INDUSTRY WORKING GROUP

REPORT ON OPTIONS TO IMPROVE MONITORING, REPORTING AND COMPLIANCE WITH THE MAXIMUM MOVEMENT LIMIT

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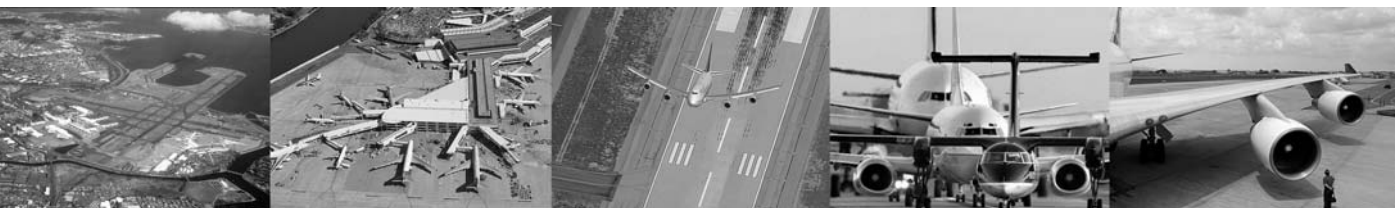


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EXECUTIVE SUMMARY

In December 2010, the Minister for Infrastructure and Transport (the Minister) formed an industry Working Group to investigate and implement measures to mitigate the risk that the maximum movement limit (the cap) at Sydney Airport will be exceeded.

The formation of the group followed reports by Airservices Australia (Airservices) that there were seven occasions during the June and September quarters of 2010 when the cap of 80 runway movements per regulated hour was exceeded. These are the first reported occasions since 2001 when the cap has been exceeded.

The Working Group considered the likely cause of the occasions when the cap was exceeded. The Working Group did not identify any instances where more than 80 movements were scheduled in any regulated hour. The issues have arisen from the variation between the number of scheduled gate movements and the actual number of runway movements that occurred in each of the relevant hours.

Adverse weather conditions contributed on at least two occasions. Other incidences appear more a reflection of increasing movements in and around the morning peak period. Most of the recent breaches occurred in the 8:15 am to 9:15 am regulated hour. This is a peak period for operations at the airport, with slot allocations for gate movements at or close to 80 per hour and the airport operating in a high capacity parallel runway mode if weather permits. The high capacity modes are capable of handling more than 80 movements per hour when there is high demand.

While the Act applies the movement cap to the number of runway movements in an hour, the mechanism it provides for regulating traffic, the slot management scheme, applies to the scheduling of gate movements. There is not a precise correspondence between the timing of a scheduled gate movement and the timing of the associated runway movement. The interval between arrival or departure at the gate and movement on the runway will depend on taxiing times and any holding on the tarmac.

The difference between runway movements and gate movements would not be significant if measured over a period of a full day, as the number of runway movements cannot exceed the number of gate movements. However, compliance with the movement cap is measured on the basis of regulated hours on a rolling quarter-hour basis i.e. 7:00 am to 8:00 am, 7:15 am to 8:15 am, 7:30 am to 8:30 am etc. As a result there are 65 regulated hours between 6:00am and 11:00pm.

While the fluctuations will balance over time, they can lead to situations where the number of runway movements in a particular regulated hour exceeds the number of scheduled gate movements. When the number of scheduled gate movements approaches the cap of 80 per hour, there is a real risk that these fluctuations will lead to occasions where the runway movement cap is exceeded. In some cases, a matter of seconds may be involved in whether the number of movements in a particular regulated hour is 80 or 81.

Ongoing growth in demand at Sydney will result in more hours where movements will be at or close to the 80 movement cap. The Sydney Airport Master Plan indicates that the airport is planning for the annual number of aircraft flying into and out of Sydney to rise to 427,000 by 2029. The impact of growth in movement numbers will be, subject to the airlines commercial and operational drivers, to spread the peak periods when scheduled movements are at or close to the cap. The Bureau of Infrastructure, Transport and Regional Economics estimate that within ten years (by 2019/20) demand at Sydney Airport will exceed 80 movements in 5 out of 17 clock hours.

The Long Term Operating Plan (LTOP), developed in the mid 1990s, provides 10 different operational modes currently being used at Sydney Airport to manage traffic on the three runways and associated flight paths. These runway modes of operation are implemented to meet noise sharing targets subject to weather and traffic demands. The industry is of the view that the implementation of the LTOP may be a contributing factor to the breaches. On most occasions a low capacity mode would be utilised in the lead up to the morning peak period, with concerns that, as slot allocations exceed the estimated capacity of the particular mode approaching the peak hours, some congestion builds during this period and is exacerbated when the runway modes are switched. As air traffic at Sydney Airport increases and the peak periods spread, Airservices will increasingly need to employ the high capacity modes to handle the presenting demand, thereby constraining the ability to meet the noise sharing targets.

The Working Group found that the current arrangements for day-to-day operational management of aircraft movements at Sydney Airport do not involve active management of the cap. Currently, the tactical air traffic control (ATC) acceptance rate for Sydney Airport is set based on weather conditions and runway mode of operation. While an upper limit of 50 runway arrival movements per hour is applied, there is no specific operational mechanism in the system to limit the total runway movements to 80 per hour. The ATC system has relied on the slot management scheme for scheduling of gate movements to regulate the demand. As indicated above, no indication has been found that more than 80 gate movements have been scheduled in any hour, but the control of gate movements does not provide a precise control on the actual runway movements in a particular regulated hour.

The Working Group has identified a range of operational and administrative initiatives which collectively should assist in minimising the risk of further exceedances of the cap in the future and address the deficiencies identified in the system to the greatest extent possible. Areas for attention are:

- Restricting the allocation of slots on an ad hoc basis for itinerant flights where there is a risk of exceeding the movement cap;
- Managing the ATC arrivals acceptance rate to not exceed the number of available arrivals within the movement cap;
- Strengthening the management of authorisations for departures to take account of the runway movement cap on the day;
- Establishment of enhanced arrangements for managing movements during the recovery phase after a disruption to normal operations, with those arrangements to take account of the movement cap;
- Enabling more precise and frequent data collection, monitoring and reporting processes; and
- Monitoring the implementation of the enhanced arrangements, with a review of their effectiveness to be conducted after 12 months.

RECOMMENDATIONS

Recommendation 1 In relation to itinerant aircraft, that Airservices and the Slot Manager refuse any further allocation of slots for itinerant operations in peak periods as advised by the Slot Manager.

Recommendation 2 In relation to managing the number of arriving aircraft, that Airservices use its flow management tools to set the maximum arrival rate to limit the acceptance of arriving aircraft to no more than the number of available gate arrival slots for the regulated hour as notified by the Slot Manager in the block-out sheet and updates, and put in place arrangements to adjust the arrival rate regularly (to commence from 1 April 2011).

Recommendation 3 That further work is done through the Working Group on a strategy for strengthening management of departures on the day to take account of the movement cap.

Recommendation 4 In relation to recovery following a disruption to operations, that Airservices coordinate the agreement of stakeholders to set the ratio of arrivals and departures for the recovery period, with regard to the movement cap.

Recommendation 5 To support the initiatives in recommendations 2, 3 and 4 above, that Airservices, Sydney Airport Corporation Limited (SACL), the Slot Manager and aircraft operators develop Business Rules to set out how they will interact in managing movements, identify the processes and criteria on which key decisions will be made and provide effective arrangements for cooperation in day-to-day operations.

Recommendation 6 That Airservices, SACL, the Slot Manager and aircraft operators consider the scope for use of new or existing technology to assist in the management of movements, communication between participants and data collection.

Recommendation 7 That the Working Group conduct a review in early 2012 of the implementation of the new arrangements and their effectiveness in managing movements in accordance with the cap.

ESTABLISHMENT AND OBJECTIVES OF THE INDUSTRY WORKING GROUP

Following reports by Airservices that the cap at Sydney Airport had been exceeded during the second and third quarters of 2010, the Minister instructed Airservices and the Department of Infrastructure and Transport to work with industry to investigate and implement measures to mitigate the risk of further breaches of the cap.

An Industry Working Group was established to present a strategy to deliver on the Minister's request by the end of February 2011. The Working Group is chaired by the Secretary of the Department.

The Working Group consists of representation from:

- The Department;
- Airservices;
- Sydney Airport Corporation Limited (SACL);
- Airport Co-ordination Australia Pty Ltd (ACA / the Slot Manager);
- Qantas Airways Limited ;
- Virgin Blue Airlines;
- Regional Express;
- Jetstar Airways; and
- the Board of Airline Representatives Australia (BARA).

In developing this advice, the Working Group has met on three occasions (29 November 2010, 22 December 2010 and 9 February 2011), with two additional meetings of a sub-group on Business Rules (16 February 2011 and 4 March 2011), to identify and analyse:

- effective methods for monitoring and compliance of the cap;
- strategies to manage risk of exceeding the cap; and
- implementation of arrangements to manage the impacts of aeronautical growth on the cap.

CONTEXT

On 18 November 2010, the Minister tabled reports in Parliament from Airservices advising that the cap at Sydney Airport had been exceeded on several occasions in the second and third quarters of 2010. These reports show that runway movements at Sydney Airport exceeded the cap of 80 in seven separate regulated hours. Prior to this, the cap had not been exceeded since 2001. The movement cap reports by Airservices show that the cap was exceeded in 61 separate regulated hours between June 2000 and August 2001.

The recent occasions are a reflection of increasing numbers of aircraft movements at Sydney Airport, back to levels that have not been seen since immediately prior to the collapse of Ansett and the terrorist attacks on the United States in September 2001. In 2010 daily movements on 32 occasions were at or above 900 per day. During peak periods, gate movements are being scheduled at or close to the maximum of 80 per hour over several consecutive regulated hours**.**

Aircraft noise continues to be a sensitive issue for communities surrounding Sydney Airport. The Minister has highlighted that capping aircraft movements at 80 per hour continues to be an essential element of the arrangements introduced to minimise the impact of aircraft noise and operations at Sydney Airport. The Minister advised the Sydney Airport Community Forum (SACF) of the recent breaches, noting his concerns and advising that he instructed Airservices and the Department to work with industry to investigate and implement measures that will mitigate the risk of further breaches of the cap in the future.

The outlook of continued growth of operations at Sydney airport will continue to put pressure on the cap. The Working Group has noted the Minister's concerns and has prepared options that strengthen the management of traffic in the context of the movement cap, balancing the need to maximise operational efficiency and avoid unnecessary disruption of scheduled services and recognition of the impact of aircraft noise on the community.

BACKGROUND ON MAXIMUM MOVEMENT LIMIT

The *Sydney Airport Demand Management Act 1997* (the Act) imposes a cap of no more than 80 aircraft movements per regulated hour at Sydney Airport. A regulated hour is a period of 60 minutes starting on the hour, at 15, 30 or 45 minutes past the hour. An aircraft movement means the landing of an aircraft on a runway or the taking off of an aircraft from a runway.

The Act also establishes a framework under which slots are allocated for gate movements at Sydney Airport. A 'slot' provides an operator with permission for a gate movement, with a time and day specified.

The Act further:

- Requires Airservices to monitor compliance with the cap and report any breaches of it to the Minister who is then required to table such reports in both Houses of Parliament;
- Provides for the endorsement of a slot management scheme and a compliance scheme;
- Deals with the appointment of a Slot Manager who administers the slot management scheme; and
- Establishes a Compliance Committee, which administers the compliance scheme.

Both the slot management scheme and the compliance scheme are statutory instruments, approved by the Minister and subject to disallowance.

The Act is only one element of a range of measures at Sydney Airport to manage capacity and community impact from the operations of the Airport. Other measures include the *Sydney Airport Curfew Act 1995,* the Long Term Operating Plan (LTOP) for noise sharing, and the SACF for community consultation.

The legislation expressly provides that the role of Airservices in monitoring and reporting against the cap does not authorise or require Airservices to take any action to enforce compliance with the cap.

The slot management scheme is administered by the Slot Manager. The Slot Manager is a proprietary company, Airport Co-ordination Australia Pty Ltd (ACA). ACA has been appointed by the Minister under s61 of the Act to undertake the day to day administration of the slot management scheme. The ACA board is comprised of representatives of SACL and the Australian airlines/operators using the airport. The cost of administering the slot management scheme is met by the Australian airlines using the airport (contributing 90%) and SACL (contributing 10%), with the contributions of individual airlines based on the number of slots allocated for the forthcoming season. The Department conducts annual reviews with the Slot Manager to ensure that all statutory rules governing slot allocation have been applied.

A key objective of the slot management scheme is to provide an effective means of administering the cap. Other objectives of the slot management scheme include alleviating delays caused by congestion, safeguarding access for regional airlines, providing equal access to slots for new entrants, and spreading aircraft movements more evenly within hours.

The Slot Manager receives applications for slots, assesses them against the rules set out in the slot management scheme and allocates slots accordingly. This slot allocation process is undertaken at two levels. First at a scheduling conference held before each scheduling season (i.e. northern hemisphere summer and winter) and second in response to more immediate events or request from airlines. In the administration of the slot management scheme, scheduled gate movements are limited to no more than 80 per hour.

Airservices assists the Slot Manager in the consideration of any urgent applications for slots for ad hoc operations where those applications are received outside ACA's normal business hours.

The primary compliance mechanism in the slot management scheme is *historical precedence*. To gain historical precedence, which essentially gives an operator first option to retain a slot for the next equivalent scheduling season, the operator must actually conduct at least 80% of the movements in an allocated slot series. A slot series means 5 or more slots that authorise the same kind of gate movement at the same time on the same day of the week within 1 scheduling season. The historical precedence is highly valuable to airlines for various reasons including investment certainty, competitive advantage when high levels of demand exist for restricted capacity in peak periods, and ability to plan for future services.

The compliance scheme is based on the expectation that an aircraft operator should normally conduct its authorised gate movement within a certain period of time before or after the scheduled slot time. A gate movement which occurs outside this tolerance is recorded as a potential off-slot movement. The reasons why the movement was out of tolerance are collected, with all potentially off-slot movements categorised into two groups: those for reasons within the operator's control and those outside the operator's control.

The enforcement of the slot compliance system is administered by the Compliance Committee in accordance with the provisions of the compliance scheme. Under the compliance framework, penalty action may be taken for off-slot movements that are within the operator's control, and if part of a slot series, amounts to more than 20% of the series.

DETAILS OF THE BREACHES AND REASONS FOR THEM

In two successive reports dated 28 July 2010 and 28 October 2010, Airservices advised the Minister that between April and September 2010 there were seven occasions where aircraft runway movements at Sydney Airport exceeded the regulated hourly cap of 80[1].

Reported incidents on most recent occasions were during the 8.15 am to 9:15 am regulated hour. The most efficient runway modes of operation were being used on all occasions when the cap was exceeded.

Between 6 am and 7 am the airport is generally operated on a low capacity runway mode to meet the noise sharing objectives under the LTOP. International arrival demand for runway use is high during this time, and while the cap provides for 80 movements, the low capacity modes can only handle an estimated 30 to 64 movements during this hour. The estimated runway capacity can be even less in adverse weather conditions. This provides for a situation where scheduled movements can exceed runway capacity and in which arriving aircraft are being required to delay arrival times.

When delay times approach the acceptable tolerance (20 minutes), the airport switches to a more efficient mode of operation. The objective of Airservices at this time is to efficiently and safely manage airspace and runway movements with priority being given to the arrival of holding aircraft.

There are no legislative provisions, and no current operational procedures, that require Air Traffic Control (ATC) to take the cap or regulated hour into account in carrying out their day-to-day duties.

There was no occasion identified when more than 80 movements had been scheduled for a particular hour. The causes of the cap being exceeded are attributable to a range of factors discussed in more detail below.

Breaches attributable to adverse weather conditions

Airservices reported that there were two occasions when aircraft movements at Sydney Airport exceeded the cap following delays from early morning fog. Both occurrences are shown in the table below.

Date	Regulated Hour	Movements
24 June 2010	10:00 am - 11:00 am	81
10 September 2010	8:15 am – 9:15 am	82

It is common for fog to cause delays in airline on time performance, both take off and landings, during the onset of winter each year (May-July). This can lead to unexpected delays in airline schedules. Airservices has advised that when there are conditions like 'fog', they do not close the airport. Rather, during periods of restricted operations, they advise pilots of the prevailing weather conditions and the pilot decides whether or not to land.

On both days, a significant number of aircraft could not operate in the regulated hour for which they were planned and had to be systematically dealt with by ATC when weather conditions improved. The consequential backlog of off-schedule flights was cleared by ATC as safely and efficiently as possible.

To achieve a high movement rate capable of clearing the backlog as quickly as possible, ATC used one of the two high capacity runway modes (departures to the south and arrivals from the north – Mode 10) which have capacity for more than 80 movements per hour.

Overall, unplanned cancellations and network effects meant that the number of actual movements at the airport on both days was less than scheduled.

Airservices and the Slot Manager have confirmed that on both days, the number of gate movement slots allocated for the regulated hour did not exceed 80.

[1] Weblink to Airservices reports tabled in Parliament
http://www.airservicesaustralia.com/projectsservices/reports/capreports/default.asp

Breaches attributable to congestion and growing demand

Airservices reported that there were five occasions when aircraft movements at Sydney Airport exceeded the cap for reasons largely due to built up demand. Each occurrence is shown in the table below.

Date	Regulated Hour	Movements
23 July 2010	8:15 am – 9:15 am	83[2]
18 August 2010	8:15 am – 9:15 am	82
20 August 2010	8:00 am – 9:00 am	81
13 September 2010	8:15 am – 9:15 am	82
28 September 2010	8:15 am – 9:15 am	81

Initial use of low capacity modes on these 5 days (with an estimated capacity of 30 and 64 movements) was followed by a period of particularly high demand in a number of consecutive regulated hours. Analysis of the scheduled arrivals and departures on these days (Appendix 4) reveals that 68 or more movements were consistently scheduled in the 6:45am regulated hour. The capacity of the runway mode in use at that time was less than the approved demand, resulting in increased traffic delays and congestion as the morning peak approached.

Once delays increased and approached the acceptable tolerance, ATC switched to a higher capacity mode to reduce congestion and maintain safety. The process of switching modes also incurs additional delays. Some flights spilt over into the regulated hour and in some instances, the 81st movement occurred less than 30 seconds before the next regulated hour.

The consequential backlog of off-schedule flights was cleared by ATC as safely and efficiently as possible. To achieve a high movement rate capable of clearing the backlog as quickly as possible, ATC used one of the two high capacity runway modes (departures to the north and arrivals from the south – Mode 9) with capacity for around 80 movements per hour.

Airservices and the Slot Manager have confirmed that for each of these cases, the number of gate movement slots allocated for the hour did not exceed 80 (sample at Appendix 4).

Overall, unplanned cancellations and network effects meant that the number of actual movements at the airport on each of these days was less than scheduled.

In some cases, regulated hours have been exceeded because of an 81st movement falling within the 60 minute period by margins of 20 to 30 seconds. Even though this means the cap has been exceeded, there have been offsetting reductions in demand in the preceding or succeeding hour.

2 The Slot Manager has advised, since tabling of the report, that 2 of the 83 movements were exempt operations which should not have been included.

KEY ISSUES

INTERACTION OF THE MOVEMENT CAP AND SLOT MANAGEMENT SCHEME

There are a number of complexities in relation to the interaction of the movement cap and the slot management scheme. The basic requirement set by the Act is that the slot management scheme is to be consistent with the movement cap. It is not made clear whether this means that the scheme is to ensure that no more than 80 movements are allocated in any regulated hour, or whether it means that the scheme should ensure that in practice there cannot be occasions when actual movements could exceed 80 movements in any regulated hour. The slot management scheme has been effective against the first of these interpretations. The Working Group did not identify any instances where more than 80 movements were scheduled in any regulated hour.

While the Act applies the cap to the number of runway movements in an hour, it provides for the slot management scheme to apply to the scheduling of gate movements. There is not a precise correspondence between the timing of a gate movement and the timing of the associated runway movement. The interval between arrival or departure at the gate and movement on the runway will depend on taxiing times and any holding on the tarmac. These times vary considerably according to factors such as the runway in use at the time, the association between the runway and different aircraft parking positions, and any congestion affecting the aprons, taxiways and runways.

The number of actual runway movements in a short period will in practice fluctuate slightly above and below the number of scheduled gate movements in the same period. The difference between runway movements and gate movements would not be significant if measured over a period of a full day, as the number of runway movements cannot exceed the number of gate movements. However, compliance with the movement cap is measured on the basis of regulated hours on a rolling quarter-hour basis i.e. 7:00 am to 8:00 am, 7:15 am to 8:15 am, 7:30 am to 8:30 am etc. There are 65 regulated hours each day. While the fluctuations will balance over time, they can lead to situations where the number of runway movements in a particular regulated hour exceeds the number of gate movements. When the number of scheduled gate movements approaches the cap of 80 per hour, there is a real risk that these fluctuations will lead to occasions where the runway movement cap is exceeded.

Additional pressures are likely to arise when airport operations are disrupted through factors such as adverse weather and there is a build-up of demand that needs to be cleared when full service is resumed

IMPACT OF CONTINUED GROWTH AT SYDNEY AIRPORT

Aviation activity over the last 10 years has been influenced by major events such as the September 11 terrorist attacks, the collapse of Ansett and the global financial crisis. In Australia, growth in the aviation industry recovered strongly after the events of September 2001. While passenger numbers returned to 2001 levels quickly and continued to grow, the use of larger aircraft has meant that the recovery of aircraft movement numbers was slower. Movement numbers at Sydney Airport have now returned to levels seen in August 2001 and, if movements continue to increase as anticipated, the flexibility to manage traffic to prevent breaches will diminish.

Applications for slots in the morning peak period regulated hours already exceed the 80 per hour that can be allocated and have been as high as 92 per hour (Appendix 1). This demand means that there are now a number of consecutive hours when allocations are at or close to the 80 cap.

The *2009 Sydney Airport Master Plan* indicates that the airport is planning for the annual number of aircraft flying into and out of Sydney to rise to 427,000 by 2029, therefore operating at or near the cap for about 7 hours per day (Appendix 2).

After the approval of the 2009 Master Plan and following an expected strong growth in passenger numbers, the number of aircraft movements through Sydney Airport is forecast by the Bureau of Infrastructure, Transport and Regional Economics (BITRE) to increase by 2.3 per cent a year over the forecast period to 473,900 in 2029–30. BITRE forecasts have been developed on the basis of the long-term forecasts of air passenger movements, aircraft size and seat utilisation rates.

IMPACT OF THE LONG TERM OPERATING PLAN (LTOP)

The LTOP, developed in the mid 1990s in response to community pressure to share the noise generated by Sydney Airport, provides 10 different operational modes currently being used at Sydney Airport to manage traffic on the three runways and associated flight paths (Appendix 3). Subject to weather and traffic demands, these Runway Modes of Operation are implemented to meet noise sharing targets. The modes have different capacities. For most of the modes, the maximum number of movements which can be handled in normal operations is significantly less than 80 per hour. But for the two most efficient modes (modes 9 and 10, which involve operations on the parallel runways), it is operationally possible to achieve more than 80 movements per hour in favourable weather conditions.

Airservices employ a runway selection procedure to facilitate the fair sharing of the impact of aircraft noise and with an aim to meet noise sharing targets in the LTOP. Generally, Airservices use low capacity modes during periods where demand is expected to be less, for example, at 6 am when the curfew period is lifted, during the middle of the day and again before the curfew period starts. Modes are changed when traffic delays increase and a different mode will better sustain the presenting traffic levels.

Airlines have expressed the view that the implementation of the LTOP's noise sharing objectives in the early morning period may be a contributing factor to the breaches. A graph showing a comparison of actual and allocated runway and gate movements for the 20 August 2010 breaches is set out in Appendix 4. The estimated hourly runway movements for low capacity runway Mode 7 under LTOP is 64; consisting of 27 arrivals and 37 departures. Routinely, more than 27 arrivals per hour are scheduled from as early as the 6:30 am regulated hour and through to approximately 9:00 am, peaking at about 45 scheduled arrivals in the 7:00 am, 7:15 am and 7:30 am regulated hours. Scheduled departures are close to or slightly above 37 across the 7:15 am through to 9:15 am regulated hours. In these circumstances, the low capacity mode flow rate at the start of the day may not align with the scheduled demand and therefore results in a build up of demand for the arrival capacity. As delays increase and approach the acceptable tolerance, ATC procedures call for a higher capacity mode to be used to reduce congestion and maintain safety. Switching modes also incurs additional delays. The efficient throughput of traffic on a high capacity mode in an overloaded system can achieve over 80 movements per hour, dependent on traffic mix, aircraft separation requirements and whether instrument or visual approaches are being used. At present, ATC's programmed traffic flow rate currently has no reference to scheduled slot allocations, the 80 caps or concept of a regulated hour. In effect, it is focussed on dealing with the demand as traffic presents, relying on the slot management arrangements to regulate that demand.

When LTOP was developed in 1995-96, there were 270,000 aircraft movements at Sydney Airport. Airservices statistics provide that aircraft movements at Sydney Airport in 2010 were approximately 295,000. As air traffic at Sydney Airport increases and the peak periods spread, Airservices will increasingly need to employ the parallel runways (or higher capacity modes) to handle the presenting demand thereby constraining the ability to utilise the noise-sharing modes that have lower capacity.

OPERATIONAL COMPLEXITIES

Current responsibilities for functions associated with demand management at Sydney Airport are fragmented across agencies, organisations, industry and committees. Appendix 5 demonstrates the functions associated with the management of traffic at Sydney Airport and the complexity of the current system. Ensuring the safe and efficient operation of Sydney Airport requires the operational and technical expertise of Airservices, SACL, the Slot Manager and the airlines. The Working Group has explored these parameters with a view to strengthen the interaction between each component.

SACL, as the long-term lessee and under the terms of authority of its lease and the *Airports Act 1996*, is responsible for day-to-day management of the aerodrome's infrastructure. SACL's Terminal Operations Centre provides tactical management (evaluation, planning and monitoring) of the international terminal (T1) and one domestic terminal (T2) and the gates and aprons associated with those.

Qantas Airways Limited (Qantas) leases the T3 terminal and adjoining jet-base and has an option to renew the T3 terminal lease when it comes up for renewal in 2014. Qantas provides the tactical management (evaluation, planning and monitoring) of T3 and the gates and aprons associated with that terminal.

A primary task in managing air traffic safely is to maintain aircraft separation. In order to do so, ATC must use aircraft and airspace information, and any other available resources, to control potential conflicts between

aircraft, flight paths and airspace. Airservices does not have the authority to compel an aircraft to comply with a direction and ultimately the pilot in command of the aircraft is responsible for its operation and safety during flight. Airlines consistently provide Airservices with updated schedule information necessary for ATC's effective performance.

In addition to managing separation in flight, ATC also provide separation for aircraft on the aerodrome's ground movement areas. Pushback clearance from any terminal is currently given by ATC if the aircraft is moving directly onto a taxiway or movement area.

OPTIONS FOR CHANGE

Operational and administrative factors have contributed to the risk of breaches of the cap including:

- Demand in some regulated hours in the peak period exceeds 80 and slot allocations are at or are close to 80 in some hours;
- During the peak periods, some unscheduled flights may have been allocated a slot on the actual day of operation even when slot allocations were close to 80 in a regulated hour;
- While the number of gate movements and the number of runway movements will correspond over the day, there are likely to be fluctuations between gate movements and runway movements if measured over a short period such as the regulated hour;
- Enforcement provisions under the compliance framework are designed to support the orderly operation of the slot management scheme and scheduled gate movements, and do not relate directly to runway movements and the cap; and
- There is no real-time data collection and monitoring against the cap, resulting in limited capacity to detect the potential for an imminent breach and respond.

The Working Group has identified a range of operational and administrative initiatives to mitigate the risk of breaches of the cap in the future. No single action will prevent the cap from being exceeded, however taken together, a suite of measures will minimise the risk of further breaches. Implementation of the initiatives will require active participation of all Working Group stakeholders, and the cooperation of the broader airlines community, in the development and application of more detailed business rules.

The Working Group recommends initiatives in the following areas to reduce the risk of further breaches:

- Restricting the allocation of slots on an ad hoc basis for unscheduled flights where there is a risk of exceeding the movement cap;
- Managing the arrivals acceptance rate to regulate arrivals to the number available within the movement cap;
- Strengthening the management of authorisations for departures to take account of the runway movement cap on the day, with emphasis on improved arrangements for coordination across the parties involved;
- Establishment of enhanced arrangements for managing movements during the recovery phase after a disruption to normal operations, with those arrangements to take account of the movement cap;
- Enabling more precise and frequent data collection, monitoring and reporting processes; and
- Monitoring the implementation of the enhanced arrangements, with a review of their effectiveness to be conducted after 12 months.

Each of these initiatives are explored in more detail below.

OPERATIONAL TRAFFIC FLOW PROCEDURES

Management of itinerant flights

Ad hoc movements are primarily general aviation movements, private or corporate aircraft or itinerant charter operators and represent about 2% of total movements at Sydney Airport. Ad hoc movements are afforded lower priority under the scheme, as well as by Airservices under its operational prioritisation protocols. The allocation of ad hoc slots to itinerant aircraft is a function delegated to Airservices by the Slot Manager outside the Slot Manager's normal business hours.

To reduce the risk of ad hoc aircraft movements creating a situation where the cap is exceeded, the Working Group supports a new procedure for the management of itinerant slots during the peak hours in order to retain an additional buffer below the cap.

During the peak period in a scheduling season, as advised by the Slot Manager:

- The Slot Manager will not allocate any further slots to itinerant flights in those periods on the assumption that a high capacity runway mode will be in operation;
- Airservices, operating on behalf of the Slot Manager, will not allocate any further slots to itinerant flights in those periods if Airservices expects a high capacity runway mode to be in operation.

Itinerant slots for diverted RPT departing aircraft need to be considered separately from this recommendation.

Outside these circumstances, slot applications for itinerant flights will be processed on request.

Potentially, this could provide a buffer around the busiest regulated hours in situations where Airservices has demonstrated the operational efficiency to exceed the cap. This measure would therefore assist to reduce the risk of future breaches.

Recommendation 1

The Working Group recommends that, in relation to itinerant aircraft, that Airservices and the Slot Manager refuse any further allocation of slots for itinerant operations in peak periods as advised by the Slot Manager.

Tactical management of arrivals, departures, and recovery after delays

Currently, the tactical ATC acceptance rate for Sydney Airport is set based on weather conditions and runway mode of operation. While an upper limit of 50 runway arrival movements per hour is applied, there is no specific operational mechanism in the system to limit the total runway movements to 80 per hour. The ATC system has relied on the slot management scheme's allocation of gate movements to regulate demand.

This results in aircraft being accepted at the maximum achievable rate, which, in optimum circumstances (i.e. high capacity runway mode of operation in fair weather, with high demand), could be more than 80 movements in a particular 60 minute period. An overview of the current air traffic management model is at Appendix 6.

Airservices presented a strategy to the Working Group that would ensure the cap becomes a primary consideration (after safety) in the management of air traffic at Sydney Airport. An overview of the proposed air traffic management model is at Appendix 7. The proposal would require the acceptance rate to be set at no more than the number of available arrival gate slots for that given regulated hour. To ensure that capacity was not wasted and unnecessary holding introduced, if the allocated gate slots (combined arrival and departure) for any given regulated hour was less than 80, the acceptance rate would be set at 80 minus the gate departure slots allocated for that hour.

For example, if allocated gate slots for a particular regulated hour were 44 arrival gate slots and 36 departure gate slots, then the ATC acceptance rate for that hour would be set at no more than 44. If allocated gate slots for a particular hour were 35 arrivals and 37 departures, then the acceptance rate would be set for that hour at no more than 43, which is the allocated arrival slots plus any unallocated or vacant slots for that regulated hour.

This acceptance rate would be set in Airservices' current Central Traffic Management System (CTMS) and Maestro Flow Management Tool which tactically manages the arriving aircraft demand into Sydney Airport. Further consideration will be given to the handling of exempt flights, such as medical emergency and State aircraft.

When a situation occurs that restricts actual aircraft movements at Sydney Airport to a number significantly lower than scheduled (for reasons such as fog or thunderstorms), recovery procedures would be implemented to clear the backlog of scheduled flights. The appropriate arrival and departure rates for the recovery period would be determined by Airservices consulting with relevant stakeholders. The ratio of arrivals and departures agreed would take into account the relevant needs of the parties, for example, agreement may be for more arrivals than departures in the first recovery hour and a higher weighting of departures to arrivals in the second hour, with the rate being adjusted as needed to clear any backlog after which operations would return to normal. For safety reasons Airservices will be the arbiter of the ratio set.

Airservices are already in the process of implementing advances in air traffic management systems capable of simultaneously managing traffic flows at multiple airports. This will ensure a balanced distribution of delays and give ATC and airlines the option to delay flights and more effectively manage capacity at other airports or in the cruise phase of flights, or by absorbing delays on the ground at the departure port, speed reduction, track extension or airborne holding. The system will allow improvement management of planned and actual demand of the runway and more dynamic check points to trigger when demand and capacity are reaching an imbalance. This system, known as Collaborative Decision Making, will be phased in at Sydney Airport in the first half of 2011.

A proposal has been put forward by Airservices to establish a Departure Monitor to undertake management of

departures in real time against approved slot movement limits to ensure airport operations are kept within the cap. The role of the Departure Monitor would be to maintain and monitor a progressive tally of gate departure movements during designated hours and to alert stakeholders when there is a risk of exceeding the agreed number of departure gate slots in any regulated hour. Where the potential to exceed the agreed number of departure gate slots is identified, the Departure Monitor would contact the relevant authority coordinating the gate movements at the particular terminal (SACL in the case of T1 and T2, and Qantas in the case of T3) to request action to delay the movement of an aircraft from the departure gate where feasible. In addition the Departure Monitor would monitor movements on the airfield (through the Aerobahn tool which provides a real time picture of ground movements) to monitor the flow of departing traffic and coordinate with ATC during the progress of aircraft taxiing to the departure runway threshold to refine any necessary delays. This would be necessary when the aircraft to be delayed has not been able to hold on the gate due to gate availability.

Under the proposal the Departure Monitor would oversight the outbound flow of traffic from the terminals, ensuring that the number of aircraft departing the gates matched the number of available gate departure slots based on the latest information provided by the Slot Manager (this would be the same information used by Airservices to calculate the aircraft CTMS arrival rate for the applicable regulated hours). The monitoring of ground movements and maintenance of a cumulative count against the movement cap for each regulated hour by the Departure Monitor would provide a basis to make final adjustments to the departure flow if necessary. If a particular departure should need to be delayed to avoid a breach of the movement cap, the Departure Monitor would alert ATC to that need. The objective is to keep the need for such intervention to a minimum and to avoid any potential for ATC staff to be distracted from their primary accountability to maintain the safe separation of aircraft.

The Departure Monitor would also provide advice to relevant industry stakeholders on the progress of an aircraft from the gate continuing to the threshold, where necessary. The Departure Monitor will be responsible for maintaining an accurate record of all decisions taken and advice provided regarding the execution of their role.

Airservices consider that the role of the Departure Monitor would be beyond the role it can properly take on under the Act and may conflict with the primary role of ATC to manage safe aircraft operations and the airspace interface with the aerodrome. Airservices consider that gate departure management, which is directly affected by airport and airline capacity to move passengers and aircraft at the terminals and gates would be best handled by industry stakeholders consistent with international airport collaborative decision making practices. Options suggested by stakeholders include a representative of ACA or SACL to fill the role of Departure Monitor.

The proposal put forward by Airservices represents a revised approach intended to address concerns raised in the discussion on earlier proposals. The Slot Manager and airline representatives expressed views, including that:

- It is not clear that an extra process for clearance at the gate alone would effectively address the risk of breaches of the cap;
- To ensure the cap is not breached, a mechanism is needed to count movements in real time at the runway threshold;
- Introducing another party to a departure monitor role could further complicate operational processes;
- If a monitor role is to be introduced, the monitor should be an independent entity who would not have its own commercial interests at stake in the sequencing of departures, and having the Slot Manager perform the role would address this concern; and
- The monitor would need to work closely with ATC and have access to real time data from ATC relating to movements, including surface movements.

Following circulation of the revised Airservices proposal outlined above, Virgin Blue and ACA have advised that they are not satisfied that their concerns have been addressed. Virgin Blue has sought further discussion to clarify aspects of the proposal, and its intended operation and practical effect.

ACA, prior to the circulation of the revised Airservices proposal, put forward a proposal on behalf of industry for a Runway Movement Departure Monitor to undertake management of departures at the runway threshold to take account of slot allocations and the movement cap. The position would be located in the Sydney Airport Control Tower with access to available electronic and visual means, be employed through ACA and selection of an employee would be made on recommendation from Airservices and the Department of Infrastructure and Transport. Airservices does not support this proposal. The differences between the ACA and

original Airservices proposals were whether the management of departures was centred on the runway threshold as opposed to terminal gates. The revised Airservices proposal is based on the expectation that an effective approach involves management and monitoring across the departure process from the gate to the threshold. This may be particularly important in the situation of recovery after a disruption.

Airservices has advised that it has significant safety concerns about trying to manage the movement cap only at the runway threshold and does not have the real-estate within the tower to accommodate a further position for the Departure Monitor role. Airservices has suggested that an alternative may be to locate the employee within Airservices' National Operations Centre where all necessary technology to perform the role is available or Sydney Airport's Terminal Operations Centre where there is currently a plan to install the Aerobahn system.

The Working Group proposes to continue work to resolve an enhanced strategy for managing departure movements.

Recommendation 2

The Working Group recommends that in relation to managing the number of arriving aircraft, Airservices use its flow management tools to set the maximum arrival rate to limit the acceptance of arriving aircraft to no more than the number of available gate arrival slots for the regulated hour, and put in place arrangements to adjust the arrival rate regularly (to commence from 1 April 2011).

Recommendation 3

The Working Group recommends that further work is done on a strategy for strengthening management of departures to take account of the movement cap on the day.

Recommendation 4

The Working Group recommends that, in relation to recovery following a disruption to operations, Airservices set the ratio of arrivals and departures for the recovery period in consultation with stakeholders and with regard to the movement cap.

Business Rules

The success of the strategies outlined above for managing the arrivals, departures and recovery after a disruption will be very much determined by the ability of Airservices, SACL and operators to make timely and effective decisions which are consistent with the efficient operation of the runways, taxiways, aprons and terminals. To help achieve attitudinal and behavioural change and maintain cooperation from all parties, Business Rules will be developed through a consultative process.

Once a strategy for managing departures is resolved, the Business Rules will be finalised to set out the arrangements for Airservices, SACL, the Slot Manager and aircraft operators to interact, identify the processes and criteria on which key decisions will be made and provide adequate arrangements for participants' cooperation.

Recommendation 5

The Working Group recommends that to support the initiatives in recommendations 2, 3 and 4, Airservices, SACL, the Slot Manager and aircraft operators develop Business Rules to set out how they will interact in managing movements, identify the processes and criteria on which key decisions will be made and provide effective arrangements for cooperation in day-to-day operations.

STRENGTHENING COMPLIANCE

The Working Group considered whether strengthening administration of the compliance scheme would help manage movements at the airport in the context of increasing traffic and pressure on the cap. The Working Group noted that the compliance scheme is aimed at supporting the management of the slot management scheme and accordingly focussed on whether operations comply with the scheduling of gate movements. It does not relate directly to runway movement times or management of the cap.

While the Working Group noted that compliance would not be a major contributor to addressing the potential for breaches, nevertheless, there is value in reviewing aspects of the compliance scheme to ensure that, as far

as practicable, movements align with scheduling. A review process with key industry stakeholders could be undertaken to consider whether there are aspects of the current process that could be improved. Aspects for review include:

- Strengthening the constitution of the Compliance Committee through appointment of an independent chair;
- Streamlining the arrangements for deliberating about the reasons for off-schedule movements;
- Revising the definitions and guidance for categorising whether reasons for off-slot movements fall within those outside the operator's control or those within the operator's control;
- Improving the framework for taking enforcement action and improving the practicality of issuing penalty notices in appropriate cases so that there is a real deterrent against non-compliant behaviour.

This work could be led by the Department in consultation with the Compliance Committee building on work already done by the Compliance Scheme Working Group established in 2007.

IMPROVING DATA COLLECTION, MONITORING AND REPORTING PROCESSES

Monitoring and Reporting

Airservices are required to monitor and report to the Minister on any exceedances of the cap at the end of each quarter. The monitoring function, which includes reviewing ATC data and calculating the number of aircraft movements that occurred in each regulated hour) has been undertaken periodically by Airservices to meet the requirement for retrospective quarterly reports.

This delayed monitoring of the cap followed by quarterly reporting to the Minister did not provide Airservices and the Minister with timely information on aircraft movements at Sydney Airport.

As of 1 November 2010, Airservices began daily monitoring of the cap and immediate investigation of the periods close to or at 80. This process allows for notification to the Minister of movements over the 80 cap to occur within 7 days. The Working Group considers that this process will significantly improve the timeliness and accuracy of data on the cap.

The Working Group also recommends that action be taken to ensure that a transparent regime for monitoring, assessing and reporting against the cap is implemented by clearly identifying information sources and articulating the process for analysing and validating data. This process will be included in the Sydney Airport Demand Management Administration Manual being developed in conjunction with Airservices, the Slot Manager and the Compliance Committee.

Review

The Working Group proposes to review the effectiveness of these measures for managing traffic and their implementation. It is recognised that, once the system has been established, a review may identify scope to improve some elements or address any risks identified.

The Working Group has identified existing technology is likely to be suitable for the short term implementation of the risk mitigation strategy. For the long term, the Working Group considers technology enhancements may assist in coordination of the measures identified in this report.

Recommendation 6

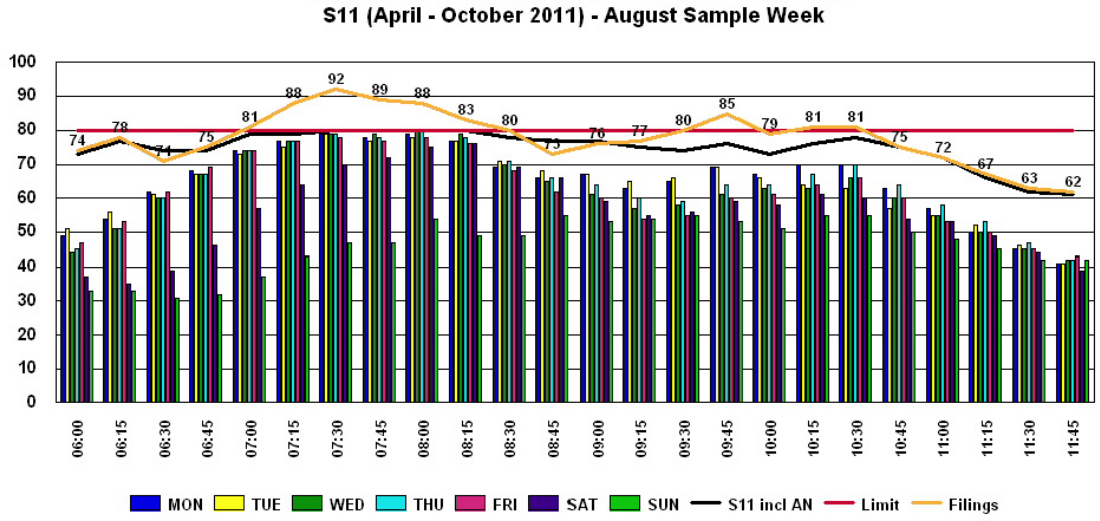
The Working Group recommends that Airservices, SACL, the Slot Manager and aircraft operators consider the scope for use of new or existing technology to assist in the management of movements, communication between participants and data collection.

Recommendation 7

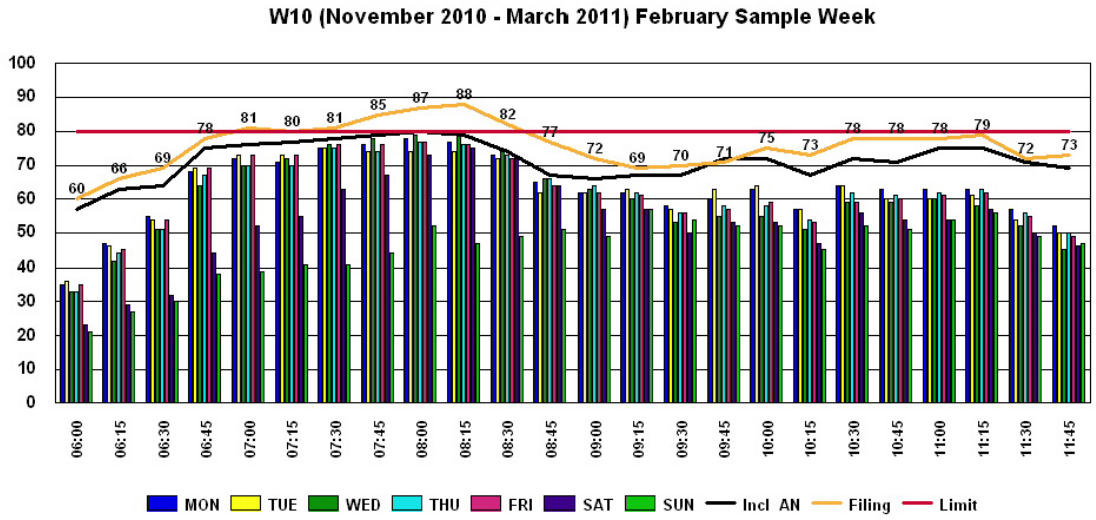
The Working Group recommends that the Working Group conduct a review in early 2012 of the implementation of the new arrangements and their effectiveness in managing movements in accordance with the cap.

APPENDICIES

APPENDIX 1: ALLOCATED GATE MOVEMENTS AND DEMAND



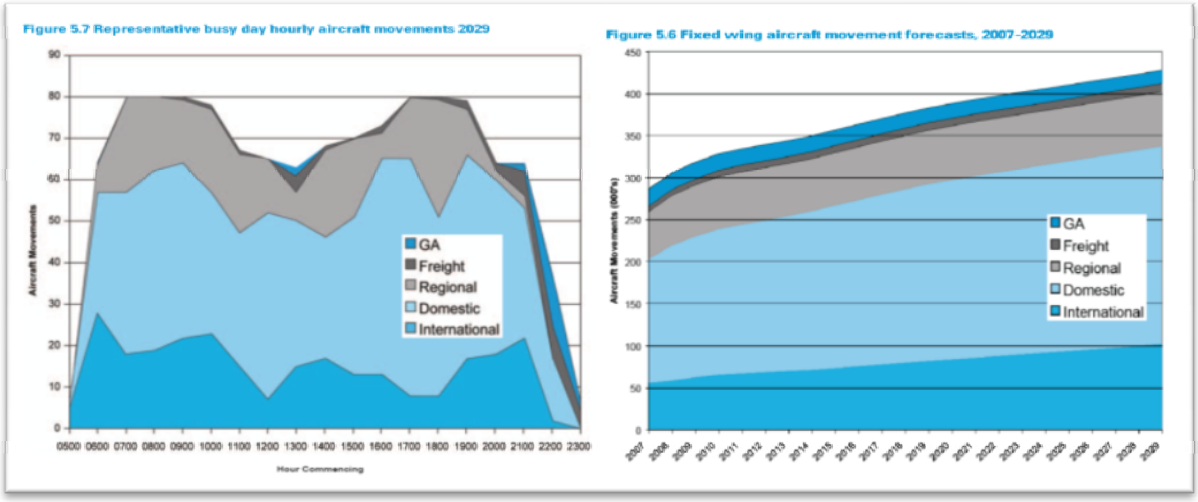
Updated: 26 November 2011



Updated: 17 December 2011

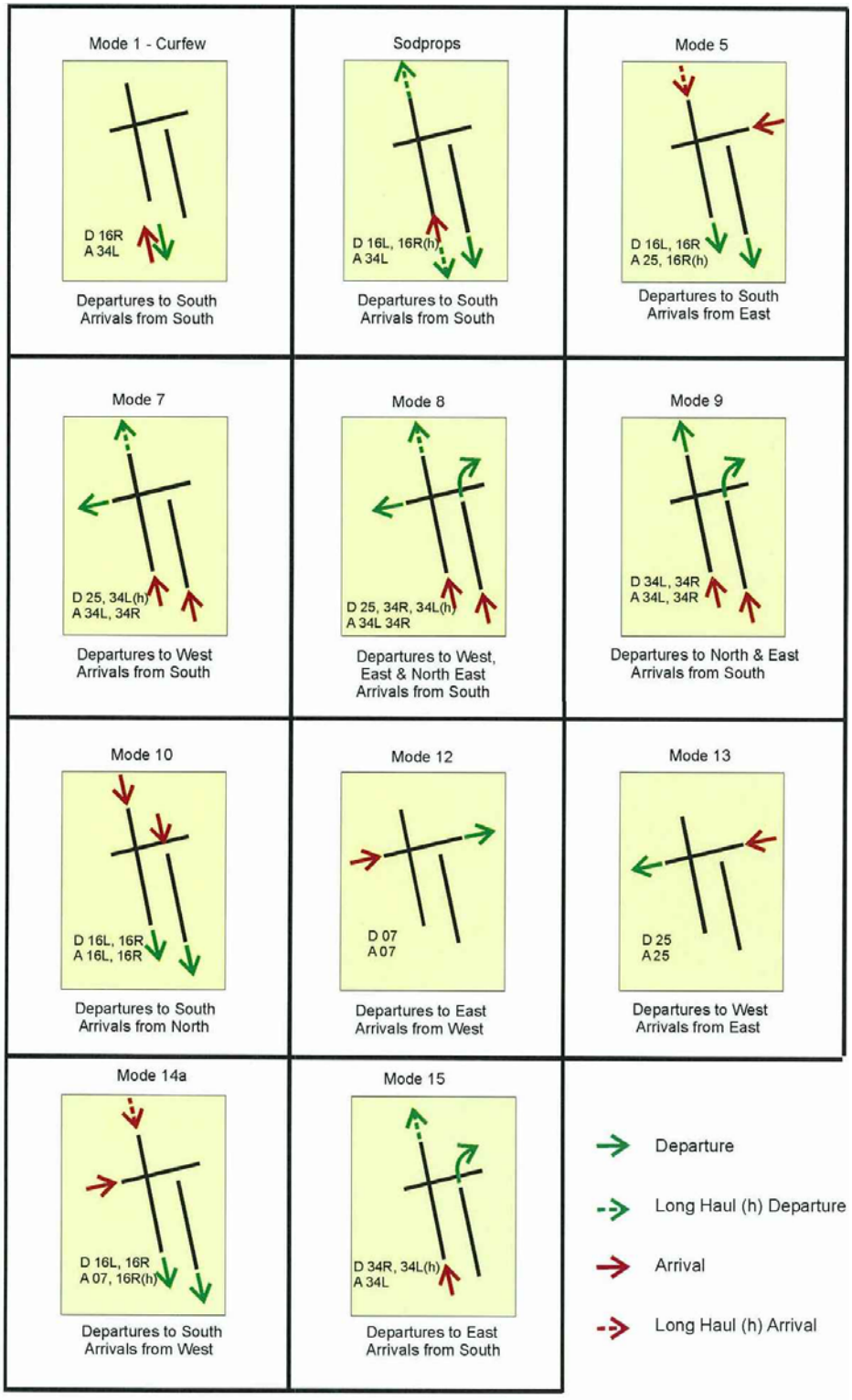
Source: Airport Co-ordination Australia

APPENDIX 2: AIR TRAFFIC GROWTH PROJECTIONS



Source: 2009 Sydney Airport Master Plan

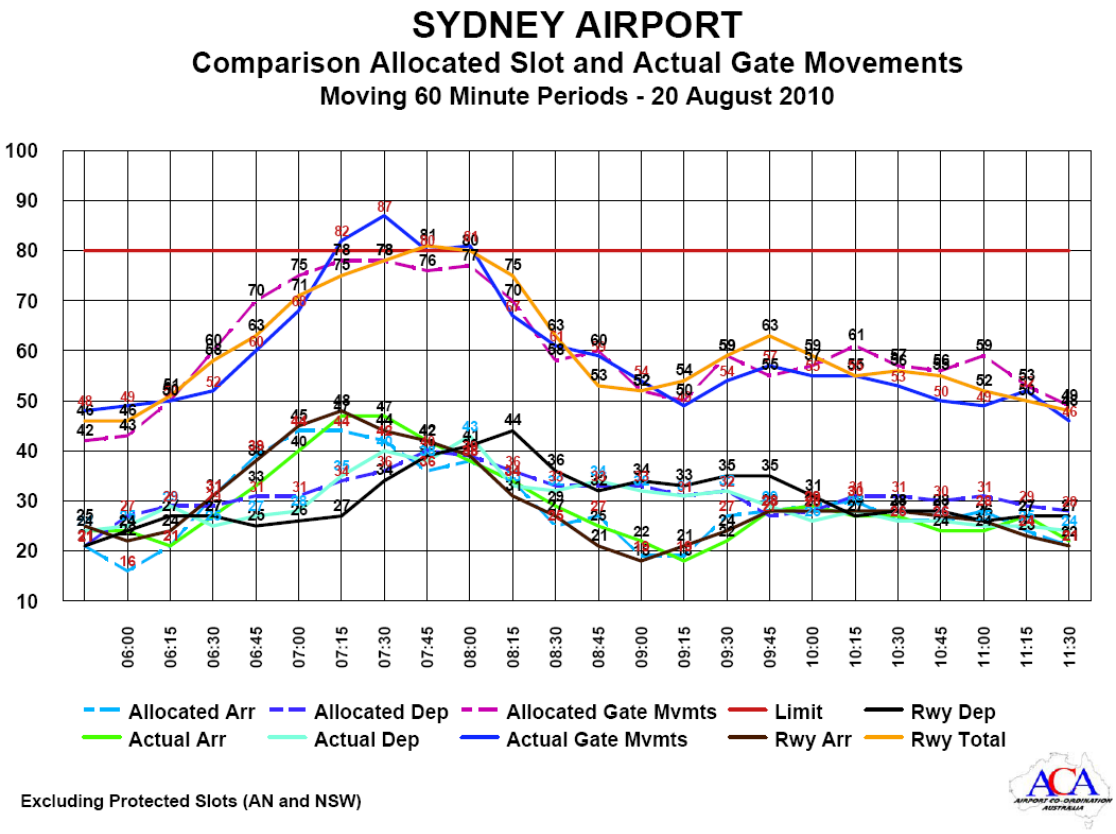
APPENDIX 3: LTOP RUNWAY MODES OF OPERATION



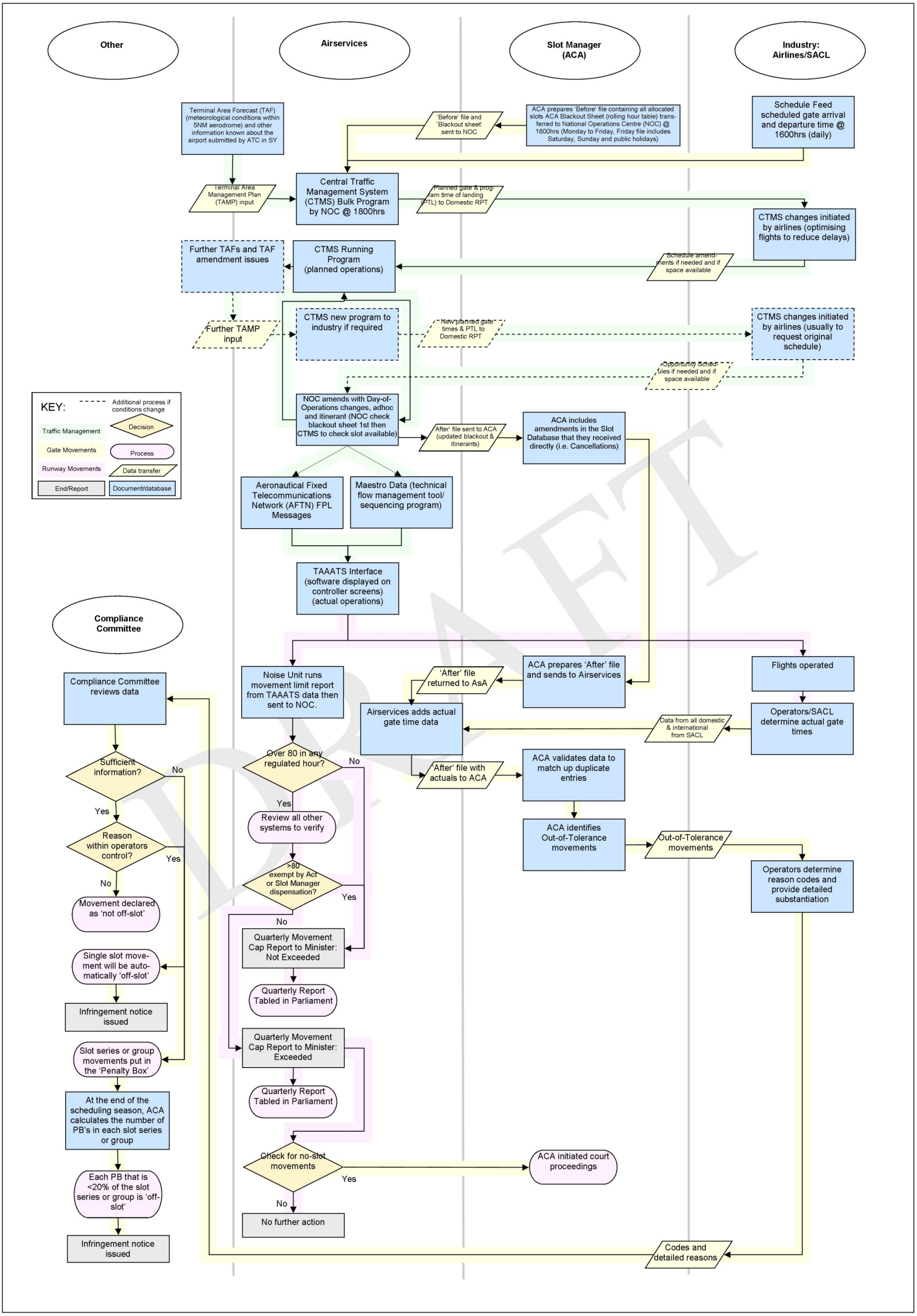
(1) Mode 15 was introduced during RESA works (commenced October 2008) and ceased being used at the completion of RESA (April 2010).

Source: Airservices Australia, October 2010

APPENDIX 4: COMPARISON OF ALLOCATED SLOTS, ACTUAL GATE AND RUNWAY MOVEMENTS BY ARRIVALS AND DEPARTURES

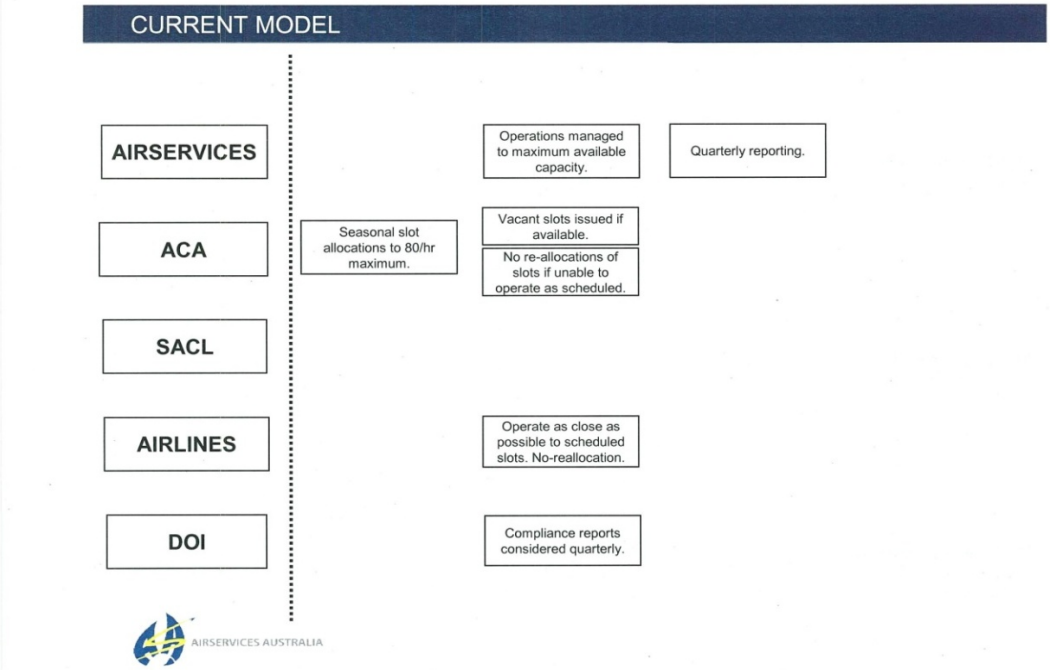


APPENDIX 5: FLOWCHART OF AIRSPACE MANAGEMENT SYSTEM



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APPENDIX 6: THE CURRENT DEMAND MANAGEMENT MODEL



APPENDIX 7: THE PROPOSED DEMAND MANAGEMENT MODEL

