NATS

Safeguards for Airports and the Communities around them - Discussion Paper

The NATS Response Prepared for the Australian Department for Infrastructure, Transport, Regional Development and Local Government

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1.0 INTRODUCTION

NATS has been involved in discussions on a variety of aviation-related topics in connection with the development of a White Paper on aviation for Australia. As such, NATS has been invited to respond to the **Safeguards for Airports and the Communities Around Them – Discussion Paper** produced by the Australian Department of Infrastructure, Transport, Regional Development and Local Government.

NATS is considered a world-leading Air Navigation Services Provider, and has the capability to accurately assess not only air traffic management but also other aviation-related activities. In addition to en-route air traffic services, NATS provides air traffic services to 15 of the UK's leading airports, and expert aviation consultancy services worldwide.

This document, in response to the discussion paper, aims to describe and exemplify the skill and expertise across the business, and identify some of the pertinent considerations based on its experience of airport safeguarding policies and practices.

Any questions on the content of this response should be directed to:

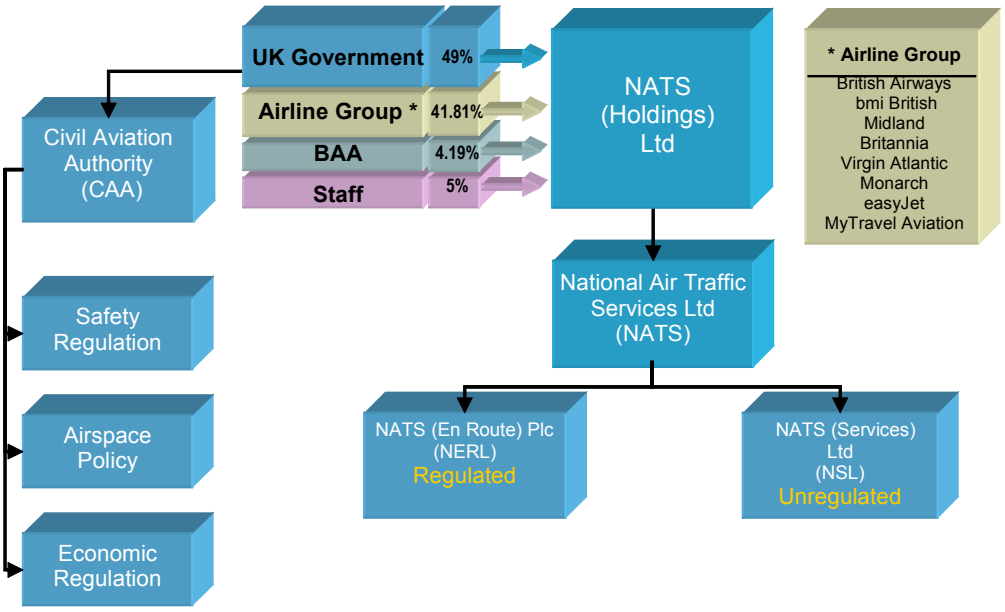
Steve Hathway
NATS
Heathrow House
East Wing 2 Floor
Bath Road
Hounslow
Middlesex
TW5 9AT
UK

E: Steve.Hathway@nats.co.uk
T: +44 (0) 208 750 3631

2.0 BACKGROUND

2.1 NATS Company Profile

NATS was originally established in 1962, with both civil and military components. The civil element was incorporated into the UK Civil Aviation Authority (CAA) on its establishment 30 years ago. In 1996, the civil element of NATS became a limited company, a wholly owned subsidiary of the CAA. On 26 July 2001, NATS was established as a Public Private Partnership (PPP). The UK Government retains a 49% stake and the Airline Group (the strategic partner) holds a stake of slightly less than 42%, along with the controlling interest of the company. BAA and the NATS employees hold the remaining stake as illustrated below. The CAA remains the safety, airspace and economic regulator for NATS activities.



NATS is formed internally into 3 distinct parts. NATS (Holdings) Ltd forms the holding company and corporate services for two subsidiary companies:

- NATS (En-Route) plc (NERL) provides regulated services and activities within the UK. These services include civil en-route, terminal control, oceanic control and military co-ordination together with engineering and technical consultancy.
- NATS (Services) Ltd (NSL) is, since privatisation, the unregulated business within NATS. NSL works within a competitive environment delivering both UK and overseas business. All airport operations are won and managed on a competitive basis against strong competition.

NATS turnover in the year to March 2009 was £767.3m and a pre-tax profit of £135.5m was reported. There are currently approximately 5,000 employees, 1,200 of whom are engineers and 2,000 are licensed Air Traffic Controllers.

NATS is the UK market leader in all aspects of Air Traffic Management and its ability to provide services of the highest safety and quality standards is widely recognised and respected. All NATS units operate stringent safety management systems. NATS is ISO9001:2008 (UKAS and TickIT) certified for all its activities, particularly the operation, design, manufacture, programme and project management, installation, maintenance, repair and support of operational systems. The certificate also covers provision of support services including system design and engineering, software development, test and measurement services, and technical documentation.

NATS' role is to plan, provide and operate safe, efficient and expeditious air traffic services within UK airspace and across 650,000 square miles of the North Atlantic which:

- allow all airspace users to fly in safety at an acceptable cost
- provide for future traffic growth without significantly increasing delays or charges.

To support this operation, NATS operates and maintains a nationwide communications, surveillance and navigation network, carries out advanced research and development, develops software for current and new systems and trains air traffic controllers and engineers for its own operations and for customers overseas. Additionally, NATS provides ATC consultancy, engineering support, capacity studies and safety management services to many international customers.

NATS collaborates within many organisations on a commercial basis to deliver solutions. These partnerships vary from the internal delivery of engineering, construction, and software solutions to the external partnering for specific collaborative commercial ventures. Partnership arrangements are also in place on non-commercial strategic programmes, for example the Single European Sky (SES) initiative.

NATS is an active member of the International Air Traffic Management community and is represented at more than 40 relevant international fora at which NATS contributes to the design and development of relevant standards and recommendations. Examples are EUROCAE (European Organisation for Civil Aviation Equipment) Global Navigation Satellite System group, Eurocontrol EATMP Global Navigation Satellite System PSG, and ICAO Groups on CNS/ATM. This ensures that NATS has constant access to best practice and technical know-how. Full details of such groups are available on request.

Furthermore NATS remains: a key member of many other Eurocontrol steering committees; is an extremely active full member of CANSO; provides experts to ICAO Panels and Regional Planning Groups on behalf of the UK Government and it has a major role in advising the UK Department for Transport (DfT).

More information about NATS is available from the website http://www.nats.co.uk.

2.2 NATS (En-Route) plc

NATS En-Route Limited (NERL) supply the following services as part of the NATS business:

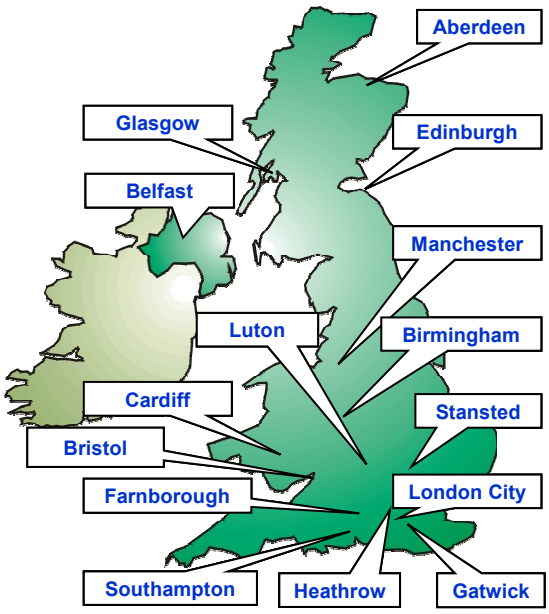
- A fully integrated civil/military en-route air traffic service within UK airspace, regularly handling more than 2 million flights per year.
- Airspace planning and management, both nationally and internationally.

- Oceanic Air Traffic services for aircraft flying over the North Atlantic – a responsibility assigned to the UK by ICAO. The Oceanic Area Control Centre handles up to 110 movements per hour at peak periods (422,000 annual movements) and, through collaboration with NAV CANADA, NATS now has unrivalled expertise in handling trans-oceanic flights utilising Reduced Vertical Separation Minima (RVSM), at all flight levels.

- Off-route air traffic services in the London and Scottish Flight Information Regions.
- UK Aeronautical Information Service (AIS).
- UK Civil Aviation Communications Centre (CACC).

2.3 NATS (Services) Limited

As the preferred provider of air traffic services in the UK, NATS also provides air traffic control services through its wholly owned subsidiary NATS (Services) Limited, known as (NSL), at 15 of the nation's largest airports and has recently won the contract to provide services in Gibraltar.



NATS operates at all seven BAA airports including London Heathrow, the world's busiest for international traffic, and London Gatwick, which is the world's busiest single-runway airport, having recently achieved a record hourly air traffic movement rate of 60 movements.

The airport portfolio also includes other key regional gateways such as Manchester International, Birmingham International and Glasgow International, together with smaller, but rapidly developing airports such as London City, London Luton, Southampton, Farnborough and Cardiff.

NATS' airport ATC contracts account for around 85% of the air transport movements in the UK, giving NATS a dominant position in the marketplace as well as unrivalled experience in conducting airport ATC operations.

In addition to the above, NATS also provides air traffic services to customers with specific requirements such as helicopter companies operating in the North Sea oil

fields, small regional and outlying islands airports which lack an approach service and the Ministry of Defence for their missile testing ranges.

With the commercial freedoms available under the Public Private Partnership, NATS now makes available to other international organisations the expertise derived from the operations described above. This may, for example, take the form of consultancy, training, engineering support or ATC operations. It is through our competent, multi-disciplined staff that NATS has been able to position itself as a world leader in Air Traffic Service provision with a safety record that is recognised by all of its customers.

2.4 Consultancy Excellence

NATS Development and Investment Division is the main NATS division which provides expertise in support of operational services in 4 main areas:

- Airspace design
- ATM Tools and Policy
- Research and Development
- Operational Analysis

It has a proven track record in taking operational concepts from the initial research, through simulation, implementation, operational trial and integration in to the operational environment. Furthermore, it has delivered increased capacity with a reduction in delays in complex airspace and within the framework of a mature safety management system.

The Airport Services group within NSL delivers operational expertise on a variety of areas direct to airport customers. It maintains operational services at 15 UK airports ensuring the proactive management of safety and enhancement of capacity within the regulated airport environment.

Public Safety Zone consultancy is undertaken within the Operational Analysis Department, which comprises 55 operational analysts. Significant operational research experience has been gained within the department, encompassing: airport and airspace capacity modelling, delay modelling, post-operational analysis, safety projects and numerous Third Party Risk (TPR) and Public Safety Zone (PSZ) assessments at over 40 UK and overseas airports.

NATS has over 15 years experience in the field of PSZs, successfully developing a national methodology for use throughout the UK. Over this time the methodology has been tried and tested at major international airports such as Heathrow, through to smaller airfields with PSZ concerns. NATS expertise in PSZ issues has resulted in it being a best-practice leader on a worldwide scale.

3.0 SAFEGUARDING DISCUSSION PAPER TOPICS

The issues raised in the Safeguarding Discussion paper are considered below in their sections, along with appropriate background context.

3.1 Planning for Compatible Development

Issue: *The need for a nation-wide cooperative land use planning approach that protects both the operations to and from the airport and the interests of surrounding communities*

Background

As the issues in this section are primarily focused on the mechanism of land-use planning as a means to mitigate the impact of noise on local communities in Australia, the following response considers the way noise mitigation is handled in the UK in order to highlight relevant concerns.

Noise mitigation

Aircraft noise in the UK is governed through international, European Union and national regulation, with responsibility for noise mitigation generally residing with the airport operator. Measures to reduce noise range from the application of ICAO Chapter classification standards, various bespoke local controls on an airport and on individual aircraft noise events.

The three London airports (London Heathrow, London Gatwick and London Stansted) are 'designated' under section 80 of the Civil Aviation Act 1982, which requires that the UK Secretary of State has responsibility for noise abatement (administered by the Department for Transport). The noise mitigation controls available for use at the airports may include:

a) Operational Restrictions

- Noise Preferential Routes (NPRs) – designed to avoid over flight of built-up areas where possible. They lead from the take-off runway to the main UK air traffic routes, and form the first part of the Standard Instrument Departure routes (SIDs).
- Enforcement of ICAO chapter standards.
- Departure noise limits - To ensure that best practice departure operating procedures are used at the designated airports, departure noise limits are enforced. In place since 1959, fines for infringements were introduced in 1993. This follows a wider policy of noise concentration at the designated airports.
- Specification of certain geographic height/operational minima.
- Continuous Descent Approach procedures for flights (low power and low drag procedures) – guidance provided to pilots, airlines and airports to adopt this procedure which reduces noise and aircraft emissions.

- Night-time Quota Count System – UK noise classification and quota system to cap noise exposure at night. This criteria has become a global design standard for major aircraft manufacturers.
- Night-time operating restrictions for the noisiest types of aircraft.
- Noise exposure area cap – which may lead to restrictions on numbers or type of aircraft.
- Airport-specific operational restrictions on the mode of operation and use of runways.
- Economic instruments such as landing charges that vary according to the noise performance of aircraft, or an airline's record on track keeping.

b) Noise Indices and Assessment

A variety of noise indices are used to portray aircraft noise, including maximum based metrics, such as Sound Exposure Level (SEL) and L_{max}, to indices that describe long-term noise exposure.

Since 1990, the established noise exposure index in the UK for the purposes of aircraft noise assessment and control has been the Equivalent Continuous Sound Level index, abbreviated L_{Aeq}.

L_{Aeq} can be defined as the level of notionally steady sound which over a given period of time contains the same amount of sound energy as the actual variable sound. As such L_{Aeq} provides an indication of the average energy dose.

UK Government sponsored research has shown that the L_{Aeq} index provides a suitable correlation between aircraft noise exposure and community annoyance, with 57dBA L_{Aeq} marking the approximate onset level of significant daytime community annoyance.

The magnitude and extent of noise around an airport is depicted on maps showing contours of constant noise exposure, or L_{Aeq} values. Standard modelling practice is to produce L_{Aeq} noise exposure contours based on a 16 hour average summer day 0700 to 2300 local time, and contours are conventionally plotted from 57dBA to 72dBA in 3dBA steps, each successive contour representing a doubling of average energy.

In addition to L_{Aeq}, airports with in excess of 50,000 movements are required to produce L_{DEN} noise contours in accordance with the European Noise Directive Regulations, which have been adopted into national law. The adopted Environmental Noise (England) Regulations 2006 require airport operators to develop Action Plans based on the results of L_{DEN} modelling, to manage noise issues and effects, including a reduction to movements if necessary.

NATS works with the Civil Aviation Authority's Environmental Research and Consultancy Department on the production of noise-exposure contours for airspace change proposals when required, and NATS has a growing capability to produce noise exposure contours using the FAA's commercially available Integrated Noise Model (or INM). The indices used by NATS to communicate noise effects and potential future noise effects range from L_{Aeq} contours through to the use of maximum-based noise and operations diagrams describing the number of expected aircraft events. The latter two methods being used in particular to communicate noise impact scenarios to the public.

UK CAA guidance on airspace change requires that the proposer of a change must undertake a public consultation of the likely noise and other environmental impacts. Through this process NATS has built considerable expertise in producing and communicating environmental impact assessments, and a deep understanding of community reaction to aircraft noise.

NATS recent airspace change proposal for a region of airspace called 'Terminal Control North' provides a good case in point; this region of airspace is one of the most complex areas of airspace in the world, covering an area with a population of 12 million people, and home to some of the UK's busiest airports. As a result, NATS carried out detailed environmental assessments for all proposed airspace changes, which were communicated as part of its largest consultation to date.

c) Land-use Planning and Insulation

In the UK, the World Health Organisation's "Guidelines on Community Noise" are applied predominantly through Building Regulations. The planning restrictions that are applied are similar to the Australian Standard AS2021, with some differences between the noise exposure 'bands' which define 'acceptability' of noise.

In the immediate vicinity of airports, UK Local Planning Authorities apply land-use and planning restrictions to limit noise exposure, on the basis of modelled noise exposure predictions. These are set out in Planning Policy Guidance (PPG) Note 241.

Many UK airports are located in populated areas, so the potential for land-use planning controls to reduce noise exposure from existing airports is limited. However, planning has a role to play both for new developments near existing airports and for the development of new airports. Two methods can be employed to mitigate noise: considerations for accepting planning applications, and 'zoning'.

- Planning permission – government planning guidance advises that planning permission for housing should normally be refused in areas exposed to noise from any source louder than 66dBA L_{Aeq} during the day (and 57dBA L_{Aeq} at night). At noise levels between 57 and 66dBA L_{Aeq} where it is considered that permission should be given, for example if there are no known quieter sites available, conditions should be imposed to ensure a commensurate level of protection. Below 57dBA $L_{Aeq,}$ planning controls need not be considered.
- Zoning – land around airports can be demarcated as either qualifying for compensation and support for noise insulation, or as being inappropriate for residential development given current or future noise levels.

The provision of insulation can be required on a statutory basis under Section 79 of the UK Civil Aviation Act 1982, however, current airport noise insulation schemes are provided on a voluntary basis by airport operators, and are often supported by local planning agreements. Airport operators are expected to:

- Provide households at 69 dBA L_{Aeq} and above assistance with the costs of relocating.
- Acoustic insulation (applied to residential properties) to other noise-sensitive buildings, such as schools and hospitals, exposed to medium to high levels of noise (63 dBA L_{Aeq} or more).

- Further schemes may be implemented at local airport level. For example, London Heathrow airport operates a scheme to mitigate against night-time noise from arrival aircraft by providing help towards insulation for dwellings inside the footprint of the noisiest allowable aircraft.

Under the Government's Aviation White Paper it was recognised that provision of additional airport capacity to accommodate aviation growth out to 2030 may both lead to significant increases in noise where there were previously low levels of noise exposure, or increase noise within community's already subject to medium to high levels of noise. The Government expects airport operators to:

- purchase those properties suffering from both a high level of noise (69 dBA L_{Aeq} or more) and a large increase in noise (3 dBA L_{Aeq} or more)
- provide acoustic insulation to any residential property which suffers from both a medium to high level of noise (63 dBA L_{Aeq} or more) and a large increase in noise (3 dBA L_{Aeq} or more)

Other statutory powers exist outside the planning system and insulation requirements. Major legislative instruments include:

- Under the Environmental Protection Act 1990/Noise and Statutory Nuisance Act 1993, local authorities are required to serve abatement notices where the noise is emitted from any premises, or from vehicles, machinery and equipment in the street which constitute a statutory nuisance
- The Control of Pollution Act 1974, which gives local authorities powers to control noise from construction sites, and introduces the concept of a Noise Abatement Zone or NAZ (also known as a Noise Perimeter Zone or NPZ)

Lastly, the requirements for noise protection for the UK population are applied in a number of other ways - for example, personal individuals' noise exposure at work is governed through the Noise Exposure at Work Regulations 2005, and protective measures applied through provision of suitable Protective Personal Equipment. Peak noise level exposure is assessed by peak frequency *and* average daily exposure (similar to the way in which the WHO guidelines are expressed) and restrictions applied according to the results of these two criteria.

Discussion Questions

1. Does the ANEF system provide an effective basis for planning in noise affected areas?

For aviation, ANEF and L_{Aeq} type indices are in widespread use around the world to assess noise exposure, and for the purposes of land-use planning and building regulations. These indices use the underlying principle of average energy dose, and have been found to be more highly correlated to community reaction than any other index. It is worth considering other benefits to the use of such an index. These include the relative ease of measurement and calculation, and the practical benefit of being able to express both long-term and short-term noise exposures through a simple, single-valued index, which allow for simple comparisons of noise exposure changes over time. This is particularly important when considered changes at airport level, as the index is responsive to changes to the number and noise intensity of aircraft events.

To move away from the average energy principle would be to put disproportionate weighting on either the number or the intensity of aircraft events.

Given these qualities, the ANEF system is considered as an appropriate land use planning tool. It is difficult at this time to see a better alternative. It should be noted that such indices were never designed or intended as a means of communicating noise impact to the public. As noted in the discussion paper, they are difficult to comprehend and highly criticised by the public for many of the reasons already cited within the discussion document. However, it is felt that opportunity exists to better understand community reaction to a wider range, and tighter graduations (or bands) of noise exposure level.

2. How effective is the ANEF system as a land use planning standard for greenfield developments around airports?

Similar arguments as given above about the suitability of this index to accurately assess noise exposure apply here also. In relation to greenfield sites the standard provides a basis to preclude development of housing and define acoustical adequacy of buildings based on the ANEF system.

Comparing the Australian system to the UK PPG24 system, whilst the general spirit appears to be the same, the UK system would appear to be a bit more lenient than the Australian standards.

Taking 20 ANEF as being comparable to 57dBA 16hr L_{Aeq} the difference between AS2021 and UK PPG24 is that development in areas above 57dBA L_{Aeq} is only allowed provided appropriate insulation is incorporated and with development allowed to occur up to 66dBA L_{Aeq}. Even above these levels development can take place with appropriate insulation provided that no quieter site can be found. Only at the highest levels of noise exposure >72dBA L_{Aeq} is development entirely precluded.

As a methodology for restricting development or specifying conditions for development, such as the appropriate level of commensurate insulation required, the ANEF system, or similar energy average index is considered suitable. The ability to correlate noise exposure level to significant community reaction/annoyance, and in particular understand the percentage of people affected provides a suitable basis for effective planning. Once again opportunity remains to change the levels at which conditions and exclusions come into play. However given that the index allows planners to understand likely community reaction at a number of noise exposure levels, suitable flexibility is provided.

3. Are the acceptable levels of aircraft noise for particular developments identified in AS2021 consistent with current community expectations?

AS2021 standards show that appropriate steps have been taken to protect noise-sensitive buildings through the setting of limits based on building type. Whilst it would be expected that public attitudes would vary accordingly to the building type, NATS cannot provide comment on the specific community expectations within Australia.

4. How can the current planning arrangement to address developments in noise-affected areas around airports and under flight paths be improved to take account of community expectations, while also providing for the reasonable growth of aviation activity at airports?

Previous experience has shown that communication of a range of sources of noise analyses improves community expectations. Of prime importance is the need to supplement ANEF contours with information that depict the likely impact of airspace and airport changes beyond the extent of the 20 ANEF. These may include a number of different methods to show the spatial distribution and density of tracks, operational and respite statistics, and maximum based noise indices.

In addition, difference contours based on L_{max} and SEL can be computed, alongside reference to the human perception of loudness instead of energy (for example a 10dB change is often perceived as a halving or doubling of noise intensity). Often, the sole use of energy averaged indices to communicate likely noise impacts is seen as being disingenuous by the public. The general community perception of these is that noise impact is confided within the contours, when in reality significant changes in noise environment can occur outside of these contours without any impact being portrayed; the inclusion of appropriate supporting material would reduce such misconceptions.

5. For developments around the major capital city and freight airports, should state governments have to refer residential development within a defined buffer zone to the Commonwealth Transport Minister or Secretary for approval?

NATS is not suitably familiar with Commonwealth legislation, nor Australian State and National Governmental involvement in development decisions to provide an appropriate response to this issue, therefore, NATS has not provided any further detail.

3.2 Protection of Operational Airspace

Issue: *Development of a uniform policy guideline for planning authorities to regulate the potential impact on aviation from new tall structures and vegetation (i.e. trees) on and off airports.*

Background

UK airport safeguarding policy, in relation to the control of developments that may impact airport operations, is based upon ICAO baseline principles and standards and due to the uniqueness of UK airspace, it has had to expand and in some cases deviate from the ICAO standards. Safeguarding at UK airports is covered under the UK Civil Aviation Authorities' Licensing of Aerodromes (CAP 168) document in support of the discretionary powers relating to the granting of an aerodrome licence contained in the UK Air Navigation Order (ANO).

The Civil Aviation Authority (Chicago Convention) Directions 2007 require the UK Civil Aviation Authority (CAA) to ensure that it acts consistently with the obligations placed on the UK under the Convention on International Civil Aviation, agreed in Chicago on 7 December 1944 (the Chicago Convention). Not all ICAO Standards and Recommended Practices (SARPs) and procedures have been fully implemented directly in the ANO, therefore, where the CAA has discretionary powers to grant a

licence, certificate or approval (provided it is satisfied as to the suitability of the applicant), the CAA is expected to implement such SARPs through its policy documents such as CAP 168. Where the UK has formally notified ICAO of differences to any of the SARPs in Annex 14, these differences are also published in the UK Aeronautical Information Publication (AIP) at GEN 1.7.

The ANO requires that, in the UK, most flights for the public transport of passengers, and all flights for the purpose of flying instruction, take place at a licensed aerodrome, or at a Government aerodrome. The Order also makes provision for an applicant to be granted an aerodrome licence subject to such conditions as the CAA deems fit. The purpose of the CAP 168 document is to give guidance to applicants and licence holders on the procedure for the issue and continuation of, or variation to, an aerodrome licence issued under Article 128 of the ANO 2005, and to indicate the licensing requirements that are used for assessing a variation or an application. The document also describes the CAA's aerodrome licensing requirements relating to operational management and the planning of aerodrome development. This document represents the minimum standards necessary to meet the licensing requirement.

Obstacle Safeguarding

The effective utilisation of an aerodrome may be considerably influenced by natural features and man-made constructions inside and outside its boundary. These may result in limitations on the distance available for take-off and landing and on the range of meteorological conditions in which take-off and landing can be undertaken. For these reasons, certain areas of the local airspace must be regarded as integral parts of the aerodrome environment. The degree of freedom from obstacles in these areas is as important in the granting and retention of an aerodrome licence as the more obvious physical requirements of the runways and their associated runway strips, and is determined by way of survey in accordance with CAP 232 – Aerodrome Survey Requirements. Due to the extent of obstacles/structures that might impact on aerodrome operations, it is imperative that national and local legislation standards are in place to regulate planning applications around aerodromes.

To support this process, NATS provides safeguarding expertise and specialist software tools to manage these services on behalf of aerodrome licensees. This might include training aerodrome personnel in the use of the software or for NATS to lead the design process. Safeguarding the Obstacle Limitation Surfaces (OLS's) is not the only function necessary to limit obstacle growth around airports but is also used to initiate a set of pre-defined processes to analyse the impact of such structures/obstacles on aerodrome operations. NATS can provide this expertise to analyse the impact on Instrument approach and departure procedures at aerodromes, and has been an integral part in many airport procedure redesigns worldwide.

As this issue is controlled at the regulator level, while NATS has provided brief considerations and opinions to support the discussion questions, no specific recommendations have been provided.

Discussion Questions

6. Should the current protection of airspace regulatory provisions be strengthened and broadened to cover all CASA-Certified and Registered aerodromes?

There are a number of existing guidelines which support the protection of airspace via regulatory provisions at Australian airports. Without sufficient experience in the Australian aviation regulatory system it would not be appropriate to comment on whether the existing provisions are sufficient, however it would seem sensible for a common policy to be used at all aerodromes to ensure equality and maintain the high levels of safety on a nationwide level.

7. How might state, territory and local government planning rules help protect airports from encroachment by unsafe intrusions into airspace?

As the obstacles and potential intrusions around each airport can vary significantly, planning guidelines that can be used across different tiers of government must be flexible, but also be easy to understand and enforce. In the UK, it is the responsibility of the airport operator/license holder, to ensure the safety of the airport operation; however, it is the UK CAA who have the remit to revoke operating licenses should an airport fail to comply with relevant safeguarding policy. Therefore a pertinent consideration in the development of policy for Australia would be that such policy must be enforced by legislation that enables the safety regulator to independently verify an airport's compliance with national guidelines.

3.3 Turbulence and Wind Shear

Issue: *To establish effective protocols for the assessment and possible mitigation of turbulence and wind shear potentially arising from new development in close proximity to runways.*

The control of development in the vicinity of an airport is largely controlled via Obstacle Limitation Surfaces as defined by ICAO. The additional national policy of Public Safety Zones in the UK (see section 3.8) often means new developments that may cause noticeable issues with the delivery of airport services are not allowed. These result in no formal requirements for detailed mechanical turbulence modelling assessments on proposed developments.

In the UK it is the airport operator's responsibility to ensure the safety of aircraft using the airport, and as such, NATS is often involved in consultancy projects to determine the impact of proposed developments on its flight operation. NATS does not explicitly model the effect of mechanical turbulence as it is not a problem in the UK, for the reasons detailed above. Therefore, NATS has not provided any further response to the discussion questions under this topic.

Discussion Questions

8. Should there be a consistent industry standard for mechanical turbulence and wind shear? If so, should the standard be proscriptive or allow for a case by case assessment?

9. Should expert modeling reports on turbulence and wind shear be mandatory for developments in close proximity to runways and who should bear the cost?

3.4 Wildlife Hazards

Issue: *The adequacy of existing land use provisions for the management of birdstrike (including bats).*

As in the previous section on mechanical turbulence, wildlife hazards are the responsibility of the airport operator as part of its operating license certified by the UK Civil Aviation Authority. The majority of airports in the UK have mature and effective on-airfield bird control programmes, following CAA guidelines on topics such as habitat management which discourages the congregation of birds in critical flight areas. Unfortunately with such wildlife it is often difficult to control the risk off-airport, and requires the engagement of the local community by the airport to ensure risks to the operation are managed. As part of this, NATS provides consultancy to UK airports to advise on aviation impact assessments to assist with wildlife mitigation investment decisions.

As this topic is not directly in the remit of NATS primary operations, NATS has not provided any direct response to the discussion questions under this topic. However it is clear that national guidelines for the mitigation of bird strike risk would be a distinct benefit to protecting the safety of airport operations.

Discussion Questions

10. Given variable regional circumstances for birds and flying foxes, would a recommended standard zone (e.g. 15km radius) be appropriate?

11. What other planning issues might arise in safeguarding against birdstrike?

3.5 Wind Turbines

Issue: *To reach agreement on the rules and notification procedures for assessing the impact of wind turbines.*

Both aviation and wind energy are crucial to UK national interests, however, both industry sectors have legitimate interests that must be balanced carefully. The UK Government has imposed targets on the amount of electricity produced from renewable energy sources and it is expected that wind energy will form a large part of achieving the target.

An adverse effect of the proliferation of wind turbines on the aviation industry is the effect on surveillance systems. The taller and larger the wind turbine, the greater the likelihood that it will cause unwanted radar returns which appear as clutter on the air traffic controller's radar screen.

As the interests of the respective industries must be protected, a practical approach is essential for resolving any conflicts between the Government's energy and transport policies, the UK CAA therefore devised a set of guidelines for aviation stakeholders to address wind energy related issues.

As with technical Communications, Navigation or Surveillance (CNS) installations, legislative provisions on wind turbine development are set out in the Town and Country Planning Act. The CAA produces safeguarding maps which determine 3D surfaces where obstructions such as wind turbines should not penetrate. The CAA does not, however, have regulatory powers to approve or reject development planning applications alone, rather it is the responsibility of the developer to inform the appropriate consultee (in this case the CNS technical site operator) of the proposal. The technical site operator will then follow UK planning law and raise an objection to a wind turbine development if it is found to impact ATC service provision.

As NATS provides en-route ATC services in the UK, NATS is responsible as a statutory consultee to ensure that wind farm developments do not impact the technical systems that support air traffic management. In addition, NATS acts as a consultant to airport operators when such developments encroach upon airport safeguarding surfaces. NATS is able to effectively evaluate the likely technical impact of a wind turbine development on its service provision and as such assess the feasibility of wind turbine planning applications.

In general, NATS is consulted whenever a wind turbine development is proposed within the operating range of a radar or within the operational zone of the airport, although these criteria are derived from general guidelines on safeguarding criteria such as those used for technical sites.

NATS worked extensively with BAA Scotland to mitigate the anticipated effect on Glasgow airport operations of Scottish Power's proposal for Europe's largest onshore windfarm at Whitelee. As a result of the impact to existing radar services, a new primary radar site was needed to offer the requisite airspace coverage; the data from both existing and new radars was combined to give air traffic controllers a complete surveillance picture whilst allowing the windfarm development to proceed. In late 2008, the windfarm built its 91st turbine, making it officially the largest operational onshore windfarm in Europe, generating enough green energy to power over 117,000 homes.

Discussion Questions

12. What guidance do state, territory and local governments require on the siting of wind farms and the potential impacts on aviation?

There is significant evidence to conclude that wind farms do impact on the ability to deliver an ATC service due to the wind turbines ability to interfere with surveillance systems. NATS, as a requirement of its operating license, has developed specialist assessment techniques to determine the likely impact of wind farm developments on its service; as such it is necessary to have a mechanism within which the interests of the aviation industry and the wind turbine developer can be balanced.

The UK approach utilises existing planning law to facilitate the mediation of parties, with the wind farm developer lodging its intentions (and potentially engaging with NATS before the planning application stage) and then NATS will proceed to evaluate the likely impact and thus object if necessary. This mechanism allows for appropriate representation between key stakeholders, and also allows responsibility for mediation to rest with the Local Planning Authorities (LPAs). Where agreements between the

parties cannot be reached, the UK system allows for national government intervention, in the form of a planning inquiry.

NATS suggests that in considering wind farm issues for the white paper, Australia must ensure a flexible approach, which allows all sides to present arguments towards a wind turbine planning application, including the production of impact assessments, and for such developments to be decided at the local level, with minimal national government involvement.

13. Should developers of wind farms be required to provide CASA with a report on the potential impacts on aviation and aviation infrastructure of the turbines?

Currently the production of a report by the developer on aviation impacts is not carried out in UK practice. This is primarily as the technical systems impacted by wind turbines are often complex electromagnetic systems and impact assessments must therefore be carried out by system specialists.

Whilst a proposal to put the onus on wind farm developers to produce a report on aviation impacts would result in the mandatory submission of relevant considerations with a planning application, the wind farm developer would have a conflict of interest, as showing significant impact would be detrimental to the planning application. In addition, it would require the developer being technically capable in the detailed operation of surveillance and other aviation-related CNS systems, whose expertise clearly lies with the operator.

The establishment of an effective local planning system which used national guidelines to inform aviation safeguarding principles would facilitate a simple mechanism for controlling all types of development, including wind turbines, within areas that may disrupt air transport services.

NATS suggests the formal requirement of the production of an aviation impact report for CASA by wind farm developers would not necessarily be beneficial as it may lead to key stakeholders not being appropriately represented in the planning application process. NATS recommends that a mechanism is used where all stakeholders are fairly represented, and in which independent experts provide the pertinent technical information.

3.6 Technical Facilities

Issue: *The effectiveness of existing planning rules to minimise the impact of new developments on radar and navigation systems.*

In the UK, the responsibility for safeguarding the technical facilities that support air traffic management is dependent on the area of control. For en-route operations, there is legislation which dictates that NATS En-Route Limited (NERL) should be a statutory consultee under the UK Town and Country Planning Act when developments are planned in the proximity of en-route communications, navigation or surveillance (CNS) systems. The specific proximity depends on the technical installation in question; however the criteria for further investigation are set by NATS, cascaded from UK Civil Aviation Authority (CAA) Safeguarding regulatory guidelines. The NERL Safeguarding

department then considers all development applications forwarded by Local Planning Authorities (LPAs) for potential interference with the ATC service.

For Airports, the responsibility for maintaining technical CNS services rests with the airport operator as part of their operating license; as such, they are responsible for the production and distribution of CAA-approved consultation zone maps to LPAs that can extend as far as 50km from the airport. At the 15 UK airports in which NATS provides ATC and engineering services, NATS provides specialist systems engineering consultancy to evaluate relevant planning applications on behalf of the airport operator.

NATS (either via NERL safeguarding or NSL specialist consultancy) will initially assess a planning application for potential conflict against the defined zoning criteria set against certain technical installation sites; for example, Radars, Navigational Beacons, and Airport landing systems all have specified zones within which proposed development would require a detailed engineering impact investigation. The investigation would assess whether the proposed development would erode the operational integrity of the CNS facility, the result thus informing NATS response to the planning application.

In en-route and airport areas, the mechanism for the consideration of planning applications follows UK Planning Law. NATS options for response are simply, no objection to the development, or, to raise an objection and cite the impact on ATC service. In this instance however, NATS is only acting as a consultee, and the LPA may choose to find against NATS' response. In UK planning law, there is a mechanism for appeal, and further, for planning inquiry, should such a development be suitably controversial.

Discussion Questions

14. Should development of technical facilities near aerodromes (say within 5 km) require automatic referral to CASA for assessment of impact on radar and navigation systems?

As Australian CNS systems are owned and operated by Airservices Australia and the Australian Department of Defence, it would be unnecessary to implement a system in which an intermediary is required to carry out technical impact assessments. Whilst such an automatic referral system would centralise the issues, the organisation best placed to carry out the technical assessments would be the site owner/operator.

In the UK, NATS maintains a variety of national CNS installations and as such, is best placed to carry out investigations as a result of planning applications for proposed developments. It carries this function out on behalf of the CAA as part of its en-route operating license, but also on a consultancy basis on behalf of airports, in compliance with the airport's own operating license.

As such, on production of the White Paper, NATS suggests any policy on the safeguarding of Australian technical sites must draw on the expertise of the site operators to carry out impact assessments. However, as in the UK, guidelines for the range and shape of zones around such sites, within which detailed assessments would be necessary, may be set by the regulator CASA, to ensure consistent application. In addition, unless CASA intends on mediating planning decisions instead of LPAs, there may be benefit in allocating the approval of "consultation zones" around airports to CASA, but still devolving the control and administration of planning within such zones to LPAs. This would reflect a similar operation to proposals for Public Safety Zones.

15. What additional guidance do state, territory and local governments require on the siting of technical sites and the potential impacts on radar and navigation systems?

UK guidance on safeguarding criteria for CNS systems has been set by the CAA; in addition, NATS places a more detailed set of evaluation criteria on its own technical sites that enhance those in the guidelines. As the assessment against such criteria falls to NATS, it is unnecessary for such criteria to be issued as guidelines for state, territory and local governments.

However, it is sensible for guidelines in the form of consultation zone maps to be issued to relevant bodies. In the UK, consultation zone maps for airports are issued to LPAs at the discretion of the airport, and for en-route technical installations, consultation zones are determined by the CAA and cascaded to LPAs.

NATS therefore suggests that any governmental guidelines on technical site safeguarding would be most beneficial for defining consultation zones for LPAs, within which specialist impact assessments should be considered. The assessments themselves must be completed by system experts to ensure planning decisions can be made upon detailed information.

3.7 Lighting and Pilot Distractions

Issue: *The adequacy of existing laws to restrict the use of lasers, high intensity lighting and other potential pilot distractions in the vicinity of airports.*

In the UK, the CAA has developed guidelines for the use of lasers, searchlights and fireworks in and around UK airports. The control of such pilot distractions and the enforcement of policy is their remit as aviation safety regulator and therefore the CAA has established a notification zone around airports, within which airports must be notified of light or firework displays that may distract pilots. A more recent trend is pilot distractions arising from handheld lasers used by individuals that are intent on disturbing aviation operations; if it is proven that such action has caused unnecessary danger to aircraft operations, there exists powers to prosecute such individuals.

As this topic is the remit of the aviation safety regulator, NATS has not provided any further response to the discussion questions under this topic.

16. Are CASA's current requirements sufficient, and what additional guidance might state, territory and local governments require regarding lighting and pilot distractions?

3.8 Public Safety Zones and Third Party Risk

Issue: *To work with planning authorities to identify zones adjacent to the end of a runway where special considerations might be applied to new developments to maximise safety.*

Public exposure to the risks associated with airport operations are controlled in the UK by the application of Public Safety Zones (PSZs). As UK PSZ policy, led by NATS, is the only worldwide policy used nationally to safeguard the public from the risk of airport operations, a detailed background in the field is given to provide context to NATS' response on the issues surrounding development of PSZ policy for use in Australia.

Background

The use of PSZs in the UK has existed since 1958 following recommendations from the Committee on Safeguarding Policy. The sole purpose of the establishment of PSZs was to minimise the exposure of the public to the risks associated with airport operations; this is achieved via control of development within a PSZ.

Inspired by ICAO safety areas, PSZs originally were designed to fan out from the runway end in a trapezium shape to contain more than half of accidents (Figure 1); as such the length of the standard PSZ was set at 4,500ft for large airports, based on the analysis of accidents.

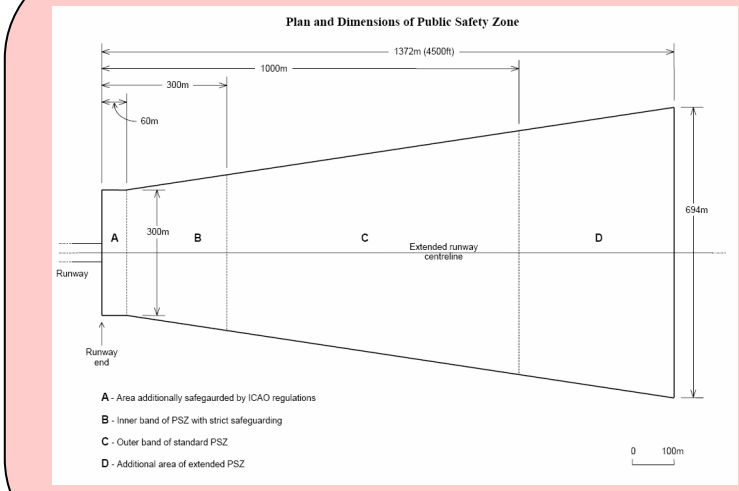


Figure 1: Original Public Safety Zone

In 1981, PSZ policy was refined to implement reduced length PSZs at aerodromes with smaller numbers of annual air transport movements and at airports with different operating characteristics; the largest size PSZ at 4,500ft was therefore only implemented at the largest UK airports. The risks from aircraft operations, and as such the size of PSZs in place, were only correlated with the number of annual traffic movements, which led to many airports having the same size and shape PSZs despite large variations in the way they operated.

In 1994, due largely to the interest in airport risk during the Manchester Airport Second Runway public inquiry, the Department for Transport (DfT), known then as the Department of Transport (DoT), commissioned a review of PSZ policy and administration. The objective of the review was to ascertain whether the policy could be strengthened with scientific basis by taking into account advanced risk assessment techniques. The review was led by a consultancy team in NATS who advised on:

- whether there was sufficient evidence, of reliable quality, to make risk contour modelling feasible
- what levels of third party risk near airports were tolerable, or intolerable

Since then, NATS has continued to drive development of PSZ methodology by acting as the DfT's technical consultant on PSZ policy.

The DfT, (at the time titled the Department for Environment, Transport and the Regions – DETR), published a document in 1997 outlining the review findings (available from www.dft.gov.uk/aviation). That document reached the following conclusions:

- Individual Risk (IR) was found to be the most useful measure of Third Party Risk, since it allows the production of risk contours which can be mapped using Geographic Information System (GIS) Software and used to identify areas exposed to given risk levels.
- The bespoke NATS TPR empirical models, compared with others, used larger data sets, giving greater confidence in the accuracy of results.
- Cost-benefit analysis was chosen as the most appropriate method for defining PSZ policy. The DoT has used a similar approach for a number of years in road safety investments and both surface rail and London underground work.
- The UK Health and Safety Executive (HSE) recommends an upper tolerable risk level of 10^{-4} per year for members of the public, this is used in other safety critical industries such as the nuclear and petrochemical industries.
- The cost-benefit study reached the following conclusions regarding land use:

Individual Risk Level[1]	**Conclusion**
IR $\geq 10^{-4}$	Strong case for the removal of housing and other development occupied by third parties for a high proportion of the day.
IR $< 10^{-4}$	No case for removing existing housing/non-housing.
$10^{-4} >$ IR $\geq 10^{-5}$	There is a case for inhibiting new housing, and non-housing development (unless it has a low density of human occupation averaged throughout the day). There is a case for permitting extensions to housing.

In addition to an appraisal of third party risk assessment techniques and a recommendation of public safety zone policy to be used in the UK, the document included full details on the NATS methodology developed for airport risk assessments. The NATS methodology showed that the old-style PSZ shape, whilst appearing intuitive in fanning out from the runway end to follow departure routes, did not reflect the real distribution of risk. The NATS third party risk methodology was applied to a selection of major UK airports to assess the risk from operations and determine how the proposed revised PSZ policy might affect them.

[1] 10^{-4} is short form notation of a risk relating to 1 in 10,000. Similarly, $10^{\wedge-5}$ is equal to a risk of 1 in 100,000

The NATS Methodology

Modern geographical risk assessment techniques measure Individual Risk – i.e. the risk arising from a certain event to an individual occupying a specific location. In the context of airport third party risk, the event to be assessed is an aircraft crash. The NATS Third Party Risk methodology comprises 3 model components which together determine the individual risk profile of an airport:

- Crash frequency model - the statistical expectation that an aircraft crash occurs in the vicinity of the airport
- Crash location model - the probability, given that a crash has occurred, that it affects a particular location
- Crash consequence model - the size of the area likely to be affected as a result of a crash and the probability of fatality for people on the ground within that area

All components utilise historical crash and movement data from a variety of sources to form a core risk methodology applicable to all airports. Parameters associated with the airport that is to be assessed are then fed into the model components to tailor the risk profile results to make them airport scenario specific. Parameters include: the location of runway landing thresholds, the number of annual movements, the mix of aircraft, and also the method of operation of the flight (e.g. passenger, cargo). The datasets that lie behind the core model components are updated periodically to ensure risk assessments appropriately reflect actual risk trends.

The model components use data appropriate to their individual aims; the data has been filtered for each component to maximise model robustness, ensure consistency and improve the accuracy of the risk methodology. The components combine to give individual risk values surrounding an airport, these values are turned into isoline risk contours from which PSZs can be derived. Further details on how these risk contours are used in UK PSZ policy are outlined later.

The original risk methodology developed by NATS undergoes continuous improvement to improve the accuracy of the Individual Risk assessments. This has largely been achieved by analysing data on recent crashes and updating the core model parameters that are used in the modelling process; this ensures aircraft accident trends are taken into account in any risk modelling and that PSZ assessments accurately reflect the risk present from an airport's specific operation.

In 2000 the DfT began a full public consultation on PSZ policy and the NATS methodology that was being used to inform the risk assessments. This process engaged the public who would be affected by the implementation of such a national policy.

It was decided that PSZ policy should be based on traffic forecasts at 15 years in advance of the year of assessment. This allows the establishment of PSZs which would encompass the areas at risk not just from current operations but also those that may be at risk from anticipated traffic growth. As a result, all risk assessments model forecast traffic for the chosen airports and risk contours reflect the potential risk that may be present in the lifetime of a PSZ.

The approach developed from modern risk assessment techniques was sufficiently strong to form the basis of new airport TPR assessment techniques and statistically-informed PSZ policies. In 2002, after extensive consultation on PSZ policy and the

supporting NATS methodology, it was formally determined that the PSZ policy based on qualitative risk assessment techniques would be implemented at major airports. NATS then modelled the risk profiles of 29 major UK airports and the resulting PSZs were delivered to the DfT for implementation.

NATS and the DfT are committed to continually reviewing PSZ methodology to ensure that the risk to third parties from airport operations is appropriately assessed. As such, PSZs are reviewed on 7-year cycles to ensure they appropriately reflect trends in airport traffic. In order to ensure the methodology was as robust as possible for the first round of revised PSZ assessments, NATS performed another refresh of the data behind the risk methodology in 2007.

The model outlined above has been used to derive all UK airport PSZs on behalf of the DfT, as well as the evaluation of risk zones at international airports. The model has also been used to evaluate the risk to third parties at specific developments in the vicinity of airports.

Policy

UK PSZ Policy was developed on the basis of NATS' TPR methodology in 1997; it is administered by the UK Department for Transport, which liaises with airport operators to define their PSZs. NATS used constrained cost-benefit analysis to evaluate whether the benefit gained from reducing individual risk outweighs the cost of restricting development in the 10^{-4} and 10^{-5} individual risk contours. The study proposed the following land use planning restrictions:

Tolerability Criteria	Land Use Restrictions
$IR \geq 10^{-4}$	Removal of housing
$10^{-4} > IR \geq 10^{-5}$	Prevent new housing and non-housing development but there is no need to remove existing development. (Existing house extensions allowed). Non-housing development with low density of human occupation may be allowed (e.g. long stay car parking).

PSZ policy has not changed since the individual risk-tolerability criteria were derived circa 1996 using cost-benefit analysis, the results of which will not change over such a relatively short time period. Parts of the cost-benefit analysis were repeated by the Health and Safety Executive in 2007, to re-assess the tolerance towards risk in order to support the analysis of recent events. Those studies confirmed that, even a decade after the original PSZ work, the PSZ tolerability criteria originally derived are still valid.

Due to the complexity of enforcing land restrictions within exact individual risk contours, NATS proposed the use of Public Safety Zones at UK airports that are based on the contours and are also a simple geometric shape which would be easier to implement by local planning authorities. After public consultation, NATS proposed a 'pinched' isosceles triangle shape whose dimensions would be directly related to the airport's specific operation and which would encapsulate the entire 10^{-5} risk contour whilst minimizing unnecessary land restriction. This method requires only 5 co-ordinates to define the vertices of the pinched triangle, making implementation and identification in

practice far easier for local planning authorities; this is the shape that was approved for use by the DfT and is used at most airports in the UK today (Figure 2).

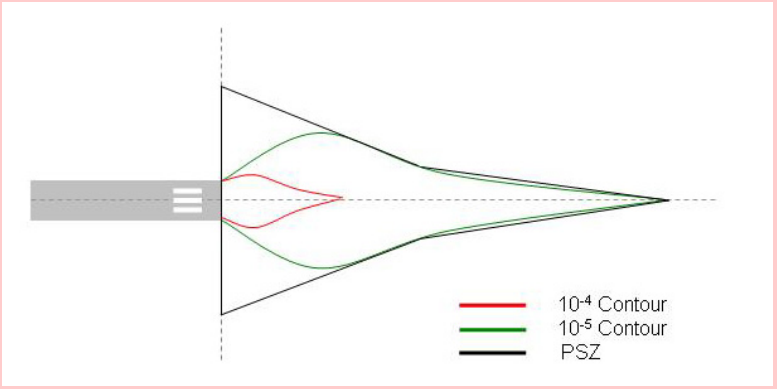


Figure 2: Pinched Triangle PSZ Shape (exaggerated for illustration only)

PSZ policy only applies to existing airports where the level of traffic warrants the creation of safety zones; this level is where Air Transport Movements exceed 1500 per month. Proposed airport developments which may change the level of risk need not necessarily be constrained by PSZ policy, but any planned developments that do affect the size, shape, number or location of Public Safety Zones will result in the PSZs being reviewed once development is approved and in place. All PSZs are reviewed at approximately 7-year intervals to ensure that they accurately reflect changing airport activity and that any changes to the predicted risk profile of the airport are taken into account.

Societal risk analysis gauges the impact on society from the realisation of an accident; studies have shown that public reaction is far more adverse to infrequent incidents that claim large numbers of victims than to frequent incidents that claim a small number of victims. It is a subjective measure of risk, and as such, it was acknowledged during the development of PSZ policy that determining tolerability criteria for societal risk would be open to differing views. Additionally, the cost-benefit analysis performed at the time has inherent societal risk considerations and as such, no dedicated societal risk methodology has been developed.

UK PSZ policy is an example of best practice airport safety zone policy, having benefited from almost a decade of development and implementation at airports across the UK. The combination of empirical third-party risk assessment and optimised PSZ policy have created a robust system for the control of exposure to risk, and one that can be applied nationally with confidence.

Discussion Questions

17. Should an approach based on the identification of public safety zones be introduced to help ensure that new developments around the ends of runways do not lead to undue levels of risk?

NATS has carried out significant research into the location and consequences of aircraft accidents in the vicinity of airports. This statistical research found that accidents are more than twice as likely to occur during the takeoff and approach phases of flight in airport areas as during normal en-route operations; as such NATS fully advocates the implementation of a national policy that would limit the exposure of risk to people in the vicinity of airports.

In the UK, NATS has fully supported HM Department for Transport in the establishment of PSZs at major UK airports, ensuring the public's exposure to the risk from airport operations is controlled via restrictions on the number of people living, working and congregating in PSZs. It achieves this result by implementing guidelines on PSZ policy at a governmental level, under which Local Planning Authorities must follow. This ensures national interests in public safety are followed consistently, but devolves administration to lower tiers of government for day-to-day administration and enforcement.

The UK example demonstrates a process that NATS developed in partnership with the DfT. This exemplifies how scientifically-derived risk models can be used to effectively determine the areas at most risk, and use these to inform the often emotive issue of public safety.

It is recognised that the state of Queensland, Australia includes considerations toward public safety in their state-planning policy guidelines, however the public safety area guidelines it contains are based on research completed some time ago, and since then, PSZ policy has matured greatly, influencing the shape of PSZ commonly used.

It should be noted that PSZs are not a mechanism for restricting airport growth nor imposing unnecessary land-use restrictions on developments in the vicinity of airports, they are merely a way of controlling public exposure to risk from airport operations. As such, UK PSZ policy is a successful example of how competing development ambitions, those of the airport and the local public, can be coordinated by local planning authorities to ensure safety is not compromised.

NATS fully encourages the Australian Government to take a proactive approach to airport third party risk management. The implementation of such a policy in the UK has proved successful in limiting the number of people exposed to airport risk, and allows for potentially conflicting aims to be coordinated based solely on safety grounds. A national policy would ensure safety is considered fairly and consistently across all states, which is a crucial factor in enabling engagement of a policy which may affect sizeable urban populations.

18. For which airports might such public safety zones be identified – all airports or only major airports with regular airline traffic?

In the UK, PSZs have been established at all major airports; the DfT recommends that PSZs should be established at airports which are shown to average 1500 Air Transport Movements (ATMs) per month at the time of implementation and in due course are likely to exceed 2500 ATMs per month.

Whilst there is a risk present from smaller airports/airfields that may have sizeable private flying clubs, the risk from such operations is usually too small to establish functional PSZs.

It should be noted that a methodology to assess risk at airports should be flexible to effectively analyse risk at all airports, however the results would be specific to their methods of operation. As such, there would be no need to have a policy in which smaller airfields were given a standard 'one size fits all' zone. In the UK, NATS developed a core risk model which is customised by an airport's method of operation, this ensures a consistent risk assessment technique between all airports, however it also allows for assessments at airports of varying characteristics.

NATS therefore recommends that any PSZ policy must cover the major airports in Australia that exceed 1500 ATMs per month. PSZs may also be applied to smaller airports at the discretion of the government where it is believed they would be of benefit (e.g. locations where there is sizeable development in close proximity to an airfield). Such a policy should be consistent across all airports, with small airfields having the same customised analysis approach as for larger airports.

19. What methodology and criteria should be applied in defining the boundaries of a PSZ?

It is clear from the public consultation on PSZs carried out in the UK that a transparent policy and risk methodology is necessary to ensure engagement of the policy by the public.

NATS methodology developed for use in the UK has previously been published to detail the core model components and how the process works. This openness to scrutiny allows the methodology to be more robust, taking into account suggested improvements or refinements as appropriate. The methodology has been used as part of national PSZ policy to establish PSZs at all major UK airports and also to inform airports worldwide of their risk profile. Any implemented methodology must benefit from investment to keep it up to date, reflecting current aircraft safety trends, to ensure PSZs are accurate. NATS also maintains regular links with academic field experts to ensure that best practice is maintained and therefore, NATS would recommend that any developed policy in use in Australia should utilise academic expertise.

A key issue regarding the aircraft accident data within the methodology is what specific historical crashes should be considered. The NATS model was designed to assess risk at airports in the UK and in first world[2] countries; as such, the accident data and resulting model parameters contained within the methodology reflect this. In developing a national methodology for use at Australian airports, NATS recommends research is carried out into whether sufficient accident data exists to create a methodology based solely on Australian accident data. However, if, as is the case in the UK, sufficient country-specific data does not exist due to its high safety record, it would be likely that a first-world type methodology would also fit appropriately.

Whilst it is important for a national methodology to be developed that allows for a consistent PSZ policy, it is necessary that a risk methodology takes into account the differences in airports' individual operating procedures. For example, in the UK, the forecast traffic using an airport tailors the results of the risk assessment, which directly determine the size and dimensions of a PSZ. This is crucial as it allows airports with safer traffic mixes to have less land-use restrictions than those airports operating an older, less safe, traffic mix.

It should be noted that PSZs are based on an airport's forecast traffic data to ensure that recent local developments that lie within a new PSZ area may remain with a reasonable lifespan; therefore, UK PSZs are refreshed on approximately 7-year cycles.

[2] First world countries include: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hong Kong, Iceland, Ireland, Italy, Japan, Luxembourg, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, The Netherlands, UK, USA.

The criteria used in the UK to determine the boundary of a PSZ was determined during development of the policy. Constrained cost-benefit analysis was carried out by the Centre for Transport Studies, University College and Imperial College London, to determine the threshold level of risk, above which land use restrictions would be beneficial to controlling risk exposure. Work carried out by the UK Heath and Safety Executive (HSE) in 2007 demonstrated the results found from the original cost-benefit analysis still hold, in that the current 1 in 100,000 risk contour should remain the risk level that defines a PSZ.

In addition, PSZ policy defines a high-risk contour area within which the risk exceeds 1 in 10,000. This unacceptable risk threshold is consistent with those the HSE applies to other industries such as the petrochemical industry; as such, measures must be taken to reduce the number of people exposed to this risk.

NATS does recognise that other countries and industries sometimes use larger risk areas to define safety zones, however such zones can extend far further than the reasonable range of "airport operations" and have little cost-benefit basis for any PSZ policy. In addition, the PSZ boundary representing risk equal to 1 in 100,000 is actually much lower than risks experienced in everyday life, for example in 2008 the risk of death from a road accident in the UK was 1 in 18,500.

Other methods of airport risk assessment have been considered for use in the UK, however many lack the required resolution to allow geographic regions of most risk to be determined, or introduce subjective risk indicators into the methodology; such risk assessment techniques have therefore been discounted for use in UK risk assessments in favour of a more robust and practical methodology.

NATS therefore recommends that a transparent methodology is used to deliver scientifically robust risk assessments, based upon historical data that accurately reflects the risk present from Australian airport operations. In addition, the risk assessment methodology must be partnered with a PSZ policy that controls the risks fairly between all airports but allows for individual airports to improve their risk profile. Such a methodology must take into account future airport operations appropriately, to give stability to the PSZ policy.

20. What sort of additional controls might be imposed for new developments in identified PSZs?

As part of UK PSZ policy, constrained cost-benefit analysis was used to ascertain the threshold level of risk, above which a PSZ should be based. In addition, analysis was carried out to determine precisely what land use controls would be appropriate within a PSZ to control the exposure to airport risk.

The research found that inside a PSZ, there was a case for limiting new development. However, there was no case for removing existing development that was determined to be inside a new PSZ region. This work formed the basis of PSZ policy when it was revised in 2002 and it currently underpins all land-use decisions around airports in the UK.

In addition, PSZ policy also includes land-use restrictions for the high risk contour area within which the risk exceeds 1 in 10,000. In this region, no residential or work development is allowed as such levels of risk have been determined to be

unacceptable for the public by the HSE, consequently, measures must be taken to this reduce risk.

As these are guidelines, there are minor exceptions which are considered on a case-by-case basis. For example, new transport developments may be built within a PSZ where there would be significant benefit and risks could be controlled. Such cases would be subject to Governmental consideration by the department who sets PSZ policy.

Whilst the implementation of such land-use controls within a PSZ fall to local planning authorities, controls for developments that fall within an unacceptable high-risk range must be backed by government legislation that can enable the compulsory purchase of properties. In the UK, PSZ policy enforcement falls to local planning authorities at a council level; however the Secretary of State for Transport has the power to grant compulsory purchase orders on behalf of airport operators where it is necessary to remove developments within unacceptably high areas of risk.

Therefore NATS recommends that any PSZ policy introduced to Australia must be a consistent set of objective guidelines for application at all appropriate airports. This should include necessary details to allow local planning authorities or states to carry out PSZ administration independently. This shall allow for the Government to act as an impartial owner of the policy itself, in order to consider special exceptions and interpretations of the policy.

21. What sort of steps might be taken to ensure the identification of a PSZ does not unduly affect the value and enjoyment of existing properties within the zone?

Existing developments within a PSZ are not required to move as the risk is comparable with everyday risks such as the risk of a car accident; therefore there should be no effect on the value and enjoyment of existing properties given the establishment of a PSZ.

What must be made clear to the public on the adoption of a PSZ policy is that the risk from airport operations already exists, however the identification of a PSZ, and the guidelines for development within it, are a new mechanism to control the ongoing exposure to the risk. Consequently, UK PSZ Policy outlines that no compensation is payable to existing development owners solely as a result of the definition of public safety zones. Under certain circumstances, compensation in the form of a purchase notice is payable where a site is incapable of being put to any alternative beneficial use as a result of it being within a PSZ, such practice however is rare. If compensation was to be payable, it would be the liability of the airport owner and be paid via the local planning authority who would carry out the purchase notice.

In addition, PSZ policy allows for some common redevelopments such as extensions to residential housing and the change of use of business developments, but only where the occupancy of such developments does not increase; again, such practise is rare in the UK.

NATS believes there should be no reason for the identification of a PSZ to unduly affect the value and enjoyment of existing properties as the risks from airport operations were always present. However for completeness, any PSZ policy for use in Australia must include appropriate provisions for special circumstances where compensation may be payable.