

## **Airport OLS Penetrations by Existing and Planned Structures in the Sydney and Brisbane CBD**

It is crucial that the safety implications arising from the recent incidents involving a Qantas airbus A380 following take-off at Singapore airport on the 4<sup>th</sup> of November, 2010 and a B747 departing the same airport two days later are fully appreciated by governments at all levels.

**Although the problems were serious enough, they could have been a lot worse and could well have occurred at Brisbane or Sydney airports.**

To further illustrate what happened to the A380, the following interim list of 18 items damaged by the exploding engine was released to the media on the 11/11/2010.

**1.** Massive fuel leak in the left mid fuel tank (there are 11 tanks, including in the horizontal stabiliser on the tail); **2.** Massive fuel leak in the left inner fuel tank; **3.** A hole on the flap fairing big enough to climb through; **4.** The aft gallery in the fuel system failed, preventing many fuel transfer functions; **5.** Problem jettisoning fuel; **6.** Massive hole in the upper wingsurface; **7.** Partial failure of leading edge slats; **8.** Partial failure of speed brakes/groundspoilers; **9.** Shrapnel damage to the flaps; **10.** Total loss of all hydraulic fluid in one of the jet's two systems; **11.** Manual extension of landing gear; **12.** Loss of one generator and associated systems; **13.** Loss of brake anti-skid system; **14.** No.1 engine could not be shut down in the usual way after landing because of major damage to systems; **15.** No.1 engine could not be shut down using the fire switch, which meant fire extinguishers would not work on that engine; **16.** ECAM (electronic centralised aircraft monitor) warnings about the major fuel imbalance (because of fuel leaks on left side) could not be fixed with cross-feeding; **17.** Fuel was trapped in the trim tank (in the tail) creating a balance problem for landing; **18.** Left wing forward spar penetrated by debris

With so much damage to the aircraft, it's clear **that all on board were extremely lucky.**

It must also be appreciated that had the incident occurred to a north-bound aircraft after departing runway 19 at Brisbane or runway 34L/R at Sydney airport with an aircraft more severely damaged - which may have included a fire and/or structural damage involving control lines etc, the outcome may not have ended with the aircraft safely back on the ground – instead, the scenario could have included a night-time departure, adverse weather conditions, stressed pilots nursing a stricken aircraft whilst attempting to conduct a low-level circuit under instrument conditions to make an approach to the runway they had just left – to be confronted with the lights of tall buildings abruptly appearing out of the gloom immediately ahead and the prospect of possibly being unable to avoid obstacles, and a collision. The out-bound track to the north from either airport would take the aircraft over the adjacent city and would place the pilot in command in such an unenviable position.

The Pans-Ops surfaces at either Brisbane or Sydney Airports should provide the pilots with obstacle-free airspace to enable an aircraft in trouble to complete a standard low-level circuit of 500ft (150m) to line up with the Airport's active runway for landing. Instead, the Pans-Ops surface at Brisbane Airport is currently 250m and the Pans-Ops surface at Sydney Airport being 179m (Provided the aircraft can avoid the restricted Sydney CBD area which has obstacles up to 309m in height).

The A380 crew, although busy were not concerned with obstacles in the airport's OLS/Pans-Ops surfaces as the Singapore CBD is around 18klms from Changi International Airport and because of that distance (being far greater than Sydney or Brisbane), Singapore's CBD high-rise and tower-blocks are well outside Changi airport's OLS.

The situation that currently exists with respect to the protection of airspace around Australia airports is unacceptable and scandalous in the extreme. The *"passing the buck"* attitude is alive and well with the latest Australian Transport Safety Bureau REPCON report R200800103 confirming that the regulator **CASA has no responsibility for the protection of airspace**. The REPCON states:

*"CASA has no authority to stop such developments. The existing regulatory regime for obstacles, as set out in Civil Aviation Safety Regulation 139, does not empower CASA to prevent a development which creates an obstacle nor does it make CASA responsible for the presence of obstacles. These matters are under consideration in the context of the development of the Government's National Aviation Policy Statement. Notwithstanding the above, CASA also advised that:*

*Under CASR 139.360, the aerodrome operator must inform CASA of details of any proposed development near the aerodrome that is likely to penetrate the OLS of the aerodrome and create an obstacle. Under CASR 139.370 CASA makes a determination if the proposed development will be hazardous to aircraft operations because of its location, height or lack of marking and or lighting. CASA then gives written notice of the determination to the proponent of the building or structure and to the relevant authorities whose approval is required for the construction of the building or structure".*

In other words, CASA simply advises the developer and the local authority that a proposed structure will penetrate the OLS/Pans-Ops surfaces and leaves it at that. It is clear that as both the developer and the local authority want the development to proceed, the proximity of a major airport is the last thing to be considered and accordingly, CASA's advice is ignored. The DoT&I and the ATSB as the final arbiters in the process, simply remain silent.

The property council of Australia's CEO Mr. Steve Greenwood states in a recent article

PROPERTY COUNCIL OF AUSTRALIA

### **CASA Comments Canned**

17/06/2010

*Construction of a 79-storey Brisbane inner city development should proceed without further interference from the Civil Aviation Safety Authority, Australia's peak property body said today. The Property Council of Australia's Steve Greenwood said that the developers of the Mary Street Brisbane site on which the Vision building is being constructed had received all relevant approvals. Mr Greenwood said the approvals process had included consultation with the Civil Aviation Authority regarding its height and any potential impacts on Brisbane's air space. Mr Greenwood said: "I have today received information from the Brisbane City Council which clearly shows that the Civil Aviation Safety Authority was consulted and had no concerns with the building's height."*

*"Developers need certainty; the sort of certainty that usually comes with a development approval," Mr Greenwood said. Mr Greenwood's comments followed stories in the media this week reporting concerns held by the Civil Aviation Safety Authority and the Brisbane Airport Corporation that the building's height was unsafe for aircraft.*

**The Property Council of Australia's article above is a good example of how developers can easily influence decisions affecting aviation safety with impunity.**

### **BACKGROUND:**

On the 11<sup>th</sup> of November, 1993, the International Civil Aviation Organisation (I.C.A.O.) amended previous airspace protection documentation and officially introduced the Pans-Ops Surface as an extension of an airport's OLS. This new measure was designed to protect aircraft on approach to an airport whilst operating in Instrument Meteorological Conditions (IMC).

### The Legal Requirements:

The Airports Act 1966 defines any activity that could intrude upon an **airport's protected airspace** to be a **"controlled activity"** and requires that such works cannot be carried out **without approval from the Federal Department of Infrastructure and Transport** or the airport operator to approve applications and to impose conditions.

**Any controlled activity without approval is an offence under the Airports Act 1996 and penalties equivalent to \$27,500 can be imposed.**

### What is Protected Airspace?

International standards have been adopted that define two sets of invisible surfaces above the ground around an Airport. **The airspace above these surfaces forms the airport's protected airspace.** These two surfaces are the:-

- Obstacle Limitation Surface (OLS); and
- Procedures for Air Navigational Services – Aircraft Operations (PANS-OPS) surface.

### What is a Controlled Activity?

Any activity that infringes an **airport's protected airspace** is called a **Controlled Activity** and **requires approval before it can be carried out.** Controlled activities can include:-

1. Permanent structures, such as buildings, intruding into the protected airspace.
2. Temporary structures (max 3 months) – i.e.: cranes intruding into the protected airspace.
3. Any activities causing intrusions into the protected airspace through glare from artificial light or reflected sunlight, air turbulence from stacks or vents, smoke, dust, steam or other gases or particulate matter.

The photos below give some indication of the problem with the proximity of Brisbane and Sydney airports to their respective CBDs clearly evident.



Figure 1: Brisbane CBD viewed from the airport  
 OLS Outer Horizontal surface – 152.5m AHD  
 Pans-Ops Surface – 250m AHD  
 excluded



Figure 2: Sydney CBD viewed from the

OLS Outer Horizontal surface – 156m  
 Pans-Ops surface – 179m AHD with CBD

At least 15 of the structures in both the Brisbane and Sydney CBDs penetrate their conical and outer horizontal surfaces by around 60-70m with the tallest at 250m (AGL) penetrating the surface by around 130m – thus becoming a controlled activity under the Act.

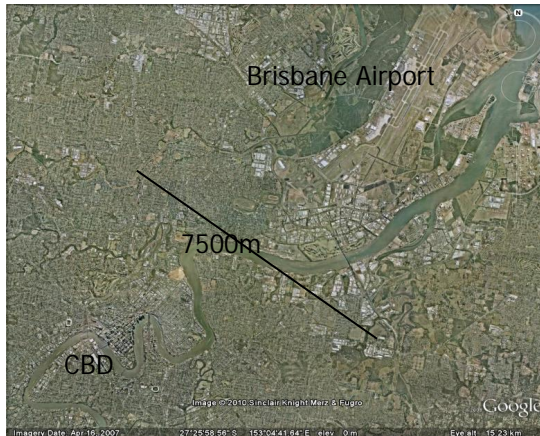


Figure 3: Distance from Brisbane airport and the CBD

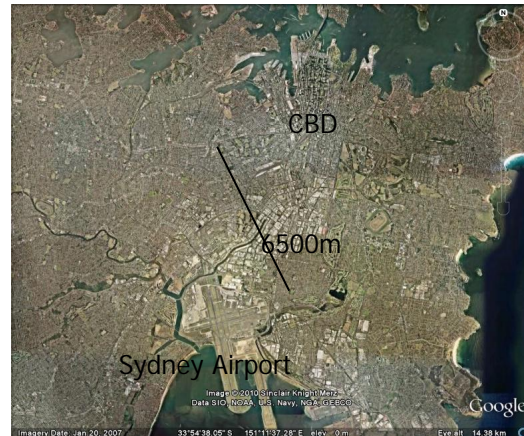


Figure 4: Distance from Sydney airport and the CBD

### Details of what Constitutes "Prescribed Airspace"?

The Commonwealth Airports (Protection of Airspace) Regulations nominates that "prescribed airspace" comprises two surfaces:

- The Obstacle Limitation Surface (OLS), is **used for flying by sight**. The Department of Infrastructure and Transport have discretion to approve buildings that penetrate the OLS.
- The Procedures for Air Navigation Services - Aircraft Operations (PANS-OPS), **used for flying by instruments**. The Department of Infrastructure and Transport will not approve any building that penetrates the PANS-OPS.

With reference to the Cities of Brisbane and Sydney and their adjacent international and domestic airports, safety issue involving OLS/Pas-Ops penetrations exists concerning:

- (1) Inner capital city high-rise commercial development.
- (2) The expansion of a Capital City's airport.
- (3) The expansion of low to medium-rise residential developments around a capital city airport.
- (4) The breakdown of communications between governments and the airport.
- (5) Aviation Safety – particularly for aircraft on approach to land IMC or experiencing difficulties during take-off, a missed approach or go-around.

**This work concerns problems involving an airport's OLS and associated Pans-Ops surface. However, safety has been severely compromised by the actions of the respective levels of government (local, state and federal), to ensure capital inner-city CBD developments proceed without interference from any of the regulators; (DoT&I), ATSB, CASA etc) and anyone else concerned with maintaining I.C.A.O. – Manual of Standards Part 139.**

It is therefore crucial that the Federal Government's white paper adequately addresses this glaring problem and makes CASA (instead of DoT&I) not only responsible for the determination of penetrations of an airport's OLS/Pans-Ops surfaces but to also have the power to stop such developments occurring in the first instance. This may mean overriding the power of the relevant authorities whose approval is currently required for the construction of tall buildings or structures to proceed.

In the interests of safety, this should not be a significant problem for the federal government.

**The management of Brisbane and Sydney international airports are powerless to protect the airport's airspace and like other airport operators are totally dependent on the regulator to enforce laws governing obstacles in airspace.**

**Currently, airport operators have to resort to continually raising the Pans-Ops surfaces to the height of the highest structure within the airport's OLS. Only then can the airport legally promulgate the Pans-Ops surface as being clear of obstacles.**

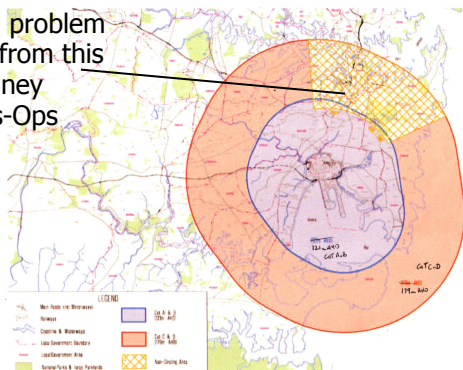
**Those connected with aviation realise that it is crucial for airports – particularly capital city airports to rely on federal legislation to rigidly protect the airspace surrounding the facility.**

Authorities must ensure that structures within an existing airport's OLS/Pans-Ops surface are kept to heights that are realistic and will allow a large aircraft to maintain altitude with one (or more) engines inoperative or some other malfunction that may prevent the aircraft from climbing to a safe altitude.

Because communication between stakeholders is demonstrably minimal, each continues to operate independently and (generally) ignoring provisions set out in legislation covering airspace and its protection.

**As a result of the current situation, structures in Brisbane and Sydney's CBD are growing even taller with each airport leasing company (ALC) continually raising the Pans-Ops surface to the height of the highest building. Tower blocks are continuing to be erected within "Protected Airspace" without attracting any challenge or retribution from the regulator.**

Aircraft with a problem are "banned" from this section of Sydney airport's Pans-Ops surface



Sydney Airport Pans-Ops surface diagram.

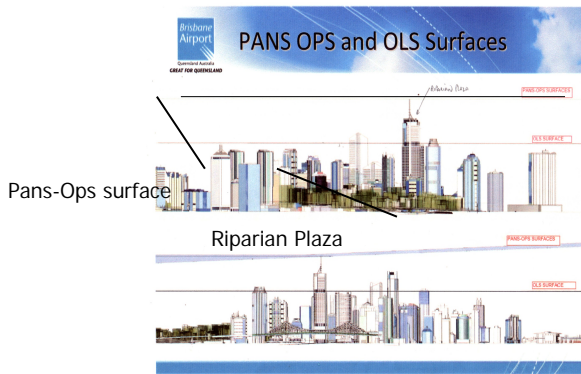
It is worth noting that structures in the Sydney CBD have risen to such a height over the past few years that a large section of the Sydney Pans-Ops surface has been designated a "non-circling area. Structures located within Sydney's CBD range from the 218m Aurora Place up to Sydney Tower at 309m AHD.

As the Sydney Airport's Pans-Ops surface for cat C&D Aircraft is currently 179m, it is clear that as each structure was completed, the operator of Sydney airport was forced to raise the height of the Pans-Ops surface. The stage has been now reached where it is becoming absurd for the operator to keep adjusting the Pans-Ops lower level.

#### **BRISBANE:**

The Riparian Plaza in eagle street Brisbane rises to 250m and this now forms the new height of the Pans-Ops surface. Another structure, "Vision" in Mary Street is under construction and will exceed 283m in height when completed.

With no apparent objections emanating from the regulator, it is expected that the management of Brisbane airport will simply raise the lower level of the Pans-Ops surface to that level and continue to raise the level as structures in the Brisbane CBD - or anywhere in Brisbane airport's OLS get higher and higher.



The Riparian Plaza's spire at 250m is now the Pans-Ops lower level

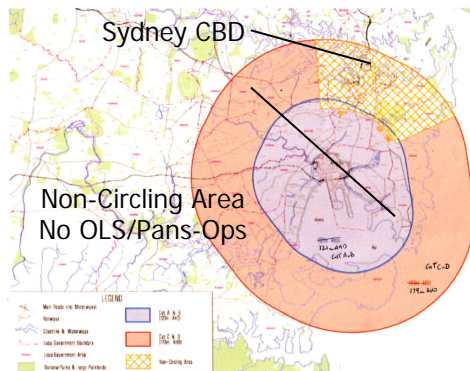
The artist impression at left is included in Brisbane Airport's master plan. It clearly shows Brisbane airport's Pans-Ops surface as the top of the Riparian Plaza's antenna. The CBD is viewed from two directions with the lower depiction viewed from the north east or from Brisbane airport.

When ICAO Announced at the 1983 Montreal Conference that their obstacle clearance panel was proposing to introduce Pans-Ops surfaces around airports sometime in the future, when it did occur during 1993, the Pans-Ops surface for Brisbane airport was published at 152m.

### SYDNEY:

Sydney has a similar problem. With the Sydney Tower rising to 309m – thus penetrating the Sydney airport's OLS outer horizontal surface by some 153m, the authorities have abandoned any attempt at controlling building heights in the Sydney CBD and have simply designated the CBD as a Non Circling Area. (See figure 13.4 in Sydney airport's master plan).

Because the circling area is part of any Pans-Ops surface it is clear that a Pans-Ops surface cannot exist over Sydney's CBD as it would be unable to provide any meaningful protection for an aircraft in trouble or making a go-around. The closure of this section of the Pans-Ops surface will force a pilot of an aircraft in distress to make other arrangements.



As both are major international airports, it is crucial that aircraft arriving during periods of inclement weather or periods of extremely low visibility such as that produced by smoke from bushfires etc, and with limited fuel reserves, are able to make a standard instrument approach – secure in the knowledge that if a go - around is required for any reason, the airport's Pans Ops surface provides an obstacle-free height that can be maintained by an aircraft with one or more engines inoperative and unable to climb.

Sydney International airport's Pans-Ops surface

Both the Sydney and Brisbane airspace have been severely compromised by structures that have been approved by councils and state governments after the regulator provided no objections - and that such approvals are in breach of the terms of the protection of airspace legislation – and the I.C.A.O. Montreal convention to which Australia is a signatory.

### The following is a list of 15 of the tallest completed buildings in Brisbane

Name	Height metres / ft	Storeys	Usage	Land area (m <sup>2</sup> )
<a href="#">Riparian Plaza</a>	250 / 820	53	mixed use	3,644
<a href="#">Aurora Tower</a>	207 / 679	69	residential	2,672
<a href="#">Central Plaza One</a>	174 / 571	44	office	2,979
<a href="#">275 George Street</a>	171 / 561	32	office	
<a href="#">Waterfront Place</a>	162 / 531	40	office	4,747
<a href="#">Brisbane Square</a>	151 / 495	38	office	7,511
<a href="#">400 George Street</a>	150 / 492	37	office	
<a href="#">Santos Place</a>	150 / 492	38	office	
<a href="#">Skyline Apartments</a>	150 / 492	48	residential	2,631

<u>M on Mary</u>	145 / 476	46	residential	
<u>111 George Street</u>	145 / 476	30	office	1,299
<u>Riverside Centre</u>	142 / 466	40	office	4,506
<u>Charlotte Towers</u>	138 / 453	44	residential	2,273
<u>Festival Towers</u>	135 / 443	42	residential	
<u>AMP Place</u>	135 / 443	35		

Currently the Riparian Plaza is the highest structure rising to 250m AGL. New structures are planned such as the "Vision" development rising to 283m above street level. It is certain that with the completion of this building, Brisbane Airport's Pans-Ops surface will rise accordingly.

#### The List of Structures in the Sydney CBD are:

*Note: Sydney originally had a 46-metre max. building height that was enforced until 1957. The height limit now stands at 235 metres and structures have since been allowed to penetrate Sydney airport's OLS outer horizontal by a significant amount.*

Rank	Building	Height (m) <sup>[A]</sup>			Storeys Completed	
		Spire	Roof	Antenna		
	<u>Sydney Tower</u> <sup>[B]</sup>	309	275	309	19	1981
1	<u>Chifley Tower</u>	244	216	244	53	1992
2	<u>Citigroup Centre</u>	243	206	-	50	2000
3	<u>Deutsche Bank Place</u>	239	160	-	39	2005
4	<u>World Tower</u>	-	230	-	73	2004
5	<u>MLC Centre</u>	-	228	244	67	1977
6	<u>Governor Phillip Tower</u>	-	227	254	54	1993
7	<u>Ernst &amp; Young Centre</u>	222	190	-	51	2004
8	<u>Aurora Place</u>	218	188	-	41	2001
9	<u>Suncorp Place</u>	193	182	-	42	1982
10	<u>AMP Centre</u>	-	188	-	45	1976
11	<u>Century Tower</u>	183	158	-	50	1997
12	<u>Capita Centre</u>	183	158	-	34	1988
13	<u>Grosvenor Place (Sydney)</u>	-	180	-	44	1988
14	<u>Australia Square Tower</u>	-	170	-	50	1967

The purpose of this article on air-space penetrations is to point out that the regulators do not appear to have raised objections or issued orders to amend plans that had been submitted to the DoT&I for approval of structures as a controlled activity within the airport's protected airspace via a local authority and/or a state government.

Such amendments would have been designed to keep building heights at a safe level around an airports OLS/Pans-Ops Surface.

As the ACT and the ATSB REPCON REPORT - R200800103 clearly confirms.....

***"The Act and Regulations are administered by DoTRD [the Department]. The Department decides whether or not to approve a 'controlled activity'. The Aerodrome Operator has no approval authority for long-term controlled activities".***

It is clear that the Federal Department of Infrastructure and Transport is not fulfilling its role as the approving authority and the Brisbane and Sydney skylines clearly show tower blocks under construction that will significantly penetrate the existing Pans-Ops surfaces of both airports indicating that local and state Governments are not concerned **in the least** about safety. Despite Royal Commissions, Coroner Inquests and Senate inquiries the Federal Government and others have demonstrably not learnt that each link in the chain of safety is important, that there is no place for complacency with aviation and when holes in defensive

layer's line up (as they have a latency towards), tragic accidents can and do happen. Although the Singapore incident had a successful ending, the potential for a less successful outcome to occur at Brisbane and Sydney airports in particular is very real.

It is also worth remembering the Air France concorde crash which resulted from metal debris on the runway being "flicked up" into the aircraft's fuel tank by the concord's wheel as it accelerated for take-off. The piece of metal debris subsequently started a fire with catastrophic consequences. Photographs of the stricken aircraft clearly show the difficulty the Pilot was experiencing in maintaining height. The pilot tried to divert to an adjacent airport but the concord aircraft crashed before reaching it. If there is no suitable airport in close proximity, a pilot will naturally attempt a return to his departure airport. If the incident occurred at Brisbane or Sydney, there would be no "assurance of safety".

It is therefore crucial that the airport's OLS/PANS-OPS surfaces be kept clear of obstacles to allow aircraft experiencing an emergency on take-off to safely return for landing. By airport owners/operators simply jacking-up the lower level of the Pans-Ops surface to reflect the height of the tallest building located within that Surface, **unacceptably** compromises safety at that airport.

Governments at all levels are guilty of turning a blind eye to the problem by not wanting to stifle or turn away high-rise developments in their cities. The Federal Government is also guilty of not transferring legislative power from the Department of Infrastructure and Transport to the regulator CASA to have the power to prevent the erection of high-rise developments within an airport's OLS/Pans-Ops surfaces

It is unfortunate that the "*she'll be right*" or "its not my concern" attitude is still alive and well and being adopted by authorities whose approval of structures that clearly penetrate an Airport's Airspace in turn provides an unacceptable safety risk for those who fly.

END

Ross Steele was a professional witness for the Civil Aviation Authority for the Commission of Inquiry into the Relations between the CAA and Seaview Air