Executive Summary

Terminal air navigation services (TANS) are the air traffic management (ATM) services that assure safe separation between aircraft at an airport and, depending on the traffic and airspace complexity, on approach to the airport. Traditionally, TANS are provided by air navigation service providers (ANSPs) that have long term, sometimes statutory, monopoly status.

In any market, a lack of competition tends to lead to services that can be high priced, lack a keen customer focus, and be slow to adapt to customer needs. Airline and airport customers of TANS often find that the current industry under-performs. This paper makes the case for introducing competitive supply of TANS, bringing the benefits of market discipline to TANS services and creating opportunities for TANS suppliers. The benefits of market liberalisation include more cost effective service, pricing transparency, improved customer focus and accelerated innovation.

In locations where TANS have been liberalised, experience shows that these benefits are being realised. In Europe and the USA the cost of supplying TANS has reduced between 30% and 74% when competition is introduced. The unbundling of TANS has improved pricing transparency by reducing cross-subsidisation of services. Where innovation is important, there is evidence that new TANS suppliers are responding to customer needs. Incumbent TANS providers have also responded to the threat of competition and the need to retain market share by increasing customer focus and engagement.

Liberalisation can take the form of “competition for the market” in which a TANS provider obtains an exclusive right to supply TANS to an airport or airspace for a fixed period of time. Whilst competitive tendering could be used to select a supplier, it is also possible that the threat of competition would be sufficient for an existing supplier to deliver improved value or quality, reducing the transaction costs whilst realising the benefits of a competitive market.

The market for TANS is large and diverse. There appears little reason to exclude an airport from competition for TANS on the basis of its scale of operation. Current examples of competitive supply include both busy and other relatively quiet locations. At high intensity locations the airport customer may be looking for experienced suppliers with the resources to ensure business resilience to supply tailored, high performance services. At low intensity locations customers are likely be cost sensitive and provide opportunities for efficient suppliers delivering standardised services. In either case, suppliers may have opportunities to increase security of tenure and grow the business by expanding into adjacent services such as data processing and other airport-centred operational services.
Executive Summary (continued...)
There is no reason to suppose that liberalisation would compromise safety. Suppliers would need to satisfy the safety regulator that the TANS provider had adequate procedures, staff competency, and the capability and resources to meet certification standards and continue to meet safety requirements. This may require increasing resourcing for the regulator.

Competition for TANS could be put into practice at present, and there is an emerging body of knowledge to aid airports, regulators, and TANS suppliers from locations where competitive TANS supply has been established. Participants at most levels have peers with a growing understanding of success factors involved, including training, staffing, and transitioning to a new supplier, structuring existing suppliers, assets, and intellectual property to enable competition, and regulating the market to attract suppliers and enable fair competition to occur.

Competition for TANS, when appropriately structured, leads to more cost effective, more customer-focussed, and more innovative ATM services for airports and their airline customers. Given the local nature of airports, that liberalisation can take place piecemeal, commencing in regions and countries interested in taking advantage of these benefits.

This paper makes the case for introducing competitive supply of TANS, to bring the benefits of market discipline and create opportunities for TANS suppliers
Liberalising Terminal Air Navigation Services

Background
The ATM Policy Institute was formed to lead the debate on how to improve the efficiency and effectiveness of air traffic management (ATM) through market liberalisation. In “The Case For Liberalising Air Traffic Control”, the first in a series of white papers, we make a general case for the advantages that market liberalisation could bring to the ATM industry and its customers. This paper continues the series and focusses on one aspect of ATM – the potential for, and benefits of, market liberalisation of terminal air navigation services (TANS).

What are Terminal Air Navigation Services?
TANS are a fundamental component of air traffic management (ATM), ensuring safe separation of aircraft arriving at or departing from airports. TANS include aerodrome control services, may also supply approach control services (fig 1), and can be delivered in a number of ways depending on factors such as location, traffic levels, and complexity of adjacent airspace. TANS have a crucial role in enabling an airport to function effectively, and its customer airlines and their passengers to enjoy safe and efficient travel.

The traditional structure of the ATM industry, with its emphasis on monopoly providers, mitigates against achieving what could be possible with competitively-provided and customer-focused delivery of TANS. In most locations, TANS are delivered by air navigation service providers (ANSPs) that have long term, sometimes statutory, monopoly status, and are often the sole provider for a nation state. In any market, a lack of competition tends to lead to service that is high priced, lacking an insightful understanding of the needs of airports and airline customers and slow to innovate.

Figure 1 TANS as part of ATM separation services

- EN-Route Service
  - ENR service controls flights between terminal areas
- Approach Service
  - APP service controls flights arriving or departing aerodrome
- Aerodrome Control Service
  - TWR service controls vicinity traffic, runway and surface movements
  - Alternative AFIS service provides traffic information to pilots but not separation control

TANS Services
Airport and airline customers seeking improved customer focus, cost effectiveness, and higher delivered value often find that the current industry under-performs\(^2\). They also find that state owned ANSPs can be more responsive to the demands of their government owners than to the needs of their customers. ANSPs supplying TANS services to a number of airports tend towards or are required by their regulator to adopt a "one size fits all" service that may well offer an inappropriate level of service or have an inefficient cost at any particular location. Customer charges may also be opaquely mis-priced due to internal cross-subsidisation.

Services may evolve more in response to international trends or on a network-wide basis rather than to meet customer needs on a timeline that matches the development aspirations of the specific customers. It is therefore understandable that, with rising volumes of air traffic, airports and airlines are increasingly seeking a more rapid improvement in TANS performance, value, and cost effectiveness, as well as an increased ability to influence the evolution of the service.

Standard economic theory provides that enabling airport or airline customers to select between competing qualified TANS suppliers addresses these cost, performance and customer focus concerns. Accordingly, market liberalisation of TANS would bring a number of benefits such as suppliers of TANS being better attuned to their customers’ needs, and operating more efficiently and cost effectively whilst maintaining or improving service quality and safety.

Studies of the first examples of the application of competition in the TANS market suggest that this aim is attainable\(^3\). Where delivery of TANS has been opened to competition, there is evidence that these expected benefits are being realised. It should be recognised that there are transaction costs in such a move, but there is also a growing understanding amongst regulators and suppliers of how to make the transition from monopoly providers to commercial competition.

The results suggest that competition for TANS can be practical and effective when the conditions for successful competition are in place.

The purpose of this document is to outline how TANS could be transformed and improved through market liberalisation.
Why TANS liberalisation would be beneficial

The purpose of liberalising TANS is to bring the power of market forces to a part of the industry that is perceived by many airports, ANSPs and regulators as being more readily liberalised than other industry activities.

A number of benefits would result. Firms that thrive when competing for market share learn to deliver improved customer outcomes. These benefits include:

- more cost effective service
- pricing transparency
- improved customer focus
- accelerated innovation

This has been substantiated by practical experience, as described below.

• Price Transparency

Traditional ANSPs supply both TANS and en-route ATM, often over wide areas. In the absence of competition, there is no natural pressure to align charging with costs in any particular subset of the airspace. The result is that charges for services for TANS in one location may cross subsidise other aspects of the ANSPs operation. Without more visibility into the internal costs of an ANSP, airport and airline customers cannot have confidence that the ANSP charges they face are fair. Competition for TANS would bring unbundling of the TANS component of existing services and increase pricing transparency.

• Cost efficiency

Competition delivers downward pressure on prices and costs by transferring some pricing power to the paying customer. This has been borne out by the early work of the Compair Consortium\(^4\), and is supported by practical experience. In several locations where price was a driver for liberalisation, new entrant TANS providers have substantially reduced the cost of TANS.

The advent of competition can also promote increased cost effectiveness in incumbent TANS suppliers. Manchester Airport Group in the UK used its buying power (the threat of a tender) to negotiate better terms with the incumbent TANS supplier NATS (Services) Limited (NSL), without changing supplier.

The savings reported by new entrant TANS providers are substantial:

<table>
<thead>
<tr>
<th>Country</th>
<th>Service</th>
<th>Process of liberalisation commenced</th>
<th>Cost reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spain</td>
<td>TANS at 13 airports(^5)</td>
<td>2010</td>
<td>46.7%</td>
</tr>
<tr>
<td>USA</td>
<td>Contract tower service at 253 low activity visual flight rules (VFR) airports(^6)</td>
<td>1982</td>
<td>74%</td>
</tr>
<tr>
<td>Sweden</td>
<td>TANS at 14 airports operated by Aviation Capacity Resources AB (ACR)(^7)</td>
<td>2010</td>
<td>30%</td>
</tr>
</tbody>
</table>
Customer Focus

Competition incentivises commercially motivated TANS suppliers to improve service value and customer focus. Suppliers with an interest in retaining or growing market share will evolve their approach to customers to address important customer service needs, and will respond with increased engagement and value. Despite risking losing market share initially, incumbent ANSPs may improve ongoing security of tenure through increased customer focus and engagement.

Innovation

Competition spurs suppliers to find and deliver their unique selling proposition – the factor that differentiates their service to appeal to the customer. The essential need to maintain market share stimulates suppliers to continuously adapt products and services to better satisfy customers. Opening TANS to competition would provide this motivation.

Innovation is desired, and we have seen that in the right conditions, is being delivered. Gatwick airport, the busiest single runway airport in the world, went to tender in part from a need for the TANS provider to find innovative ways of increasing airport capacity and resiliency at peak traffic periods. The successful competitor, Air Navigation Solutions Ltd (ANSL) has been enhancing detailed traffic modelling methods that aim to identify process changes leading to the desired performance improvements.

Case study: Improved customer focus as a result of increased TANS competition in the UK

At London Heathrow, NSL transformed the customer relationship and became unusually broadly integrated into the airport organisation, taking management responsibility for aspects of the airside operations and becoming more aligned with airport goals than ANSPs have traditionally been in the past.

Following NATS (Services) Ltd (NSL)s loss of customer airports Gatwick and Birmingham to TANS competitors, NSL evolved its approach to customers to include increased transparency on costs and sharing performance risk via penalty and reward payments.

Conclusion

In summary, the benefits of introducing competition for the supply of TANS could include improvements in cost efficiency, pricing transparency, service quality and customer focus. Both new entrant suppliers and incumbent suppliers would improve performance as a result of market forces. Concrete examples exist today showing how competition for TANS has delivered tangible benefits.
What would competition for supply of TANS look like?

The nature of competition

As described in *The case for liberalising air traffic control*, competition can be for a market, where suppliers compete for the right to be the sole provider of TANS, or competition could be in a market, where suppliers compete directly with each other to supply TANS to individual customers. In the medium term at least, it is very likely competition for TANS would be for a market, in that TANS suppliers would compete for exclusive rights to deliver TANS at specific airports for a defined period of time.

Competition for the market gives the responsible authority a number of alternative means to obtain more effective TANS. Potential competitors could include: the existing supplier, another ANSP, a specialised TANS provider, or self-supply by the airport. Subject to practicality, aerodrome control and approach control could each be subject to competitive supply, possibly with differing suppliers. Whilst competitive tendering could be used to select a supplier, both the customer and the incumbent TANS supplier may also choose to negotiate for continued service with improved terms and quality, thereby avoiding the cost and time involved in bid preparation and response and the risks that accrue when transferring services from one provider to another. A credible alternative to the existing supplier may be sufficient to produce the benefits of competition in the ongoing service.

TANS providers would also have opportunities to grow revenue, add value for customers, and consolidate their tenure by extending their services into adjacent market opportunities.
Service differentiation

TANS suppliers can differentiate their services and realise value for their customers through optimising the efficiency of the business, improving service performance, and extending services to adjacent opportunities. These benefits can flow to both the airport and to the airlines that fly there.

Efficiency improvements could include minimising administrative overheads and optimising productivity through revised working practices. Although air traffic controller working hours are often regulated, opportunities still exist to rationalise rostering and leave arrangements, and take on other non-ATC functions.

TANS providers would also have opportunities to grow revenue and consolidate their tenure by extending their services into adjacent market opportunities that add value for customers. In some places, consolidating the airspace around and across several airfields may produce additional efficiencies.

### Examples of cost savings and efficiencies:

- Lean administration: ACR provide TANS at 14 airports in Sweden and use minimal non-operational staff. At the start of 2017 ACR employed a staff of 106, of whom 93 are air traffic controllers or assistants.  
- Optimised productivity: Contract towers at low activity airports in the USA operate with approximately half the staff employed at other similar USA locations. This is achieved by using only a single controller on duty at times. At the high intensity Gatwick airport, ANSL reduced the total number of air traffic control staff from 37 to 33.  
- Self-supply: Airports that elect to self-supply air traffic control would avoid incurring additional overhead costs where the TANS unit could be managed with existing corporate services.

### TANS provider revenue opportunities:

- Data processing and analysis for airport related operators, such as airside revenue collection or performance measurement  
- Local traffic flow management services that could streamline the airport operations, and, beyond the airport, route-oriented interactions with other airports TANS providers to streamline the progress of customer airlines’ flights.  
- Stronger integration with airport operations such as baggage and aircraft refuelling, or rescue fire services, and runway inspection.  
- Deeper participation in developing strategic options with the airport operator for future growth or more locally acceptable methods of operation.
Market segments

Given that each airport is unique and the particularities of the TANS services required depend on the nature of the airport and the complexity of the airspace surrounding it, the market is not uniform.

The lower the activity levels, the more airports tend to be price sensitive. TANS suppliers to low activity airports would focus on minimum cost service. Suppliers may be able to reduce costs through economies of scale by serving several locations and sharing common overhead costs. Increasingly, remote tower technology is available to facilitate these changes. Further improvements might be made where airports are closely located allowing the TANS supplier to improve staff utilisation. London City Airport has announced that it intends moving to a service delivered remotely, with the aim of further reducing their costs.

Low and medium activity airports may have more straightforward, standard operations that can be supplied by less experienced operators, including new entrants to the industry, or self-supplied by the airport company. In effect, lower activity airports represent a commodity market where low cost standardised service is more valued.
Market segments (continued...)

At higher intensity airports, the customers’ emphasis may focus more on performance and productivity, and the ability of TANS suppliers to support the strategic development objectives of the airport and its airline customers. Suppliers will need to focus more on specific customer needs, and differentiate their service by focusing on improving the performance or features most desired, such as capacity improvements, or closer integration with airport operations.

As operational complexity increases, fewer suppliers have the experience and capability to deliver the service. Furthermore, continuity of service is crucial, as a business or service failure could potentially have a catastrophic impact on the airport and airline businesses.

For high intensity operations – and setting aside the needs of airports – regulators may require suppliers to meet qualifying criteria not only for safety and operational capability and experience, but also business resilience, financial strength, and other factors that could provide the regulator with confidence of service continuity. The transition between TANS suppliers would be carefully managed and possibly lengthy due to the more stringent training, and more sophisticated processes, and technology involved. High intensity airports represent a specialty market where service quality and performance have greater importance.
The ATM Policy Institute

• Scale of operation

TANS are supplied on a competitive basis in several States, including Germany, Norway, Spain, Sweden, United Arab Emirates, United Kingdom and the United States of America. TANS are supplied on a competitive basis at airports ranging from low activity airports to high intensity operation airports. The sample of locations in the table below illustrate this wide range of activity levels.

<table>
<thead>
<tr>
<th>Intensity of operations</th>
<th>Airport</th>
<th>Annual aircraft movements 2016¹⁴</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>London Gatwick, UK</td>
<td>280,666</td>
</tr>
<tr>
<td>Medium</td>
<td>Birmingham, UK</td>
<td>113,184</td>
</tr>
<tr>
<td></td>
<td>Alicante-Elche, Spain</td>
<td>87,113</td>
</tr>
<tr>
<td>Low</td>
<td>Vigo, Spain</td>
<td>11,557</td>
</tr>
</tbody>
</table>

There appears little reason to exclude an airport from competition for TANS on the basis of its scale of operation.
• **Technology changes**

Liberalising TANS need not wait for developments in technology; it can be provided using existing technology and control towers. Many TANS suppliers began operations employing pre-existing equipment, with access obtained via acceptable commercial arrangements. Although innovative suppliers may introduce new technology to support improved service quality, technology evolution is not a prerequisite before beginning to liberalise TANS.

On the other hand, emerging technologies may enable more flexible competition for the market, and possibly enable competition in the market. By way of example of this in practice, London City Airport has announced that it is to move to remotely provided TANS services, to be provided by its incumbent provider, NSL, to build in resilience and cost savings.

Arguably, with emerging automation and data-based operations, competition in the market may also be foreseeable. Current research into control concepts for “sectorless ATM” and for unmanned aircraft systems (UAS) envisage multiple service providers able to deliver separation assurance services to flights in a common airspace. This means aircraft operators could choose the separation service provider for a flight, and the selected provider could deliver that service for the duration of the flight. As and when this concept becomes acceptable in TANS airspace, competition in the market would be conceivable.

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**Case study: The benefits of Virtual Tower Technology**

Virtual tower technology has the potential to transform TANS in several ways. Virtual tower technology enables a TANS supplier to deliver aerodrome control service remotely, using cameras and other sensors to replace the need for a visual control room (control tower) on site. Digitising the visual control room enables new levels of automation and productivity. The technology enables a TANS provider to supply a number of airports from a centrally located base, enabling a wider market reach, increased staffing flexibility, and costs to be shared between several airports. Given the potential for improved staff utilisation it is conceivable that virtual tower technology could enable a consolidation of the TANS market.

At the same time, competition for TANS may also influence the development of virtual tower technology. Currently, virtual tower system vendors offer proprietary systems bundling the airport sensor equipment, the control room automation and operator user interface equipment for use by a monopoly ANSP. In a business environment where airports seek the ability to choose TANS providers, and TANS providers seek to expand to additional airports, a demand may arise for inter-operable systems in which airport sensor systems can connect with control room automation from a variety of manufacturers, using standards-based interfaces. Such a technology change would enable flexible connections between TANS suppliers and airports, potentially enlarging the market both for virtual tower technology suppliers and for competing TANS providers.
• **Safety**

There is no reason to suppose that liberalisation would compromise safety. TANS suppliers would be required to meet the applicable State requirements for an air traffic service, and continue to be audited for ongoing compliance with the required safety performance standards.

Prerequisites for a TANS supplier to enter the market would include demonstrating to the regulators satisfaction that the prospective TANS supplier had appropriate and complete procedures, the resources, competent staff and the capability to deliver services that conform with those procedures. In addition to the steady state provision of TANS, the transition plan for a change of supplier would also need to assure the regulator that safety would be maintained during the transition. Active regulatory oversight throughout the business life cycle would ensure that safety continued to be assured.

• **Applicability**

Although competition for TANS is relevant to airports of most scales, and is practicable with current technology, in some cases competition for TANS may not be desired. Locations where the benefits of competition are already available – where the TANS service is efficient, customer focussed, and meets customer needs – may have little reason to change. Also, in some jurisdictions the scale of the market may mean that the benefits of liberalisation do not sufficiently offset the costs of the additional resources needed to regulate new entrants and the new market. But for locations where the airport operator has a felt need for improvement in price or service or accelerated innovation, and where the regulator and public policy are able to support that need for change, airport operators would be advantaged by the ability to choose between competing TANS suppliers.

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**Case study: TANS and Safety Concerns**

A UK Civil Aviation Authority review of the transition to new TANS providers at London Gatwick and at Birmingham, the seventh largest airport in the UK, noted that no issues were raised by any stakeholder regarding safety or continuity of service during the transition\(^{17}\).

In Spain, FerroNATS provides TANS to nine airports and reports that safety performance is ahead of the European average, with evidence that the data is robust\(^{18}\).

Safety management concerns were raised in the USA in one audit, however, liberalisation was credited with improving safety in the same report.

The 2012 FAA Office of Inspector General audit report on contract towers in the USA found that improvements could be made to the quality of safety incident reporting and regulatory oversight, but noted in the same report that FAA safety officials, airport officials, pilots, and users of the service had no concerns about the safety of the service. The report also noted that, from a national perspective, the contract towers programme had raised safety levels by making TANS affordable and therefore available at the low activity airports it supplied\(^{19}\).
Overcoming Barriers to enabling competition

Despite TANS being supplied on a competitive basis in some locations, regulatory and economic barriers to more general liberalisation and more competitive markets remain to be overcome. Furthermore, sustained competition will depend on the ability of airports to continue to find savings, efficiencies and service and productivity improvements from subsequent providers.

• Public and Regulatory Issues

Enabling competition would remove the statutory monopoly status of a large number of the current TANS providers, ensuring that the market is attractive to competitors, facilitating a reasonably fair market for both new entrant and existing TANS providers, and considering ways in which the cost of transitions could be reduced.

Clearly, for competition to commence, statutory monopolies for existing TANS providers need to be removed. At the same time, airports need to be empowered to procure TANS services, and regulators must be prepared to certify and supervise new entrant TANS providers, their procedures, technology and staff, including, where it is important, economic and business continuity aspects.

• Staffing

The incumbent TANS provider and its staff have a singular power over any competitor’s ability to commence operations because of the way in which air traffic controllers are authorised to operate. Crucially, controllers hold site-specific licence validations. Secondly, the only instructors and examiners able to validate new controllers on local procedures are likely to come from the incumbent. For the incoming TANS provider, this means that the new operation is dependent on cooperation by the outgoing TANS provider and staff.

There are contractual ways to address these issues. Provided agreeable terms can be found, the incoming TANS provider could offer continuing employment to existing staff. In the event that some existing staff choose not to transfer to the incoming TANS provider, or the incoming provider elects to recruit its staff, the TANS provider would train replacements, and have little choice but to depend on the outgoing TANS provider both for instructors and examiners to validate new trainees, and for seconded staff to bring the unit up to operational numbers during the training period.

• Enabling demand

A principal driver for change will be an airport operator seeking improvements in efficiency and reduction in charges. Both the financing of TANS and the procurement of TANS may need to be aligned with the airport to bring the opportunity into focus. If the TANS charges levied by the incumbent TANS provider are not paid by the airport operator but are paid directly by the airlines to the TANS provider, or if the charges are cross subsidised by other activities of the TANS provider, there may be little incentive for change. Similarly, if TANS cannot be procured by the airport but TANS supply is arranged by others, the ability of the airport to understand and seize the opportunity for improvement may not be realised.
• **Market regulation**

To ensure a fair market, regulators need to recognise, and possibly moderate, unavoidable monopoly power that the incumbent TANS provider could possess. The incumbent can have distinct advantages owing to adjacent operations, the qualifications of its staff, detailed knowledge of the airport and an investment in operating procedures. These advantages can give the incumbent power over the others ability to compete, and a dominant position over a competitor’s ability to recruit and validate staff; in other words to commence operating.

The incumbent TANS provider may be in a position to cross-subsidise the TANS unit from en-route revenue, distorting the market and making it impossible for third parties to compete economically for the TANS service. Competing TANS suppliers may also be part of or a subsidiary of a well-resourced ANSP. To ensure a fair market, regulators may require a restructuring of an existing full service ANSP to ensure the contestable TANS services delivered from a separate entity unsubsidised from wider company resources.

Inevitably, the incumbent TANS provider has a thorough knowledge of the airport operations, traffic patterns, and other factors that would assist prospective suppliers in correctly pricing risk when responding to a tender. To ensure that prospective TANS suppliers can correctly price risks, the data available to competitors during due diligence period of the tender should include any understanding the incumbent TANS provider may have about airport activity patterns that materially affect revenue or costs for the TANS provider.
Transitioning to competition for TANS may require some restructuring of asset ownership and management. In many cases, ATM equipment in towers may rely on centralised processing by the en-route ANSP, whilst airport specific equipment such as aerodrome lighting will be localised. The role of the airport, either to own the tower facilities, or to have long term access to it, will impact the nature of the TANS service that can be offered. In the longer term, airport systems are anticipated to become more networked and interactive, with tower and ATS activities more integrated with airport operating systems and processes.

Air traffic control safety and certification relies on the organisation faithfully following carefully developed detailed procedures. Such procedures form an essential part of the basis for certification by the safety regulator, and would be required by any incoming TANS provider.

Because the procedures affect not only the TANS provider but also all operators of adjacent airspace, the cost and risk of a significant change to procedures is high. The incoming TANS provider is faced in practice with the choice of either recreating the procedures afresh, or procuring or licencing the procedures at an agreeable price. This places the incumbent TANS provider in a position of pricing power, yet at high intensity airports, the detailed procedures may genuinely contain process details that the TANS provider could consider to be product differentiation details worthy of a premium price.

At lower activity airports, procedures may be unremarkable and perhaps better owned by the airport itself, reducing the transaction cost when changing supplier.

Ownership policy needs to enable coherent future development, possibly on timelines not synchronised with TANS supply contracts. For this reason, emerging work by Compair foresees a predominant pattern in which TANS suppliers tend to become shorter-term ATS operations and management specialists, with technology and process development supplied by others, and assets ownership aligned with airports. On the other hand, at high intensity airports, the TANS operator may be crucial to achieving service improvements, which could be sophisticated and subtle marginal improvements with a local and bespoke character. TANS suppliers at these airports may wish to invest in supporting technology and retain intellectual property rights to the improvement techniques. Asset ownership policy will therefore require locally appropriate choices.
**Transition issues**

Effective competition needs the market to attract sufficient suppliers using an appropriate balance of risk and reward. Tender design needs to balance the cost of bid with the potential benefits for suppliers. The tender duration would need to enable the successful supplier to recover setup and transition costs with confidence. To optimise cost and risk for TANS suppliers to low activity airports, tenders may be more attractive when multiple airports are offered in the same tender, increasing the returns relative to the cost of responding to tender.

Where an incoming TANS provider depends on the incumbent for training and staff secondments, it could be expected to pay for these services at market rates. Whilst it could budget for these risks as part of its bid preparation, the outgoing TANS provider has significant power over the cost and duration of the training period which could affect the profitability of the incoming TANS provider. This factor could require regulatory oversight. Exit conditions may also be considered for existing TANS contracts, requiring a level of positive cooperation from an outgoing TANS supplier.

**Interoperability**

From a broader perspective, the smooth flow of air traffic requires well organised, effective coordination on at least two scales. For safety and efficiency, formalised transfer of the control of flights (including the related pre-planning information) is required with adjacent airspace control sectors whether controlled by the same or another ANSP. This requirement implies a need for formal process agreements to be put in place in the form of letters of agreement, service level agreements or even contracts between a TANS provider and controllers of adjacent airspace.

At a larger scale, effective (tactical) air traffic flow management generally requires longer range processes to effectively manage capacity/demand balance. For example, traffic peaks that produce congestion may be reduced by coordinating departure timing at points of origin, or en-route speed control by ANSPs upstream from the problem location. The operating agreements, collaborations and remote customers that could produce these sought-after benefits are considerations not only for TANS liberalisation but also for the broader ATM industry. The ATM Policy Institute intends to discuss these cross-cutting, system level concerns more fully in other white papers covering en-route and flow management services.
Where to from here?

This paper argues that there are a number of benefits in considering the liberalisation of the TANS market, and in introducing competition into that market. In summary, we contend as follows:

- Competition for TANS, when appropriately structured, leads to more cost effective, more customer-focussed, and more innovative ATM services for airports and their airline customers. Furthermore, competition for TANS is feasible across a wide range of airport operations, and could be put into practice at present.

- The market for TANS is not solely focussed on cost reduction. The purpose of market competition for TANS is to match the service supplied with the needs of the customer, and deliver this service efficiently. These needs vary from airport to airport and require service quality, performance and price to correspond effectively with local needs.

- The benefits of competition will only become available when the conditions for effective competition exist. These conditions include: supportive political will and regulatory environment, the regulator to be resourced to enable competition, demand from airports with a felt need for service improvement, and suppliers able and willing to operate in the location concerned. Given the local nature of airports, that liberalisation can take place piecemeal, commencing in regions and countries interested in taking advantage of these benefits.

An important set of barriers to liberalisation have been identified in this paper. In each case where an airport is considering liberalising the provision of TANS, an analysis against these barriers should be carried out in order to ensure that the liberalisation is a success. To aid regulators, airports and TANS suppliers, an emerging body of knowledge is developing from locations where competitive TANS supply has been established. As a result, participants at most levels, have peers with growing understanding of factors involved in successfully implementing competition for TANS and obtaining benefits.

This paper is aimed at furthering the debate. It is one in a series of papers that the ATM Policy Institute is publishing to further discussion on the benefits of liberalising air traffic control. We welcome comments and thoughts in relation to the liberalisation of the TANS market. Please send your comments to info@atmpolicy.aero

2 See, for example, IATA's response to the European Commission Reference Period 2 consultation.


7 Aviation Capacity Resources AB. Swedish game changer.


10 Steer Davies Gleave Review of TANS provider transition at Birmingham and Gatwick, Civil Aviation Authority final (Public) report, January 2017.


20 Aviation Capacity Resources AB. *Swedish game changer*.
