ATC Staffing Resilience Plan

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1.   Introduction

A safe and resilient air traffic control (ATC) service is delivered through a combination of capabilities that include people, systems and processes.

Resilience in operational staffing relies on our ability to provide sufficient staff with the right sector validations to meet the operational requirement for Air Traffic Controllers (ATCOs).

This document outlines the current processes and procedures specific to operational staffing resilience, that aim to either anticipate, prevent, absorb or adapt to disruptive events that could impact the availability of personnel, and to recover from such events safely and rapidly.

1.1.   Supply constraints

We operate in a safety-critical environment. We need to deploy our staff in ways that manage ATCO fatigue and the variable intensity and complexity of traffic. We have a high level of union membership within our workforce and we work to have constructive relationships with our Trade Unions to ensure we have agreements that deliver the resource and resilience the business requires whilst complying with the various regulations pertaining to ATCO working hours. Constructive relationships aid our change management processes and allow for bespoke agreements to be made when resource constraints are identified, for example, when new airspace or technology is introduced into service.

ATCOs are deployed in small teams within a watch-based structure; each ATCO having skills for a small number of airspace sectors, these being limited due to regulatory recency requirements. As a result, a reduction in the number of ATCOs or their skills can have a significant adverse impact on the deployable resource for a particular part of the airspace network. As well as having a disproportionate impact on service resilience, having too few ATCOs can impact our ability to implement changes to our service, while minimising disruption to customers. Our ATCOs are also required to support non-operational duties, which are critical to ensuring we can continue to deliver the required service in future reference periods. These duties include supporting the development of the technology and airspace programmes, safety improvement developing new procedures, and compliance with competency and training requirements.

Due to the demographic profile of our operational staff, we expect a substantial number will retire during the next five to ten years. There is no fixed retirement age for ATCOs and they can leave with relatively short notice. This combined with the long lead times to recruit and train, means that we need to manage the risk of staff shortages carefully. Furthermore, the loss of more experienced staff with multiple validations leads to a reduction in flexibility in deploying staff until newly trained ATCOs acquire similar levels of validations. This can take up to two years following attainment of their first sector validation.

1.2.   Demand characteristics

Traffic growth, and the operational demand it generates, is not equally distributed across the network. Several sectors see double digit traffic growth at peak times. As sectors reach full capacity, we may be able to open additional sectors, with a corresponding requirement for a full complement of controllers. In some cases, however, increasing capacity requires airspace change. The relationship between traffic and delay is not linear. If there are insufficient ATCOs available to service the operational demand, there is a risk that even small levels of traffic growth may result in much greater increases in delay.

Long term traffic forecasts contain inherent uncertainty. Airlines will respond quickly to changing passenger demand for different destinations by adding and/or changing their routes season by season. As an historic example, between 2017 and 2018 a proportion of traffic shifted from Spanish destinations to Greek, Italian and Turkish destinations. This increased the workload of airspace sectors covering the eastern part of the UK. The dynamic nature of this process means that airlines often do not know which destinations or routes that they will use for the following season, let alone the longer term. We therefore aim to be in a position where our plan for the long term allows us to respond to such changes in our customers' needs.

At the other end of the time scale, the way that traffic presents each day is driven by a broad range of factors such as weather, capacity, European air traffic flow management regulations, airspace complexity and sometimes industrial action elsewhere in the network. Many are inherently unpredictable and/or are out of NATS control. We will always have safety as our priority, and should the two outcomes conflict, will prioritise safety over service performance.

A further unusual factor in our business is the impact of the jet stream. Our unique position as the gateway to Europe from the North Atlantic means that changes in the jet stream have a significant impact on the way air traffic uses UK airspace, and in turn on the number of staff and skills that we require. If the jet stream is in higher latitudes, the air traffic travelling east tends to follow the jet stream and this results in heavy loads in many of our sectors in both Scottish and English airspace. If the jet stream is located more southerly, then much of the traffic either enters the airspace of our southern sectors or sectors controlled by neighbouring Air Navigation Service Providers (ANSPs). The position of the jet stream is a significant determinant of our staffing requirement but is not predictable more than four days in advance. We need to plan operations for both scenarios.

1.3.   Customer and regulatory considerations

The level of safety, service performance and operational resilience that we provide is of great importance to airspace users. These priorities continue to be reflected in our annual customer survey and throughout both the RP3 and NR23 customer consultations.

Industry feedback has demonstrated that there is sensitivity to delay at London airports, even when we are operating well within performance targets across the network as a whole.

Our operational resourcing was the focus of an investigation by the CAA relating to a formal complaint under the provisions of the Transport Act 2000 in 2016 - Project Oberon. Although the complaint was not upheld, we have acted on the recommendations contained within the Project Oberon report and continue to improve the way in which we plan and execute our services to provide a resilient service.

A further CAA investigation - Project Palamon - was initiated following complaints brought by Ryanair plc and Stansted Airport Ltd related to Air Traffic Flow Management delays experienced by airlines and passengers of Stansted and Luton airports between January 2019 and March 2020. NATS has accepted most of the CAA's recommendations and has developed a response that seeks to address the concerns identified by the investigation.

CAA recommendation 1 relates to staffing resilience available to London Approach airports and Essex airspace. Recognising the need to deliver a more flexible and agile operational capability in future, and documented in NATS' main Palamon response submission, NERL is developing a range of initiatives to support this outcome, in consultation with staff and Trades Unions. Alongside these initiatives there remains a continued focus on training to deliver both headcount and validations to bolster resilience and flexibility in this part of the operation. Our workforce planning for these approach sectors is contained within Appendix 2.

2.   Proactive and reactive resilience

NATS' resilience framework consists of two main components, proactive and reactive resilience barriers, each of which considers a combination of people, technology and process arrangements. Proactive resilience barriers aim to minimise the risk of disruption, either reducing the likelihood of the event and/or reducing its potential impact on the service. Reactive resilience aims to reduce the impact of the event when it occurs, through incident response and recovery.

For the purposes of this document, proactive staffing resilience refers to the workforce planning and deconfliction activities undertaken in advance of the day of operation to best match available supply to anticipated demand. Reactive resilience refers to the mitigations during the operation to tactically respond to a shortfall in available operational resource. To enable continuous improvement, we undertake regular reviews and lesson learning exercises. These ensure our processes remain effective and where appropriate, changes to our approach will be reflected in this plan.
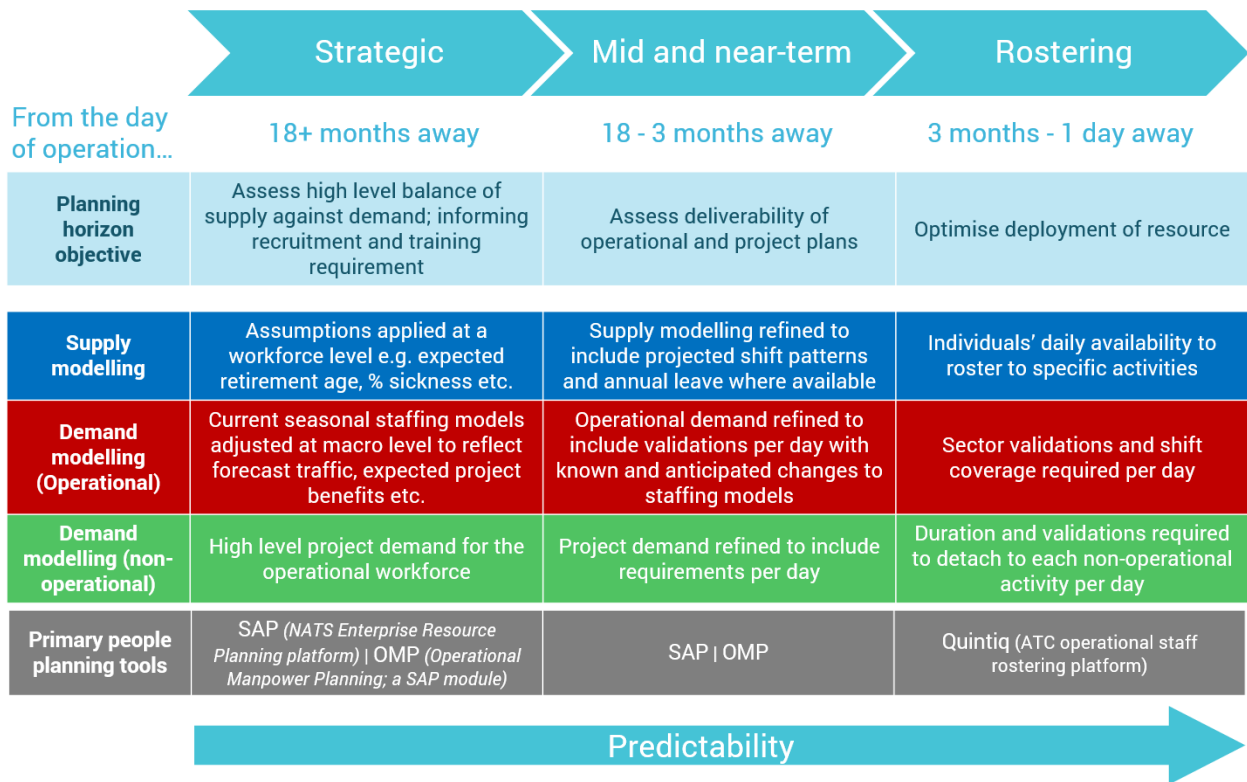
Our staffing resilience risk is supply being insufficient for the requisite demand and this materially impacting our service performance and/or other commitments. The barriers in place to enable us to anticipate this occurring are the same across the NERL operation. Apart from some specific local variations defined within Unit Working Practice Agreements, the barriers to prevent, absorb and adapt are also common across the NERL operation. The key determinant of which barrier(s) can be effectively enacted is how far in advance the staffing risk is detectable and measurable. To increase headcount for example - a sustained shortfall in supply against demand, quantified long enough in advance, may be appropriately mitigated by training new ATCOs. Increasing headcount however in response to sickness notified on the day of operation, relies on a different set of tactical interventions. The primary barriers applied by NERL in response to identified staffing resilience risk are outlined in Appendix 1.

2.1.   Proactive resilience

The following sections outline the processes in place to determine the demand, and forecast and manage the available supply, to provide operational staffing resilience across NERL.

Planning is split across three distinct time horizons: strategic, mid and near-term, and rostering. Each horizon has processes and tools tailored to the level of uncertainty, and the interventions available, given the distance from the day of operation. Scenarios are tested at each stage to ensure a full range of likely outcomes, and the effectiveness of our barriers should they materialise, are considered. An example scenario is different anticipated retirement ages being modelled for the ATCO workforce in to order to understand the impact on supply.

Table 1:Summary of our operational staff planning across 3 distinct time horizons

From the day of operation…	Strategic 18+ months away	Mid and near-term 18 - 3 months away	Rostering 3 months - 1 day away
Planning horizon objective	Assess high level balance of supply against demand; informing recruitment and training requirement	Assess deliverability of operational and project plans	Optimise deployment of resource
Supply modelling	Assumptions applied at a workforce level e.g. expected retirement age, % sickness etc.	Supply modelling refined to include projected shift patterns and annual leave where available	Individuals' daily availability to roster to specific activities
Demand modelling (Operational)	Current seasonal staffing models adjusted at macro level to reflect forecast traffic, expected project benefits etc.	Operational demand refined to include validations per day with known and anticipated changes to staffing models	Sector validations and shift coverage required per day
Demand modelling (non-operational)	High level project demand for the operational workforce	Project demand refined to include requirements per day	Duration and validations required to detach to each non-operational activity per day
Primary people planning tools	SAP *(NATS Enterprise Resource Planning platform)* | OMP *(Operational Manpower Planning; a SAP module)*	SAP | OMP	Quintiq (ATC operational staff rostering platform)

Predictability →

Source: NATS own elaboration

2.1.1. Operational demand planning

We have an established process to forecast the number of ATCOs that we require for a safe operational service of the right quality and resilience, for example, to cover staff sickness, technical issues, weather, and industrial action in other countries. It considers strategic, mid and near-term and rostering timeframes, refining our understanding of the variables as we progress toward the day of operation.

This process considers the number of airspace sectors that we expect to open and for how long, the staff required to operate those sectors and the requisite service quality. The traffic forecast is only one variable in the planning process and is not the sole driver of ATCO headcount requirements. As outlined below, many other factors need to be considered. Our operational and planning and resource teams use their expertise to model and predict how many airspace sectors we will need to open in the future, and the commensurate number of staff this requires to operate them.

The operational requirement is determined using the agreed Working Practice (WP) model process for WP Groups e.g., Swanwick Area Control (AC), Swanwick Terminal Control (TC) non-Heathrow Approach. The WP model uses various inputs including a position staffing schedule (PSS) which governs the opening hours of operational positions, rostering criteria, NATS and national resourcing regulations, and operational expertise.

The PSS is determined following joint assessments of both service demand and effective capacity to meet that demand, incorporating service commitments made by NATS to its customers. The PSS uses:

> Historic information - total workload, sector opening times taken from Operational Position Monitoring (OPM) records

NATS Public

> Variations in traffic patterns - hourly, daily, weekly and monthly

> Predicted traffic - customer demand and requirements

> Business requirements - meeting our regulatory regime, delay targets, contractual commitments etc.

A roster pattern and shift palette are then created to efficiently match the PSS. This is an iterative process that can produce changes to the roster patterns, the PSS, or both and results in an agreed WP model.

Strategic time horizon (18 months + from the day of operation)

Given the degree of uncertainty this far in advance of the day of operation, we forecast operational demand at the level of Full Time Equivalent (FTE) ATCOs required per month for each WP group. This is determined by reviewing the current agreed WP model and extrapolating the impacts of variable macro factors across the strategic period. These include:

> The potential impacts of traffic growth, e.g. where sectors are likely to require more regular splitting as traffic grows

> Possible changes in aircraft routing e.g. resulting from geo-political change, airport and airline growth plans (where known)

> Operating benefits from project delivery

> Benefit from continuous improvement in the operation

> Consideration of the expected target level of service performance

Mid and near-term time horizon (3-18 months from the day of operation)

The WP Group models are reviewed at least every 6 months, considering:

> The timing, duration and frequency of airspace sectors that were used during the previous season and the delay that resulted

> Known and anticipated changes in flight volumes and routings

> Shift patterns, break allowances, leave allowance, and any updates to NATS and national resourcing regulations

Modelling scenarios are then created using expert input from across Operations to predict the number of airspace sectors that will be required to service the forecast traffic, and the shift patterns and corresponding staffing demand this generates.

Rostering time horizon

As discussed above, an output from the WP model is a requisite number of shifts and activities required to meet the operational demand for a period. This demand is then reflected in Quintiq (NATS rostering tool for operational ATC staff) and attached to a roster as the baseline demand to assign supply against.

2.1.2.   Non-operational demand planning

Alongside the requirement for ATCOs to provide the core operational service, we also need to ensure that the service is sustainable over the medium term. We therefore need ATCOs to undertake work that is necessary to maintain the operation. These include tasks such as competency assessments, professional training and development such as annual refresher training, supporting safety improvement work and the operational training of new ATCOs.

While we work to minimise ATCO involvement in projects to ensure their availability for the operation, we nevertheless require input from ATCOs in the development of both technology and airspace. This ensures that we get high quality outcomes from these projects and an accepted transition into service. As well as input at the development phases, ATCOs are also required to undertake training to operate new equipment, procedures and airspace before these enter into operation. This work is defined and planned through our investment programme, and forms part of the overall requirement for the number of ATCOs we need to sustain the business over time.

Strategic time horizon

Demand for ATCOs for non-operational activity in the strategic time horizon is levied by the activity owners (projects, training etc.) in SAP. As with operational demand, this far advance of the day of operation, non-operational demand is estimated as the FTE required per month from each WP group.

Mid and near-term time horizon

In this time horizon, as the timing and specific requirements for activities become more certain, the SAP demand is refined iteratively toward the specific sector validations required each day. Approaching the near term, this demand must be converted to requests for specific detachments, which projects place through the Quintiq system.

Rostering time horizon

The detachment requests in Quintiq provide the granular detail required to roster the activity e.g. if an ATCO holding a specific validation or general rating is required, whether the timing is fixed or flexible within a date range etc. The Rostering & Deployment team provide a level of challenge to ensure the release is as efficient as practicable, weighing up the priority of each alongside other non-ops activities, as well as operational service delivery.

2.1.3.   Supply planning and balancing against demand

Our headcount supply plan aims to match the supply of ATCOs to the demands placed upon them to provide the operational service, sustain the operation, and support the investment programme.

In doing so, we aim to strike a good balance between having too many ATCOs, which would lead to higher prices, and too few, which could cause high indirect costs to our airline customers and their passengers through delay, as well as deferring the benefits that will be delivered by the airspace and technology programmes. By having a margin for resilience, we aim to balance these risks.

Strategic time horizon

As with our modelling of demand in the strategic time horizon, ATCO supply is considered at the level of FTE per month for each WP group. Our supply is forecast by applying assumptions to the existing workforce, for example expected retirement age(s), non-retirement leavers (based on

historic trends) and the proportion of time contributed by ATCOs who retain operational skills, but whose main role is devoted to other tasks such as training or supporting airspace design.

Given the lead time to train new controllers, the nearer portion of the strategic time horizon will contain trainees already within Operations Training, progressing towards their initial validations, at which point they are counted in the ATCO supply. Where training has progressed sufficiently for an individual that a specific estimate of their validation timing can be made, this is incorporated. For later years, data driven assumptions are used for the timing and volume of future trainees validating as ATCOs against each WP group.

Our ATCO training programme is ongoing and determining our requirement for new controllers is iterative. When our modelled supply is assessed against expected demand, this may indicate a shortfall. Shortfalls are evaluated to determine their likely impact and manageability. Should a shortfall persist within the appropriate lead times, a demand will be levied on Operations Training to increase supply through recruiting and training new ATCOs. Given the unpredictable nature of workforce attrition, forecast supply balance between WP groups can be fluid. With sufficient lead time and training capacity, it is possible to offset emerging imabalances through reallocating planned validations to redistribute future supply between groups.

Mid and near-term time horizon

As outlined, in the mid and near-term, demand begins to become more certain and refined moving from FTEs per month per WP group, to the specific sector validations required per day. Forecasting our supply becomes more refined too and high-level assumptions where possible are replaced with objective intelligence such as notice given by individuals retiring, loss of an individual's medical and parental leave dates.

Many of the above events are uncontrollable and contribute to the fluid nature of the balance of validations across watches. This requires ongoing management and must be factored alongside flexible working requests, career progression, and development moves by ATCOs to roles outside of the operation.

Initial training for new controllers gains them a student licence for a rating: Area or Approach. As supply gaps in specific validations become known, trainees are funnelled to target gaps in watches and sectors as required. Training can also become more targeted for existing ATCOs to extend and gain additional validations to increase flexibility and resilience.

ATCO leave for the following season is also finalised, providing increased certainty on the likely availability of specific validations on specific dates. Leave is managed systematically to control the amount approved at any given time.

Rostering time horizon

Rosters are built approximately 3 months ahead of the day of operations in monthly blocks and are published on the 20th of the preceding month. Supply at the start of roster build is more stable than in preceding planning phases.

Rosterers take account of the tactical availability of staff e.g. the days they have booked leave, are required for training etc. A number of controllers whose role is primarily outside of the operation retain an operational validation. To maintain recency, they are required to complete a minimum number of operational shifts per month. This provides additional resilience and flexibility to roster to demand. Shifts and activities that have been rostered are regularly reviewed against the demand prior to publication to ensure that it is matched as closely as possible.

We are always susceptible to unplanned personnel changes and work to incorporate these into the roster with as little impact as possible as and when they become known. These changes could include individuals becoming unavailable through loss of licence and sickness (short or long-term).

Staffing numbers following roster publication are monitored daily. This monitoring involves looking at the headcount and skills mix available on the day, taking any tactical changes to demand or supply into account e.g. adverse weather impacts or sickness, and agreeing action to resolve any imbalances if required where identified.

2.2.   Reactive resilience

If short-term (e.g. single-shift) or sector-specific staff shortfalls occur on the day of operation, for example late-notice sickness, redress of the shortfall is achieved through a range of Ops Supervisor instigated mitigations following the Working Practice Agreements and local arrangements (see Appendix 1).

For events spanning multiple-shifts or where widespread staff shortfalls occur or are anticipated, for example due to severe weather, we invoke the response plans and incident management (details of which are contained within the NERL Core Services Response Plan). Silver Team will coordinate the response following Incident Management procedures.

3.   Appendices

3.1.   Appendix 1 - Primary barriers for identified staffing resilience risks

Table 2: Primary barriers for staffing resilience

Proactive resilience barriers: Strategic time horizon	> Train new ATCOs > Redistribute future planned trainees across WP groups > Identify requirement for enhanced overtime provision > Restructure non-operational demand (e.g. re-plan project activities)

Mid and near-term	Supply
	   > Watch balancing
	   > Periods of restricted leave
	   > Overtime agreements
	   > Extension training
	   > Review part-time and flexi agreements
	   > Review secondments and supply back to the ops room
	
	Ops demand
	   > Identify high priority days for airport and airline customers
	
	Non-ops demand
	   > Restructure demand
	   > Reprofile and deconflict activities

Rostering	> Target resource from the non-ops controller maintaining recency where individuals hold a valid skill > Cancel/reschedule non-essential detachments or courses > Request shift swaps to reduce surplus on one shift to support shortfalls on another > Offer overtime > Apply additional attendance and flexibility options (agreed for summer periods during NR23)
Reactive resilience barriers	> Obtain resource from the non-ops controllers where individuals hold a valid skill > Recall staff from non-essential detachments, or courses > Request shift swaps to reduce surplus on one shift to support shortfall > Close less essential positions and redistribute staff > Temporarily stop extension training to make available the instructor and valid controller training on a new sector > Offer overtime > Apply network regulations

3.2. Appendix 2 - Demand and supply modelling for Swanwick Terminal Control - Heathrow and non-Heathrow Approach functions and Terminal Manoeuvring Area (TMA)

Our objective is to manage supply to the level required to achieve the target service performance. As such, as forecasts evolve, our resource planning processes will identify adjustments to address shortfalls or surpluses against the optimum. We intend to continue to engage with customers through the SIP process on the evolution of traffic and associated service implications.

Demand

Our estimate of the controller headcount required to provide the operational service, aligned to the STATFOR October 2023 base traffic forecast and adjusted for latest business intelligence.

Supply

The controller headcount effort available to deliver the operational service. This includes a proportion of time (four shifts per month) from ATCOs who retain operational skills but whose main role is devoted to other tasks, for example, training or supporting airspace changes.

Output and use of this modelling

The output of this modelling is forecast demand and supply at the level of ATCO Full Time Equivalents (FTE) per month. This strategic time horizon modelling is used to indicate potential shortfalls in FTE supply against demand. Shortfalls identified in this modelling are evaluated to determine their likely impact and manageability. If required, supply shortfalls can be appropriately mitigated by training new controllers and/or training existing controllers to gain additional validations, as well as other measures outlined in Appendix 1.

Flexibility and Resilience

The Swanwick TC WP models are built to take account of flexibility provided by ATCOs holding validations across a number of sectors. Each operational unit sets a minimum unit requirement (MUR) for the validations controllers must hold. In TC, a Heathrow validation on its own is MUR and has its own model. For the non-Heathrow Approach functions, two of these sectors represent MUR. This allows us to combine these sectors into a single WP model, which factors in the flexibility to use and share this resource across, generating a more efficient total requirement than by disaggregating the sectors. Although controllers are grouped separately for workforce modelling purposes, there are a selection who hold both TMA and approach validations. This provides further flexibility and resilience to demand across TC.

Supervisory demand and supply

We capture demand for supervisors within the TMA model. ATCOs that hold both a radar and supervisor skill however could be deployed against either an Approach or a TMA demand therefore they have been balanced in the graphs shown.

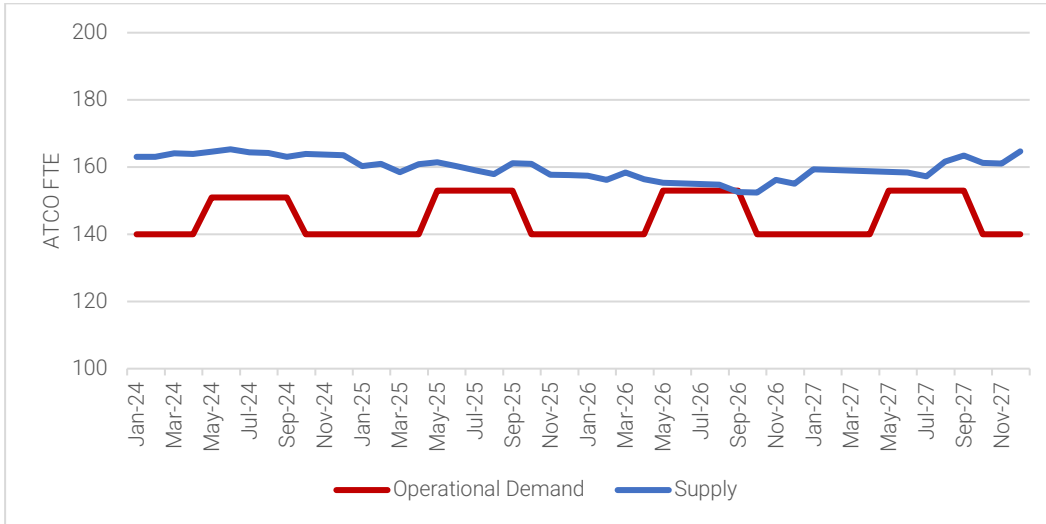*Figure 1: Swanwick TC Non-Heathrow Approach | Gatwick, Stansted, Luton, Thames*
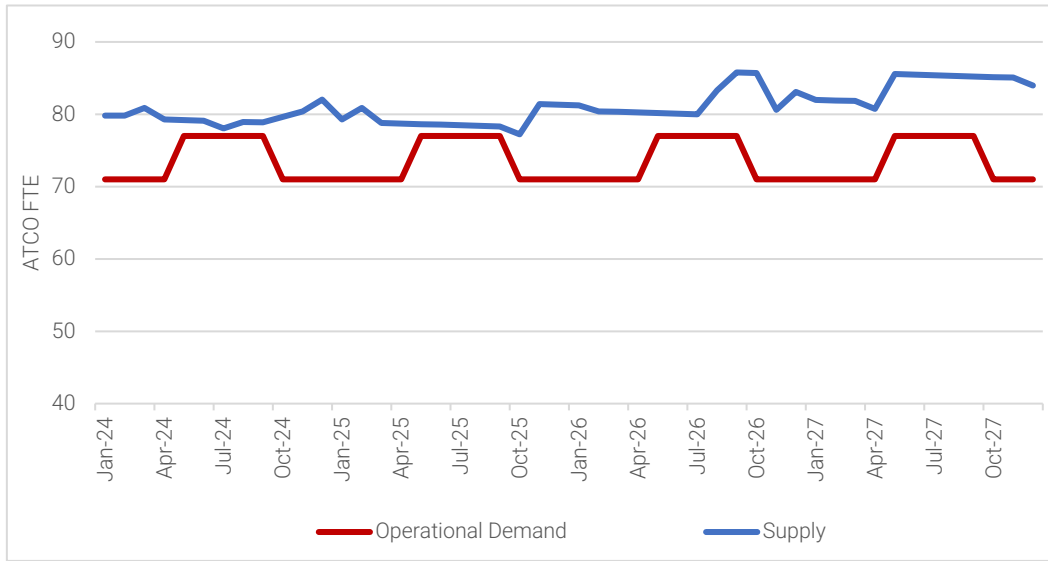
Source: NATS own elaboration

Figure 2: Swanwick TC Heathrow Approach
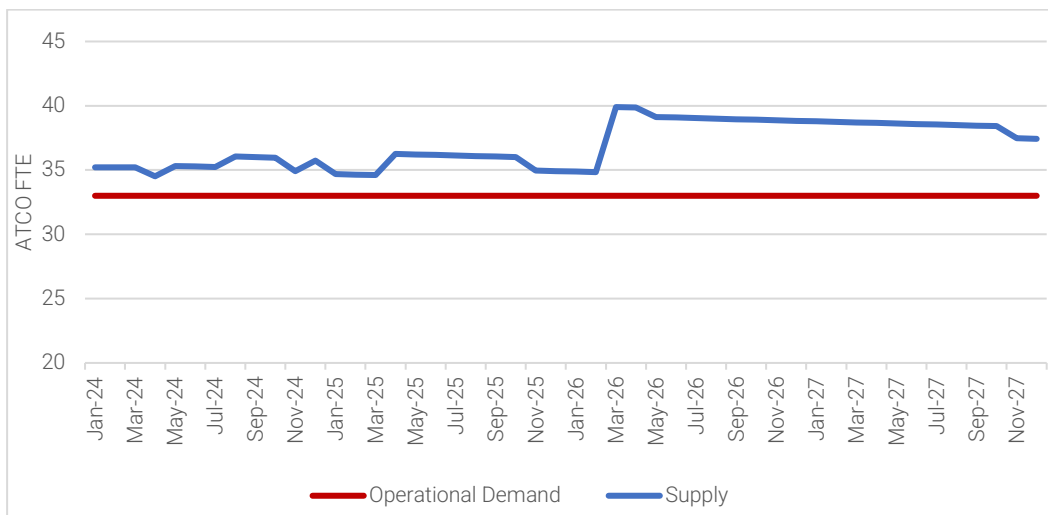
Source: NATS own elaboration

Figure 3: Swanwick TC Terminal Manoeuvring Area (TMA)

Source: NATS own elaboration