Life	8 years
Deliverability Risks	None anticipated

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Assumptions behind total CAPEX requirement	Costs have been constructed using estimates provided by experienced vendors.
Continuing From RP3?	Yes
Reason for continuation	RP3 project Covid-19/Resource issues delayed completion of project in RP3 period.

***Radar Upgrade Phase 1*: Budget Ref W002** **Timescale:** ✂

Category
RP4 – Technical Services, Terminal, and En Route Services

Project Cross-dependencies
Safety

Total CAPEX Requirement
✂

Project Summary **RADAR Overhaul – Remote Control and Monitoring System (RCMS)**

Eight of the AirNav radar systems were installed between 2005 and 2011 and many components are at end of life. A number of radar subsystems, such as radar antennae and ancillaries which have not degraded or have been upgraded may be retained, facilitating a more cost-effective radar upgrade rather than radar replacement during this RP3 period.

Up to two radars per year will be upgraded. Ahead of RP4 some aspects of this project will commence in 2024, specifically the RCMS and Woodcock Hill radar. The Remote Control and Monitoring System (RCMS) for all AirNav radars is to be upgraded first.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**		**X**	This project involves the upgrade of eight radars to replace components that have reached the end of their life, protecting against the risk of obsolescence of critical radar systems.
	Compliance			
	ATM Masterplan & DES Alignment			
	Resilience		**X**	Radar upgrade required to ensure continuity of surveillance provision from these locations due to radar component failure
	Safety	**X**		Any potential failure to a radar due to component failure could potentially impact on safety. The upgrade project should help to ensure safety performance does not deteriorate, particularly in relation to the rate of separation minima infringements KPIs, with a separation service reliant on radars working correctly.
	Capacity		**X**	While procedures are in place to cope with loss of radars, in most instances these procedures increase separations, leading to reduced capacity
	Productivity			
	Cost-effectiveness	**X**		It is more cost-effective to upgrade existing radars than wait for their

				components to deteriorate to the point where a complete replacement is required.
	Lack of a cost-effective alternative			

Key Information and Benefits	This is Phase 1 of a National Radar Upgrade project which addresses the current radar obsolescence problem, with a cost-effective solution which delivers resilient surveillance coverage, by extending the life of each upgraded radar. AirNav Commissioned 8 Radars between 2005 and 2011 and, as these radars are at end of life, this project covers the cost of upgrading the radars to extend their life by at least 15 years. This phase addresses the upgrades of the oldest 4 of these 8 radars.

Project Output	This project will ensure that four AirNav radars will be upgraded, ensuring AirNav has sufficient, reliable and accurate surveillance coverage of AirNav Airspace in order to maintain 5NM horizontal separation of Aircraft. The radars will be upgraded as follows: **RADAR Overhaul - Woodcock Hill** Woodcock Hill Radar electronics upgrade from RSM-970S to RSM-NG. **RADAR Overhaul - Malin** Malin Radar electronics upgrade from RSM-970S to RSM-NG. **RADAR Overhaul - Dooncarton** Dooncarton Radar electronics upgrade from RSM-970S to RSM-NG. **RADAR Overhaul - MT Gabriel 1** Mt Gabriel H1 Radar electronics upgrade from RSM-970S to RSM-NG.
Non-Staff OPEX Impacts	None foreseen
Deliverables	4 AirNav radars will be upgraded to extend their operational life to 2039-2041.
Asset Life	12
Deliverability Risks	Project will require prolonged release of operational radar which will need to be carefully coordinated with operations

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Assumptions behind total CAPEX requirement	Costs estimates are based upon the contracted cost.
Continuing From RP3?	Yes
Reason for continuation	RP3 project Covid-19/Resource issues delayed completion of project in RP3 period.

***Generator Replacement Programmes*: Budget Ref W003** **Timescale:** ✂

Category
RP4 – Technical Services, En route and Terminal Services,

Project Cross-dependencies
Safety

Total CAPEX Requirement
✂

Project Summary

Generator Replacement Programmes

This project delivers power supply resilience to key radar and VHF Communication sites. The generators at several radar sites are at end of life and the identified VHF Communication sites currently have no backup generator.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**	**X**		The generators at several radar sites are at end of life and therefore need to be replaced
	Compliance			
	ATM Masterplan & DES Alignment			
	Resilience	**X**		Identified VHF Communication sites currently have no backup generator, implementation of new generators in these sites will help ensure business continuity
	Safety	**X**		Resilience of power supply to safety critical Radar, VHF and HF communications will be maintained in case of power grid failures or disruptions through the replacement of end-of-life generators.
	Capacity			
	Productivity			
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits

The outcome of this project will be beneficial to AirNav En Route centers by ensuring that power services supporting business-critical Radar, VHF and HF communications will be maintained at these sites.

Project Output

1. Rosslare – New 50KVA Generator
2. Cork – New 100KVA Mobile Generator.
3. Dooncarton - Replacement 60KVA Generator
4. Woodcock Hill Radar - Replacement 60KVA Generator
5. Shannon Radar - Replacement 60KVA Generator
6. Mt Gabriel Head 1 Radar - Replacement 60KVA Generator

7. Mt Gabriel Head 2 Radar - Replacement 60KVA Generator

Non-Staff OPEX Impacts	No significant impacts (maintenance of systems - €4K per annum additional compared to current OPEX)
Deliverables	As per project output above
Asset Life	8 years
Deliverability Risks	None Anticipated

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Assumptions behind total CAPEX requirement	Costs constructed using estimates provided by experienced vendors.
Continuing From RP3?	Yes
Reason for continuation	RP3 project Covid-19/Resource issues delayed completion of project in RP3 period.

***ATC 2Kx2K Screen Replacement*: Budget Ref Y002** **Timescale:** ✂

Category
RP4 – Technical Services, Terminal and En route Services

Project Cross-dependencies
OSG, FDPS

Total CAPEX Requirement
✂

Project Summary

ATC Screen Replacement - BCY & DUB

The ATC screens in Dublin and Ballycasey ATCCs were installed in 2007 and were upgraded with LED backlights in 2016. These display screens are now at end of life, and this project is to deliver the required replacement ATC screens.

This project will replace the obsolete ATC 2K x 2K resolution screens in Dublin and Ballycasey ATCCs. The ATCC screens were initially installed in 2007 and upgraded with LED backlights in 2016 to extent their usable life. Screens in Ballycasey (75) and Dublin (36) are to be replaced with 111 screens.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**	**X**		Display screens originally installed in 2007 are at end of their life in Dublin and Ballycasey ATCCs, hence require replacing
	Compliance			
	ATM Masterplan & DES Alignment			
	Resilience		**X**	The ageing equipment comes with a higher risk of failure. A failure of display screens in an ATCC would ATC service delivery.
	Safety	**X**		The reliability and accuracy of the ATC screens contributes to the overall safety of ATC.
	Capacity			
	Productivity			
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits

This ATC Screen replacement project addresses the obsolescence of the current ATC screens in Ballycasey and Dublin. Suitable screens are required at ATC positions to enable air traffic controllers to carry out their duties. Obsolete ATC screens introduces a risk to operations and this project seeks to eliminate this risk for the usable life of the new screens.

Project Output	One Hundred and eleven (111) new High-Resolution ATC screens in Dublin and Ballycasey ATCCs as follows: • Ballycasey ONL 32 console screens • Ballycasey CVF 12 screens, 6 console and 6 desktop • Ballycasey ✂ 20 desktop screens • Ballycasey Replay 2 desktop screens, TCD 1 desktop screen • Ballycasey Spares and 8 x spare screens (2 for ✂) • Dublin ONL 20 console screens (incl. Baldonnell) • Dublin CVF 8 desktop screens • Dublin Replay 1 desktop screen, TCD 1 desktop screen • Dublin Spares and 8 x spare screens.
Non-Staff OPEX Impacts	No significant impacts
Deliverables	One Hundred and eleven (111) new High-Resolution ATC screens in Dublin and Ballycasey ATCCs as follows: ▪ Dublin ONL & CVF - 36 screens ▪ Ballycasey ONL & CVF - 75 screens
Asset Life	8 years
Deliverability Risks	None foreseen
✂	
✂	
✂	
Assumptions behind total CAPEX requirement	Costs have constructed using estimates provided by experienced vendors
Continuing From RP3?	Yes
Reason for continuation	RP3 project Covid-19/Resource issues delayed completion of project in RP3 period.

***NAVAIDS Dublin and Shannon*: Budget Ref R005** **Timescale:** ✂

Category
RP4 – ATM Operations, Terminal

Project Cross-dependencies
NET SEC

Total CAPEX Requirement
✂

Project Summary

Replacement of the existing Instrument Landing System (ILS) and Instrument Runway Visual Range (IRVR) systems at Dublin and Shannon.

The aim of this project is to replace the existing Instrument Landing Systems (ILS) and Instrument Runway Visual Range (IRVR) systems to provide safe and efficient Terminal ATC services. The existing IRVRs were installed between 2006 and 2007. The existing ILSs were installed between 2004 and 2007. The current systems are reaching end-of-life and some components of the systems are obsolete. Technical services are planning the replacement programme, on a phased basis, starting in 2020 and plan to complete the installations by 2025. Technical services are also planning to add backup IRVR sensors to improve the IRVR resilience.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**	**X**		Current systems are reaching the end-of-life and certain components are identified as being obsolete.
	Compliance		**X**	Compliance with ICAO categorisation requirements.
	ATM Masterplan & DES Alignment			
	Resilience		**X**	Additional resilience built into IRVR systems
	Safety	**X**		The replacement of ILS and IRVR which are critical systems in aiding the safe landing of aircraft at airports, especially in during low visibility conditions. should make sure safety performance does not deteriorate.
	Capacity			
	Productivity			
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits	• The main benefit of the project is the replacement of obsolete ILSs that provide business continuity for airfield, i.e aircraft can continue to land in low visibility conditions. • Sustained customer satisfaction as users of AirNav Navaids services will continue to benefit from a safe and reliable Navaids infrastructure. • AirNav will maintain its reputation as an efficient and effective CNS provider. • Avoidance of substantial operational problems and maintenance costs that would result from aging equipment. Not completing the project would means an inability to land aircraft in low visibility conditions.
Project Output	The objective of this project is to replace existing IRVRs and ILS's to ensure that the IRVR and ILS systems continue to provide a safe, reliable and cost-effective service to our users and customers.
Non-Staff OPEX Impacts	SLA costs part of contract Post implementation system support & maintenance €100,000 additional compared to current OPEX
Deliverables	▪ New IRVR systems at Dublin, Shannon and Cork airports ▪ Back-up IRVR sensors at Dublin and Cork ▪ New ILS systems at Dublin, Shannon and Cork airports ▪ New infrastructure to support these systems at Dublin, Shannon and Cork airports
Asset Life	12 years
Deliverability Risks	Completion of airfield civil works by airport authorities in advance of ILS installations
✂	
✂	
✂	
Assumptions behind total CAPEX requirement	The costs estimates are based on current quotations from relevant industry contractors. The internal manpower costs are based on known system installation, commissioning and engineering training and documentation preparation time scales. Pricing variations dependent on Regulatory and Operational requirements.

Continuing From RP3?	Yes
Reason for continuation	Delayed due to Covid-19 (project stopped for almost all of 2020, project priority on Dublin tower and parallel runway with knock-on impact on resources (2021 & 2022). Long delays due to airport authorities lack of engagement with AirNav regarding completion of civil works

Category
RP4 Technical Services, Terminal Services

Project Cross-dependencies
NET SEC

Total CAPEX Requirement
✂

Project Summary **Upgrade of airfield cables at Dublin South Runway and Shannon Airfield**

Elements of the Shannon and Dublin airfield cables have been in service for over 40 years and run the risk of failure given their age. Data for the Instrumented Runway Visual Range (IRVR) and Instrument Landing system (ILS) is transmitted on the existing airfield cables, which owing to their age run the risk of failure, potentially resulting in the ILS or IRVR being unavailable. If this were to happen during poor visibility, the loss of IRVR or ILS could result in significant disruption to traffic. In Shannon, the airfield cables also connect the voice switch to the VHF receiver site. The existing airfield cabling at Shannon and Dublin Airport needs to be upgraded.

Upgrade of the Shannon airfield cabling will facilitate diverse routing of the datacomms from the airfield via the control tower and Shann Radar (SRE) building to Ballycasey. This project will also facilitate a diverse route from the Shannon control tower to Ballycasey via the SRE building.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**	**X**		Existing cables at Shannon and Dublin airfield over 40 years old, thus there is an inherent risk of their failure owing to age
	Compliance			
	ATM Masterplan & DES Alignment			
	Resilience		**X**	Providing additional redundancy through diverse routing of cables
	Safety	**X**		The aging cables significantly increases risk of failure of IRVR and ILS RSI, both of which are essential for safe aircraft operations during poor visibility conditions.
	Capacity			
	Productivity			
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits	The upgrade of airfield cabling is expected to provide the following benefits: • New fibre cables will ensure reliable datacomms for airfield equipment into the future and future proof the airfield network. • Where required new ducts will be installed protecting the cables and ensuring greater reliability. • Fibre optic cables will provide additional capacity on airfield datacomms network for future equipment needs.
Project Output	1. Installation of new ducts where required, (existing ducts will be used where available and as long as they are in good condition). 2. Installation of fibre optic cables to sites on the airfield, replacing existing copper cabling 3. Facilitate a diverse cable routing from the Shannon control tower to Ballycasey via the SRE building
Non-Staff OPEX Impacts	Post implementation system support & maintenance reduced due to newer cabling and diverse cable routing, leading to fewer faults.
Deliverables	▪ Shannon airfield new ILS/IRVR ducting and cabling ▪ New diverse cable routing from Shannon tower to Ballycasey via SRE building ▪ Dublin south runway new airfield ducting and cabling to new ILS sites
Asset Life	20 years
Deliverability Risks	Contractor airfield CPRSA access requirements
✂	
✂	
✂	
Assumptions behind total CAPEX requirement	The costs estimates are based on quotations from relevant industry contractors. This is a multiyear project and updated quotations are sought from suppliers as statements of work are finalised. The internal manpower costs are based on known system installation, commissioning and engineering training and documentation preparation timescales.
Continuing From RP3?	Yes
Reason for continuation	Delays in airport authority being able to provide resources to support the project

***Met Server: SHN, Cork and Dublin*: Budget Ref R016** **Timescale:** ✂

Category
RP4 – ATM Operations, Technical and En route Services

Project Cross-dependencies
NET SEC, Safety, OSG

Total CAPEX Requirement
✂

Project Summary **MET Data Processing System installation Dublin, Shannon & Cork**

This project commenced in RP3, and its scope focusses on the upgrade of the existing METREP function with a system that is more cost effective and easier to maintain. This upgrade was completed in Dublin ACC in RP3.

(EU) 2017/373 relates to the provision of Meteorological services and currently there is an ANSD / ICAO non-compliance against the provision of MET services, in relation to the broadcast of runway status. This non-compliance is also applicable to Met Eireann as they are issuing a non-standard METAR message (Weather Message) to facilitate case of use for the Automatic Terminal Information Service (ATIS).

This is a joint project with MET Eireann. MET Eireann will provide the AMAP system which will encompass the new MET Sensors at each airfield and runway (Dublin, Cork and Shannon) and AirNav will provide the MDP (MET Data Processing) system to take the MET feeds into AirNav's ATC Centers and Towers.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**		**X**	The existing ATIS system is obsolete and can no longer be upgraded
	Compliance	**X**		Compliance with ICAO Annex 3 and (EU) 2017/373 regulatory MET requirements
	ATM Masterplan & DES Alignment			
	Resilience			
	Safety	**X**		Ensures runway condition reports can be provided
	Capacity		**X**	Reduces controller workload as currently information has to be called out with VHF (potential consequential impact on capacity)
	Productivity		**X**	Improved efficiency in dispersal of information
	Cost-effectiveness			Implementation of a system that is more cost-effective to maintain
	Lack of a cost-effective alternative			

Key Information and Benefits	The key benefit of this project is meeting a regulatory requirement (global report formatting regulation) runway condition reports. Not undertaking this project risks non-compliance with ICAO Global Reporting Format for Runway Surface Conditions GRF/RCR regulation. The project will result in improved local airport weather information, and reduced costs as interfacing with automated weather systems will result in cost reductions from the current manual Met Observer interface with COOPANS. In addition removal of the existing COOPANS connections to MET Eireann would simplify future software upgrades and maintenance activities. AirNav would be compliant with ICAO MET Requirements, and there would be less manual intervention required by the ATC Coordinator in preparing ATIS broadcasts.

Project Output	The Operations directorate and ATC Operations will be the beneficiary, 1. Through improved Local Airport Weather information, and reduced costs as interfacing with automated weather systems will result in cost reductions from the current manual Met Observer interface with COOPANS. 2. Improved display of additional ATC relevant data including Received Met Messages, Temporary Work Instructions, Weather RADAR. 3. Improved ATIS system with increased levels of automation, and less manual intervention by the ATC Coordinator. 4. Compliance with ICAO ANNEX 3 and (EU) 2017/373 regulation Met Requirements.
Non Staff OPEX Impacts	SLA costs part of contract. Post implementation system support & maintenance €40,000 per year additional compared to current OPEX
Deliverables	▪ Dublin, Ballycasey and Shannon Tower MDP System ▪ Cork Tower MDP System ▪ Network Costs ▪ CE-ROC MDP System
Asset Life	8 years
Deliverability Risks	Supplier Resourcing/ Skillset

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Assumptions behind total CAPEX requirement	The costs estimates are based on current quotations from relevant industry contractors. The internal manpower costs are based on known system installation, commissioning and engineering training and documentation preparation time scales.
Continuing From RP3?	Yes

Reason for continuation	Delayed due to Covid-19 (project stopped for almost all of 2020, project priority on Dublin tower and parallel runway with knock-on impact on resources (2021 & 2022)

RP4-COMM-01: CEROC Midlife Upgrade for CEROC Main R&S VCCS **Timescale:** ✂

Category
RP4 – Technical Services, En Route

Project Cross-dependencies
NET SEC, Safety, M&E, OSG

Total CAPEX Requirement
✂

Project Summary

Midlife Upgrade for CEROC Main R&S VCCS

Midlife upgrade of the CEROC Main Rohde & Schwarz Voice Communication and Control Systems (VCCS) to allow continued continuity of communications and replace aging equipment, allowing continued support from the manufacturer.

The upgrade includes the upgrade of COTS (Commercial off the shelf) hardware (servers, switches, routers, gateways, operating working positions, firewalls, etc.) to enable continued support from the manufacturer due to the end of life of hardware, and software/firmware upgrade to allow control and interaction with VHF radios. The current Cisco networking equipment is end of life and requires upgrading.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**	**X**		Involves a midlife upgrade to an existing R&S VCCS in order to refresh obsolescent hardware and updated firmware / software for connection to VHF radios.
	Compliance			
	ATM Masterplan & DES Alignment			
	Resilience		**X**	CEROC provides a contingency operation for ANI En route service in Ballycasey. Upgrading the R&S VCCS in CEROC will ensure continued support life for the main VCCS system in CEROC.
	Safety	**X**		This project would protect against the risk of insufficient service in the event of the main ACC becoming inoperable.
	Capacity			
	Productivity			
	Cost-effectiveness		**X**	Midlife upgrade of current Main R&S VCCS will allow all ancillary infrastructure to remain in place along with no additional overhead for training, spares and maintenance in terms of cost effectiveness.
	Lack of a cost-effective alternative			

Key Information and Benefits	The main benefit of the project is the contingency for communications services for Ballycasey ACC. Not completing the project would mean there is no contingency available in the event of main ACC becoming out of service

Project Output	Upgrade of the Rohde & Schwarz VCS-4G CEROC VCCS to allow continuity of service and increase lifespan of the VCCS for an additional 15 years through software / firmware updates and hardware replacement including all supporting network equipment.
Non staff OPEX Impacts	None foreseen – existing maintenance contract in place
Deliverables	Rohde & Schwarz VCS-4G CEROC VCCS upgrade to include: • Upgrade software / firmware to the most up to date version available (Release to be determined). • Upgrading of networking hardware (new servers/switches/routers/firewalls). • Upgrading of server platforms. • Project Services for CEROC R&S VCCS upgrade project • Installation & Documentation – Back off & Monitoring
Asset Life	8 years
Deliverability Risks	Dependency on VOIP Switch Ballycasey Main being completed first
✂	
✂	
✂	
Assumptions behind total CAPEX requirement	ROM Pricing from Supplier. The internal manpower costs are based on known system installation, commissioning and engineering training and documentation preparation time scales.
Continuing From RP3?	No

RP4-COMM-02: Communications & Navigation Test Equipment **Timescale:** ✂

Category
RP4 – Technical Services, Terminal and En Route

Project Cross-dependencies
N/A

Total CAPEX Requirement
✂

Project Summary **The purchase of Communications and Navigation Test Equipment**

The scope of this project covers the CAPEX costs necessary to procure the required new communications and navigation test equipment to ensure that the engineering division can continue to test and maintain AirNav's communications and navigational assets to comply with ICAO Annex 10 and EUROCONTROL European Safety Regulatory Requirements (ESARRs) standards.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**	**X**		Existing communications and navigational test equipment requires replacement due to age of equipment
	Compliance	**X**		The purchase of new communications and navigational test equipment to comply with ICAO Annex 10 and EUROCONTROL ESARR standards
	ATM Masterplan & DES Alignment			
	Resilience			
	Safety		**X**	The new equipment is necessary to ensure that AirNav communications and navigational assets are maintained preventing a deterioration in safety performance.
	Capacity			
	Productivity			
	Cost-effectiveness		**X**	Test equipment purchased will be utilised at all AirNav sites. Test Equipment selected and purchased will provide multiple functionality to ensure value for money.
	Lack of a cost-effective alternative			

Key Information and Benefits The project facilitates the ongoing requirement of maintaining the AirNav's Communications and Navigational infrastructure to comply with ICAO Annex 10 and EUROCONTROL ESARR standards.

Project Output Continued compliance with ICAO Annex 10 and EUROCONTROL ESARR standards for maintenance of ATC operational equipment.

Non Staff OPEX Impacts	No impact foreseen
Deliverables	The purchase of new communications and navigational test equipment
Asset Life	5 years
Deliverability Risks	None foreseen

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Assumptions behind total CAPEX requirement	These costs are based on current quotations from communications and navigational test equipment suppliers
Continuing From RP3?	No

Category
RP4 Technical Services, Terminal & En Route

Project Cross-dependencies
Property

Total CAPEX Requirement
✂

Project Summary

Expansion of Frequentis VCCS at Dublin & Ballycasey CVF platforms

In 2022, a Frequentis Voice Communications & Control Switch (VCCS) was procured and installed in Dublin ATC & Tower, under an existing RP3 project. During RP4, a similar Frequentis VCCS is scheduled to be installed in Ballycasey ATC in the period 2024-2026 also under the existing RP3 project. Additionally, there is a separate requirement which requires the modification of the Ballycasey CVF to be able to accommodate the new planned Frequentis VCCS installation.

A further requirement had emerged in the form of extending the Frequentis VCCS into the current Dublin CVF for contingency and training purposes.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**	**X**		At Ballycasey, modifications need to be made to the CVF to accommodate a new VCCS installation. At Dublin there is a requirement to replace obsolete Schmid VCCS
	Compliance			
	ATM Masterplan & DES Alignment			
	Resilience	**X**		The project will ensure that voice communication capabilities are available at the CVFs, providing contingency voice services
	Safety	**X**		At Dublin ATC & Tower, the VCCS previously installed in 2022, will now be extended to be used for contingency and training purposes at the Dublin CVF.
	Capacity			
	Productivity			
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits

This project maintains a VCCS system in the Dublin and Ballycasey CVF platforms for operational contingency and training.

Project Output	Installation and availability of VCCS system at Dublin and Ballycasey CVF platforms
Non Staff OPEX Impacts	Will form part of existing Frequentis maintenance SLA – any increase in OPEX is expected to be minimal
Deliverables	▪ Frequentis VCCS at Dublin CVF for contingency and training ▪ Frequentis VCCS at Ballycasey CVF for contingency and training
Asset Life	8 Years
Deliverability Risks	None foreseen

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Assumptions behind total CAPEX requirement	Based upon Frequentis quotations
Continuing From RP3?	No

RP4-NAVG-01: Doppler VHF Omni Directional Range (DVOR) /Distance Measuring Equipment (DME)

Timescale: ✂

Category
RP4 – Technical Services, Terminal Services

Project Cross-dependencies
NET SEC

Total CAPEX Requirement
✂

Project Summary

DAP (Dublin airport), Cork, Shannon, Connaught DVOR / DMEs as per minimum operation network requirements

As part of AirNav's minimal operational network for Navigational Aids (NavAids), it was deemed necessary to keep the DVOR/DMEs as conventional navigational aids at Dublin airport, Cork, Shannon, Connaught. This is necessary to maintain alignment with Commission Implementing Regulation (EU) 2018/1048 Article 6. DVOR/DMEs are used to support en route services (in the event of GNSS outage) and non-precision approach procedures to Shannon, Dublin, Cork and Knock airports.

The existing DVOR/DMEs were installed between 2006 and 2008. The current systems are reaching end-of-life, and some components of the systems are obsolete.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**	**X**		Current systems are reaching the end-of-life with some system components identified as being obsolete. This upgrade project is essential in protecting against the risk of obsolescence of these DVOR/DME sites.
	Compliance		**X**	Compliance with Commission Implementing Regulation (EU) 2018/1048 Article 6.
	ATM Masterplan & DES Alignment			
	Resilience		**X**	Resilience in the event of GNSS being unavailable.
	Safety	**X**		In the event of a failure, interference or spoofing of GNSS there would be no PBN or conventional method of navigation. This will help ensure AirNav's safety performance does not deteriorate, particularly in relation to the rate of separation minima infringements KPIs.
	Capacity		**X**	In the event of GNSS being unavailable, maintaining conventional NavAids ensures capacity is maintained.
	Productivity			

	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits	The main benefits of the project are the replacement of end of life DVOR/DME equipment leading to improved reliability in ground based navigational aids. The project also allows AirNav to adhere to Commission Implementing Regulation (EU) 2018/1048

Project Output	This this project is to replace existing DVOR/DMEs to ensure that the DVOR/DME systems continue to provide a safe, reliable and cost-effective service to our users and customers.
Non Staff OPEX Impacts	Service Level Agreement SLA costs as part of contract Post implementation system support & maintenance €150,000
Deliverables	▪ New DVOR/DME equipment at Shannon ▪ New DVOR/DME equipment at Dublin Airport ▪ New DVOR/DME equipment at Cork ▪ New DVOR/DME equipment at Connaught
Asset Life	8 years
Deliverability Risks	None foreseen

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Assumptions behind total CAPEX requirement	ROM Pricing from supplier
Continuing From RP3?	No

RP4-NAVG-02: En route Distance Measuring Equipment (DME) **Timescale:** ✂

Category
RP4 – Technical Services, en route services

Project Cross-dependencies
NET SEC

Total CAPEX Requirement
✂

Project Summary

Replace En route DMEs RNAV Sites (GLENTEIGE (GTG), MOHERCROM (MCM) & WOLFTRAP (WTP))

As part of AirNav's minimal operational network for NavAids it was deemed necessary to keep the RNAV En Route DMEs as conventional navigational aids. This is necessary to maintain alignment with Commission Implementing Regulation (EU) 2018/1048 Article 6.

The existing RNAV DMEs were installed in 2004. The current systems are reaching the end-of-life, and some components of the systems are obsolete.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**	**X**		Current systems are reaching the end-of-life and certain system components are identified as being obsolete. This upgrade project is essential in protecting against the risk of obsolescence of these obsolete DME sites.
	Compliance		**X**	Compliance with Commission Implementing Regulation (EU) 2018/1048 Article 6
	ATM Masterplan & DES Alignment			
	Resilience		**X**	Resilience in the event of GNSS being unavailable
	Safety	**X**		In the event of a failure, interference or spoofing of GNSS there would be no PBN or conventional method of navigation This should help to ensure AirNav's safety performance does not deteriorate, particularly in relation to the rate of separation minima infringements KPIs.
	Capacity		**X**	In the event of GNSS being unavailable, maintaining conventional NavAids ensures capacity is maintained.
	Productivity			
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits	The main benefits of the project are the replacement of end-of-life RNAV DME equipment leading to improved reliability in ground based navigational aids. The project also allows AirNav to adhere to Commission Implementing Regulation (EU) 2018/1048.

Project Output	This project is to replace existing RNAV DMEs to ensure that the RNAV DME systems continue to provide a safe, reliable and cost-effective service to our users and customers.
Non Staff OPEX Impacts	To be built into tender contract Service Level Agreement SLA costs part of contract Post implementation system support & maintenance
Deliverables	▪ New RNAV DME at Glenteige ▪ New RNAV DME at Mohercrom ▪ New RNAV DME at Wolftrap
Asset Life	8 years
Deliverability Risks	None foreseen
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✂	
✂	
Assumptions behind total CAPEX requirement	ROM pricing from supplier
Continuing From RP3?	No

Category
RP Technical Services, Terminal & En Route

Project Cross-dependencies
Safety, OSG

Total CAPEX Requirement
✂

Project Summary

MEP EVCS Mid-life Upgrade nationally (Dublin, Ballycasey Shannon Tower CEROC)

An MEP Emergency Voice Communications Switch (EVCS) was installed nationally during the period 2012 – 2016. A separate project to update software and firmware in the EVCS is being progressed in RP3. This project sheet relates to a mid-life hardware upgrade which is needed to extend the life of the system up to 2031. A full system replacement will be considered in RP5.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**	**X**		This project addresses the obsolescence of the EVCS system hardware, replacing critical voice infrastructure necessary for ATC service provision.
	Compliance			
	ATM Masterplan & DES Alignment			
	Resilience		**X**	Ensures system resilience through maintaining an emergency VCS in vendor support, which ensures availability of a back-up to the main VCS in the event of its failure.
	Safety			
	Capacity			
	Productivity			
	Cost-effectiveness		**X**	Delivery of a mid-life hardware upgrade that avoids the need for a full system replacement at this time
	Lack of a cost-effective alternative			

Key Information and Benefits

The main benefit of the project is the national upgrade of existing emergency voice switch hardware which is becoming obsolete. Current hardware will cease to be supported by the end of 2027 unless an upgrade is performed. Consequently, the emergency voice switch would not be supported if the project is not implemented.

The main benefits from this project are:

- Mid-life upgrade of obsolete MEP EVCS hardware which maintains the system in vendor support

- Avoids the need for a full system replacement and lengthy tender process at this time

Project Output	1. Replace obsolete hardware on EVCS system
Non Staff OPEX Impacts	No significant impact foreseen - part of existing MEP EVCS maintenance contract
Deliverables	▪ Replace all obsolete hardware on all AirNav MEP EVCS systems
Asset Life	5 years
Deliverability Risks	None foreseen
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Assumptions behind total CAPEX requirement	ROM pricing from supplier (MEP)
Continuing From RP3?	No

RP4-COMM-07: VOIP Skysoft Recording System **Timescale:** ✂

Category
RP4 – ATM Operations, Terminal and En Route

Project Cross-dependencies
NET SEC, Safety, M&E, OSG

Total CAPEX Requirement
✂

Project Summary

Skysoft "off the glass" recording system upgrades / installations.

This project delivers Skysoft "off the glass" recording system upgrades at Dublin ACC and Ballycasey ACC. In addition, a new system at Shannon Tower & Cork Tower is required to replace an obsolete Thruput system which is over 10 years old.

Skysoft provides "off the glass" recording of the COOPANS screens for the purpose of integrated playback, with the main purpose of supporting incident investigations.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**	**X**		Existing hardware and software at Dublin ACC and Ballycasey ACC require updates after it was first installed in 2013. At Shannon tower there is an obsolete system which is over 10 years old.
	Compliance			
	ATM Masterplan & DES Alignment			
	Resilience			
	Safety	**X**		The new systems replacing the obsolete recording systems currently in place have enhanced playback capability, which will aid incident investigation. Further the new recording systems is required to be able to capture screen recordings of the new COOPANS system.
	Capacity			
	Productivity			
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits

The main benefit is to ensure Dublin ACC, Ballycasey ACC, Shannon Tower & Cork Tower have operational incident investigation capabilities through "off the glass" playback technology. Not completing the project limits the facility for incident investigation.

Project Output	1. Upgrade of Dublin and Ballycasey “off the glass” systems to the latest versions of hardware and software 2. For Shannon tower the replacement of an obsolete system with a new system 3. New “off the glass” recording system at Cork Tower, providing additional capability not currently available
Non Staff OPEX Impacts	No significant impacts foreseen - existing maintenance contract in place
Deliverables	1. Upgrade of Dublin ACC “off the glass” recording system 2. Upgrade of Ballycasey ACC “off the glass” recording system 3. Replacement of Thruput “off the glass” system at Shannon tower 4. New “off the glass” recording system at Cork Tower
Asset Life	8 years
Deliverability Risks	Internal resourcing availability to complete project

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Assumptions behind total CAPEX requirement	ROM pricing from supplier
Continuing From RP3?	Yes
Reason for continuation	Multiyear project business case approved in 2024.

***Voice Communication Switch* Budget Ref S005** **Timescale:** ✂

Category
RP4 – ATM Operations, Terminal and En Route Services

Project Cross-dependencies
NET SEC, Safety, M&E, Property, OSG

Total CAPEX Requirement
✂

Project Summary

The full scope of the project includes the strategic replacement of the following Voice Communications Switch (VCS) infrastructure:

- Main Voice Comms Switch installation Cork Main
- Main Voice Comms Switch installation Dublin Main
- Main Voice Comms Switch installation Ballycasey Main
- Main Voice Comms Switch installation Shannon Tower
- Main Voice Comms Switch installation Ballycasey test and backup

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**	**X**		Main benefit of the project is the replacement of existing voice switches which are obsolete at Shannon Tower and Ballycasey,
	Compliance		**X**	Best in class technology, future-proofed & scalable, aligns to AirNav Corporate Strategy and to EUROCONTROL and SESAR best practice guidelines.
	ATM Masterplan & DES Alignment			
	Resilience	**X**		The project will remove the risk exposure that currently exists around manufacturer and support services from the current vendors.
	Safety	**X**		Being able to reliably communicate with aircraft is vital for aircraft safety. New Voice systems with enhanced features, may lead to higher safety standards, in addition to ensuring that the contingency (back-up) system remains in place
	Capacity			
	Productivity		**X**	Involves the replacement of critical voice infrastructure following bankruptcy of existing system supplier and the suboptimal performance of current company offering support
	Cost-effectiveness		**X**	Streamlines training and spares / maintenance programme.
	Lack of a cost-effective alternative			

Key Information and Benefits	The main benefit of the project is the replacement of existing voice switches which are obsolete at Shannon Tower and Ballycasey, and additionally at Ballycasey to test and ensure contingency (backup) is still in place. The old voice switch is out of support, there would potentially be no voice service for ATC, if the project is not implemented.
Project Output	1. Enhanced features. 2. New IP voice switch at Ballycasey including a contingency voice switch and a new Ip voice switch at Shannon tower
Non Staff OPEX Impacts	3. Service Level Agreements SLA Costs part of contract 4. Post implementation system support & maintenance €100,000 additional as there is limited support on current VCS
Deliverables	The Main Voice Comms Switch installation at Cork and Dublin will completed before RP4. The main RP4 deliverables are as follows: ▪ **Shannon Airport Voice Communications Switch:** Dual Redundant Server based IP VCS Switch with Air/Gnd and Gnd/Gnd connectivity. ▪ **Ballycasey Voice Communications Switch:** Dual Redundant Server based IP VCS Switch with Air/Gnd and Gnd/Gnd connectivity. ▪ **Ballycasey Contingency / T&V Voice Communications Switch:** Dual Redundant Server based IP VCS Switch with Air/Gnd and Gnd/Gnd connectivity.
Asset Life	8 years
Deliverability Risks	Internal resourcing to complete project

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Assumptions behind total CAPEX requirement	The costs are based on current quotations from relevant industry contractors. The internal manpower costs are based on known system installation, commissioning and engineering training and documentation preparation time scales.
Continuing From RP3?	Yes
Reason for continuation	Delayed due to Covid-19 (project stopped for almost all of 2020, project priority on Dublin tower and parallel runway with knock-on impact on resources (2021 & 2022)

Category
RP4 – Technical Services, Terminal and En route, NAC services

Project Cross-dependencies
FDPS, COMMS

Total CAPEX Requirement
✂

Project Summary

NGIDS (Next Generation Intruder Detection System) project requires a 2nd phase. Build out of IDS is required at STBU, CTBU,. This will be based on ANSD requirements and to Acquire System Isolation equipment (Data Diode (TAP) to protect ATM Systems from intrusion).

To comply with NIS (Network and Information Systems) directive and clause D.010 of (EU) 2017/373, the service provider is implementing Next Generation Intrusion Detection System (NGIDS) capability across the ATM functional system. This project will be rolled out to Dublin and Ballycasey during 2024 and will be rolled out in RP4 (2025) to our remaining ATC sites at Shannon, Cork

This project covers the expansion of the Security Detection System NGIDS to Terminal and NAC, and the acquisition of System Isolation equipment (The TAP acts as a Data Diode ensuring data is Uni-directional from ATM system to IDS monitor). In addition, the scope of the deployment includes Server Scanning (AV) technology for Linux OS, and end point protection solutions through engagement with technology vendors.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**			
	Compliance	**X**		To comply with NIS Directive (EU) 2016/1148 and (EU) 2017/373 Clause D.010, ensuring cybersecurity compliance with safety orientated regulation is necessary to limit the potential for cybersecurity threats to impact aviation safety.
	ATM Masterplan & DES Alignment			
	Resilience		**X**	The project provides business continuity assurance through harmful malware detection
	Safety	**X**		Project supports ATM ANS Security Intrusion Detection (IDS) for enhanced detection of Cyber Threats that may impact safety.
	Capacity			
	Productivity			
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits	The project will benefit AirNav by ensuring full compliance with D.010 Clause of Regulation 2017/373. Enhanced Security will be derived from the NGIDS system and through its capability to detect harmful malware it will lead to a safer ATM system. If this project is not completed there is a risk of regulatory non-compliance.
Project Output	1. Regulatory compliance with (EU) 2017/373 + NIS Compliance 2. Enhanced Security Monitoring 3. Capability to detect harmful malware which may impact the safe operation of critical ATM Systems 4. Isolation of ATM system from the IDS Monitoring through deployment of TAP (Data Diode) for all equipment
Non-Staff OPEX Impacts	Circa 30k per annum from 2026.
Deliverables	▪ Deploy system to STBU and CTBU ▪ Implement End Point Protections
Asset Life	8 years
Deliverability Risks	Resources in terminal

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Assumptions behind total CAPEX requirement	Extending pricing estimates from the experience of IDS for en route and Dublin TBU
Continuing From RP3?	No
Reason for continuation	

RP4-NETW-01: Fibre Remotes **Timescale:** ✂

Category
RP4 – Technical Services, En Route

Project Cross-dependencies
SURV,COMMS/NAV

Total CAPEX Requirement
✂

Project Summary

RP4 Fibre project - add resilient Fibre to 3 key sites - DOON, WCK HILL, MT GABRIEL

This Project will support investment in the delivery of alternate and diverse Fibre Feeds to the 3 most significant and critical sites in the delivery of ATM services for En Route. The secondary paths for remote ANI sites supporting ATM radar and VCS transport are based on Microwave Radio system technology. These systems are susceptible to failure during extreme weather events resulting in sub-optimal network availability. Significant operational benefits will accrue if a diverse access fibre can be provided to these key sites. Greater network stability will be achieved to support safe operation of ATM services.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**			
	Compliance		**X**	AirNav's ability to manage contracted TELCO Services (REF EU 2017/373 Clause B.015) will be greatly enhanced through provision of dual Fibre, which will increase SLA Availability for ATC En route. IAA Regulator oversee AirNav ability to manage contract services
	ATM Masterplan & DES Alignment			
	Resilience	**X**		Increased robustness of the ATM system ensuring high availability on key radar and communications routes
	Safety		**X**	Safety is enhanced as significant operational benefits stand to be derived from fibre, with greater network stability in providing support to safe ATM services. In comparison to ATM radar and VCS transport based on Microwave Radio system technology which are susceptible to failure during extreme weather events resulting in sub-optimal network availability.
	Capacity			Enhanced network infrastructure will help maintain service resilience during extreme weather conditions and retain ability to meet current and growing capacity demands through enhanced traffic management.

	Productivity			
	Cost-effectiveness			
	Lack of a cost-effective alternative			There exist significant operational benefits to be realised in adopting fibre feeds in comparison to using current microware radio technologies.

Key Information and Benefits	Undertaking the project will lead to more resilient network infrastructure, enhanced resilience and availability of ATC for en route services. It will also lead to higher availability for communications and surveillance services to ATC en route, delivering enhanced traffic management for AirNav operations. Air traffic management will improve through the efficient management of traffic separation through AirNav Airspace

Project Output

1. Procurement
2. Project Management Circuit and Equipment attachment
3. Testing
4. Transfer to Operations

Non-Staff OPEX Impacts Circa 200k for the 3 fibres in 2027/2028

Deliverables

- Request for Information
- Survey
- Acquisition
- Implementation

Asset Life 8 years

Deliverability Risks Infrastructure might not be available on the market

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Assumptions behind total CAPEX requirement Estimated range of 0.5 to 1M per site to build Fibre network, assuming that the solutions will be delivered sequentially (Site 1, 2, 3)

Continuing From RP3? No

Reason for continuation

RP4-NETW-03: 2028 Nokia Refresh **Timescale:** ✂

Category
RP4 – Technical Services, Terminal and En route

Project Cross-dependencies
SUR & COMMS, NAVAID OPS

Total CAPEX Requirement
✂

Project Summary **Nokia 2028 System Updates**

The NOKIA system was procured in 2018 to support the implementation of IP network to ANI Contingency Centre and support replacement of the legacy Backbone Network System for En route. This system of NOKIA Service Aggregation Routers deliver the IP Backbone for ATM Services for delivery of Radar and Voice Comms. As the Service Aggregation Routers (SAR) devices approach their end of life and reach obsolescence, this budget is required to support the replenishment of the infrastructure.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**	**X**		System 10 years old and is reaching end of life
	Compliance		**X**	Will enable AirNav Ireland to remain in compliance with regulatory requirements and SP Procedures
	ATM Masterplan & DES Alignment			
	Resilience			
	Safety	**X**		Project enables AirNav Ireland to maintain a safe and available service to meet Operational Requirements. The systems will remain in compliance with AirNAV'S Tech Procedures (Vendor support, no EOL or obsolescence)
	Capacity			Better network availability will lead to stable traffic management allowing ATC maintain separation standards
	Productivity			
	Cost-effectiveness		**X**	Stability of the service arising from upgrades and refresh will minimise unplanned costs on maintenance and 3rd party call out.
	Lack of a cost-effective alternative			

Key Information and Benefits

Completing the project will enhance stability of the Nokia IP backbone through replacement of legacy and unsupported equipment to address obsolescence issues.

AirNav will remain in conformance with EU Regulation and own procedures.

Project Output	1. Obsolescence Addressed 2. System Future-Proofed **3.** Remains in Conformance with Safety and Security requirements through update/refresh
Non Staff OPEX Impacts	Minimal impact due to refresh of old hardware, OPEX should remain consistent with pre-existing run rate
Deliverables	▪ Audit/Assessment to identify scope based on risk ▪ Project Plan ▪ Procurement ▪ Implementation / Safety Approval
Asset Life	8 years
Deliverability Risks	None foreseen

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Assumptions behind total CAPEX requirement	Year 1 – Upgrade Centres, B chain, then A Chain, Year 2 - Address Remote Sites, Professional Services across full project.
Continuing From RP3?	No

***Independent IP Network*: Budget Ref U008** **Timescale:** ✂

Category
RP4 – ATM Operations, en route services

Project Cross-dependencies
Comms (RBS), SUR, FDPS

Total CAPEX Requirement
✂

Project Summary

Independent network using private Internet Protocol (IP) (Network Resilience)

The requirement to deploy an "Independent" IP network, follows the extant legacy design principle that Data (Radar) and Voice (COMMS) are critical to the safe provision of Air Traffic Control (ATC). The IP network to support these services is based on a NOKIA Backbone system that supports COOPANS online production system and Voice Communications Switch (VCS) (Frequentis) online production systems as well as the new Contingency Air Situation Display System (CASDS).

The stability and robustness of the overall ATM system will be significantly enhanced with the equipment resilience enabled through the addition of an "Independent IP Network". The system will mitigate the loss of the Nokia Backbone and support ongoing safe operation of operational COOPANS, VCS and CASDS systems.

The independent system will also support the modernisation of the RBS Comms Contingency system. This project will not commence until 2025 (when it will be procured), and connectivity to all key remote sites via Independent IP Network to support Radar Data.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**		**X**	*Existing networks require modernisation to maintain stability and robustness*
	Compliance			
	ATM Masterplan & DES Alignment			
	Resilience	**X**		COOPANS online production system and new CASDS will be additionally robust due to this Independent IP network
	Safety	**X**		The Independent IP network will act as a back-up failsafe supporting safe continuous operation should a Cyber Event disable the Nokia Backbone (and vice-versa)
	Capacity			
	Productivity			

	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits	Benefits in resilience and contingency. 1. Operational Resilience – Independent IP network will mitigate the risk of equipment failure on the Nokia Backbone and/or Cyber-attack on the Nokia Backbone, supporting safe continuous operation of COOPANS, VCS new CASDS systems. 2. The RBS system is obsolete, running on legacy TDM equipment and Circuits, the system needs an upgraded IP Network service to ensure stability and availability. The Independent IP network will support this requirement.
Project Output	Safety and resilience enhancement for flight data and communications. Providing robustness to COOPANS and CASDS
Non-Staff OPEX Impacts	Additional OPEX for IP Network SLA/Backoff
Deliverables	▪ Increased ATM system resilience through the addition of independent network ▪ Enhanced Cyber resilience through addition of independent network ▪ System modernization through upgrade of the RSB network
Asset Life	8 years
Deliverability Risks	None foreseen

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Assumptions behind total CAPEX requirement	Assumptions derived from existing Cisco and Nokia Networking equipment costs.
Continuing From RP3?	Yes
Reason for continuation	• Covid-19 and prioritisation of key RP3 projects. This delay had a knock-on impact on the Independent IP network. • Delays in Nokia IP Backbone (S007) (which will complete in 2024) was due to largely resource constraints. This previous project related to the main IP Network rollout (NOKIA) which is complete - this project is for a separate IP network.

ERIN: Budget Ref V008 **Timescale:** ✂

Category
RP4-ATM Operations, En route

Project Cross-dependencies
Comms, FDPS

Total CAPEX Requirement
✂

Project Summary **Cessation of E1 Circuits and Migration to IP (ERIN)**

ERIN is a private international network between NATS UK and ANI supporting exchange of Surveillance, Comms and messaging services between the SP's. The NATS provider (Vodafone UK) has flagged an obsolescence issue with the legacy E1 circuits supporting the connectivity and announced the end of life on the service. This EOL announcement was expected but not until 2025 onwards. The SP initiated a project in 2022 to address.

This project supports the upgrade of equipment to support the safe delivery of Voice and Data services to a modern IP international Network. The project will migrate services from ERIN to the new pan-European network service (NewPENS) during 2024. In addition, NATS and ANI will contract a replacement International IP network from Vodafone UK as a backup to the PENS.

The SP will present the safety argument for migration of impacted services to PENS and Vodafone IP in the form of the International Air Nav Ireland System Safety Case (IANI).

There will be a residual spend of €75k during 2025 for final completion of the IANI system.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**	**X**		Will address legacy TDM circuits which cannot be supported beyond mid 2024. Upgrading of equipment required to support the safe delivery and exchange of Data and Voice services AirNav, NATS and AirNav
	Compliance			
	ATM Masterplan & DES Alignment			
	Resilience	**X**		Undertaking the project will ensure service continuity given withdrawal of services from existing service provider. New equipment will be "Cyber Resilient"
	Safety		**X**	International CNS services will benefit from migration to modern network equipment and connectivity, addressing the end-of-life E1 circuits.
	Capacity			
	Productivity			
	Cost-effectiveness			
	Lack of a cost-effective			

	alternative			

Key Information and Benefits	Undertaking this project will ensure service continuity for both AirNav and NATS, thereby ensuring that business continuity is retained and safety is not compromised.

Project Output	1. Obsolescence risks removed 2. Business continuity enhanced thorough new data network between AirNav & NATS 3. Enhanced Cyber Resilience through acquisition of modern network equipment
Non-Staff OPEX Impacts	OPEX Costs have been constructed using estimates based on recent experience of network connectivity solutions • Equipment Maintenance – increase by €15,000 • Ethernet Private Wire Costs - increase by €90,000
Deliverables	▪ Upgraded Comms voice equipment for INTL ▪ Upgraded IP network for INTL Surveillance ▪ Upgrade of INTL Connectivity across PENS and new Vodafone IP
Asset Life	8 years
Deliverability Risks	Timelines and Safety Approval

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Assumptions behind total CAPEX requirement	Budget overspill into RP4 will relate to VODAFONE UK costs via NATS agreement.
Continuing From RP3?	No – Unplanned project from 2023
Reason for continuation	Although this project started in 2023, it was not planned RP3 project and arose because of an unplanned announcement by INTL network provider Vodafone UK, leading to impact on NATS. The project will conclude early in RP4.

ISMS: budget Ref W005 **Timescale:** ✂

Category
RP4 – Technical Services, Terminal and En Route

Project Cross-dependencies
FDPS, SURV, COMMS, OSG

Total CAPEX Requirement
✂

Project Summary

Regulation 203/2023 requires the ANSP to build an Information Security Management System (ISMS) - as clarified by ECTL, the ISMS comprises of the Policy, the Procedure and the implementation of Security Policies and Practices.

The regulation also imposes a requirement to analyse "Events" that may potentially impact the safe performance of the ATM system - requiring AirNav to implement a Security Incident Event Manager (SIEM Solution)

The ISMS must be deployed by Feb 2026. There is alignment required with Compliance and SMU. A compliance matrix will be delivered in the first half of 2024 that will outline the steps and tasks required and will include the requirement to implement a SIEM Solution across the ATM/ANS functional system. Given the significance of the need to comply with the new regulation, this project will impact the technical services directorate, safety directorate and operations directorate.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**			
	Compliance	**X**		Regulation 203/2023- SPs are required to be compliant by 02/2026
	ATM Masterplan & DES Alignment			
	Resilience		**X**	Reduction in threat of Cyber-Security event that will disable operational systems
	Safety	**X**		Project will mitigate the impact of a cyber events on the safety and operational delivery through an enhanced system of procedures and processes.
	Capacity			
	Productivity			
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits	Undertaking this project ensures AirNav will achieve compliance with 2023/203 regulation, enhancing the risk of security impacting the safety of ATM System The SIEM solution will enable the SP monitor abnormal and anomalous behaviour in the overall system and will support the analysis of Cyber Related security events.
Project Output	Compliance with (EU) 203/2023 and to develop a system that recognises the impact of security on system safety
Non-Staff OPEX Impacts	▪ Ongoing costs related to maintenance on ISMS ▪ OPEX Impact for licensing TBA
Deliverables	▪ Regulatory Compliance with ISMS 2023/203 ▪ Integrated Security Management System ▪ Enhanced Risk Management and Risk Treatment ▪ Enhance internal and external Incident Reporting ▪ Security Event Management system and monitoring (SIEM & SOC)
Asset Life	8 years
Deliverability Risks	Cross domain resource alignment

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Assumptions behind total CAPEX requirement	• The budget derived from experience of 2017/373 and extensive work required to build out Security ISMS • Estimates derived from ICT Business Case on deployment of Q Radar SIEM.
Continuing From RP3?	Yes
Reason for continuation	• Delay in the publication of the PART IS regulation by EASA, delay in the publication of the AMC/GM, which arrived in Q4 2023 • AirNav had to prioritise CAP on REG 373 and purchase of IDS System

Project Z007 Nokia Resilience **Timescale:** ✂

Category
RP4 – Technical Services, En route and Terminal services

Project Cross-dependencies
COMMS, NET/SEC, Safety

Total CAPEX Requirement
✂

Project Summary **Nokia 2024 to expand system, enhance system resilience and system reporting**

The regulatory and safety environment (Regs 2017/373, 2023/203) has triggered a requirement for further enhancements to the ATM Backbone Network - Nokia System.

The following are the key milestones providing the basis for the additional investment:

- STBU and CTBU Service Resilience: A separate Nokia footprint in Ballycasey to support Terminal Services (Cork and Shannon)
- System Manager Enhancement (Analytics): To enhance the network performance reporting.
- System Manager Upgrade: Requirement to replace Network Monitoring and Management Servers
- Nokia Firewall Appliance: Providing enhanced Security to the assets connected via NOKIA network.
- Remote Access Test System.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**			
	Compliance	**X**		Enhanced Reporting and availability will support compliance with EU 2017/373
	ATM Masterplan & DES Alignment			
	Resilience		**X**	This project will provide resilient Monitoring and Security
	Safety	**X**		The project will see investments being made in additional equipment, which will support better reporting and analytics which will provide more evidence for safety cases.
	Capacity			
	Productivity			
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits	The benefits of the project include enhanced compliance, safety and availability. Investing in additional equipment which will mean more resilience, better reporting and analytics which will provide more evidence for safety cases, enhanced security of system to meet security regulations (2017/373, (2023/203)). The strategy is to make Nokia the preferred ATM backbone replacing obsolete infrastructure. If the project doesn't go ahead this initiative would be stalled, resulting in higher cost and increased risk through retention of legacy infrastructure. The VCS services would not be approved for migration to the Nokia system for en route.
Project Output	1. Extend Nokia Footprint to TBU's 2. Enhance Server infrastructure for management 3. Enhanced system performance reporting 4. Security Enhanced through FW Module
Non-Staff OPEX Impacts	Circa 60k increase per annum from 2025 onwards, for the maintenance of an increasing capital asset base.
Deliverables	1. Extend Nokia Footprint to TBU's 2. Enhance Server infrastructure for management 3. Enhanced system performance reporting 4. Security Enhanced through FW Module
Asset Life	8 years
Deliverability Risks	None foreseen
✂	
✂	
✂	
Assumptions behind total CAPEX requirement	Based on cost of similar projects procured in RP3, which also required Nokia hardware

Continuing From RP3?	Yes
Reason for continuation	Started in 2024, but bulk of the work will be conducted in the first 18 months of RP4

Category
RP4 – Technology, Service Enhancement/Business Continuity

Project Cross-dependencies
OSG, SUR, M&E, NET SEC ✂

Total CAPEX Requirement

Project Summary

A new ATM system needs to be procured given the age of the existing system and its limited capabilities to enable longer term SES alignment. This new system enables obsolescence to be addressed and facilitates CP1 compliance.

Technological advancements and changes in the aviation industry have rendered the current system less effective and efficient compared to modern solutions. Consequently, maintaining the existing system to enable SES alignment would require significant costs when compared to procuring a new system.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**	**X**		The existing ATM system has been in operational service for over 17 years, making it outdated and at the end of its operational life. The technological advancements and changes in the aviation industry have rendered the current system less effective and efficient compared to modern solutions.
	Compliance	**X**		Modernization is necessary to achieve the CP1 (Common Project 1) compliance. The compliance with regulatory standards and requirements is crucial for maintaining operational integrity and safety within the aviation sector. The upgraded system will incorporate features and capabilities that better align with the CP1 standards.
	ATM Masterplan & DIgital European Sky (DES) Alignment	**X**		The modernization effort will bring AirNav, working with its COOPANS partners, in line with the European ATM Master Plan and the DES initiative. These initiatives aim to harmonize and enhance air traffic management across Europe, leveraging digital technologies to improve efficiency, safety, and sustainability in aviation operations.
	Resilience	**X**		The new ATM system is expected to be more resilient in terms of software, safety, and security. Improved resilience ensures better business continuity, minimizing disruptions due to technical failures or security breaches. This enhanced resilience directly contributes to maintaining the safety and security of air traffic operations.

	Safety	**X**		Will provide a safe, resilient & secure system to satisfy customer needs at an economical cost
	Capacity	**X**		The upgraded system is anticipated to offer greater capacity, enabling it to handle an increased volume of flights.
	Productivity		**X**	The new ATM system will incorporate advanced controller tools that empower air traffic controllers (ATCOs) to efficiently manage more flights per ATCO hour. These tools could include automation, data analytics, and improved decision-support systems, all of which can streamline operations and enhance overall productivity.
	Cost-effectiveness	**X**		The decision to upgrade the current system to the TopSky ATC One system provides a cost-effective solution that is compatible with the previous levels of capital expenditure by the COOPANS partners and which, through cost-sharing, represents a considerably lower investment rate per ANSP than for the other ANSPs served by the same supplier or, indeed, the other suppliers in Europe. Historically procuring through the COOPANS alliance has resulted in roughly a 30% cost saving compared to procuring as an individual ANSP.
	Lack of a cost-effective alternative	**X**		Benchmarking within the European market clearly indicates that engaging in a competitive tender process will lead to higher expenses for a future-proofed ATM system. Furthermore, conducting such a process would necessitate significant resources from the COOPANS members including AirNav staff to navigate the entire open-tender lifecycle, resulting in extended delays in acquiring the upgraded system.

Key Information and Benefits

AirNav is a founding member of the COOPANS partnership which has been widely admired in Europe as means of providing a more cost-effective approach to procurement of systems in ATM. The partnership also involves collaborative contributions to other projects such as Exodus which is a key project to de-risk future ATM concepts that will be used in Ireland.

The TopSky project and associated innovation platform is the key next system development in the COOPANS partnership and directly aligns with the COOPANS Business Concept, enabling joint system development, industry partnership and innovation. Furthermore, the current proposal removes the technical debt and obsolescence built up in the existing system and places COOPANS on a strategically sound footing for the future.

Key benefits include:

- Joint and harmonised system development.
- A unified branch of TopSky ATC One. This new direction prioritises a globally consistent roadmap tailored to meet the collective needs of its users.
- Industry Partnership: If COOPANS transitions to TopSky ATC One, its partnership with Thales will be strengthened and further developed through active participation in the EXODUS project.
- Positive influence on the European Environment

Consequences of Not Doing the Project

- Based on historical spend, it is assumed COOPANS costs to continue as is would be €23.6M/year.

		Rationale
Alignment with PRB Objectives	**Safety**	Safety is the highest priority of the PRB and the PRB has highlighted that safety performance needs to continue to improve over RP4. The new ATM system is expected to be more resilient in terms of software, safety, and security, and will remove technical debt in the existing system. This should help to ensure AirNav's safety performance does not deteriorate, aiding AirNav in promoting safety risk management through the continuity of service.
	Cost-Efficiency	The ATC One system provides a cost-effective solution that is compatible with the previous levels of capital expenditure by the COOPANS partners, supporting a more efficient cost base, particularly in the long term as traffic volumes increase.
	Capacity	The upgraded system is anticipated to offer greater capacity, enabling it to handle a higher flights volume, with an implied mitigation of additional en route ATFM delays from the improved platform.
	Environment	The new system will facilitate more environmentally efficient flight profiles and support the implementation of future developments in this area.

Project Output	1. The upgrade of the existing COOPANS TopSky system 2. Virtualised platform concept (EXODUS) 3. Achieve CP1 compliance as soon as reasonably practical 4. A system which provides Open ATM with no worse functionalities
Non-Staff OPEX Impacts	1. ATC Staff Training Costs 2. Programme Management Costs for New Builds 3. SLA costs
Deliverables	The COOPANS TopSky ATC One platform will replace the existing COOPANS platform and associated software and hardware.

Asset Life	8 years

Deliverability Risks	• There is a risk in delays from Thales in delivering the new system • AirNav faces major business continuity and regulatory risks if it cannot proceed with the TopSky ATC One project in a timely manner. • Any delays may result in COOPANS missing critical regulatory deadlines requiring additional system builds or facing legal actions from regulators.

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Assumptions behind total CAPEX requirement	A Gartner report recommended that the existing COOPANS ATM system was upgraded. The costs were subject to negotiation and contract between all COOPANS partners and Thales.

Continuing From RP3?	No

I-ATS: Budget Ref R035 **Timescale:** ✂

Category
RP4 – Technical Services, Terminal Services

Project Cross-dependencies
OSG, COMMS/NAV, Safety

Total CAPEX Requirement
✂

Project Summary

New Dublin Tower Equipment - I-ATS Enhancements and A-CDM compliance

This project is a component of the large-scale new Dublin tower/North runway project which was completed in 2021 and 2022. This project is a continuation of the enhancements to I-ATS commenced during RP3. In Q4 of 2021 the AirNav Terminal Services Business Unit put into operational service an Integrated Air Traffic System (I-ATS) to support the provision of Air Traffic Services at the new Dublin Visual Control Tower. During the project ATC have identified several enhancements which increases system safety and productivity. In addition, Airport Collaborative Decision-Making A-CDM trials with EUROCONTROL have identified a number of A-CDM issues which need to be rectified to enable the system to be A-CDM compliant

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**			
	Compliance	**X**		CP1 compliance
	ATM Masterplan & DES Alignment			
	Resilience			
	Safety		**X**	Through ATC HMI enhancements and improved playback capabilities for the I-ATS system
	Capacity			A-CDM can help to reduce to increase the efficiency of turnaround processes, reducing taxiway and hold point congestion and improve flight predictability through real time data. This helps to reduce delay and increase capacity.
	Productivity		**X**	A-CDM can help to reduce improving flight predictability through real time data, reducing emissions through more direct routings.
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits

This project ensures AirNav's compliance with EU regulations and delivers ATC HMI enhancements to improve ATCOs productivity. Through compliance with A-CDM regulation this project enables further environmental benefits from A-CDM deployment. In addition, some system cybersecurity improvements are also provided through this project along with improved playback capabilities for the I-ATS system.

Project Output	1. Enhanced I-ATS for the Dublin ATC tower 2. A-CDM enhancements 3. Compliance with CP1 regulation
Non-Staff OPEX Impacts	No significant impacts foreseen - existing maintenance contract in place.
Deliverables	▪ Software updates to I-ATS system ▪ A-CDM compliance with CP1 regulation
Asset Life	8 years
Deliverability Risks	None foreseen

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Assumptions behind total CAPEX requirement	Costs have been calculated using rough order of magnitude (ROM) estimates based on previous I-ATS system upgrades and hardware prices
Continuing From RP3?	Yes
Reason for continuation	Project progress has been slower than expected due to impacts on the side of the vendor

R017 – Simulator **Timescale:** ✂

Category
RP4 – Technical Services, Terminal Services

Project Cross-dependencies
OSG

Total CAPEX Requirement
✂

Project Summary

New Tower IATS Electronic Flight Strip Simulator Dublin

A new Tower Simulator is required to replace the old EFS simulator which is now obsolete. There is an ongoing requirement to train Tower ATCOs for the Dublin IATS. The IATS System is ANI's main Tower ATM system in Dublin Airport. This project is confined to the electronic flight strip functionalities used for training of Dublin TWR, Dublin GND and Clearance Delivery Service (CDS).

Multiple roles can be selected at one position.

- TWR S
- TWR N
- GND S
- GND N
- CDS

Type of electronic strips:

The system provides the following types of strips:

- Arrival flight strips
- Departure flight strips
- Overflight flight strips
- Towed aircraft strips
- Vehicle strips
- Information strips

The workflow of a strip (through roles and sections) is dependent on strip type, Runway, and stand.

Correlation with the ground radar:

Flight plan data that is shared between the ground radar and the EFS:

- SID / Route
- Stand

		Primary Driver	Secondary Driver	Rationale
General	**Obsolescence**	**X**		Hardware upgrades

Benefits	**Compliance**	**X**		CP1 regulation compliance
	ATM Masterplan & DES Alignment			
	Resilience			
	Safety	**X**		Requirement to train ATCOs
	Capacity			
	Productivity			
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits

Overall this project delivers benefits as it supports AirNav to continue to meet its regulatory and safety obligations.

In addition, the new EFS system for use with the Dublin Tower simulator will:

- Replicate all existing and new EFS functionality.
- Be far more reliable thereby eliminating interruptions to training.
- No longer require OSG/Engineers for routine maintenance or to update it every time the Dublin Tower I-ATS system is updated.

Project Output

1. Replace hardware to avoid obsolescence.
2. Improved user interface.

Non-staff OPEX Impacts

No major impact foreseen

Deliverables

- Software updates
- New hardware

Asset Life

8 years

Deliverability Risks

Dependency on ✂

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Assumptions behind total CAPEX requirement	Quotation from a supplier
Continuing From RP3?	Yes – work commencing in 2024
Reason for continuation	

RP4-FDPS-01: Smart Messenger **Timescale:** ✂

Category
RP4 – Technical Services, En route and Terminal Services

Project Cross-dependencies
None

Total CAPEX Requirement
✂

Project Summary

Smart Messenger Aeronautical Fixed Telecommunication Network (AFTN) / Aeronautical Message Handling System (AMHS)

System upgrades for enhanced security and compliance - The AFTN/AMHS System is used globally to distribute Flight Plan data. The system is also used to distribute aeronautical information and aviation MET data. In 2026 and 2028 the system will require a refresh to include the latest security updates and ensure the hardware is not obsolete.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**	**X**		Hardware upgrades to reduce likelihood of the system becoming obsolete
	Compliance		**X**	Possible changes to regulations at the latter end of the RP4 period.
	ATM Masterplan & DES Alignment			
	Resilience	**X**		To ensure the continuity of the service provision.
	Safety		**X**	Improved software will enhance security and thereby maintain safety. Cyber security attacks could affect the system performance and compromise safety.
	Capacity			
	Productivity			
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits

This project is required to be undertaken to provide necessary maintenance for business continuity.

By not undertaking this project, AirNav will have increased risks of being compromised by a cyber-attack. In the long-term, business continuity will be affected if the system does not continue to meet compliance or if the equipment becomes obsolete.

Project Output	1. Make progress improvements by implementing cyber security best practices. 2. Comply with regulation updates. 3. Replace hardware to avoid obsolescence.
Non-Staff OPEX Impacts	No major impact foreseen. Ongoing support the same as current OPEX support for RP3.
Deliverables	▪ Software Updates ▪ New Hardware
Asset Life	8 years
Deliverability Risks	None foreseen at present

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Assumptions behind total CAPEX requirement	Costs have been calculated using rough order of magnitude (ROM) estimates based on previous AFTN system upgrades and hardware prices
Continuing From RP3?	No – Enhancement to an existing project from RP3 on the same system

RP4-FDPS-02: AIM System Upgrade **Timescale:** ✂

Category
RP4 – Technical Services, En route and Terminal Services

Project Cross-dependencies
NET SEC

Total CAPEX Requirement
✂

Project Summary **AIM System Upgrade**

Aeronautical Information Management (AIM) is the dynamic, integrated management of aeronautical information services through the provision and exchange of quality-assured digital aeronautical data, in collaboration with all parties. AIM ensures that accurate and up-to-date information is available to pilots, air traffic controllers, and other aviation professionals, contributing to the overall safety and efficiency of air travel.

The AirNav Ireland AIM office requires a system upgrade due to the CP1 regulation. In addition, regular security updates are required, and hardware replacement is required due to hardware obsolescence.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**	**X**		Hardware upgrades of obsolete components.
	Compliance	**X**		Adherence to CP1 regulations.
	ATM Masterplan & DES Alignment			
	Resilience	**X**		To ensure the continuity of the service provision.
	Safety	**X**		Efficient notifications of NOTAMS and airspace design. Improved software will enhance security and thereby maintain safety.
	Capacity			
	Productivity		**X**	Improved user interface.
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits

Completing the project will provide necessary maintenance for business continuity.

Not undertaking the project risks increased probability of the failure of equipment with potential to impact business continuity.

Project Output	1. Make progress improvements by implementing cyber security best practices. 2. Comply with regulation updates. 3. Replace hardware to avoid obsolescence.
Non-Staff OPEX Impacts	No major impact foreseen. Ongoing support the same as current OPEX support for RP3.
Deliverables	▪ Software updates ▪ New hardware
Asset Life	8 years
Deliverability Risks	None foreseen

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Assumptions behind total CAPEX requirement	Costs have been calculated using rough order of magnitude (ROM) estimates based on previous AIM system upgrades and hardware prices
Continuing From RP3?	No

RP4-FDPS-03: CMS System Upgrade **Timescale:** ✂

Category
RP4 – Technical Services, En route and Terminal Services

Project Cross-dependencies
None

Total CAPEX Requirement
✂

Project Summary **CMS System Upgrade**

The Centralised Monitoring System (CMS) integrates a number of monitoring systems from AirNav functional systems to provide a reduced number of Human Machine Interfaces (HMIs) at the technical control desk. In RP4 AirNav's CMS will require a hardware replacement due to hardware obsolescence. In addition, the system software will require a refresh along with periodic security updates. Integration of future AirNav ATM system will require an expansion of the CMS system.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**	**X**		Hardware upgrades due to obsolescence
	Compliance			
	ATM Masterplan & DES Alignment			
	Resilience		**X**	To ensure the continuity of the service provision and periodic security upgrades.
	Safety		**X**	The system allows the TCD to safety manage multiple alarm systems
	Capacity		**X**	New AirNav ATM systems will need to be integrated into the CMS.
	Productivity		**X**	Improved user interface.
	Cost-effectiveness			Increasing the resilience through an upgrade to the centralised monitoring system will ensure continuity of service at an improved Cost-Efficiency.
	Lack of a cost-effective alternative			

Key Information and Benefits

Completing the project will provide necessary maintenance for business continuity. Capacity needs to be enhanced for future ATM systems.

Not undertaking the project risks increased probability of the failure of the CMS equipment with potential to impact business continuity.

Project Output

1. Replace hardware to avoid obsolescence.
2. Improved user interface.
3. Increase capacity.

OPEX Impacts	No major impact foreseen. Ongoing support the same as current OPEX support for RP3.
Deliverables	▪ Software updates ▪ New hardware
Asset Life	8 years
Deliverability Risks	No risks foreseen

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Assumptions behind total CAPEX requirement	Costs have been calculated using rough order of magnitude (ROM) estimates based on previous CMS system upgrades and hardware prices
Continuing From RP3?	No

RP4-FDPS-04: CASDS Refresh **Timescale:** ✂

Category
RP4 – Technical Services, Terminal and En route Services

Project Cross-dependencies
NET SEC, FDPS, OSG

Total CAPEX Requirement
✂

Project Summary **Contingency Air Situation Display System Refresh**

Contingency Air Situation Display System (CASDS) is used as a contingency Air Traffic Control (ATC) system in the event of a major failure of the COOPANS system. The old Emergency Air Situation Display System (EASDS) will be replaced during RP4 by CASDS, and this project is to cater for additional security and regulatory amendments, and to refresh CASDS towards the end of RP4. In addition, this refresh will also include HMI changes which may be required with the transition to TopSky ATC One.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**			
	Compliance	**X**		System updates to cope with regulatory amendments
	ATM Masterplan & DES Alignment			
	Resilience	**X**		Ensures business continuity at the end of RP4 and into RP5
	Safety	**X**		Improved software will enhance resilience and security and thereby increase safety. This project will serve as a Contingency Air Situation Display System (CASDS) protecting against the risk of a COOPANS failure, ensuring that a back-up system is available.
	Capacity			
	Productivity			
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits

The project will benefit AirNav by providing necessary maintenance for business continuity. It should be noted that the main ATM system HMI will change, requiring corresponding changes on the proposed backup system.

If this project is not completed, AirNav risks an increased probability of the failure of equipment with potential to impact business continuity in addition to divergence between the main and backup ATM system.

Project Output Contingency Air Situation Display System (CASDS) system refresh

Non-Staff OPEX Impacts	No impacts foreseen
Deliverables	Upgraded CASDS ATM system in Dublin ATCC, Dublin Tower, Ballycasey ATCC, Cork Tower, Shannon Tower and CEROC contingency centre, removing obsolescence risk
Asset Life	8 years
Deliverability Risks	None foreseen

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Assumptions behind total CAPEX requirement	Costs have been calculated using rough order of magnitude (ROM) estimates based on AirNav Ireland expert judgement for purchase and installation of ATM system
Continuing From RP3?	No

RP4-FDPS-05: I-ATS Enhancements including CP1 & Hardware **Timescale:** ✂

Category
RP4 – Technical Services, Terminal Services

Project Cross-dependencies
FDPS, OSG & SUR

Total CAPEX Requirement
✂

Project Summary **I-ATS Enhancements including CP1 & Hardware**

The Integrated Air Traffic Service (I-ATS) System is Dublin Tower ATM System was commissioned as a key enabler for the opening of the parallel runway in Dublin Airport in August 2022. To ensure the system continues to provide the key services for Dublin Airport the system requires upgrades for compliance, enhanced security, and hardware obsolescence.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**	**X**		Hardware upgrades. Addressing the hardware obsolescence the project will aid in ensuring continued safety risk management, as to not transfer risk to operations through redundant hardware.
	Compliance	**X**		CP1 regulations.
	ATM Masterplan & DES Alignment			
	Resilience	**X**		To ensure the continuity of service provision.
	Safety	**X**		Improved software will enhance security and thereby maintain safety.
	Capacity		**X**	Maintains existing capacity
	Productivity			
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits

Completing the project will provide necessary maintenance for business continuity.

Not undertaking the project risks increased probability of the failure of equipment with potential to impact business continuity. By not undertaking this project, then AirNav will have an increased risks of being compromised by cyber attach. Business continuity will be affected if the system does not continue to meet compliance or if the equipment becomes obsolete.

Project Output	1. Make progress improvements by implementing cyber security best practices. 2. Comply with regulation updates. 3. Replace hardware to avoid obsolescence.
Non-Staff OPEX Impacts	No major impact foreseen
Deliverables	▪ CP1 Compliance ▪ Hardware Upgrades
Asset Life	8 years
Deliverability Risks	Dependant on EUROCONTROL

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Assumptions behind total CAPEX requirement	Costs have been calculated using rough order of magnitude (ROM) estimates based on previous I-ATS system upgrades and hardware prices
Continuing From RP3?	No

RP4-FDPS-06: IWXXM to TAC Conversion Tool **Timescale:** ✂

Category
RP4 – Technical Services, En route and Terminal Services

Project Cross-dependencies
OSG

Total CAPEX Requirement
✂

Project Summary **IWXXM to TAC Conversion Tool**

The transition of MET messages from the old format TAC to the new IWXXM format completes at end of 2026. Therefore, as Airnav's new ATM system will not be operational until 2029 a new conversion tool will be required for the legacy COOPANS System. Met Eireann will continue to provide TAC messages in 2026 and 2027 but provision for alternative source is required as COOPANS legacy software will still be in use until mid-2029.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**	**X**		MET Eireann will provide TAC messages until the end of 2027. There after provision is made for a conversion tool.
	Compliance			
	ATM Masterplan & DES Alignment			
	Resilience			
	Safety			
	Capacity			
	Productivity			
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits

Completing the project will ensure business continuity.

Not undertaking the project risks increased workload on ATCOs.

Project Output	1. Software to avoid obsolescence. 2. Hardware
Non-staff OPEX Impacts	No major impact foreseen
Deliverables	• Software • Hardware
Asset Life	8 years
Deliverability Risks	No risks foreseen

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Assumptions behind total CAPEX requirement	Costs have been calculated using rough order of magnitude (ROM) estimates based on previous system upgrades and hardware prices
Continuing From RP3?	No
Reason for continuation	

Category
RP4 – Technical Services, Terminal and En Route

Project Cross-dependencies
OSG, NET SEC (regarding PENS for SWIM)

Total CAPEX Requirement
✂

Project Summary **COOPANS Roadmap Builds (Dublin and Shannon)**

This project will deliver enhancements to system capabilities including System Wide Information Management (SWIM) infrastructure and obsolescence of hardware and the TMCS (Technical Monitoring and Control System). This project will also facilitate investigation into new functionality required under Commission Implementing Regulation EU 2021/116.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**	**X**		Addresses hardware and Operating Systems obsolescence
	Compliance	**X**		Facilitates compliance with CP1 regulatory requirements under Commission Implementing Regulation EU 2021/116.
	ATM Masterplan & DES Alignment			Facilitates compliance with SWIM requirements
	Resilience			
	Safety	**X**		Enhanced functionality supporting ATCO decision making and ATC provision
	Capacity			
	Productivity			
	Cost-effectiveness		**X**	Joint COOPANS partners contract negotiation following procurement rules will ensure the project is delivered at best possible market rates.
	Lack of a cost-effective alternative			

Key Information and Benefits

Facilitates compliance with SWIM requirements under Common Project One (CP1) Commission Implementing Regulation EU 2021/116. In addition, the project provides the following enhanced functional and operational benefits

- Controller Tools, 'TCT' and 'TCT What Else' tools aid ATCO decision making
- Blind Spot, Alerts ATCO to conflicts prior to delivery
- Extended Arrivals Management Message Exchange
- Improved system security
- FAST TBS Implementation

- Migration to SWIM for some data services
- Handle Hardware and Operating Systems obsolescence

If AirNav does not implement this project AirNav will fall behind the other COOPANS partners.

Project Output	This project delivers a SWIM network required for CP1 compliance. This project also drives service improvement, provide increased system security, and enhance ATCO efficiency. It also addresses obsolescence issues will ensure continuity and safety of the ATM service provided.
Non-Staff OPEX Impacts	No major impact foreseen
Deliverables	New releases of the COOPANS platform including new software and hardware to be deployed at: • Dublin ATCC (Air Traffic Control Centre) • Ballycasey ATCC • Cork Tower • Shannon Tower • CEROC contingency centre.
Asset Life	8 years
Deliverability Risks	Potential capacity issues as COOPANS TopSky ATC One project ramps up in parallel

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Assumptions behind total CAPEX requirement	Costs are based on experience of COOPANS development projects of similar scale and functionality, using rough order of magnitude (ROM) estimates based on estimation for purchase and installation of similar COOPANS ATM systems releases. Final costs will be subject to negotiation and contract between all COOPANS partners and Thales.
Continuing From RP3?	Yes
Reason for continuation	Project work began during RP3 and was planned to extend into RP4

CASDS: Budget Ref U003 **Timescale:** ✂

Category
RP4 – Technical Services, Terminal and En Route

Project Cross-dependencies
OSG, SUR, M&E, NET SEC

Total CAPEX Requirement
✂

Project Summary **Contingency Air Situation Display System and Simulator for Dublin and Shannon**

The current Emergency Air Situation Display System (EASDS) was introduced into operational service in 2008. It is used as a contingency Air Traffic Control (ATC) system in the event of a major failure of the COOPANS system. The existing system is now at an age that it is necessary to replace it. It is no-longer possible to extend the old systems life as has been done in the past. The hardware and software are now obsolete and will not be maintainable in the future. This system replacement will address obsolescence issues and allows ATCOs to be trained on the new system. The new system will be known as Contingency Air Situation Display System (CASDS).

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**	**X**		Existing system is aged and needs replacement to ensure the continuity of the ATC service provision. The replacement of the current Emergency Air Situation Display System (EASDS) will ensure that it can be used as a back-up ATC system as a contingency measure in case of a COOPANS failure
	Compliance	**X**		The old system will not comply with CP1 regulation. The upgrade ensure that systems at AirNav are in compliance with latest CP1 regulations.
	ATM Masterplan & DES Alignment			
	Resilience	**X**		A new improved software with built in redundancy will enhance resilience and security and thereby increase safety.
	Safety	**X**		Contingency system allows AirNav to maintain safety standards.
	Capacity		**X**	Increased capacity when relied upon over strips or the current clear the skies EASDS and will mean continuity of service is assured in such instances. The replacement of EASDS will ensure that it can be used as a back-up ATC system as a contingency measure in

				case of a COOPANS failure, which is likely to lead to a positive improvement in the amount of delay per flight.
	Productivity			
	Cost-effectiveness			
	Lack of a cost-effective alternative			The life of the existing system cannot be extended further. Therefore the most cost-efficient means to continue ATC service provision is to replace the EASDS system.

Key Information and Benefits	If this project is not delivered there is a risk that the existing system will become unserviceable in the near future. This would lead to a reversion to a manual fallback system which would cause significant flow control issues in Irish controlled airspace. Benefits of the project include: • Replacement of end-of-life essential ATM system • ATM business continuity assurance • Compliance with safety & regulatory requirements. New security measures can be enabled to meet EU Network and Information Security directive. • Training will be possible on the new platforms to satisfy safety requirements.
Project Output	1. Contingency Air Situation Display System (CASDS) 2. ATCO Training on EASDS simulator 3. Back-up system to COOPANS providing business continuity and meeting IAA safety obligations at Shannon ATCC including Cork Tower and Shannon Tower, Dublin ATCC including Dublin Tower and CEROC ATCC
Non-Staff OPEX Impacts	Increase in OPEX is expected driven by post implementation system support & maintenance – more specific quantitative estimates will be apparent following the tendering stage
Deliverables	▪ A new contingency ATM system in Dublin ATCC, Dublin Tower, Ballycasey ATCC, Cork Tower, Shannon Tower and CEROC contingency center. ▪ The procurement and installation of the new software and hardware
Asset Life	8 years
Deliverability Risks	None foreseen

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Assumptions behind total CAPEX requirement	Costs based on estimates received from trusted/experienced vendor. Costs have been calculated using rough order of magnitude (ROM) estimates based on AirNav Ireland expert judgement for purchase and installation of ATM systems. Liaison with COOPANS partners also provided information on their past purchases. Actual costs will be determined through the procurement process.
Continuing From RP3?	Yes
Reason for continuation	The project was postponed in 2020 as part of Covid-19 cost containment, which had knock-on impacts and delayed the commencement of the project and with others in the portfolio.

Category
RP4 – Operations

Project Cross-dependencies
None

Total CAPEX Requirement
✂

Project Summary **FMP/AMC FUNCTION**

A Flow Management Position (FMP) is responsible for the efficient management of airspace, largely through the monitoring of traffic volumes, applying regulations (flow control) or short-term ATM measures (STAMs) where required, and the coordination of these measures with the EUROCONTROL Network Manager. This is governed by EU Regulation 255/2010. The Airspace Management Cell (AMC) is a state function in accordance with EU Regulation 2150/2005, which is responsible for the management of segregated airspace / FUA. The FMP and AMC functions for Ireland are currently provided by NATS through their UKFMP position. This arrangement was made under the UK/Ireland FAB agreement, largely to allow the ANSPs/States demonstrate to the European Commission, an operational benefit arising from the FAB. NATS receives no remuneration for the provision of this funct

on from Ireland, however it is expected that their requirements to support Ireland is included in their performance scheme.

EU Regulation 255/2010 recommends that FMP and AMC functions are collocated and EUROCONTROL is currently working on a best practice document which proposes that the tasks of the FMP and AMC are amalgamated.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**			
	Compliance	**X**		Compliance with regulations Network Functions 123/2019, ATFM 255/2010 and Flexible Use Airspace (FUA) Policy 2150/2005
	ATM Masterplan & DES Alignment			
	Resilience			
	Safety	**X**		Ensuring airspace demand does not exceed capacity to deliver ATM services on the day.
	Capacity		**X**	Ensure AirNav has more tactical management of airspace to maximise capacity
	Productivity			
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits	Completing this project will ensure that AirNav is in compliance with the relevant EU regulations pertaining to this area. It will also allow AirNav opportunities to effectively manage traffic in the airspace controlled by AirNav so as to maximise efficiency and environmental performance.
Project Output	1. Develop Training and purchase the required equipment for the development and delivery of the AMC/FMP functions for Ireland by AirNav Ireland.
Non-staff OPEX Impacts	1. This paper is supplied in a context of CAPEX funding while the output will drive additional ongoing OPEX spend.
Deliverables	1. FMP/AMC will help deliver capacity and environmental analysis and benefits for airspace under the control of AirNav Ireland.
Asset Life	8 Years
Deliverability Risks	Currently the AMC/FMP is performed by UK NATS. The deliverability risks are 1. Recruitment, 2. Training approval and delivery, regulatory approval and agreed timeline with UK for the transition of the service back to Ireland and AirNav.
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Assumptions behind total CAPEX requirement	Figures based on costs for equipment in both Shannon and Dublin and contingency fund for spare equipment
Continuing From RP3?	Yes/ No
Reason for continuation	

Category
RP4 – Technical Services

Project Cross-dependencies

Total CAPEX Requirement
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Project Summary **ASMGCS – Cork and Shannon**

Advanced Surface Movements and Guidance Control System (ASMGCS) is a system used at airports to provide routing, guidance, and surveillance for the control of aircraft and vehicles. This project is to deliver the infrastructure and technology to provide A-SMGCS at Cork and Shannon Airports. ASMGCS enhances safety at Airports in assisting the Air Traffic Control in the prevention and early detection of Runway incursions, taxiway incursions as well as improving the ATCOs overall situational awareness of aircraft and vehicle movements. A-SMGCS at Cork and Shannon will assist AirNav in driving down Runway Incursion events at these airports.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**			
	Compliance			Implementing an ASMGCS system ensures compliance with aviation regulations and standards, contributing to a safer and more regulated operational environment
	ATM Masterplan & DES Alignment	**X**		Aligns with one of the Strategic Objectives in the updated Master Plan SDO#1: Alert for reduction of collision risks on taxiways and runways.
	Resilience			
	Safety	**X**		ASMGCS provides real-time information on the movement of aircraft and vehicles on the ground and immediate alerts for runway and taxiway occupancy etc, reducing the risk of collisions, runway incursions, taxiway incursions and improving overall safety
	Capacity			Reduced Workload for ATCOs: Automation and advanced guidance systems help in managing and coordinating ground movements effectively, reducing the workload on ATCOs. This can lead to more efficient operations, especially during peak traffic times, it also allows for less 'eyes down' time where an ATCO no longer needs to interact with multiple screens/systems.

				Enhanced weather adaptability: ASMGCS systems often incorporate weather monitoring and forecasting capabilities, allowing for better planning and adaptation to changing weather conditions. This can be crucial for maintaining operations during adverse weather. It also removes the need for 'see and be seen' operations, and thus allows for higher movement numbers during all LVP/RVP scenarios. Increased Efficiency: The system optimizes ground movements, reducing taxi times and minimizing delays. This leads to more efficient use of runway and taxiway resources, ultimately improving airport capacity and turnaround times.
	Productivity			
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits	The project enhances safety at Cork & Shannon Airports in assisting the Air Traffic Control in the prevention and early detection of Runway incursions, taxiway incursions as well as improving the ATCOs overall situational awareness of aircraft and vehicle movements.
Project Output	This project will provide the infrastructure and technology to enable A-SMGCS at Cork and Shannon Airports.
OPEX Impacts	N/A
Deliverables	An A-SMGCS system to meet the needs of Cork & Shannon airport ATM operations
Asset Life	8 years

Deliverability Risks	None foreseen at this time

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Assumptions behind total CAPEX requirement	ROM estimates from suppliers

Continuing From RP3?	No

Category
RP4 – Technical Services

Project Cross-dependencies
OSG, FDPS, SURV, COMMS, NAV, N&S, Safety, ATC OPS

Total CAPEX Requirement ✂

Project Summary **Pavilion Dublin Contingency ACC**

This project will deliver increased resilience to Dublin Operations and will cater for a major system failure and/or event that requires the evacuation of the Dublin ACC.

The new facility will be physically independent from the Dublin ACC and will remove the requirement for Dublin in Shannon contingency operations. The Pavilion Dublin Contingency ACC will require desks to be installed to host the equipment for the ATCOs. 4 Area Sectors, 1 Approach, 2 Holding/Finals, 1 Traffic Manager,1 Flight Data Assistant, 1 Station Manager and 1 Departure Controller position + Spare Positions will be required in the Pavilion Dublin Contingency ACC. In total 14 operator positions are required in the Pavilion Dublin Contingency ACC room. Appropriate power, lighting, air conditioning will be required to support ATC Operations from the room. It will be required that the equipment associated with this Contingency Room will be monitored on an ongoing basis, this monitoring activity needs to be possible from the current TCD room and the Pavilion TCD room.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**			
	Compliance			
	ATM Masterplan & DES Alignment			
	Resilience	**X**		Enhanced contingency option for Dublin Operations
	Safety	**X**		Enhanced equipment supporting ATCO decision making and ATC provision
	Capacity	**X**		Increased capacity when operating in the new facility compared to the Dublin in Shannon contingency operations.
	Productivity			
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits

This facility will provide Dublin Operations with an alternative site to provide Air Traffic Services which is independent of the Dublin ATCC. The contingency facility will be equipped with TopSky ATC One, CASDS, IATS, Frequentis Main VCCS, MEP backup comms, MDP system, ANEMOs, IRVRs, ILS RSI and clock information.

Project Output	This project delivers increased resilience for Dublin Operations.
OPEX Impacts	With the delivery of this project, there will be an additional ACC to monitor and maintain in Dublin.
Deliverables	Independent, fully equipped ATC centre for Dublin which will replace the requirement for Dublin in Shannon Operations. • Facilities refurbishment to accommodate ATC systems & Operations • FDPS systems will deploy the COOPANS system, extend CASDS, I-ATS • Communications will deploy VCCS, MEP. • Navigation MDP, IRVR, Clock, ILS RSI's • Surveillance sensors & infrastructure to required ATC systems • Mechanical & electrical installations to support systems & operations
Asset Life	
Deliverability Risks	None foreseen at this time

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Assumptions behind total CAPEX requirement	
Continuing From RP3?	No

Category
RP4 - Operations

Project Cross-dependencies
None

Total CAPEX Requirement
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Project Summary **Shannon & Dublin console replacement**

The Shannon en route OPS Room Consoles are in place since the Ballycasey Building opening in 2003 and Dublin ACC Ops Room Consoles were deployed at the same time. In 2003, a justification was required to secure a dispensation that it would not be necessary to comply with the Office Health & Safety legislation in relation to display screens adjustability etc. As the current consoles are in operation for over 20 years and do not offer the end user any flexibility and relatively poor arm support when manipulating a Mouse pointer, it is now time to upgrade the consoles to bring the consoles in line with modern ATM operations and optimum Health & Safety offering in relation to the working position. Note, all our COOPANS Partners have height adjustable consoles at this stage.

		Primary Driver	Secondary Driver	Rationale
General Benefits	**Obsolescence**	**X**		Replacement of old consoles which are no longer adequate in modern ATM environment
	Compliance		**X**	Compliance with H&S developments
	ATM Masterplan & DES Alignment			Yet to be defined in the context of the ATM Masterplan but expected to be required in this RP period
	Resilience			
	Safety		**X**	Ensuring continued safe operations at Ballycasey & Dublin ACC's
	Capacity			
	Productivity		**X**	Provides a more comfortable working environment for ATCO's supporting productivity in the units.
	Cost-effectiveness			
	Lack of a cost-effective alternative			

Key Information and Benefits	The key benefit of this project is to modernise the working environment for the Operational staff who currently do not have the ability to move their posture during long periods of operating a working position. It is believed that this will also contribute to Operational staff wellbeing and will contribute positively towards staff retention positivity.
Project Output	1. Modern working position design and flexibility which will bring our operations rooms more into line the working position flexibility expected in a modern work environment.
Non-staff OPEX Impacts	N/A.
Deliverables	1. A replacement of all working positions in the Shannon en route Operations Room.
Asset Life	8 Years
Deliverability Risks	We have experience of tendering, procuring and installing these types of consoles before in the New Dublin Tower, CEROC, therefore it is not anticipated that this element of the project will carry risk. However, the replacement of the current desks in a live OPS Room will take careful management.
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Assumptions behind total CAPEX requirement	ROM received for height adjustable desks with addition for assumption on inflation increase and scope increase e.g. additional number of positions. ROM for Cabling estimated from previous cabling tasks

APPENDIX 4 ATM MASTER PLAN AND CP1 COMPLIANCE

Within the framework of the EU aviation strategy and Single European Sky (SES), the European ATM Master Plan is the main planning tool for ATM modernisation across Europe. It defines the development and deployment priorities needed to deliver the Single European Sky ATM Research (SESAR) vision.

The European ATM Master Plan defines the vision for ATM in Europe, analyses the current state of the art and outlines the development priorities and identifies the Strategic Development Objectives (SDOs) required to progress along the critical path to transition from today's operations to the target vision for eliminating environmental inefficiency in ATM.

The Master Plan is regularly updated, through strong collaboration between all ATM stakeholders, in order to respond to the evolving aviation landscape. The next update of the ATM Master Plan is expected to be released in the autumn of 2024; the current drafts of the document are at an insufficient level of maturity to be relied upon to strongly influence ANSP RP4 planning at this stage.

ANSPs have recently provided their feedback on a draft of the ATM Master Plan, with many ANSPs highlighting that the timeline, resourcing and financing is challenging as implementation of actual regulations (e.g. CP1), end of life equipment and investments to secure operation (like building) are prioritised and most SDOs are not reflected in the investment planning today. It was also discussed that detailed knowledge and skills need to be broadened within the whole industry as only some organizations were involved in each different project leading to solutions (SESAR1, SESAR 2020 and SESAR 3). Knowledge needs to be spread to the whole industry to secure implementation of SDOs based on details which have to be described in AMC/GM not available today.

The SESAR Research and Innovation Programme aims to deliver solutions to support the implementation of the Master Plan vision. To date, the SESAR research and innovation programme has delivered a total of 127 digital solutions. It is estimated that 120 of these solutions could bring significant direct and indirect environmental improvements to ATM operations. When implemented, these solutions could already result in a 4% direct reduction in the CO_2 emissions per flight. The implementation of some of these solutions is already mandated by law (CP1), prioritising key enablers for trajectory-based operations (TBO) and for establishing a digital backbone for the Single European Sky (SES). It is estimated that the SESAR solutions captured in the CP1 projects already contribute 2% in emissions reductions.

CP1 was established to support the implementation of the ATM Master Plan by defining mandatory investments for all ATM stakeholders. This critical regulation is composed of multiple areas, each earmarked with specific deadlines. These areas are known as ATM functionalities (AFs):

- AF 1 - Extended Arrival Management and Integrated Arrival Management ('AMAN')/Departure Management ('DMAN') in the high-density terminal manoeuvring areas: This is an ATM functionality that improves the precision of the approach trajectory and facilitates air traffic sequencing at an earlier stage and the optimum utilisation of runways, integrating the AMAN and DMAN sequences, by deploying specific ATM solutions;
- AF 2 - Airport Integration and Throughput: This is an ATM functionality that facilitates the provision of approach and aerodrome control services by improving runway safety and throughput, enhancing taxi integration and safety and reducing hazardous situations on the runway;
- AF 3 - Flexible Airspace Management and Free Route Airspace: This is an ATM functionality that combines the operation of flexible airspace management and free route and enables airspace users to fly as closely as possible to their preferred trajectory without being constrained by fixed airspace structures or fixed route networks. It allows operations that require segregation to take place safely and flexibly and with minimum impact on other airspace users;
- AF 4 - Network Collaborative Management: This represents an ATM functionality that improves the European ATM network performance, notably capacity and flight efficiency, through exchange,

modification and management of trajectory information. AF 4 contributes to the implementation of a collaborative network for planning and decision-m

- king, which enables the implementation of flight- and flow-centric operations;
- AF 5 - System Wide Information Management (SWIM): This is an ATM functionality that consists of standards and infrastructure enabling the development, implementation and evolution of services for information exchange between operational stakeholders via interoperable services which are built on SWIM standards and are delivered through an internet protocol;
- AF 6 - Initial Trajectory Information Sharing (i4D): This is an ATM functionality that improves the use of target times and trajectory information, including where available the use of on-board 4D trajectory data by
- he ground ATC system and Network Manager systems, implying fewer tactical interventions and improved de-confliction situation.

Within each AF there are a number of sub-functionalities (S-AFs) which various stakeholders within aviation including airports, ANSPs and the Network Manger have to meet, with specific deadlines attached for ensuring the sub-functionality is delivered.

APPENDIX 5 ✂

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