

Agenda – Public Accounts Committee

Meeting Venue:	For further information contact:
Committee Room 3 – Senedd	Fay Buckle
Meeting date: Thursday, 11 February 2016	Committee Clerk 0300 200 6565
Meeting time: 09.00	SeneddPAC@Assembly.Wales

1 Introductions, apologies and substitutions

(09.00)

2 Papers to note

(09.00)

Intra-Wales – Cardiff to Anglesey – Air Service: Letter from Simon Jones, Welsh Government – 27 January 2016

(Pages 1 – 3)

Glastir: Letter from Matthew Quinn, Welsh Government – 1 February 2016

(Pages 4 – 6)

3 Cardiff Airport: Evidence Session 3

(09.00–10.30)

(Pages 7 – 26)

Research Briefing

Welsh Government

James Price – Deputy Permanent Secretary, Economy, Skills and Natural Resources Group, Welsh Government

4 Cardiff Airport: Evidence Session 4

(10.30–11.30)

(Pages 27 – 178)

PAC(4)–06–16 P1

PAC(4)–06–16 P2

Research Briefing



Aviation and Transport Experts

Chris Cain – Director and Head of Research, Northpoint Aviation

Professor Stuart Cole CBE – Emeritus Professor of Transport Economics and Policy,
University of South Wales

(Break 11.30–11.40)

5 Cardiff Airport: Evidence Session 5

(11.40–12.40)

(Pages 179 – 190)

Research Briefing

Transport Scotland

John Nicholls, Director – Aviation, Maritime, Freight and Canals Transport Scotland

Andrew Miller, Chair of Glasgow Prestwick Airport

6 Motion under Standing Order 17.42 to resolve to exclude the public from the meeting for the following business:

(12.40)

Item 7

7 Cardiff Airport: Consideration of evidence received

(12.40–13.00)

Adran yr Economi, Gwyddoniaeth a Thrafnidiaeth
Department for Economy, Science and Transport



Llywodraeth Cymru
Welsh Government

Darren Millar AM
Chair – Public Accounts Committee
National Assembly for Wales
Cardiff Bay
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CF99 1NA

27 January 2016

Dear Mr Millar

I am writing to follow up on your letter dated 5 November to James Price requesting further information on the Intra Wales Air Service.

I have enclosed a document which attempts to do this as fully as possible, and which reflects the latest position with the service following events on Friday 22 January. Please let me know if you require any further information.

Yours sincerely

Simon Jones



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Welsh Government response to the PACs request on 5 November 2015 for further information to the Welsh Government response dated 28 October 2015.

PAC comment:

The Committee considered the response on 3 November and wish to request a further update by 1 February 2016 on progress made exploring the potential opportunities to extend the opening times of Anglesey Airport and how the Welsh Government intends to undertake its review of the marketing strategy.

WG response:

Through a competitive procurement process, the Welsh Government has procured the services of expert aviation specialists Northpoint Aviation to explore the potential opportunities for expanding operations at Anglesey Airport, including extending operating hours. The work will involve demand forecasting; economic analysis; engagement with key stakeholders such as the RAF at Anglesey, Anglesey Council, the operator and Cardiff Airport; and consideration to onward connectivity from North West Wales. Receipt of a draft report is anticipated by the end of March.

The review of marketing strategy is on hold until a new permanent operator for the route is appointed.

PAC comment:

In addition, and I would welcome an early response on this matter, the Committee has noted, following the announcement on 21 October, that LinksAir has had its safety licence revoked by the Civil Aviation Authority to 'protect the travelling public'. Whilst noting that the Danish Airline North Flying has taken over the route as an interim measure, I would welcome your comments on how long the interim measures will last for, the liability arrangements and the action the Welsh Government is taking to appoint a permanent carrier for this route.

WG response:

Until 22 January 2016 the contract for the Intra Wales Air Service remained with Links Air. Links Air had arrangements with other suitable airlines to provide the service while it worked to resolve the issues relating to the suspension of its Air Operator Certificate. Additional costs incurred for the temporary arrangements were met in full by Links Air.

The Welsh Government put in place a Supplemental Agreement with Links Air for these interim arrangements that were to remain in force until the end of January 2016. If the AOC were not re-instated by then, the Welsh Government would have served termination notice to Links Air. The Supplemental Agreement gave Links Air over 3 months to remedy their AOC status with the Civil Aviation Authority.

On Friday 15 January, in line with EC Regulations, the Welsh Government launched an emergency procurement (through open competition) for a 7 month contract to operate the PSO. Had Links Air's AOC been re-instated by 31 January, the 7 month procurement would have will ceased and Links Air could have continued to discharge the PSO contract for the remainder of the 4 year term.

However, on 22 January Links Air decided to unilaterally withdraw from its obligations to provide the service, without notice.

To avoid disruption to passengers, the Welsh Government has awarded a short term contract to City Wings/North Aviation to operate the PSO between 25 January and the time that the 7 month emergency contract is awarded, ensuring that there will be no break in service.

In line with EC Regulations, once the 7 month contract is awarded, a conventional open tender will be launched to procure a long term operator for the PSO service beyond the term covered by the emergency procurement process.

Adran yr Amgylchedd a Datblygu Cynaliadwy
Department for Environment and Sustainable Development



Llywodraeth Cymru
Welsh Government

Darren Millar AM
Chair
National Assembly for Wales
Cardiff Bay
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1 February, 2016

Dear Mr Millar,

I am writing in response your letter of 5 November to James Price in which you requested further detail on the actions Natural Resources Wales are taking to tackle Water Framework Directive failures attributable to them. The committee also requested sight of the River Basin Management Plans once they have been published.

The Western Wales River Basin Management plan was published on the 22 December 2015 and is available through the following link.

<http://www.naturalresources.wales/water/quality/western-wales-river-basin-management-plan-published/?lang=en>

The River Basin Management Plans for the Dee and Severn which cover parts of both England and Wales have not yet been published. These require sign off from both the Welsh Ministers and the Secretary of State for Environment Food and Rural Affairs and whilst the Minister for Natural Resources has approved these, the Secretary of State has not. I do not have details of a proposed publication date yet but I will ensure you are updated once they are published.

One of the pressures recorded for the EU Water Framework Directive is acidification. Acidification is recognised as a forestry related issue because more atmospheric pollutants, sulphur & nitrogen compounds derived principally from the combustion of fossil fuels, are captured by trees than by shorter vegetation.

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This exacerbates (though does not cause) acidification of surface waters, particularly in areas with base poor geology, where the soils have little buffering capacity. The primary solution to the acidification problem remains the reduction in emissions of atmospheric pollutants but forestry management actions can mitigate impacts.

Where a Water Body is failing due to acidification, forestry is identified as having the potential to contribute to the status of that Water Body where there is more than 30% closed canopy cover within a catchment.

The Water Bodies where forestry is recorded as potentially contributing to the reason for not achieving good status do not represent a record of breaches caused by forestry, but represents risk of potential damage to the water course rather than there having actually been an incident.

Across Wales at present, there are 12 Water Bodies failing to meet WFD due to acidification that have above 30% closed canopy cover at a whole Water Body scale (out of 942 Water Bodies across Wales in the 2nd Cycle of WFD). The forestry in these Water Bodies has 3,117 ha in private ownership and 8,960 ha which are on the Welsh Government Woodland Estate (WGWE) (of which 8,519 ha are coniferous or mixed predominantly coniferous).

NRW is currently working to identify priority areas for action within the WGWE. The actions/measures for priority areas which form part of the River Basin Management Plans are to:

- Review the forest riparian management and drainage systems and ensure they meet the [UKFS Forest and Water Guidelines](#) standards by 2021
- Prepare forest resource plans and identify potential risks, such as civil engineering, clear-felling and restocking and implement ways to mitigate them, considering Low Impact Silvicultural Systems (LISS) where applicable.
- Take all steps to mitigate water quality impact as a result of unavoidable forest operations, such as felling to comply with a plant health order.
- NRW's policy on restoring areas of afforested deep peat will also reduce the impact the forest has on acidification, by reducing closed canopy cover and holding back water in hydrological source areas.

Such actions not only reduce the potential negative impact of forestry on watercourses in terms of acidification, but also minimise the risk of sediment delivery and will deliver attenuation of water flows which should benefit communities at risk of flooding downstream.

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In addition to the work to address acidification, NRW has responded to the risk of sedimentation from forest operations by implementing mandatory Water Management Plans for all operations on the WGWE. These require an environmental risk assessment, regular water monitoring and details of mitigation in place to prevent sediment reaching watercourses.

Yours sincerely,



Matthew Quinn,
Director of Environment and Sustainable Development

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Public Policy Institute for Wales
Sefydliad Polisi Cyhoeddus i Gymru

Maximising the Economic Benefits of the Welsh Government's Investment in Cardiff and St. Athan Airports

January 2016

Maximising the Economic Benefits of the Welsh Government's Investment in Cardiff and St. Athan Airports

Chris Cain

Northpoint Aviation

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Summary

- The creation of a thriving regional airport is vital to realising the economic potential of South Wales and the Cardiff city region.
- It will provide a symbolically important gateway to Wales and support three sectors identified as priorities by the Welsh Government - Advanced Materials & Manufacturing, Life Sciences and Financial and Professional Services. It should also benefit tourism, the tertiary education sector and public services.
- Development of Cardiff and St Athan airports has the potential to retain 3,000 existing jobs and generate several thousand new jobs through the establishment of an aviation-driven business district that will equip Wales with the infrastructure to compete in an increasingly speed-conscious, globally networked economy.
- The performance of Cardiff International Airport (CIA) in the period preceding Welsh Government acquisition was weak compared with peer cities in the UK, Europe and the US. And whilst there is evidence of improvement post-acquisition, turning the airport's commercial prospects around will require further investment alongside a coherent medium term strategy to achieve expansion and secure wider economic benefits.
- Such a strategy should take account of: Air Passenger Duty, air route development, tourism opportunities, air cargo, other aeronautical activities, Air Traffic Control co-ordination, aerospace and Maintenance, Repair and Overhaul (MRO) activity, renewable energy production, improved surface access and the capture of betterment value from investment in the airport through the creation of an airport business quarter or district.
- Both airports should be retained and the Welsh Government will need to provide significant capital and revenue funding for aviation related investment, with returns on that investment having the medium to long term horizon typical of major infrastructure – this ownership model is common for airports in many parts of Europe and North America. However, in doing so, it will also need to regard EU State Aid regulations, competitive pressures and the financial and external risks associated with major investment in airports and supporting development in the surrounding area.
- The Cardiff - St Athan Strategic Development Framework provides a coherent and logical strategic vision if masterplan details remain flexible, but it should be underpinned by a clear 'Route Map' which establishes appropriate governance and management structures, identifies funding sources and sets out programme delivery mechanisms. This should be accompanied by a robust 3-5 year Business Plan for each airport and annual budgets tied clearly to the delivery of the business plans.

Introduction

The Minister for Enterprise, Science and Transport (EST) asked the Public Policy Institute for Wales (PPIW) to provide advice on ways of maximising the direct and indirect economic benefits of the Government's investment in Cardiff International Airport (CIA) and St Athan Airport. The PPIW has worked with Chris Cain of Northpoint Aviation to conduct a review of the evidence and identify a strategy (including funding options) to achieve this. The analysis in this report is based on:

- A review of the international evidence base including nearly 100 professional and academic reports, policy documents, newspaper and online articles;
- Statistical analysis based on newly collated data and publicly available statistical data and graphics;
- Discussions with Welsh Government officials, the management team at CIA and its outgoing and incoming Chairmen, the Welsh Government team at St Athan and other key individuals;
- Benchmarks that facilitate comparisons with peer regions/cities and to identify factors that influence different approaches to the use of airport infrastructure and the lessons that can be drawn from this;
- An assessment of the air connectivity and infrastructure requirements of key sectors of the Welsh economy, focusing on those which are identified as priorities by the Welsh Government (Welsh Government, 2010) and have a high propensity to fly (Advanced Materials and Manufacturing (AMM), Life Sciences and Financial and Professional Services (FPD)) and other sectors which are significant users of education (such as Tourism, the Public Sector and Tertiary Education); and
- An indication of potential sources of funding for taking forward the initiatives that are recommended.

The remainder of this report comprises the following key sections:

- **Context** of the study, which sets the scene for the subsequent analysis, discussion and recommendations;
- **A review of the academic and professional literature** on the role of airports in local and city regional economic development;
- Facts and figures relating to the **airport's historic and current performance** (set in the context of a number of **benchmarked peers**);

- The significance of enhanced '**air connectivity**' in helping to realise material productivity and trading benefits for priority economic sectors in Wales;
- The potential of **St Athan and Cardiff Airport's Enterprise Zone** to enhance the established aviation/aerospace cluster in South Wales, whilst also developing as a major business and employment node within Cardiff City Region in its own right;
- The **strategic initiatives** that could help deliver the prospective economic benefits for the Cardiff City Region, South Wales and the Welsh economy;
- The **constraints and risks** that will need to be addressed in order to achieve this;
- The **funding and governance arrangements** required to do so; and
- **Conclusions and recommendations.**

Context

When the Welsh Government bought CIA for circa £52m in March 2013, the price paid was reported by industry commentators to be at a premium compared to that which a private sector investor would have paid. However, this ignores a series of factors that justify a valuation well above the kind of figure suggested by simplistic use of multipliers of EBITDA¹ including:

- The apparent willingness of Abertis to continue to run down the condition of the asset and lose market share rather than make further investment (with the possible result that ultimately the airport would have closed or been moth-balled);
- The consequent need to accept an acquisition 'premium' in order to persuade a recalcitrant seller to agree to an early disposal when doing so would crystallise their losses. Abertis claimed the disposal price reflected the value of the asset in their accounts, but this public position almost certainly overlooked earlier write downs of the airport's book value as its profitability diminished between 2008-13²; and
- The opportunity that the Airport represents to a new owner, wise enough to recognise its underlying commercial value, and with the resources and commitment to realise its long-term potential, if well run, to generate material investment returns is significant.

¹ Earnings before interest, tax depreciation and amortisation.

² Potentially as much as c£45-50m, taking into account the price Abertis paid to acquire TBI Ltd in 2004 (£551m), which was reported to value Cardiff Airport at £100m at the time of the airport's acquisition by the Welsh Government in 2013.

For these and other reasons, not least that Abertis were unwilling to sell the Airport to any other buyer for less than the sum agreed by the Welsh Government, even when its wish to dispose of the asset was well known amongst other airport operators and investors (and several made approaches), it is difficult not to conclude that the price paid represented an appropriate market value. Moreover, if a broader long-term economic perspective is taken (as opposed to a narrow short-term commercial one), then the acquisition will, in the medium-long term, prove to be both prescient and of considerable strategic importance to Wales.

For smaller nations like Wales, located on the periphery of Europe, and certainly a capital city region with a population the size of Cardiff's, the importance of the connectivity afforded by domestic and international air links, whether in helping to facilitate trade, attract inward investment or stimulate inbound tourism, is now well recognised in the academic literature and increasingly by Government policy makers. But if appropriate airport infrastructure is not provided locally, then the ability to capture the economic benefits associated with new air services will be lost altogether; or, if neighbouring cities/sub-regions have suitable airport facilities they will leak away across administrative boundaries diluting the economic response locally.

Reliance on air services from airports in a neighbouring country or region (as happens at Manchester and Liverpool in the case of North Wales and South Wales because of Bristol Airport's ability to attract cross-border traffic) is rarely a satisfactory means of delivering strategically important connectivity. This is true, even when the immediate alternatives are only 60-90 minutes away and a global hub offering inter-continental services can be accessed within three hours, as is the case with Cardiff.

Moreover, it is also not the best way of securing for the local or regional economy the:

- Direct, indirect and induced jobs associated with an airport's operation;
- GVA generated as a function of the enhanced productivity facilitated by travel time savings; or
- Wider catalytic benefits (tourism, trade, inward investment and cluster effects) that an airport can give rise to.

Hence, exporting air services and locally originating passengers is economically inefficient, especially when investing in their provision can give rise to a material economic windfall.

This perspective is illustrated well by the example of Plymouth, a city region with a population of over 300,000, which is beginning to witness the fallout from the closure of its airport in 2012, in terms of stalled investment amongst outward facing businesses and a lack of confidence across the city's wider economy. The result is continuous calls for the airport to be re-opened and air services to be restored. Similar fears lay behind the funding of a Public Service Obligation (PSO) route to London from Dundee, traffic from which is an important source of income for the local airport. Dundee is again a substantial city of around 230,000 population, with a relatively diverse economy encompassing computer games, life sciences, financial services, tertiary education and tourism, many of which are significant users of air services, and also important components of Cardiff City region's economy. Seen in that context, the price paid by the Welsh Government for CIA makes sound commercial, economic and political sense if it can retain the economic outputs that it generates within Wales.

However, realising that potential is by no means straightforward, as the performance of the airport over the two years since it was acquired has demonstrated. With the downward spiral which was allowed to gain momentum under the previous 'private sector' owners now apparently curtailed, traffic and finances stabilised and a long term based carrier attracted, what is now required is the development of:

- A sound but exciting strategic and commercial vision;
- A carefully thought through and clearly articulated 'route map' for delivery; and above all else
- A committed, pro-active and appropriately resourced programme team, supported by the management teams at each airport to manage the delivery process and so take advantage of the green shoots of economic recovery.

Aviation and the Economy

A wide ranging review of the international literature was undertaken. This included:

- The latest academic insight and policy thinking on how Government institutions can align their influence and resources to improve regional economic outcomes, generate growth and re-balance the UK economy;
- Academic studies on the relationship between aviation and economic development;

- Relevant policy documents setting out strategies for priority sectors in the Welsh economy and infrastructure initiatives in the Cardiff City Region; and
- Numerous background reports on the two airports and the aviation and aerospace sector in Wales.

A full schedule of these sources is provided in the bibliography. Later sections of the report discuss the evidence from policy documents relating specifically to Wales. This section focuses on the wider literature, which provides important contextual policy background and strategic thought leadership.

The Regional Economic Policy Debate

With economic growth and re-balancing a major focus for the last UK Government, and for the current one, there has been a significant shift in approach to regional economic policy in the UK since 2010. The focus on devolving powers to Scotland, Wales and Northern Ireland and eight regional development agencies in England to deliver economic growth has been replaced by a new emphasis on urban dynamism and the localism agenda, led by Local Enterprise Partnerships (LEP's), combined authorities, competitive growth funding and City Deals. However, the urban areas at the heart of South Wales' economy – Cardiff, Swansea and Newport – already benefited from the pro-active approach adopted by the Welsh Government since 2010 towards key economic sectors (Welsh Government, 2010). Furthermore the Welsh Government's decision to promote the concept of a capital city region (Welsh Government, 2015A), as the basis for a co-ordinated and integrated approach to the development of Cardiff and its hinterland (including Newport), is very much in line with - indeed arguably slightly ahead of - similar initiatives in other parts of the UK.

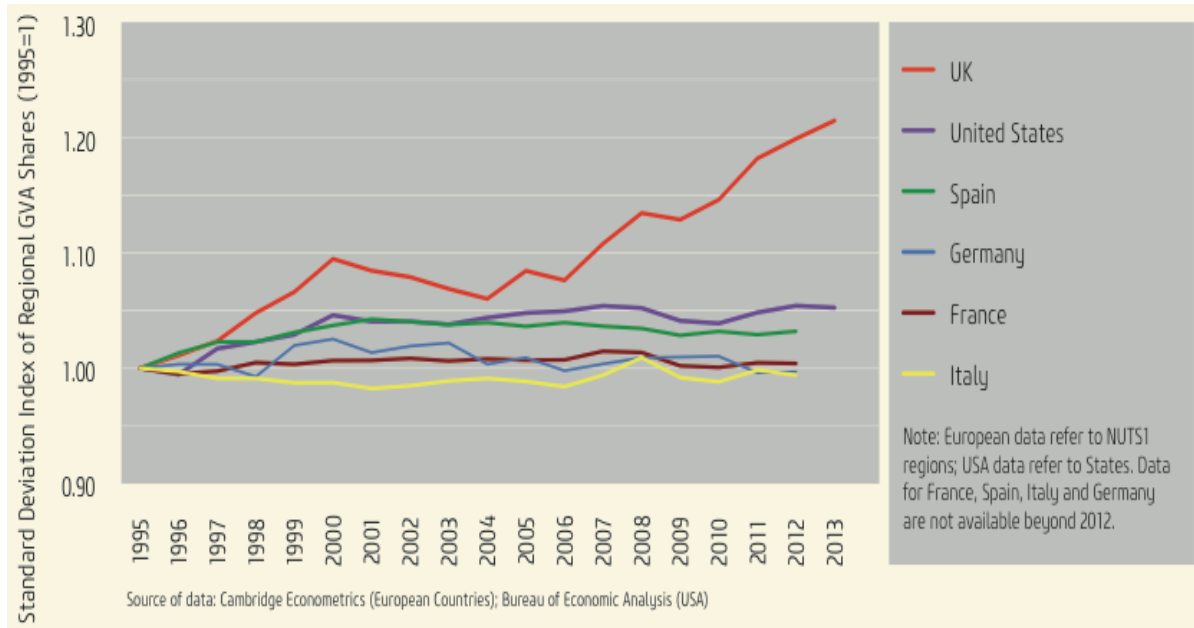
It also reflects evolving thinking about the role of the state as a strategic enabler and long-term investor in innovation and infrastructure. Mazzucato (2013), for example, argues that major technological innovation requires a commitment of long-term government funding because the financial risks associated with fundamental research are simply too great for even large companies to sustain. Mazzucato and Penna (2014) highlight the success of the Fraunhofer Institute in Germany. Jointly funded, to ensure large companies are actively engaged in partnering with academic and specialist R&D institutions, the Institute helps companies to identify new technologies that they can then exploit commercially. The UK equivalent is the new Catapult Centres, but they are far less well-resourced than their German and American equivalents.

Mazzucato acknowledges this is not the only arena in which the state can make an important contribution to securing economic growth. Providing a well-educated workforce and apprenticeships, through which new employees can develop relevant skills, is crucial to companies of all sizes. Equally important is well-designed and efficiently functioning infrastructure (e.g. broadband, transport and utilities), built with adequate capacity to cater for current and future needs. The Chancellor of the Exchequer's 'Productivity Plan' published in July 2015 (HM Treasury, 2015) and his 5th of November 2015 announcement that he is establishing a National Infrastructure Commission (UK Government Press Release, 2015), demonstrate that the current UK Government understands the importance of investment in these areas.

For 'outward facing' enterprises in South Wales marketing products or services beyond the Welsh border, or internationally, 'connectivity' is the essential ingredient which enables them to engage effectively with customers and suppliers, regulators, policy makers, researchers and designers on a face-to-face basis. It is here that air services and the availability of suitable airport infrastructure play a crucial role.

The final facet of regional development policy that it is worth highlighting in this context is the work of Professor Ron Martin and his colleagues from Cambridge University which shows that in spite of numerous policy interventions from the 1970s onwards to regenerate major cities in the UK outside London and the South East, the economic performance across the UK's regions and nations has become more and more unbalanced (Martin et al., 2015; Martin, 2015). They conclude that although some of these interventions, most notably those which encourage 'agglomeration economies' (facilitated by enhanced urban/inter-urban transport links) and cluster formation (the value of which is articulated by Michael E Porter) may be beneficial (Porter, 1998), they will not themselves address the problems associated with unbalanced growth on the scale that the UK now faces (see Figure 1). Martin argues that as long as Government Departments (and the expenditure and employment that goes with them), are concentrated in central London, then its emergence as a dominant World City and the centre of the all-powerful South East mega-region, will go unchecked. Moreover, initiatives such as the Northern Powerhouse and West Midlands Engine will also not, by themselves, be able to deliver growth on the scale required to meet the Government's core economic re-balancing objective.

Figure 1: Standard Deviation of Regional GVA Shares in Developed Economies



Source: R.Martin, A.Pike, P.Tyler and B.Gardner (2015)

The Lyons Review (Lyons, 2004), revisited by Ian R Smith at the behest of the Chancellor of the Exchequer, came to similar conclusions. Smith (2010) is a strong advocate of moving all but the most essential high level policy roles requiring face to face contact with Ministers outside London and the South East. Wales has already been a significant beneficiary of such Whitehall relocations (e.g. the DVLA to Swansea, the Office of National Statistics to Newport and the Royal Mint to Llantrisant), but could benefit further from such opportunities. Smith's view was that in many cases there were significant upsides to co-locating central and local government departments and agencies together in public service clusters, either in offices blocks at the heart of regional cities or purpose built campus style accommodation on their outskirts. However, the effective functioning of these outsourced units requires excellent IT and transport connectivity with Whitehall, the European Commission and inter-continently with other Governments and global institutions. This will again place regions and nations that have excellent broadband capability and good access to air services at a distinct advantage, because central government departments have a relatively high propensity to fly. Whilst South Wales and Cardiff in particular are already 'super-connected'³ in terms of broadband, there is certainly considerable scope for improving the latter, as outlined in the next section.

³ Offering 80-100 megabytes broadband, access to Europe's largest Tier 3 Data Centre (run by Next Generation Data) and priority roll out of EE's (Everything Everywhere's) 4G service.

Air Connectivity and the Economy

There are two kinds of economic effects related to airports. The first, the generation of employment, income, and capital investment, ensues 'naturally' from the process of providing airport services. The second, the dynamic economic 'catalytic' or 'spin-off' benefits, include tourism, improved export levels and inward investment, and are stimulated by the presence of an airport close to a city or serving the wider sub-region (Zak & Getzner, 2014).

Economic benefits associated with airport operations are typically subdivided into direct, indirect and induced effects (indirect and induced effects are also referred to as 'backward linkages' (The Austrian Institute of Economic Research, 2007) and catalytic effects. There is an extensive literature examining these links. Based on this and the most recent analysis by Zak and Genztner (2014) we can place some reliance on York Aviation's estimates of jobs and GVA associated with Cardiff airport in 2012 namely:

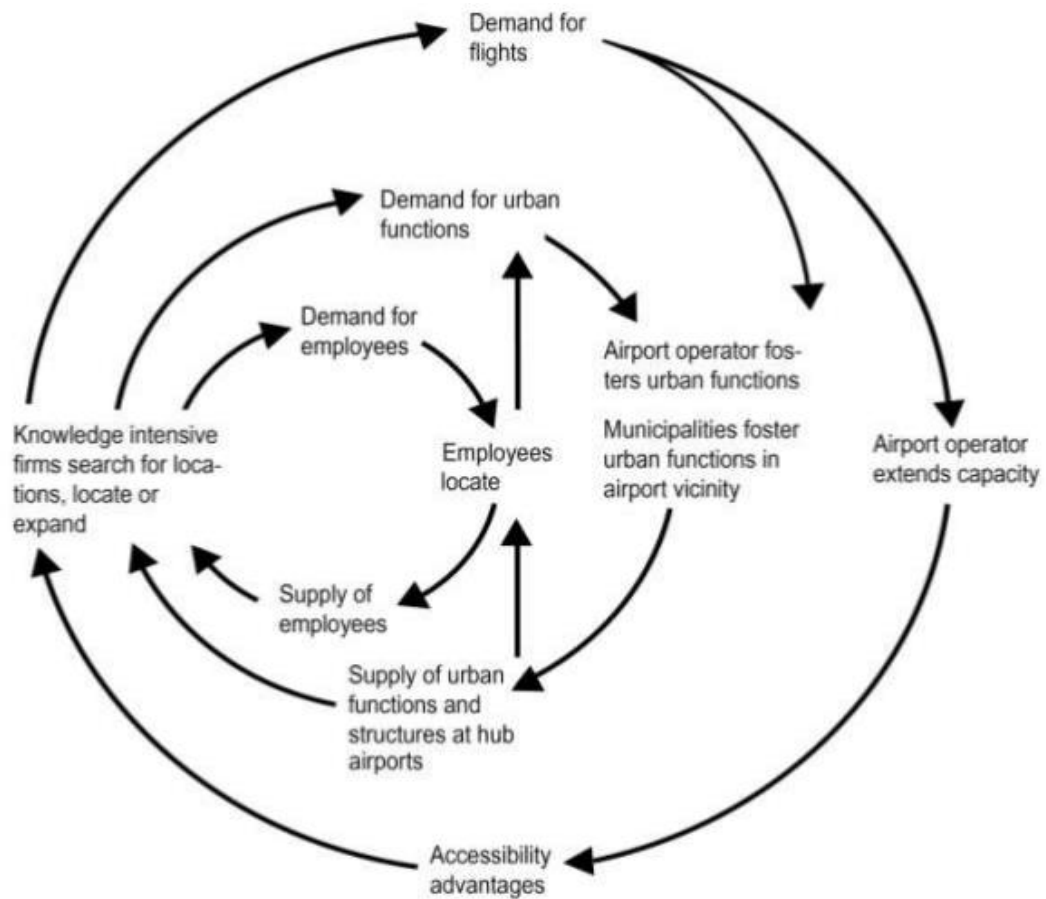
- One million passengers gives rise to 950 aviation related jobs at the airport and a further 800 at British Airways Maintenance Cardiff (BAMC);
- Indirect and induced jobs are calculated by applying a multiplier (in this case 0.5) giving 2,600 jobs in total; and
- At an average GVA per employee of £35,750, the overall GVA impact on the local economy is £93m.

Updating 2014, based on an annual passenger total of 1.023 million passengers per annum (mppa), gives an overall figure for jobs of 2,625 and a GVA of £102m.

The Davies Commission and relevant UK Government Departments (Her Majesty's Treasury, the Department for Business Innovation and Skills, the Department for Transport and The Department for Culture Media and Sport) all now acknowledge the contribution that the UK aviation and associated aerospace industries make to national and regional economies in terms of core outputs such as jobs, tax revenues and GDP. However, increasing recognition is also being taken to the catalytic benefits arising from enhanced air connectivity (e.g. trade, tourism, inward investment and productivity) and cluster effects (i.e. agglomeration economies and spill-over effects) associated with aviation related and non-aeronautical development in and outside the operational boundary fence of airports. As a result, attempts are also being made to quantify and understand the direction of causality associated with these effects.

Thierstein et al. (2011) have provided a stylised model of the relationship between the knowledge economy (comprising Advanced Producer Services, High Tech industries and knowledge creating establishments such as universities and research establishments); the urban areas in which it is located and air transport services (Figure 2).

Figure 2: Impact of Air Transport on Knowledge Intensive Sectors



Source: Thierstein et al. (2011)

The Centre for Cities has argued that innovation and technological change has seen UK cities shift increasingly towards knowledge-intensive activities over the last three to four decades (Clayton, 2015). This means that it is possible to place digital, creative and professional services firms at the heart of urban employment and output growth, which helps to understand why city development is being so widely adopted as a key macroeconomic device for driving growth and economic re-balancing across the UK.

So-called 'new work' sectors are now among the largest job creators and the most highly productive businesses in the country. They also appear to drive up demand in local

economies, creating opportunities for other businesses more dependent on the domestic market, such as food and retail. However, as explained below, they have a high propensity to operate internationally and therefore to fly. So cities with more 'new work' SMEs, which tend to be more productive, more innovative, and have higher wages and lower unemployment, require convenient access to an airport and the international connectivity it offers.

Moreover, Thierstein's conceptualisation, which attempts to define the positive feedback loops between the sector concerned and aviation, would also appear capable of adaption for other sectors of the economy in which Propensity To Fly (PTF) is materially high. As such it provides useful insights to support the case that the catalytic impacts of aviation are closely linked to connectivity. Particularly as connectivity is itself an expression of the range, frequency of service, the economic importance of destinations and the number of onward connections available from each airport. The theory suggests that catalytic benefits therefore accrue in three main ways:

- By allowing better understanding of markets and competitors (especially internationally) so that resources be redirected to the most productive uses and increase international trade in goods, services and tourism;⁴
- By facilitating knowledge sharing and access to new markets and suppliers, more sophisticated technologies and new ways of working may be identified helping to improve cost efficiency and raise domestic productivity; and
- By enabling inward investment to be attracted, capital intensity can be increased, raising per capita output and the scale of trading activity.

This prospectively means that the most significant long-term impacts of aviation connectivity are therefore not just direct employment effects, but the ability to generate economic growth by facilitating investment and enhanced productivity in the wider economy. Whilst connectivity is not a guarantee of a competitive national or sub-regional economy, because in an open market the benefits (positive and negative) can flow both ways, it is often a necessary pre-condition which enables an economy to:

- Draw on a wider source of labour, skills and capital;
- Transport goods and services efficiently and reach distant markets; and
- Encourage investment by foreign as well as domestic firms (Oxera, 2010).

⁴ Shifting more resources into export sectors could raise average productivity, although it may have an offsetting effect of raising the exchange rate (potentially disadvantaging other sectors, but raising real national disposable income through cheaper imports).

Good examples of this can be found in the economies of the more peripheral parts of the UK. For example, in the Highlands of Scotland the importance of maintaining or improving air access from Inverness is a significant focus for local development agencies, not least because the whisky industry, which is a mainstay of the regional economy, is highly internationalised and export orientated. The same applies in the energy sector for Aberdeen and the tourism sector for Cornwall.

In a report for the Department for Transport (DfT), Oxera (2010) identified the main benefits of connectivity as transport user benefits, better place competitiveness and wider economic benefits. While a study by Oxford Economic Forecasting (2006) demonstrated that a good air transport network positively affects economic growth by improving efficiency, boosting investments and encouraging more innovation. It states:

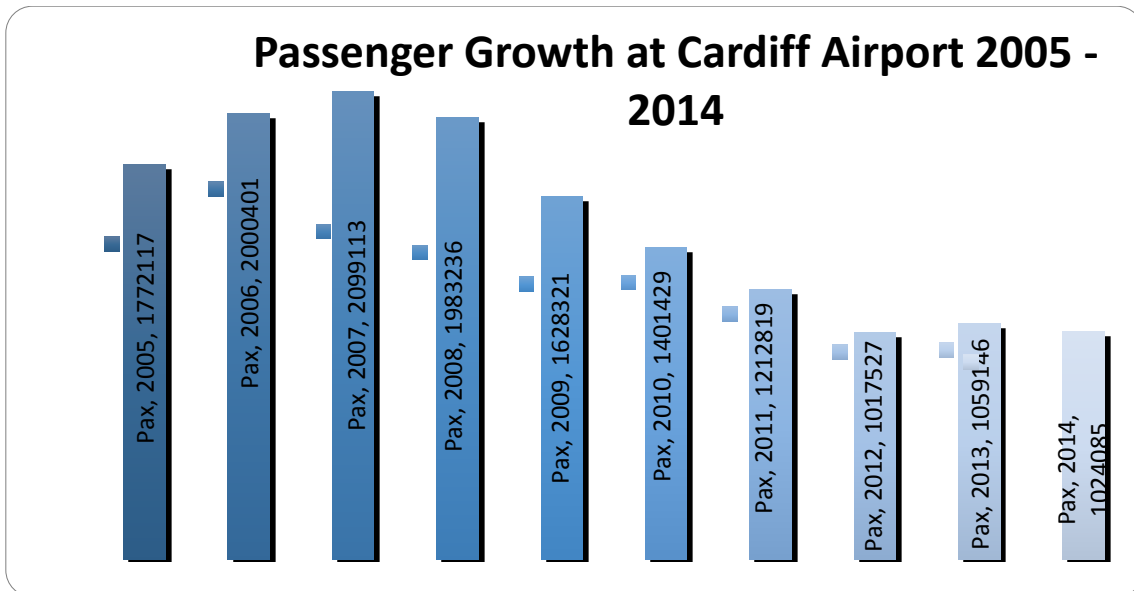
“The improvement in productivity in firms outside the aviation sector comes through two main channels: through the effects on domestic firms of increased access to foreign markets, and increased foreign competition in the home market, and through the freer movement of investment capital and workers between countries.”

Recent research by Baker, Merkert and Kanruzzman (2015) has developed the case for catalytic effects further, by providing the first empirical evidence of strong short and long run bi-directional causality between enhanced regional air transport and economic growth based on an examination of 88 regional airports in Australia over a period of 1985–86 to 2010–11. And using the same kind of Grainger causality analysis, Derudder (2014) has even been able to point to evidence of positive causality where air links have been materially enhanced in remote and peripheral regions.

Benchmarking the Airport’s Performance

The high watermark for CIA in terms of passenger throughput was 2007 when it was used by 2.094m passengers. The subsequent decline in throughput (to 1.02m in 2014) and loss of route network has been significant though it is worth noting that there have been signs of a small recovery in Cardiff’s fortunes this summer, consequent upon the arrival of Flybe as a based carrier and good load factors for other key airlines.

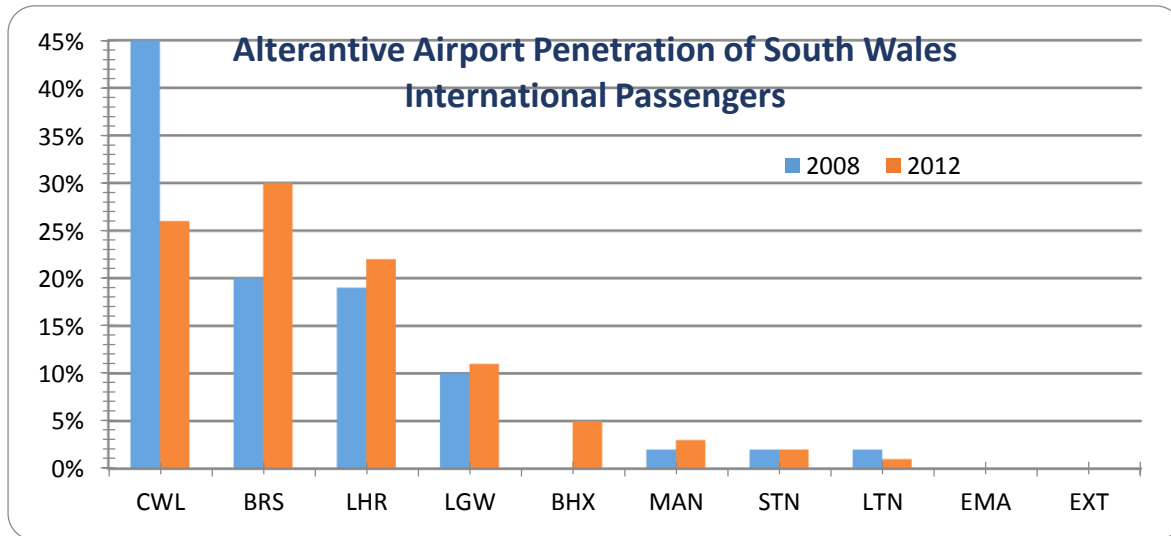
Figure 3: Passenger (Pax) Throughput at CIA in the last 10 years



Source: Cardiff International Airport Limited (CIAL)

Meanwhile Bristol has continued to grow consistently. The result is that whereas in 2008 45% of air passengers from South Wales used CIA, in 2014 the figure was 26% (see Figure 4). The cross border leakage that this implies (i.e. 74%) is the highest of any substantive regional airport in the UK. According to CAA survey data from 2012, more Welsh passengers (1.08m) now use Bristol than CIA (0.94m), even though it is over an hour's drive away from the city of Cardiff and requires the payment of a £6.50 toll to cross the Severn by car on the return journey. A further 1.18m Welsh passengers use London airports, principally Heathrow. The only destinations where CIA serves over 50% of the South Wales market are Amsterdam, Greece and the Republic of Ireland. For all other short haul destinations Bristol has secured a dominant market position; similarly Heathrow for long haul.

Figure 4: Use of Other Airports by South Wales Passengers



Source: CAA Data

Compared to the current passenger throughput of airports serving peer UK Core Cities like Bristol (6.3m), Newcastle (4.5m), East Midlands (4.3m) and Liverpool (4.0m)⁵, all of which have broadly similar underlying catchment populations and larger competitor airports on the edge of their catchments, CIA is clearly under-performing. Whilst this can be ascribed in part to a slightly lower propensity to fly in South Wales, which may be associated with lower income levels and the draw of the major London airports 2-3 hours away, it still does not explain all of the difference or the levels of leakage to Bristol. Nor does it offer a convincing rationale as to why Bristol and its satellite towns and cities in Avon, Somerset and Gloucestershire with a 3.4 million catchment population vs 1.8 million in South Wales attracts over six times the passenger numbers of (Figures 5 and 6).

The success of Bristol can be put down in part to the substantive presence of EasyJet and Ryanair at Bristol Airport, which has attracted Welsh passengers (alongside others from across the south west) looking for low cost fares. The strength of the Bristol economy in high propensity to fly sectors such as financial and professional services (Axa, Friends Provident, Hargreaves Lansdowne and RBS), high tech industries (aerospace and composites– Airbus, Rolls Royce, BAe Systems and GKN), central government agencies (e.g. MoD Procurement, GCHQ in Cheltenham) and ICT (HP Labs, Aardman and Intel), which have in turn generated the third highest GDP/Capita in England, has undoubtedly also made a major contribution.

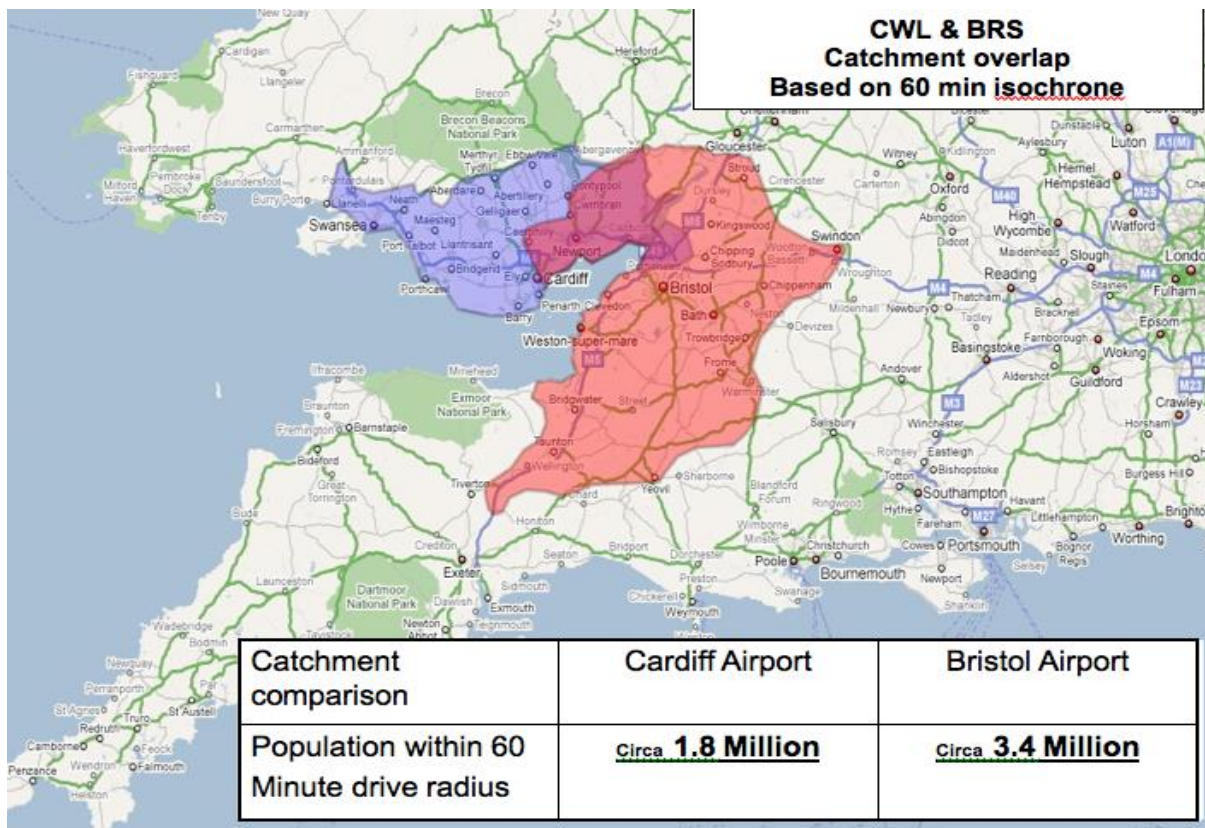
⁵ Figures represent annual terminal passenger throughput in 2014

Figure 5: Core and Extended Catchment Areas for CIA



Source: CIAL

Figure 6: Cardiff and Bristol's Overlapping Catchment Areas



Source: CIAL

If we look further afield to cities and sub-regions that are either twinned with Cardiff, such as Stuttgart in Germany, or have a similar demography and economic heritage (e.g. the Tyne and Wear in the North East or Pittsburgh in Pennsylvania), then the relative under-performance of Cardiff's airport and economy is quite noticeable. Boxes 1 and 2 benchmark Stuttgart and Pittsburgh, their city regions, economies and airports respectively, against Cardiff, South Wales and CIA. The population and economies of these cities support substantially bigger airports than that of the similarly sized and structured Cardiff Capital Region.

Box 1: Benchmarking Stuttgart and its Airport vs. Cardiff Capital Region/CIA

Stuttgart

Cardiff is twinned with Stuttgart, one of Europe's most prosperous urban areas and the capital of Baden-Wurtemberg. The city has a population of 370,000 and the broader city region 2.7m one of the highest general GDP per capita in Germany (€57,100/head). It owes its economic success to:

- Being the cradle of Germany's car industry Daimler and Porsche have their HQs there;
- Having the world or German HQs of several other major international companies (e.g. Bosch, Celesio, Hewlett-Packard and IBM);
- The presence of the Stuttgart Stock Exchange is the second largest in Germany (after Frankfurt) with many leading companies in the financial services sector are headquartered in the city (e.g. LBBW Bank, Wüstenrot & Württembergische, Allianz Life Assurance);
- A strong mittelstand enterprises sector, and;
- The highest density of scientific, academic and research organisations Germany (the area is home to six Fraunhofer institutes, four institutes of collaborative industrial research at local universities and the German Aerospace Centre - 24 per cent of employees work in the high-tech sector and no other region in Germany registers so many patents and designs as Stuttgart).

With R&D, high tech and financial service companies amongst the most significant users of aviation, Stuttgart Airport is the sixth busiest airport in Germany with 9.7mppa in 2014. It is a key base for Germanwings and features short haul flights to several major European business cities as well as a range of leisure destinations; it also offers long-haul services to a North American hub (Atlanta) and one in the Middle East (Abu Dhabi). The airport is located 13 km (8.1 mi) south of Stuttgart and can be reached within 30 mins from the city's main railway station by suburban railway.

In many ways, therefore, Stuttgart and its airport serves as an excellent model for Cardiff Capital Region to aspire to; but in doing so it also emphasises just how far behind CIA is in terms of connectivity by comparison with what should be a peer airport, whilst illustrating the importance of having a committed based carrier if the kind of network Cardiff should be seeking is to be secured.

Source: Summary by Northpoint Aviation

Box 2: Benchmarking Pittsburgh and its Airport vs Cardiff Capital Region and CIA

Pittsburgh

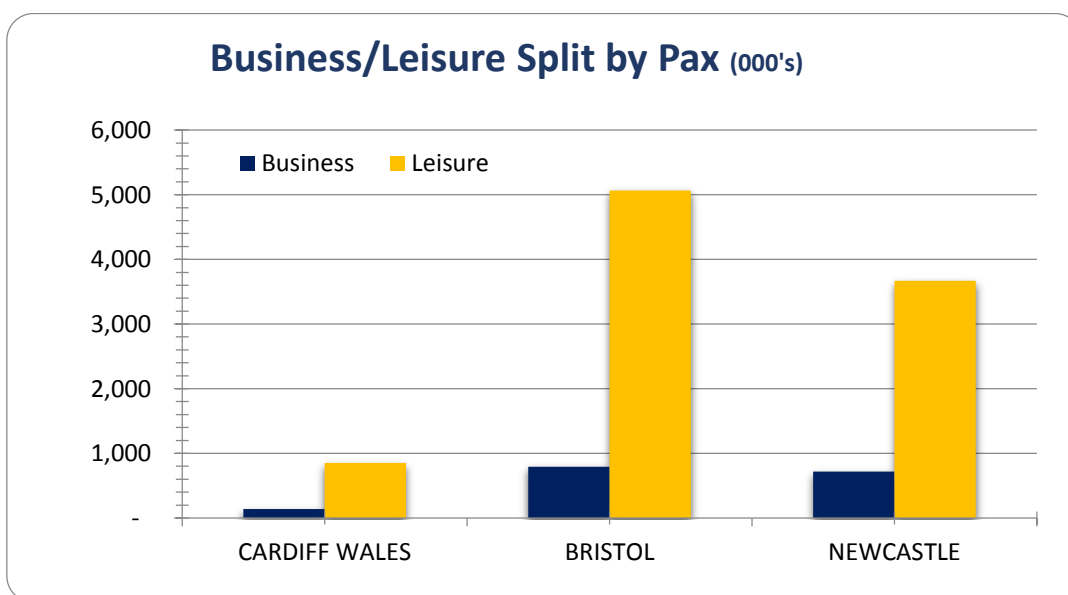
The presence of significant iron and coal deposits and easy access to waterways for barge traffic, underpinned Pittsburgh’s rise as one of the most important steel producing cities in the world between 1815-1970, with the help of those who migrated from Wales after the Merthyr rising in the 1830s. The subsequent decline of the steel industry has required the city to change its economic focus so that today, it is better known for its hospitals, universities and industrial clusters which include high technology, robotics, health care, nuclear engineering, finance, education and tourism.

As a result Pittsburgh is home to a number of major companies and is ranked in the top ten among US cities hosting headquarters of Fortune 500 corporations. These include U.S. Steel Corporation, PNC Financial Services Group, PPG Industries, HJ Heinz Company, Bayer, Alcoa, Allegheny Technologies and American Eagle Outfitters. Google, Apple, Bosch, Disney, Uber, Intel and IBM are among 1,600 technology firms with a presence in Pittsburgh which also serves as the federal agency headquarters for cyber defence, software engineering, robotics, energy research and the nuclear navy. Other major employers include BNY Mellon, GlaxoSmithKline, Thermo Fisher Scientific and the Northeast U.S. regional headquarters for Chevron Corporation, Nova Chemicals, Deloitte Touche Tohmatsu, FedEx Ground, Ariba, and the RAND Corporation.

This is again the kind of mix of sectors and enterprises that Cardiff Capital Region would aspire to host, and the city which is the county seat (regional capital) has a population of 305,842 (similar to Cardiff) and the county seat of Allegheny County (similar to the Pittsburgh city region) has a population of 2,659,937, only slightly more than that within a one hour catchment of Cardiff. And yet Pittsburgh Airport is much more substantial with US Air/American as the based carrier around 9mppa and flights to most major US cities as well as Canada, Mexico, the Caribbean, and Europe (Paris). The airport, which is regularly ranked highly in surveys of US airports, is also the home of Pittsburgh Air Reserve Station, a combined facility of the Air Force Reserve Command and the Air National Guard, providing aerial refuelling, air mobility and tactical airlift support to the U.S. Air Force.

Source: Summary by Northpoint Aviation

Figure 7: Benchmarking Business and Leisure Passengers (Pax) at CIA, BRS and NCL



Source: CAA Statistics

This disconnect is even more stark closer to home, where Tyne and Wear in the North-East of England has a smaller sub-regional population than South Wales, similar income and employment levels and an economy also in transition. However, Newcastle Airport, like Pittsburgh and Stuttgart, provides a wide range of business connections, in addition to outbound leisure flights and two long haul services, it has at over four times CIA's passenger volumes and many more business passengers (Figure 7).

Moreover, there is a similar story in terms of air cargo tonnages, with figures of around 2,300 tonnes recorded for Cardiff in 2004 when TNT operated from the airfield, reduced to just 36 tonnes in 2014. At Newcastle and Doncaster Sheffield (which serves another core city), throughput has risen from 800 to 4450 tonnes and from zero to nearly a thousand tonnes over the same time period. Perhaps most significant of all, in the context of the report's core focus on maximising economic benefits for Wales, CIA has only four business destinations with a market of over 10,000 passengers Amsterdam, Dublin, Edinburgh and Glasgow); Newcastle has 15 (2 of them long haul), Bristol 27. CIA's domestic network is particularly small, carrying only 160,000 passengers compared with 1.1m ppa Bristol and Newcastle.

The only conclusion that can be drawn from this kind of analysis is that between 2007-13 CIA underperformed significantly relative to other regional airports. This is certainly the case in the context of a regional aviation market, which has seen demand for air services recovering and many regional airports clawing back traffic originating in their own area, from busy South East airports. The reasons for this will be multi-faceted but will include some or all of the following:

- **Pricing** (in particular the desire to maintain high margins on charter traffic and not cut charges to attract a replacement low cost carrier when Bmi Baby failed);
- **The limited range of destinations available**, which results in potential customers getting used to looking elsewhere for the services they are seeking;
- **The absence of service frequency** to non-London hubs to facilitate effective 'one stop' onward connections (Amsterdam excepted);
- **Insufficient resources committed** to marketing and awareness raising locally - Newcastle Airport and its Development Agency established websites to sell the region to New Zealand and Australia and highlight the opportunities to local businesses and holiday makers of using its Emirates service, which has been hugely successful;

- **The quality and competitiveness of the overall airport offer** - it is no surprise that the 2015 Which? Survey (Which, 2015), gives Cardiff a 63% satisfaction rating, in the bottom third of airports with throughputs of less than 4mppa and lower than the much bigger Newcastle (72%), which has invested heavily in state of the art security systems and excellent airside facilities for passengers, and Liverpool (64%); and
- **The Commitment and competence of the airport's former owners and management**, which in the case of Abertis, following the recession and associated decline in passengers and profitability, was virtually non-existent with little or no investment and the arrival and departure of a succession of Managing Directors, none of whom could 'stop the rot'.

The continued commitment of Vueling and the arrival of two Flybe based aircraft provide the basis for optimism that CIA has turned a corner in terms of passenger growth and network expansion (Wales Online, 2015). It is extremely unlikely that this would have been achieved under Abertis' tenure, or indeed that of any another private owner. This is not uncommon for privately owned smaller airports of less than 2mppa in the UK (and elsewhere in Europe), that are heavily dependent on aeronautical charges for revenue generation and hence ultimately commercial performance. Plymouth, Blackpool, Manston, Galway and Sligo in Ireland and Lubeck and Lahr in Germany, Teruel, Don Quixote and Castellón-Costa Azahar in Spain, all privately owned, have all closed since the economic recession began in 2008 for this reason.

Hence a great deal more will need to be done, and more importantly invested, to restore Cardiff to a competitive position where it is capable of attracting the 2-3mppa its catchment population should be capable of supporting⁶. In Europe, the role of national, regional or city authorities in supporting the operation and development of smaller airports is well recognised (e.g. HIAL - Highlands and Islands Airports in Scotland and Isavia - the national airport and air navigation service provider of Iceland), as it is in North America - although different business models are used. Long term commercial stability is more easily and transparently achieved when the core assets of a small airport are in the ownership of a strong public authority, especially if substantive investment is required (EU, 2014). Airport operations are sometimes outsourced as management contracts or concessions to private companies (Regional and City Airports specialise in this in the UK). Very often they are retained in-house and funded through cross-subsidies associated with military operations or

⁶ The latest CAA data suggest that some 3.6m passengers per annum originate from Cardiff's core catchment area in South Wales.

ownership by a larger group (as in the case of Avinor, Swedavia, Finavia, Aena). Alternatively, and perhaps optimally they are handed over to professional management teams recruited by independent Boards appointed to oversee airport governance by public authorities that continue to own and make strategic investments in the assets. This has been the model successfully applied at Trust and Regional Airports in Canada, Shannon in Ireland, Newquay in Cornwall and is now being planned for Glasgow Prestwick airport by Transport Scotland.

In terms of non-passenger aeronautical activity, however, the story of Cardiff Capital Region's airport's is rather more positive:

- Cardiff and St Athan have between them attracted additional GA activity (including Bristow's Air Sea Rescue base for the Severn Estuary, South Wales and North Devon Coast and increased military use);
- British Airways has re-committed to BAMC (Wales Online, 2015) and Cardiff Aviation and e-Cube have established themselves at St Athan; and
- The Welsh Government's AM&M team has been successful in finding tenants for all the other lettable properties at St Athan – the Superhanger excluded (although that may also be put to productive economic use if Aston Martin do decide to move their operations there), and in so doing creating 200 new jobs.

This serves to demonstrate what might be achievable with a well-structured, co-ordinated and resourced programme of developed focused on the airport enterprise zone. Models of what might be possible can be found in:

- Scotland – where the majority of the country's 10-14,000 aviation and aerospace jobs (depending on what is included) are to be found in the 'aerospace corridor between Glasgow Prestwick and Glasgow International airports.
- The Aerospace Valley centred on Toulouse (500 companies supporting 120,000 jobs); and
- Aero-Montreal (approaching 50,000 jobs in the logistics and aerospace sectors) concentrated around the cities three airports.

Sectors that will benefit from investment at St Athan and Cardiff Airports

In a Welsh context, the key to maximising economic benefits from core airport 'operations' (i.e. scheduled passenger services), is to ensure that measures are put in place to claw back as much of the traffic leaking from its core South Wales catchment area as reasonably practicable whilst pro-actively developing non-passenger dependent aeronautical activities at both Cardiff International and St Athan airports. The potential means to achieve both objectives are set out in subsequent sections of this report.

According to an accepted rule of thumb, first set out by ACI in 2004 (Airports Council International Europe and York Aviation, 2004) and affirmed by Zak and Getzner (2014) and York Aviation (2012), adding a million passengers to CIA's throughput should create around a thousand new jobs in total (i.e. direct, indirect and induced). That ratio will slowly deteriorate as passenger throughput increases and productivity efficiencies in airport operations are captured. If a throughput of 3mppa could be achieved at CIA over the next 5-10 years then direct jobs associated with the airport's operation might be rise to 2,250-2,500. If BAMC are included close to 3,000 jobs would be based at the airport with total jobs (i.e. including indirect and induced employment) generated by the airport nearer 4,500 – nearly 1,850 more than currently.

The extent of job creation and GVA arising from non-passenger aviation related activities at Cardiff and St Athan depends on the type of development that can be captured within their boundaries and the extent to which existing buildings and land at St Athan remain available for non-military uses requiring airside access. Some aerospace activities can be relatively intensive in terms of job creation (e.g. the 800 jobs supported by BAMC and the 300 Cardiff Aviation ultimately hopes to employ in the Pinnacle hangers). Others (e.g. flight testing and aircraft recycling) may require far less manpower but still need significant movement capacity and ground footprint respectively. Given the scale of the opportunity the airports together provide, the target in the EZ Strategic Development Framework (Welsh Government, 2015B) of establishing 4,000 new non-aeronautical jobs at the two airports does not look unrealistic in the longer term. Indeed Mirabel in Montreal has this number in aerospace and aviation logistics already and still has plenty of room to grow.

In combination with BAMC and passenger service related jobs that would make a total of 7,500 jobs based at the two airports and over 10,000 in the wider Welsh economy as a

whole once they are fully developed. If the ‘gateway’ site adjacent to CIA were also to be developed then the equivalent numbers could potentially rise to between 10,000-12,500 and 15,000-18,500 respectively. Looking separately at wider catalytic benefits (i.e. those not accounted for in the figures above) associated with air transport, these can also be material and will primarily arise in sectors that have high propensities to use aviation and are international and collaborative in outlook.

Table 1: Sector analysis: Propensity to fly

Economic Sectors in Wales	Propensity to Fly (Pax)	Propensity to fly (Air Cargo)
<u>Priority Sectors</u>		
AM&M	✓	✓
Life Sciences	✓✓	✓✓
Professional & Finance	✓✓	✓
Media & Creative	✓	-
Environmental & Renewables	xx	x
ICT	x	✓
<u>Other Sectors</u>		
Other Manufacturing	-	✓
Agriculture	xx	✓
Public Sector	✓	-
Tertiary Education	✓✓	x
Tourism (Domestic)	✓	xx
Tourism (International)	✓✓	-
Events, Conventions, Conferences	✓	-
Energy	✓	x
Retail	xx	-
Construction	x	xx

Source: Northpoint Aviation

Of the six priority sectors identified in the Welsh national Economic Renewal strategy (Welsh Government, 2010), as Table 1 highlights, it is the Advanced Materials & Manufacturing (and particularly the aerospace sub-sector clustered in South Wales), Life Sciences and Financial and Professional Services that are the most likely to benefit from enhanced connectivity associated with new route development and the restoration of some form of air cargo capability at CIA. Since two of the other three priority sectors (i.e. ICT and Media & the Creative Industries) are also likely to derive some benefit, it emphasises the importance of the first of the five strategic cross-cutting themes set out in the 2010 Economic Renewal document, namely “*Investing in high quality and sustainable infrastructure*” (Welsh Government, 2010).

The high priority sectors were chosen in 2010 based on the fact they had demonstrated above average growth at the UK level, were projected to perform well into the future and therefore are of significant importance to Wales in terms of employment. Between them they make-up almost one third of private sector employers in Wales, and companies with a high propensity to fly make up a significant sub-set of that share.

However, there is also potential for other sectors, not designated as priorities for pro-active assistance to stimulate wider economic growth in Wales, to benefit materially from aviation, notably:

- Tourism – particularly international visitors but also domestic and business tourism (i.e. events, conferences and conventions which Cardiff City Council has been keen to support the development of a purpose-built facility to attract);
- The tertiary education sector (i.e. universities, colleges and foreign language schools); and
- Public service (i.e. UK Government agencies, the Welsh Government, the NHS and to a more modest extent local government).

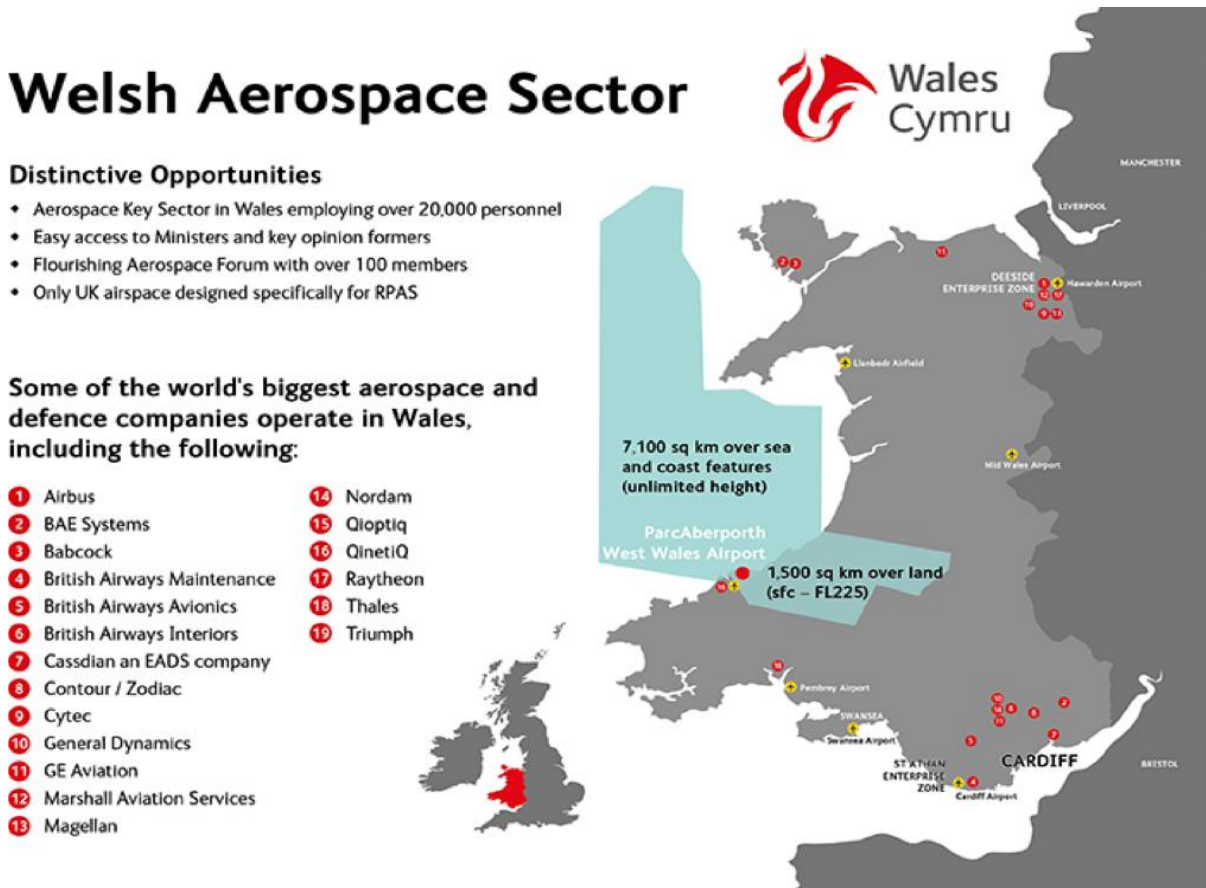
Advanced Manufacturing and Materials (Aerospace)

With around 3,000 companies, 100,000 employees, pay scales 40 per cent above the national average), turnover of £22.2 billion and a global market share of 6.2% (second only to the US), aerospace is one of the UK's most successful industries. The UK has been highly attractive as an inward investment location for this sector, with many of the world's leading players (e.g. EADS, Finmeccanica, Bombardier, Augusta Westland and General Electric) represented here. The UK also has significant outward foreign direct investment (FDI) in aerospace, especially in the US, UAE, France, India and Poland.

Within the UK, there are a number of significant aerospace clusters and one of the most important of these is in Wales, where the industry employs more than 23,000 people in 160 companies that between them have a combined turnover of £5bn. Six of the world's top ten aerospace/defence firms have bases in Wales and the sector is undoubtedly a very important one for the Welsh economy, particularly as it is engaged in complex overlapping activities from aircraft manufacture (AM), through maintenance, repair and overhaul (MRO), to research, development and training (RDT) (Clifton et al., 2011). Whilst aircraft manufacturing is predominantly concentrated in North Wales around Airbus' operation at

Hawarden, South Wales is stronger in MRO and RDT (see Figure 8) with BAMC and GE at Nantgarw leading the way.

Figure 8: Geography of the Aerospace Sector in Wales



Source: Welsh Government AM&M Brochure

British Airways is especially committed to Wales, with three dedicated MRO facilities across a 50 km radius in South Wales:

- BA Avionics - end-to-end maintenance of electrical, electronic and electro-mechanical components;
- BA Interiors - advanced maintenance works on cabin interiors and safety equipment; and
- British Airways Maintenance Cardiff (BAMC) - handles major maintenance (i.e. C & D Checks) for BA's entire long haul fleet.

Set in one of the biggest facilities of its kind, at BAMC expert teams overhaul, repair, modify, test and inspect BA's Boeing 747, 767 and B777 aircraft. On 20th October (Wales Online, 2015) BA announced that from 2016, work on the new Boeing 787 Dreamliner would also be based at Cardiff Airport alongside work on the more traditional aircraft, which will continue -

in some cases for the next 10 to 15 years. Because of the critical mass created by the South Wales aerospace cluster, the university sector in South Wales has also developed world-class training, innovation and expertise to serve it. Academics work hand-in-glove with the sector, aligning commercial focus with technical expertise, with the result that R&D projects are underway at institutions throughout Wales. Some examples are described in Box 3.

Box 3: Universities in South Wales Supporting the Aerospace Sector

Cardiff University: The Morgan-Botti Lightning Laboratory is tackling the use of composites within the mechanical structure (i.e. airframe) of an aircraft and is Europe's only University laboratory focusing on research into lightning protection for aircraft, while the Gas Turbine Research Centre conducts research to improve gas turbine design.

Swansea University: The Materials Research Centre in the School of Engineering is home to the Rolls-Royce University Technology Centre, joint funded with the Physical Science Research Council to the tune of £50m for research into structural materials and training. The Welsh Composites Centre offers materials testing and characterisation, design and structural modelling, materials and process selection and new product development. The Civil and Computational Engineering Centre is undertaking pioneering work in finite element analysis and is a leading research group in computational methods, working with Airbus (and Land Rover).

University of South Wales: The University teaches Aeronautical Engineering and Avionics, and is British Airways partner in delivering a BSc Honours degree in Aircraft Maintenance Engineering that includes EASA accreditation under BA's EASA license; it works closely with GE Aviation to provide graduate skills.

The Cardiff and Vale College International Centre for Aerospace Training (ICAT): is an approved Part-147 training centre and as such can set Part-66 examinations. ICAT has developed new course materials online and in textbook formats to support the study of the Part-66 modules.

Source: Summary by Northpoint Aviation

The above notwithstanding, Clifton et al.'s (2011) very thorough analysis of the sector provides a useful cautionary note. They state that in addition to the many strengths of the Welsh aerospace cluster it should also be recognised that: *"..... there are key inter-linkages that need consideration if the long-term health of Welsh aerospace is to be secured. Simultaneously, all three sub-sectors in Wales exhibit weaknesses, which could render them vulnerable to greater external competition, particularly from developing countries"* (Clifton et al., 2011, Abstract).

To address these issues they advocated: *"..... a need to alter the current governance arrangements and utilize different clustering characteristics that [already] exist, [but] with government, as a major sponsor of the industry, having a strong role to play in encouraging more balanced industry structures and decision-making processes"* (Clifton et al. 2011, Abstract).

The acquisition of Cardiff and St Athan airfields and the creation of St Athan – Cardiff Airport Enterprise Zone for the aerospace and defence sectors by the Welsh Government is a major step in fulfilling this agenda:

- St Athan has been a centre of aeronautical excellence for decades and the site boasts a resurfaced 1,800m regulated runway with CAT1 ILS and full airfield support. Civilian and military projects work side-by-side here, including MRO, general aviation servicing, end of life solutions, rotary and pilot training. There is also 493 acres (200ha) of developable land; and
- At 2400m, Cardiff Airport has a longer runway and also land and facilities available for MRO and supply chain operators to complement BAMC.

Life Sciences

There are 12,000 students at Welsh Universities studying Life Sciences and Welsh researchers lead the world in areas like wound healing, stem cells, neurosciences, e-health, in vitro diagnostics, medical devices etc. This is reflected in the Research Excellence Framework (REF) for 2014, which found that more than 75% of the research submitted by universities in Wales to be world leading or internationally excellent. They also have excellent knowledge transfer and commercialisation capabilities and offer attractive partnering opportunities for Life Sciences businesses, with the additional benefit of potential to access considerable European funding and to the Welsh Government's Sêr Cymru initiative. This seeks to use £50m of allocated funding to grow research excellence by attracting world-class researchers and their teams to Wales.

There are four main life sciences clusters:

- North Wales spread across an area from Llanberis (Siemens) to Wrexham and Deeside;
- Cardiff (based around the School of Biosciences at the University, the Medicentre incubator for biotech and medtech start-ups, the Life Sciences Hub Wales and GE Healthcare's Innovation Village);
- Swansea focused on the Centre for Nanohealth and Institute of Life Sciences; and

- Satellites in Bridgend (Biomet UK, Ortho Clinical Diagnostics, Biotec Services International, a PCI Company) and the Valleys (Norgine Ltd, Convatec, Penn Pharma, a PCI Company).

Life Sciences is a sector where keeping abreast of the latest research elsewhere in the world is important and collaborating internationally is common. It is also a significant user of air cargo services because the high value to weight ratio of the sector's products facilitates this. The UK centres for the sector are Cambridge, Oxford, London and Edinburgh and global examples include clusters in Boston and San Francisco. Access to direct and indirect air services is therefore important to meet the sector's need to travel.

Financial and Professional Services

With 135,000 already employed and a target of 200,000 by 2021, Cardiff is not only the UK's fastest growing Financial and Professional (F&P) Services centre outside London, but also has its own dedicated Enterprise Zone - the Central Cardiff Enterprise Zone (CCEZ), to create the optimum conditions to attract these kind of businesses and encourage them to succeed and grow. This initiative is supported by substantial investments in high quality office space, world-class data storage capacity, superfast broadband providing the same digital speeds as seen in London, a new internet exchange opened in 2014 and plans for a new central transport interchange around Cardiff Central station.

Among the companies in this sector attracted to Cardiff by this environment are: The AA, Admiral Group, Atradius, Barclaycard, Barclays, Brewin, British Gas, Deloitte Global Risk Management Centre, Dun & Bradstreet, Eversheds, HBOS Card Services, ING Direct, Islamic Finance Centre, KPMG Legal & General, Lloyds Banking Group, PWC, Principality Building Society, Royal Bank of Scotland, Serco, Tesco and Zurich Financial Services. Whilst in the other main F&P centre in Newport – GoCompare, Home Office – Procurement Centre of Excellence, Intellectual Property Office Ministry of Justice, the Office of National Statistics UK and Shared Business Services (UK SBS).

Financial and professional services typically have a high propensity to fly, especially if they have an international outlook or headquarters operations. For Cardiff to be able to continue to grow its F&P cluster, its excellent digital connectivity needs to be supported by enhanced transport connectivity, whether by addressing bottlenecks on the strategic road network (e.g. the M4), improving capacity and journey times on the rail network (particularly to London)

and perhaps most importantly the range of destinations and frequency served from Cardiff Airport rather than the much less convenient Bristol or London alternatives.

Tourism

Although not a priority sector for Welsh Government support, tourism is a major employer and generator of GVA in Wales. It is also an export industry with over 80% of visitor spending being non-Welsh in origin, which cumulatively constitutes an important source of export earnings for the Welsh economy. The Wales Tourism Satellite Accounts (TSA) estimates total tourism spending in 2011 of £4.5bn, representing a Tourism Gross Value Added (GVA) of £1.8bn – around 4.4% of total direct GVA for the Welsh economy (Welsh Economic Research Unit, 2011). Research suggests that when indirect impacts are added, the Tourism GVA increases to £2.5bn, which represents 6% of the whole economy (Welsh Government, 2013).

In terms of employment, TSA estimates that 8.3% (88,300) of all full time equivalent jobs in Wales are directly supported by tourism spending. With indirect (supply chain) jobs added, this total FTE employment rises to over 100,000, which is equivalent to around 9.5% of all Welsh FTE jobs. Oxford Economics (2012) estimated that the wider hospitality sector (hotel, restaurants and catering), in combination with the workforce employed directly in tourism constitutes 9.2% (126,000) of the Welsh workforce.

Inbound Tourism

All the evidence points to air passengers spending more per head than those travelling by surface modes (see Figure 9) and that those who fly direct to CIA (rather than via a non-Welsh airport), will spend more money in, rather than outside, Wales. At the moment the great majority of visitors to Wales are domestic in origin⁷, and of those that do visit from outside the UK, many use airports outside Wales. This pattern needs to be addressed, and securing control of CIA was the first important step to doing so.

⁷ Domestic tourism accounts for 92% of all staying visitor trips and 84% of staying visitor spend; and Wales share of international trips to the UK is declining (from 3.6% in 2002 to 2.7% in 2012).

Figure 9: Leisure Visitors Spending in the UK



Source: ABTA, AoA, Tourism Alliance and UK Inbound (2015)

Outbound Tourism

It is not just the inbound visitors and their spending which is important to city, regional and national economies in the UK. In 2013, the Centre for Economic and Business Research (Cebr), in a study commissioned by ABTA (Centre for Economic and Business Research, 2013), found that outbound leisure travellers also underpin significant economic activity in each of the English regions and UK nations through their use of Travel Agents, bespoke holiday companies, UK based airlines, inclusive IT charter operators, comparison web sites and holiday related travel writing and publications. The study found that because of the relative size of their economies, Wales and the North East of England are particular beneficiaries. Indeed, Wales ranks highest in terms of relative GVA contribution at 1.5% of total economic activity and second in terms of jobs (at 1.3% of those in Wales). This suggests that better use of CIA by the indigenous population of South Wales when booking their holidays would be beneficial to the Welsh economy, as opposed to that of Greater London or the South West.

Business Tourism: Major Events, Conventions, Exhibitions, Conferences

Business tourism is an important sub set of the overall tourism market. It is particularly appealing because it attracts high spending visitors, typically out of the main season for leisure visitors (October to March). Business tourism therefore has a number of benefits to the economy including:

- High quality, high yield tourism;
- Year round activity creating permanent full-time employment;

- Business tourism facilities lead to regeneration of urban and inner city areas and the related tourism infrastructure can also be used by leisure tourists and locals;
- It is less affected by economic downturns and shocks than leisure tourism or other sectors; and
- It stimulates future inward investment by creating a favourable impression in the minds of business tourism visitors (McNicoll, 2004).

In the UK as a whole, ‘business tourism’ expenditure is in the region of £15billion per annum and so is clearly of strategic significance, and although the Cardiff Capital Region benefits from a number of existing venues (see Box 4) that can host this kind of activity, it has ambitions to capture an even bigger share.

Box 4: Major Events and Business Tourism Facilities in Cardiff

- The Wales Millennium Stadium is a major international sports stadium that plays host to international rugby games, British speedway and international boxing bouts, in addition to some large-scale concerts.
- Wales Millennium Centre in Cardiff Bay is an important venue for concerts and the Performing Arts, as is St David’s Hall (which with a capacity of 1900 has also held political conferences and shareholders meetings) and the Royal Welsh College of Music and Drama.
- Motorpoint Cardiff International Arena is run by Live Nation and caters for pop concerts, pool and darts tournaments with audiences between 5,000 and 7,500 (and other events like beer festivals).
- Cardiff International Sports Stadium – is used for track & field competitions.

Source: Summary by Northpoint Aviation

There has been a long-running debate about whether Cardiff needs a larger purpose built convention and exhibition centre to put it on a par with London (Olympia and Excel), Glasgow (the SECC), Manchester (the Manchester Central Convention Centre - G Mex) and Birmingham (the NECC). A number of locations remain under consideration (central Cardiff, Cardiff Bay and the Celtic Manor near Newport), but their perceived viability is undermined in part by the absence of a major airport of the kind that all the other major venues in the UK have. Whilst the relationship would undoubtedly be symbiotic (i.e. a convention and exhibition centre would stimulate use of the airport and vice versa), with the current route network and passenger volumes it would be difficult for Cardiff to compete with these other venues at the present moment. Addressing these shortcomings at the airport would therefore provide a material boost for the convention and exhibition centre proposal too.

The Tertiary Education Sector

An often over looked economic relationship is that between aviation and the tertiary education sector. This is not just a function of university research being increasingly collaborative and international in scope, but also to the number of overseas students that the UK university sector attracts. The global education sector is the second largest, after healthcare, with global expenditure estimated at \$4.5 trillion in 2012 by the World Economic Forum.

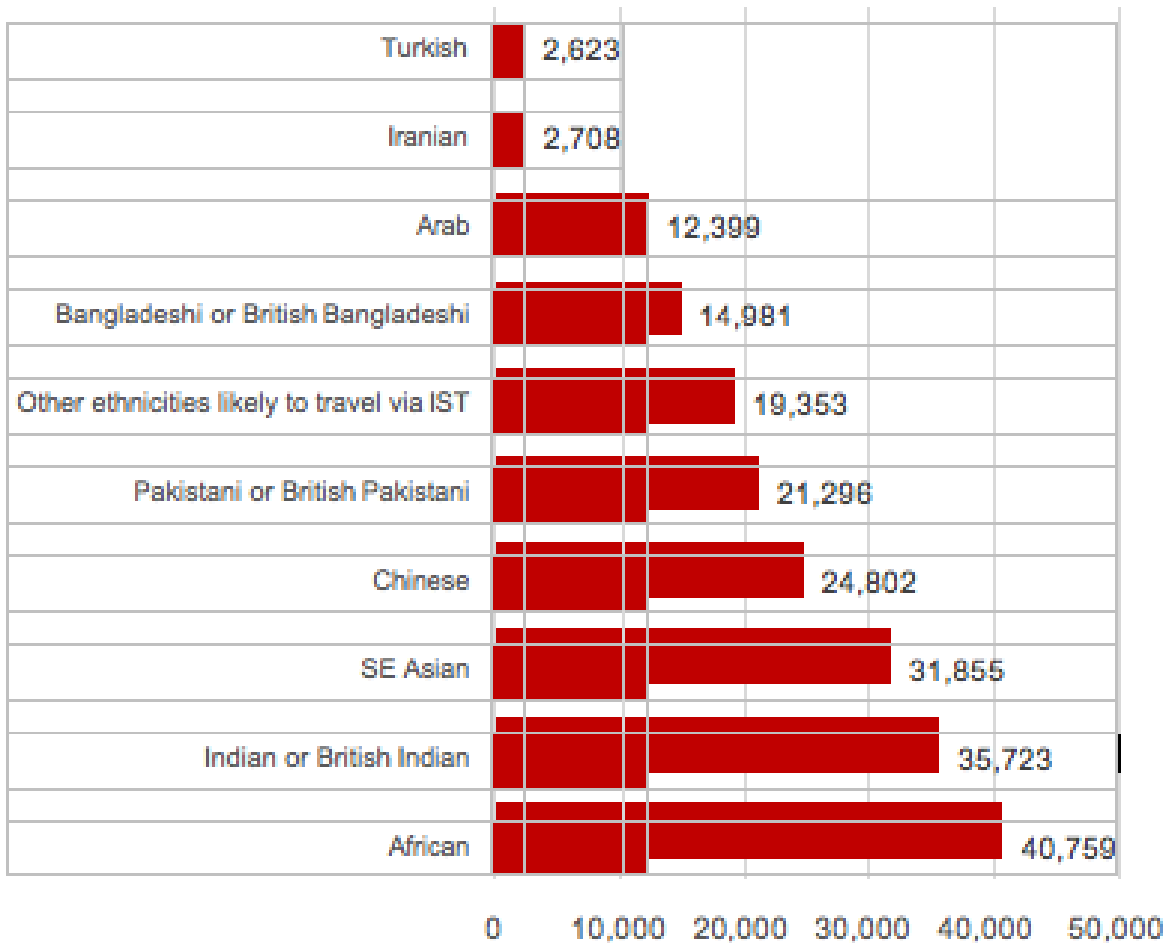
The UK has a strong global brand and a reputation for excellence in education, and generates exports worth £17.5 billion in the sector, over 75% of which are accounted for by international students studying in the UK (House of Commons Library Note, 2010). Both the UK and Welsh Governments are keen to capture a bigger share of this growing market.

Like the creative industries, where the UK also has a strong global presence, educational services is a sector in which the UK has significant advantages, most notably:

- English as the working language;
- The multicultural nature of the UK population;
- World renowned education and training institutions,
- Openness to foreign teachers and students;
- A strong pool of skilled labour, particularly in services;
- Good international travel connections; and
- Strong home-market demand for a wide variety of educational goods and services.

Against this background, it is perhaps no surprise that there are currently 12,000 international students at South Wales' eight tertiary educational establishments. Of these, the largest group is Chinese (3000), with nearly 7,000 in total from the Indian sub-continent, Middle East and Asia. Europe is also a material source of students. Historically in the UK, foreign student numbers increase where improved connections are developed and it should be borne in mind that the majority of students will travel for Visiting Friends and Relatives (VFR) purposes at least once per year, often more. These trips are additional to ethnic populations living in Wales flying for VFR purposes. In the last census (2011), over 200,000 people with an ethnicity link were officially registered residing within the 90-minute drive radius of Cardiff Airport (Figure 10).

Figure 10: Ethnic Group Populations in Cardiff Airport Catchment Area



Source: CIAL

Developing a better network offering from Cardiff for these potential customers clearly represents a significant opportunity for the airport.

Trade and Exports

In 2009, China overtook Germany to become the largest exporter of goods with 9.6% of the global goods export market. Germany accounts for 9% of goods exports, the USA 8.5% and Japan 4.7%. The UK exports the 10th largest value of goods, accounting for 2.8% of the world total. In services, however, the USA leads with 14% of world exports, followed by the UK with 7.2% and Germany with 6.5%. Therefore at 41% in 2009 services account for a relatively large share of UK exports (Department for Business, Innovation and Skills, 2010). Since the services in which the UK has a prominent global position (financial services,

business services and tertiary education) are knowledge intensive, they have good potential for development as incomes in emerging economies grow. As service sectors tend to be more people intensive, they inevitably require more face-to-face time and hence the UK economy is inevitably more air dependent than most.

In Wales, exports remain significantly 'goods led', perhaps partially explaining the country's relatively low propensity to fly. However, as a more knowledge intensive economy develops in the Cardiff Capital Region, so enhanced aviation connectivity will become more important to service it. The key markets are show in Table 2.

Table 2: Top Export Countries from Wales 2014/15

Rank	Over £100m/Qtr	Extant Air Links	Rank	£50-100/Qtr	Extant Air Links	Rank	£25-50m/Qtr	Extant Air Links
1	USA	X	10	Italy	X	16	South Korea	X
2	Ireland	√	11	Qatar	X	17	Hong Kong	X
3	Germany	√	12	Spain	X	18	Poland	X
4	United Arab Emirates	X	13	China	X	19	Turkey	X
5	Netherlands	√	14	Saudi Arabia	X	20	Brazil	X
6	Benelux	X	15	Sweden	X			
7	Canada	X						
8	France	√						
9	Singapore	X						

Source: StatsWales and CAA Statistics

Identifying and Prioritising Strategic Initiatives

On the basis of the economic context provided above, this section identifies strategic initiatives that are likely to produce material direct 'operational' or wider catalytic benefits to the economy of South Wales.

This chapter does not attempt to define a commercial strategy or business plan for the airport, because although optimising commercial revenues, profitability and/or asset values can be compatible with generating economic benefits (e.g. in the form of enhanced passenger networks and attracting other aeronautical activity to the sites), it is not always the case. Investment and maintenance strategies and the emphasis they place on asset condition can however divert resources that might otherwise be devoted to revenue enhancement or dividend payments.

The balance taken will therefore reflect shareholder priorities. In the case of Abertis it was to minimise investment and maximise short term revenues; for the Welsh Government once

breakeven is achieved, the focus is likely to be on investment and maximising wider economic outputs from what are two nationally important infrastructure assets.

Equally important, this report does not provide an aviation policy framework (those responsibilities have not yet been devolved) or a strategic development plan – the St Athan and Cardiff Airports Enterprise Zone Board published one of those earlier in the year (Welsh Government, 2015B) and consequently although it may require revisiting in places, it certainly does not require comprehensively re-inventing.

The focus here is on identifying existing initiatives that should be given the highest priority and new ones that have yet to be identified or adequately supported. The prioritisation of initiatives will inevitably be a function of a number of considerations – cost, risk, state aid implications, opportunity for securing partners, management resource required to ensure delivery, commercial benefits, political profile/sensitivity etc. To that list, this report adds the vitally important ‘maximisation of economic benefits’.

Air Passenger Duty (APD)

The February 2015 St David’s Day Agreement agreed that Whitehall should examine the case for devolving control over APD to the Welsh Government. The Scottish Government is understood to be committed to a 50% reduction in APD by 2018, and there is substantial evidence from elsewhere in Europe that any such cut is likely to stimulate demand for air travel, and encourage new service development by increasing the yield return prospectively available to airlines on under and un-served marginal routes.

For some airlines, such a move would not materially alter their approach to the South Wales market (e.g. easyJet and BA who are committed to other airports). Others that might be influenced include long haul carriers, for whom the tax is often a significant part of the ticket charges to the passenger, and Ryanair who have been known to respond strategically to a political initiative as significant as substantially reducing or eliminating APD. Indeed, they have done so at Shannon and Cork following the elimination of the travel tax in Ireland, while at Cornwall Airport in Newquay they quickly re-committed themselves to the airport once Cornwall Council announced its intention to withdraw the Airport Development Fee that had been in place since 2005 in 2016.

Unlike in Ireland, however, HM Treasury will not be willing to give up the tax revenues from APD. Therefore stimulating route development using this method will come at a cost to the

Welsh Government, and will need to be carefully weighed in the balance against their commitment to other aspects of the Enterprise Zone Strategic Development Plan. There will also be significant opposition from English airports located within striking distance of the Welsh Border and their supporters, who argue that they might be competitively disadvantaged by even carefully targeted reduction to the levy in Wales. Once the Chancellor has announced the decision of the APD review which began following the March 2015 Budget⁸, then the Welsh Government will need to carefully consider its options in the context of updated market analysis and detailed discussions with key airlines.

Air Route Development

In the absence of a generic stimulus to air travel demand such as a reduction in APD, there are several other options for interventions that can help to build network density and frequency, and therefore ultimately competitiveness for CIA, and enhanced connectivity for priority sectors and the business community in South Wales. These include:

- **A shareholder direction to the Board of CIA** to give priority to reducing aeronautical charges for new and enhanced route proposals that will result in additional year round and/or seasonal capacity, or improved service frequency, over other potential areas of expenditure or the short term retention of profit;
- **Destination marketing packages**, such as those used extensively by Team Scotland to attract new long haul routes and agreed with Flybe to encourage them to develop a new base at Cardiff;
- **A Welsh Route Development Fund**, similar to the schemes which worked successfully in Scotland and Northern Ireland between 2003-08, which could 'piggy-back' on the Department for Transport scheme approved by Brussels for the Regional Air Connectivity Fund (European Commission, 2015); and
- **PSOs** for a London hub connection, a route from West Wales to Cardiff and possibly also in international form secondary hubs willing to accept such a service.

The scale of investment required to secure the kind of air service network priority sectors of the Welsh economy need is likely to be substantial and entail a 5-7 year commitment. This is how long the Air Route Development Scheme in Scotland (Wilson, 2009) operated, before it made a significant dent in the connectivity gaps Scottish airports were suffering from in the early 2000's. That said it did help the major cities in Scotland take a significant step forward

⁸ Most probably in the forthcoming Autumn Statement

in terms of market presence and international connectivity and generate substantial economic returns.

Target Destinations

Based on the analysis in section 6, Table 3 summarises the kind of destination air service network that Cardiff Capital Region should be aspiring to by 2020-25. This would result in a passenger throughput of 3mppa or more at CIA, at which point it could become entirely self-sustaining (i.e. capable of raising and servicing its own debt) and worth substantially more than the Welsh Government paid Abertis for it.

These priorities, with the exception of a Heathrow shuttle, exclude other domestic and outbound leisure targets that should be capable of being developed based on generic airport new route discounts alone, although in terms of passenger volumes and airport finance they are likely to remain significant. However, if the key objective of the other potential incentive schemes is to maximise wider economic benefits, given the principal Welsh export markets identified in Table 2, the list of countries with firms represented in Wales in Table 4, the country of origin ties of students and ethnic minorities in Cardiff and the priority given to North America, Germany and Ireland as target international markets for Visit Wales, the list looks comprehensive, even for a ten year time horizon. The most pressing targets should therefore be:

- a. To improve frequency year round and across the day on the existing Paris and Dublin routes to optimise the potential for interline connections;
- b. To target other significant near European hubs (e.g. Dusseldorf/Frankfurt and Copenhagen) and then selectively a series of major business centres such as Toulouse/Hamburg (both major aerospace clusters) and other important, German speaking and twinned cities/regions (e.g. Berlin, Stuttgart, Zurich and Nantes);
- c. A North American East Coast hub like New York (Newark) in the USA or Halifax/Montreal/Toronto for access to Canada (Westjet); and
- d. A Middle East hub route such as Dubai (Emirates), Abu Dhabi (Etihad) or perhaps most promisingly Istanbul (Turkish Airlines) for onward connections to the Indian sub-continent, China and the rest of Asia.

Source: Northpoint Aviation

Source: Northpoint Aviation

Table 3: Route Development Priorities for Cardiff Airport

Market	Target Destination		Carrier
Long Haul:	Destination Marketing, Discount ChargesCD		
	Priority	Possibility	Emirates, Etihad, Qatar, Turkish, Pegasus, 5 th Freedom
Middle East Big Four (Emirates, Etihad, Qatar and Turkish) 4	Dubai, Abu Dhabi, Istanbul,	Doha	
North America	NE USA Coast, via Dublin, Toronto	Chicago, Atlanta, Canadian East Coast	United, American, Delta, Norwegian, IAG/Aer Lingus, West Jet, Air Canada, Norwegian, 5 th Freedom
Hubs (Network)	Public Service Obligations, Route DDevelopment Funds		
	Priority	Possibility	KLM, Flybe, Aer Lingus
Increased existing hub Frequency	Paris, Dublin	Amsterdam, Munich	
Other Hub Targets	Priority	Possibility	BA, Lufhansa, German Wings, Air Berlin, SAS, WOW, Air Iceland
	Heathrow, Frankfurt, Copenhagen	Dusseldorf, Rome, Iceland	
Short Haul	RDF		
Business Routes	Priority	Possibility	Flybe, Ryanair, Etihad Regional, Air Berlin, Swiss, Hop, IAG, Easyjet, Volotea
	Milan Geneva Brussels Hamburg Berlin Shannon	Madrid, Zurich Lisbon, Marseille, Stuttgart, Vienna,	
Inbound Charter	Priority	Possibility	Air Berlin, Niki TUI, Air Transat, Canadian Affair
	Germany, Switzerland, Austria, Scandinavia	Canada, USA	

Source: Northpoint Aviation

Inbound tourism from top targets Germany, Ireland and North America will benefit materially from (b) and (c) routes, while the scope for accessing specialist secondary hubs such as Helsinki (for the Far East), Brussels (for Europe and Africa), and Milan or Rome (for

southern Europe) could then be explored using a variety of mechanisms, including - if the destination members state were co-operative – international PSOs.

Table 4: Foreign investors in Wales by country of origin:

US	170	Netherlands	12
Germany	68	Sweden	12
Japan	59	Canada	11
France	55	Switzerland	11
Ireland	24	Denmark	10
Italy	15	Belgium	10

Source: Welsh Development Agency

Heathrow Shuttle

In the medium to long term, if a new runway is built at Heathrow, the highest priority should also be given to PSO to ring-fence slots to support a regular air shuttle to what would by then become Europe's principal global hub. A Q400 or Embraer 175/195 aircraft would provide perfect equipment for such a service and a number of parties are known to be looking at RAF Northolt as an interim facility whilst a third runway is developed.

An initiative of this kind, is not incompatible with an electrified Great Western Main Line, because the latter would primarily serve point to point traffic to central London, whilst most passengers on the former would either be interlining onto international services to destinations not served direct from Cardiff, or heading to destinations West of London along the M4 and M25 corridors.

By offering competitively priced parking adjacent to the terminal, a 30 minute express check-in, a 45 minute flight and 45 minute minimum connect time, Cardiff Capital Region passengers could be on connecting flights in just over two hours. Moreover, they would have the reassurance of being in the airline system from the moment of check-in at CIA, rather than be subject to the risk of falling foul of the vagaries of the railway system or M4/M25 traffic in making their check-in times in London. Furthermore, they would not have the inconvenience of having to carry heavy luggage around with them. Once contingencies for such eventualities are factored in, the access time to Heathrow by surface mode is likely to be double that of a flight connection, and if correctly priced potentially more cost effective.

Taking Forward the Route Development Agenda

To take forward this route development agenda, the relative merits and affordability of the other type of route development schemes listed above will need further investigation (a) to determine which schemes would be most suitable for achieving which priorities, and (b) to ensure they are properly formulated and appropriately managed having regard to commercial and state aid issues

Specialist experts with in-depth knowledge of how to structure and secure state aid approval from the EU/DfT for these schemes and then provide independent oversight of their use reporting to the Airport holding company will be needed. These in turn will then need to be audited to verify value for money has been achieved from the different schemes.

Tourism Opportunities

In line with recent UN inter-Governmental pronouncements by ICAO and the UNWTO, affirming that the formulation of policies to increase air connectivity is a key catalyst in promoting sustainable tourism and economic development, the Welsh Government's ambition is to grow tourism earnings in Wales by 10% or more by 2020 (Welsh Government, 2013). To achieve real growth in tourism earnings of 10% will not be easy as that equates to 28% more visitors. With the main focus of Visit Wales on the UK domestic market which supplies the great majority of visitor to Wales and the Irish market well served by ferries from Swansea and Holyhead, expanding the range of destinations served by CIA probably holds the key to increasing the number of overseas tourists to Wales. Therein lies a "catch 22" as the airport will need the support of Visit Wales to persuade carriers to serve routes from inbound markets.

The 'Team Scotland' approach to air service development adopted by Holyrood⁹ has proven very successful and offers a model for Wales to follow. However, it would require close working between CIA, Visit Wales, the wider Welsh Government and Cardiff Capital Region, and there has been some suggestion from the documents that have been researched and the discussions that were held during the preparation of this report that this has not always been forthcoming amongst the first two of these parties. Indeed, Visit Wales admit there are:

"still significant barriers constraining growth including low visibility and lack of awareness amongst consumers, media and the travel trade of the Wales brand and tourism offering,

⁹ Team Scotland in this context comprises: Transport Scotland, Scottish Enterprise, Highlands and Islands Enterprise, Visit Scotland and relevant Scottish airports.

limited connectivity and air capacity and lack of priority by the tourism industry and travel trade in promoting Wales in international markets” (Welsh Government, 2013B).

Clearly such problems will need to be tackled urgently if full value is to be secured from any route development and marketing investments associated with the airport. Wales should be aiming to benefit from the forecast growth in international visitors to the UK in the coming years (Welsh Government, 2013B) and this should certainly be one of the key targets for any airport related route development initiatives.

More widely, with the sporting and concert venues South Wales is already attracting significant events, and the airport is benefitting significantly when they do so, there are therefore understandable ambitions from the Board of Cardiff Capital Region to:

- Attract major sporting events like the Ryder Cup in 2010 and Rugby World Cup that the Millennium Stadium has just recently co-hosted, and looking forward a Champions League or Europa Cup final, further Test Matches and One Day Internationals and in the longer term the 2026 Commonwealth Games;
- Expand cultural and music festivals using the excellent concert venues the city already has; and
- Compete with peer cities like Birmingham, Manchester and Glasgow for major exhibitions, trade shows and the international convention market.

It is not this report’s task to resolve the convention and exhibition centre debate in South Wales, or to comment on the competing claims of a Cardiff or Celtic Manor scheme, but it is important to flag up that were such a project to eventually see the light of day, it would undoubtedly be a boon to the airport as well as having a positive impact on other initiatives in the region

Air Cargo

Section 4 highlighted the dramatic drop off in air cargo volumes at CIA under Abertis’ stewardship. The exact cause of this is far from clear and any attempt to resuscitate a cargo business from the airport will require significant groundwork to be done in the form of:

- A thorough analysis of the extent of air freight leakage from Wales – the country’s geography relative to the rest of the UK points to the market being primarily local;
- Gaining a sound understanding of the reason for that leakage from consignees and the air freight sector;
- Establishing the scale of business that could be supported at CIA and in what form; and

- What incentives and facilities are needed to secure commitment from the correct airline and brokerage partners.

Table 5: Air Cargo

Type of Air Cargo	Carrier
Bellyhold [Mixed cargo]	Network Carrier; Flybe
Express Freight [Parcels, small high value goods]	DHL, Fedex, UPS
Dedicated Freight [Perishables, Larger items, Special Cargos, Non-Express Freight]	BA Cargo, Cargolux etc
Mail [Parcels, letters]	Royal Mail, Channel Express, Jet 2

Source: Northpoint Aviation

Table 5 provides an overview of the different kinds of air cargo operating in the UK. Judging by the type of cargo operations to be found at the airports serving peer cities like Newcastle, Sheffield and Glasgow, Cardiff might expect to attract a small mail operation, occasional dedicated cargo aircraft and possibly an express freight hub feed if sufficient consignment demand can be identified. There is also no reason in principal why a route development fund could not help to support the establishment of this or regularly scheduled dedicated freighter operation. However, the best prospects undoubtedly lie with attracting a long haul carrier for whom air cargo would almost certainly be an important component of the business model for such a route from Cardiff. Glasgow and Newcastle have certainly seen significant increases in ‘flown tonnages’ with the arrival of Middle Eastern and US network carriers.

That said, with Heathrow only three hours trucking time away, developing any such operation is likely to be a challenge, so achieving throughput around the 5,000 tonne mark is likely to be the extent of any realistic expectations in the medium term, although in terms of value this would equate to 50,000 passengers and offer local firms exceptional convenience with evening collection times and early morning deliveries.

Other Aeronautical Activities

Most airports of CIA and St Athan’s size are able to attract a range of non-passenger related activities, and are pro-active in doing so, not just to generate additional revenue (although this is a major driver), but also to diversify income streams, make more productive use of assets and keep the airport’s workforce productive and trained. Table 6 identifies a range of activities that fall into this category (some of which the two airports are already pursuing) and the airfield in the Enterprise Zone that is best suited to accommodating each.

Table 6: Specified Base for Aeronautical Activities

Aeronautical Activity	Most Suitable Base in Enterprise Zone
Passenger traffic	CIAL
Air Cargo	CIAL
Diversions	Both (Depends on runway needed)
Military	St Athan
Aid flights - emergency reaction centres and storage facilities	St Athan
Business Aviation - FBO	CIAL
Emergency Services - Coastguard, Fisheries protection, Air Ambulance, Police, Search & Rescue	CIAL
Flight testing, training	St Athan
General Aviation/Airpark	St Athan
Aircraft parking/storage	St Athan
MRO - C+D Checks, Conversions, Painting	Both
Air Show, Races, Museum, Pleasure Flights	Both
UAV, Air Sports	Neither

Source: Northpoint Aviation

This distribution of activities will also be important in the context of minimising operating costs by making the most efficient use of both sites and seeking cross-airport cost savings in

a number of important budget areas. A summary of what might ultimately be achieved is set out in Table 7, which also indicates:

- Where joint operations should be considered and where the scope for efficiencies may only run to integrated rosters; and
- How in contractual terms, each functional area is likely to be most cost-effectively provided, although this needs to be subject to more in-depth management consideration and in some cases market testing.

Table 7: Scope for Joint Operations at Cardiff-St Athan

Services	Scope	Delivery
ATC	Joint	In-house – External
RFFS	Rostering	In-house
Car Parking & Transport	Joint	In-house
Security	Rostering	Outsource
Border Force	Joint	-
Senior Management	Joint	-
Airside Maintenance (inc Birds)	Joint	In-house – Possible External
Landside Maintenance (inc waste, cleaning)	Rostering	Outsource
Fuel	Rostering	In-house on site – Outsource supply

Source: Northpoint Aviation Consultants

The latter includes quite a range of options from marketing in-house services to third parties to help cover some of the costs of the local service (as in the case of ATC and airside maintenance) to outsourcing security and landside maintenance and retaining control over fuel and car-parking pricing.

Air Traffic Control (ATC)

One area, where there are potentially major operating savings to be made, (as it typically accounts for 20-25% of small airport operating costs) is through a comprehensive restructuring of the air traffic management services Enterprise Zone. This would play to Wales’ sectoral strength – there are a lot of major companies who sell ATM (air traffic management) equipment and services with bases in Wales - and prospectively offer

opportunities for achieving even larger economies of scale by progressively offering remote ATC further afield. The focus will need to be on examining the scope for:

- The creation of a single centre for en route and vectoring traffic in South Wales (and potentially, ultimately, the whole of the South West of the UK); and
- The introduction of remote approach towers, first at St Athan, and then rolled out elsewhere in Wales and the South West.

The Airfield at St Athan, as part of the Enterprise Zone, operates on a five-day working week, generally daylight hours only. A significant cost of this operation is the provision of Air Traffic Services (ATS) of circa £300K, yet the aviation demand for these services is not high. Presently there are six aircraft resident at the unit, whilst demand is increasing with growing MRO activities; the forecast impact is likely to be minimal from a number perspective. This does not diminish the inherent safety considerations and complexities of a joint military/civil operation but an innovative and more cost-effective approach to the provision of ATS is needed. While the provision of basic ATS significantly enhances the offering of an individual airfield, the required levels of communication – both radio and landline, surveillance radar and instruments approach systems depends upon the volume of traffic and method and can generate a huge and disproportionate cost to the operation of the airfield. However, emerging and proven technology is now market ready that could allow this to be applied not only to St Athan, but throughout Wales. Indeed, Saab already has live operations in Sweden, SESAR, Horizon 2020 and other EU programmes are looking to champion such innovations and there are potential private partners based or operating in Wales that could become technical partners (e.g. Thales, Raytheon) to such an initiative.

Since ATC services typically make up 20-25% of a small airport's operating budget, the prospective benefits for Cardiff and St Athan's bottom line and would be significant as would the wider economic benefits of becoming a major ATC centre in the UK, in the same way that the location of the Oceanic Centre at Prestwick Airport generated substantial benefits for Ayrshire. Keith Thomas has outlined some initial thinking on the proposition in a recently prepared paper (Thomas, 2015) and a Northern Periphery Area sponsored ERDF project, SPARA 2020, is examining the scope for roll out of the Saab technology in remote environments.

Top priority should be given to capturing the opportunities around St Athan and UAV developments in Cardigan Bay, before rolling out the system further afield in mid and north Wales and the near South West of England. In so doing, a single, coherent and cost-

effective ATS service could be delivered that would put Wales at the forefront of what globally is an emerging technological revolution. This certainly merits further investigation, and external funding can potentially be sought to help to do so.

Aerospace

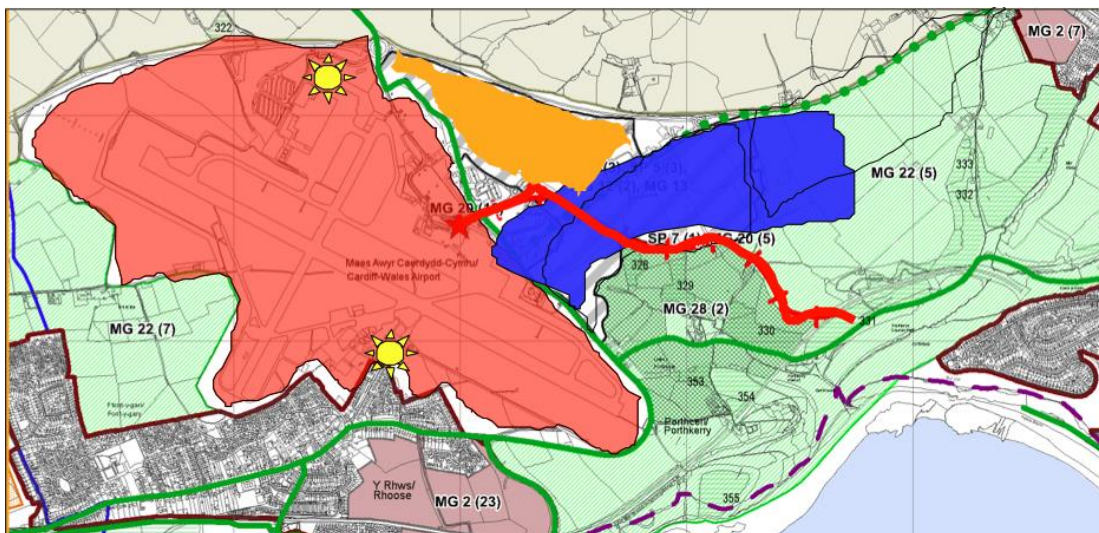
The UK has been highly attractive as an inward investment location for the aerospace sector for some considerable time. As it generates UK-based turnover of £22.2 billion (17 per cent of the global market), and there are currently a pipeline of new orders worth £32.2 billion, the UK Government is anxious it should remain so. The sector is characterised by long development lead times, programme lifecycles and technological complexity, which can act as barriers to entry for competitors, making the UK's established position even more significant. There is however, known to be high levels of state investment in the sector in China, Japan and France, amongst others, that could challenge this if the UK sector does not remain alert and at the forefront of new developments.

Wales is fortunate in being a significant player in the UK aerospace scene as outlined earlier, in terms of the Airbus related cluster in North Wales, UAV operations in West Wales and the MRO focused cluster centred on the Cardiff Airport - St Athan Enterprise Zone, where BAMC, Cardiff Aviation and ITAC are key players with strong links to GE at Nantgarw. Monarch Engineering at Birmingham and Flybe at Exeter have shown that new narrow-body and regional aircraft MRO facilities in the UK can compete for third party work against lower cost centres in Eastern Europe if well planned and efficient. There are also opportunities in the foreseeable future that are likely to involve developing new modern facilities, built specifically for an airline or Original Equipment Manufacturer (OEM), and others that will focus on more sophisticated technology driven approaches to aircraft recycling – itself likely to become a major market over the next 5 years.

At Cardiff - St Athan this points to the need for 'state of the art' commercial facilities offering a fully serviced site with good access and low operational costs; expanded training facilities, possibly in the form of an expanded ICAT, combined with a dedicated sectoral research centre to create a Fraunhofer style aerospace institute co funded by public and private investment. This could be a joint venture between the existing tertiary education establishments specialising in the field in South Wales, or might involve reaching out to a specialist North American partner like MIT, Embry-Riddell or Georgia Tech, to help secure stronger ties with the many US-headquartered aerospace companies with a presence in Wales.

Between them CIA and St Athan have plenty of capacity for incremental development with a footprint of between 20-50,000 sq ft, but plots with good runway access capable of accommodating a 200-250,000 sq ft building (roughly the size of BAMC now), though the supporting apron, parking, storage and engine testing space are far more limited. In order to attract an airline, an OEM or another of the bigger third party MRO suppliers (such as Lufthansa Technik, SR Technics, ST Aerospace or United Technologies Corporation), to develop a new facility size matters, as typically 500,000 bookable man/hrs are needed for an MRO facility to be commercially viable and that would normally imply a minimum of three bays.

Figure 11: Land within the CIA part of the Enterprise Zone



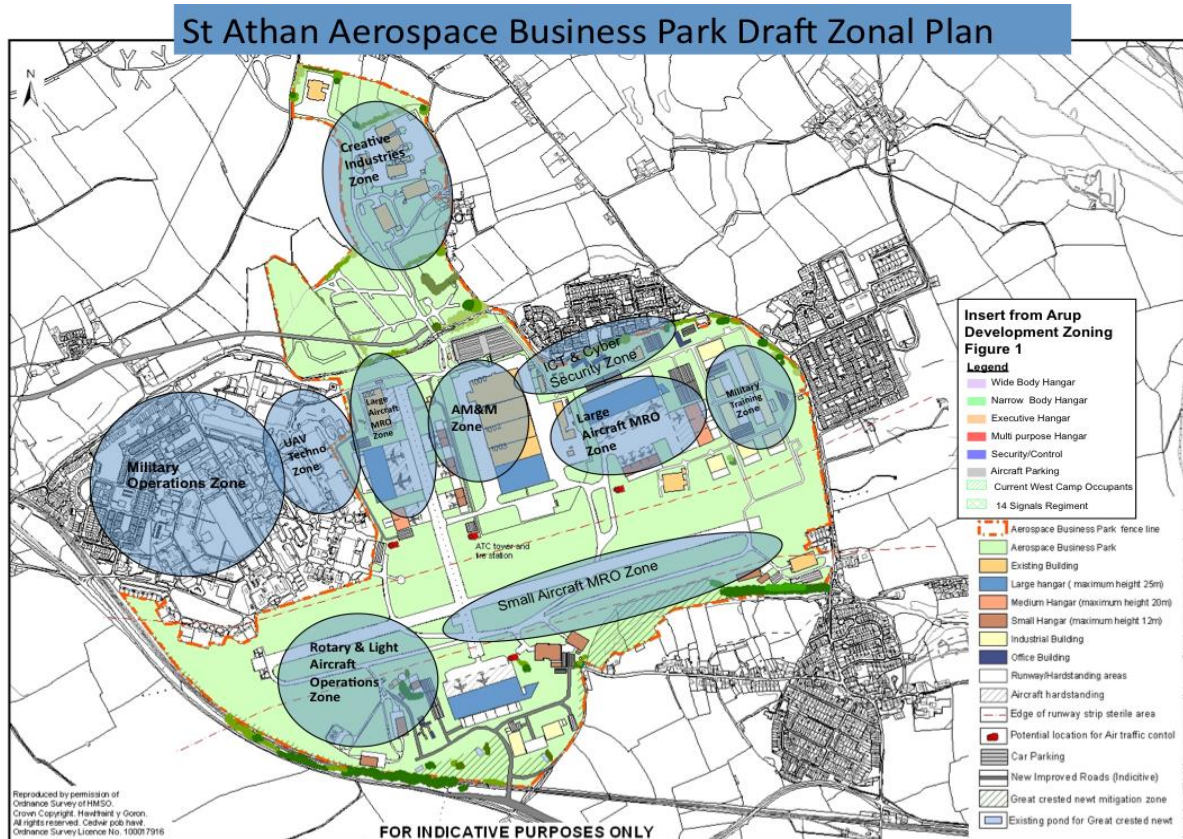
Source: Presentation - AM&M, Welsh Government (2015)

Notes: Red is CIA, Blue Legal & General and Yellow West Glamorgan Council

Topographical and radar constraints, noise, visual impact and traffic issues make it difficult to identify a suitable location for such large scale facility at CIA, unless a new taxiway is built to the Legal and General land outside the existing airport boundary (see Figure 11) or land abutting the south west of the airfield but north of Rhoose (which appears flat but is also land-locked from any significant road access), is acquired. In both cases the land in question would appear far better suited to other uses and developing large scale MRO facilities on it would create major dissonance with established or proposed land uses next or close to it, namely a new commercial quarter north-east of the airport and residential development associated with the expansion of Rhoose, respectively.

Conversely, St Athan appears to have plenty of scope in two different locations within its boundaries to build MRO facilities with double the target floor area for a major MRO operation, with significant land to spare (see Figure 12).

Figure 12: Opportunity Sites at St Athan



Source: Presentation - AM&M, Welsh Government (2015)

A capacity study is urgently needed to confirm these initial conclusions (which are based on site visits, scrutiny of maps and discussions with relevant AM&M officials), and set a firm framework of parameters for future master planning exercises. But whichever way forward is agreed, the Enterprise Zone does seem to be in a strong position to respond to any foreseeable market requirement if St Athan is retained.

Turning from supply side to potential market demand for such facilities in Wales, the MRO Report prepared by Aerospace Wales in 2014 (Aerospace Wales, 2014), provides a useful top line overview of the MRO market in Europe and some of the key dynamics within the sector. There is broad consensus that the size of the global MRO market is currently around \$55 billion and will increase steadily at the rate of between 3% and 5% per annum.

However, the 2014 analysis is certainly not an in-depth market study identifying current or prospective requirements that would consider South Wales, nor does it articulate a marketing profile or selling proposition that would pro-actively help to attract them. In what is a complicated and highly politicised sector, developing a route map that will allow the Welsh Government and Cardiff Capital City region to develop a clear understanding of who to target, how to go about it and what is needed to be competitive in a crowded market-place, must be a top priority. Having established a coherent market focused strategy, a change of culture will be required amongst the team tasked with delivering it, with less emphasis on passive marketing (i.e. attending trade shows and responding to inquiries) and more resources provided for:

- Pro-active marketing and project initiation;
- Strong industry contact networks;
- Up to date intelligence;
- A clearly defined price and quality offer; and
- Experienced and results driven account managers to develop and pursue any opportunities identified.

Aerospace Sub Sectors

Good examples of this type of opportunity would be firms supplying specialist non-MRO parts of the aerospace value chain, such as:

- Aircraft recycling – perhaps working with incumbent partners such as e-cube and GE, and new external partners like Constellium or Alcoa, the Aerospace Technology Institute (the sectoral catapult centre for aviation) and ‘circular economy’ experts;
- Paint spray facilities – a suitable site has been identified on St Athan;
- Conversions, avionics systems and interiors – in the form of specialist sub-contractors to the main OEM and MRO operators;
- Business as well as commercial jets – there are current interests in the market; and
- Light aircraft maintenance, restoration or replicas – all of which already have a representation at St Athan.

The idea of a paint-shop development is a good example of an idea/opportunity which an initial study by Arups suggested was feasible, but has then got stuck through the absence of project champion, real time market intelligence and difficulty in identifying funding, because

capital investment in large buildings was seen as off the agenda. The estimated cost of a paint-shop was put at around £20-£30million to build but the economic return (60-100 permanent jobs) was seen as poor making it difficult for the Welsh Government to proceed speculatively in the absence of any broader rationale, such as concrete demand from BAMC or a pre-condition to a new MRO provider locating in the Enterprise Zone.

Clearly, given the current state of play, there is the need for greater understanding of what the current paint-shop market looks like and whether there may be a future for Cardiff in that market.

Renewable Energy

Renewable energy is an asset driven market opportunity that, given the scale of the sites covered by the Enterprise Zone, should be explored more fully with the aim of making the airports operations and ideally all the businesses operating from them carbon neutral whilst also generating non-aeronautical revenue. The Airport masterplan includes provision for a renewable energy plant in the 'Gateway Zone', but the form this would take is far from clear.

What is needed, therefore, is a comprehensive energy strategy and financing plan that details potential responses to different scales of energy consumptive development on the two airport sites and exploration of a range of technologies for meeting the required demand. This would include solar, wind lens and biomass (using grass-cuttings from the airfield, wood chip or other crops grown on undeveloped sites), geothermal; and in the longer term if a Severn Barrage project ever sees the light of day, there would also be a tidal source to exploit.

Financing options could include the Green Investment Bank or commercial partnerships for established technologies, and EU funding (ERDF, Horizon, 2020) to trial newer technologies for their suitability to locate at airports. If the renewable sources generate a surplus beyond the onsite requirements, this would result in the realisation of carbon credits which the airport could then use to incentivise airlines flying routes from it.

Surface Access

The 2008 Welsh Transport Strategy (Welsh Assembly Government, 2008) incorporates priorities such as "enhancing international connectivity"; and "improving access between key settlements and sites", which appear designed to reflect an important role for the airport. Key actions identified then include:

- Support public transport access to airports (p46); and

- Preparation of a surface access strategy for Cardiff International Airport as well as the planned Defence Training Academy at St Athan (p51).

With this context, and given the need to make CIA and St Athan more accessible, (and therefore competitive with rival facilities elsewhere) coming to a resolution over long standing surface access proposals that would achieve this, must form an important part of any future investment plans for the Enterprise Zone sites. Figure 13 shows the disposition of the important strategic transport links relative to the airport and potential “Gateway” development site.

Figure13: Surface Access Links to the Main Enterprise Zone Sites



Source: Welsh Government: Cardiff Airport and St Athan EZ – Strategic Development Framework (2015)

Whilst, there is sufficient capacity in much of the transport network in Cardiff Capital Region to accommodate the future development of the Enterprise Zone, there are one or two important bottlenecks that will need to be addressed as CIA and the Enterprise Zone develops, while other improvement schemes are proposed (or underway) that together will enhance the quality and speed of access to the key development areas. The key schemes appear to be:

- Five Mile Lane highway improvements (Committed);
- Peak period congestion relief at Culverhouse Cross;

- Cardiff Capital Region metrolink, linking not just the airport, but the whole of the Enterprise Zone to Cardiff Centre and beyond to the airport's wider catchment area in the Valleys; and
- Creation of a new road access via the northern boundary of St Athan to facilitate development of the Aerospace Business Park.

Taken together, the effect will be to increase CIA's catchment, improve its accessibility and change the perception of the Enterprise Zone as being somewhat out with the boundary of the city. This will be important in the fight to clawback passenger traffic that is currently being lost and market the Enterprise Zone to potential inward investors in relevant sectors.

With the Five Mile Lane improvements underway and traffic conditions at Culverhouse Cross primarily dependent on other sources of traffic, planning priority should be given to the Metro connection and the St Athan road access improvements. The original TBI plc proposal of a new road from the airport to J34 seemingly having little merit until the airport and wider Enterprise Zone develops substantially, and trunk road access to link to a new crossing as part of a Severn Barrage, seemingly still some considerable way into the future.

The 2006 Airport Masterplan and the more recent master planning exercise for the 'Gateway' area adjacent to CIA, undertaken as part of the Development strategy for the Enterprise Zone, both reference a 'rail' connection to CIA including a new terminus within, or close to, the terminal building. For an airport with around 1mppa presently and a rail network to central Cardiff constrained to one train an hour through Rhoose, the notion of providing a rail spur to the airport (especially with the gradients it would need to climb) would seem wholly unrealistic given the likely costs involved and projected ridership. If the Metro project ultimately takes a light rail form and the Gateway area takes off as a commercial location this idea could be revisited, but in the interim, the priority needs to be on addressing capacity issues on the Rhoose line to secure more service frequency (initially 2x/hr, then 3x/hr) and relocating Rhoose station eastward to a location either on Pentire Y-De or near Porthkerry. A shuttle bus would then be able to provide regular, quick and easy access to and from the airport.

Since this kind of scheme would greatly enhance access to the airport from Swansea and Bridgend as well as Cardiff and Newport, reducing travel times to equivalent journeys to Edinburgh, Stuttgart and Newcastle airports from their city centres, and would be relatively cost-effective in airport terms because of the wider economic benefits of the investment in improved track capacity and signalling, it looks attractive from an airport access point of

view. But until such time as a 15-20 minute frequency can be achieved from Cardiff, the existing bus service is the only realistic option for public transport access to the airport unless a very sophisticated shared taxi scheme can more widely promoted.

Airport City Concept

The vision set out for the Cardiff Capital Region by its Board in 2015 (Welsh Government, 2015A) is a compelling one:

“A globally-connected, great place to live and work — powering the Welsh economy.”

“... an ambitious, collaborative and well-connected ... Region with the confidence and lifestyle to deliver sustained success for our people and compete on the national and international stage.”

But in the new global market where access to capital, skills and resources is becoming ever more competitive how can this be achieved? The Board of Cardiff Capital City region argue convincingly that it requires the identification of the capabilities, resources and critical mass that will give South Wales a competitive advantage and actively marketing them in such a way as to make key investors, including sovereign wealth funds, aware of the advantages the region presents, namely:

- Capital city attributes without the drawbacks;
- High rankings in European quality of life tables;
- Universities and colleges geared up to partner business to develop the commercial opportunities of innovation and research;
- Globally recognised companies (e.g. BT, Ford, Admiral, General Dynamics, Airbus, GE) that are leaders in their respective sectors to work with;
- Significant supply chain opportunities for SMEs to drive growth in priority sectors; and
- Outstanding broadband coverage, speed and capacity.

In addition to which there are plans for a programme of major events over the next ten years to help define and raise the profile of the region:

- Attract a European soccer cup final to the Region before 2020 and further test matches/ODI's¹⁰;
- Develop further iconic buildings (e.g. Callaghan Square and the new BBC Wales headquarters) and venues (e.g. a leading convention and exhibition centre) and activities that will secure global recognition¹¹;
- Host the 2026 Commonwealth Games;
- Win European City of Culture status; and
- Secure the 2018 Rugby League World Cup and the Volvo Ocean Race.

However, to be perceived as “globally connected, and investor ready” Cardiff Capital Region must have an accessible, thriving international airport, hosting a range of carriers and serving – directly or indirectly - major global business and tourist destinations, that can operate as a “Gateway to Wales”. Many capital cities are supported by international airports they can be proud of, that have helped increase business investment, especially in the vicinity of the airport. CIA currently has some way to go to achieve that kind of threshold, but it is important to define from the outset that scale of aspiration.

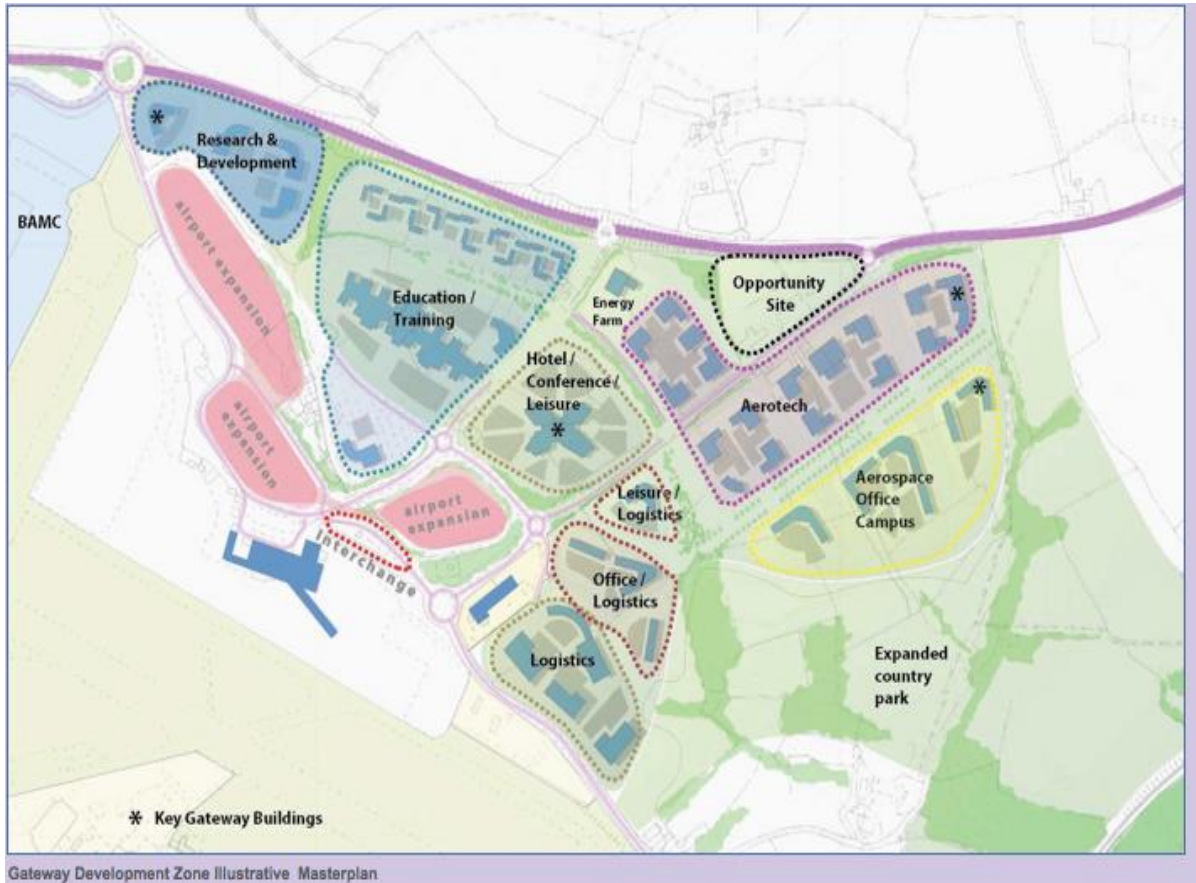
With that in mind, it is interesting to note that the Enterprise Zone development strategy refers to the potential development of the ‘Gateway’ zone alongside CIA as an ‘Airport City’ and offers Figure 14 as an indicative illustration as to how this might look and the types of land uses it might contain.

Whilst the detailed layout planning may need to be refined once the strategic capacity study has determined the scale and location of plots inside the operational boundary to be reserved as ‘opportunity sites’ for activities requiring airside access (e.g. an expansion of BAMC, other MRO developments, a cargo centre and an enhanced FBO facility), the scale of ambition Figure 13 demonstrates is admirable. What may merit further consideration is the terminology used.

¹⁰ Cricket One Day International

¹¹ For example a half marathon road race – the Welsh equivalent of the Great North Run, or a triathlon (swim across Cardiff bay, bike ride past both airports run past main city centre landmarks or an Urban Games concept).

Figure 14: Potential 'Gateway' Development at CIA



Source: Welsh Government: Cardiff Airport and St Athan EZ – Strategic Development Framework (2015)

As Stevens, Baker and Freestone (2010) highlight, with many developments around the world seeking to tag themselves as an 'Airport City' and refer to the nomenclature associated with it (see Figure 15) – Manchester Airport is a recent example, it has become an overused term often used to describe projects far larger than that planned for the Vale of Glamorgan.

"The evolution of these models is a result of descriptive representations from government marketing strategies, observed industry clustering, and projection of existing trends" rather than any kind of empirical research or didactic policy making and yet increasingly they are being embraced as "normative formulae for either airport operators or approaches to regional development" (Stevens, Baker, and Freestone, 2010).

Figure 15: Models of Airport Driven Urban Development

Table 2. Models of Airport-Driven Urban Development

	Definition	Location	Lead Actors	Key Text	Exemplar
Airfront	Airport-related commercial zone	Airport fringe	Local community; private-public partnerships	Blanton (2004)	Metropolitan airports
Decoplex	New airport community in regional setting	Regional setting	Master developer	Conway (1993)	Large-scale fly in communities
Airport city	Planned mixed-use development of airport site	Airport land	Airport owner-lessee	Güller and Güller (2003)	Schiphol
Airport corridor	Coordinated provision of infrastructure and commercial development	Airport-CBD axis	Private developers; public infrastructure authorities	Schaafsma, Amkreutz, and Güller (2008)	Zurich
Aerotropolis	Time-sensitive metropolitan scatter of airport-oriented uses	Airport-centered metro	Private market	Kasarda (2000a)	Dallas-Fort Worth
Airea	Discrete spatial clusters of airport-related development	Metropolitan subregion	Private market	Schlaak (2010)	Denver

Source: Stevens, Baker and Freestone (2010)

That said, the entrepreneurial idea of the airport going beyond purely facilitating the movement of aircraft and aviation related activity and seizing a variety of commercial and industrial opportunities as part of a wider land use zone of development often associated with an airport is a good one, but arguably needs to adopt a more accurate - and perhaps memorable - terminology such as the Airport ‘Campus’ or ‘Quarter’, and in so doing establish itself as a distinctive a new Business District within the wider Cardiff City Region.

Conceptually the urban planning and economic literature is extremely supportive of this kind of concept as the selective quotes in Box 4 serve to illustrate, but to work effectively as a net addition to a city or regional economy it is clear is that a development of this kind on any scale needs to be based on uses that manifestly require airport proximity; it can not just be another business park. Valorisation on these grounds points to the following as the key categories of activities that would be attracted to a development in the Airport Enterprise Zone:

- **Airport-support functions:** Activities supporting the operations of the airport like flight kitchens and aircraft maintenance, airport-related freight services (shipping, freight forwarding, customs, foreign trade zones, and services for airline employees and passengers such as crewing check-in and training centres, hotels, restaurants and car rental franchises;
- **Time-sensitive activities:** Goods-processing and distribution functions such as e-commerce, warehousing, and perishables handling – also express freight depots as this

has become the preferred mode for shipping high value to weight products, like electronics, optics, and pharmaceuticals;

- **Businesses with high-travel demands:** Airport proximity is also a magnet for organizations whose operations require frequent inter-city travel to do face-to-face business. ‘Airport intensive’ economic sectors include insurance, banking and finance, printing and publishing, transport, computers, precision and optical instruments, business services, and R&D (York Aviation, 2004). Airport corridors have accordingly become attractive for office buildings housing regional corporate headquarters; and
- **Non-aeronautical development attracted by agglomeration economies:** The accessibility, visibility, and prestige of an airport address can attract non-airport development, serving other markets through growing economies of scale.

Box 5: Airport Related Development in the Academic Literature

“In a globalized world, aviation has cemented its place as a dominant transport technology with consequent ramifications for the ordering of urban and regional space economies at different scales. John Kasarda (www.aerotropolis.com) has memorably captured this emergent reality with his notion of a fourth wave of development in which airports shape business location and urban development in the twenty-first century as much as highways did in the twentieth century, railroads in the nineteenth and seaports in the eighteenth” (Freestone Baker, 2011).

“In Castells (1996) ‘spaces of flows’, ... Airports are the ‘hubs of flows’, and ... are central to competitive and comparative advantage: so much so that for some ‘the airport is perhaps the most important, single piece of infrastructure in the battle between cities and nations for influence in, and the benefits of, growth and development” (O’Connor & Scott, 1992).

“Airports have become vital functional nodes in the world economy and the jousting for regional, national, and international competitiveness. They are growth nodes for local areas and regional economies” (Freestone, 2009).

“... the ‘airport area’ beyond the operational fence has in many cities worldwide created a generic post-modern landscape of offices, hotels, warehouses, shopping complexes, and logistics facilities” (Freestone & Baker, 2011).

It now forms a distinguishable airport-driven component of the ‘patchwork city region’ and captures how airports and cities now “melt together spatially and economically” (Schaafsma, Amkreutz & Guller, 2008).

Source: As shown, quotes selected by Northpoint Aviation.

So in addition to the Passenger, MRO and cargo elements discussed earlier, economic benefits from the Welsh Government's acquisition of CIA and St Athan are likely to be maximised if these are accompanied by one or more of the following:

- A dedicated military enclave;
- An Aviation College or Academy run in collaboration with a globally recognised partner (e.g. Embre Riddle, Cranfield University in the UK or the Ecole Nationale de l'Aviation Civile - ENAC in Toulouse); and
- A Conference and Business Centre, integrated with hotel accommodation on or adjacent to one of the two airports.

The foregoing will then help to provide key anchor developments for a cluster of non-aeronautical development including:

- Hotel campus/village;
- A creative industries office/studio campus;
- An aerospace innovation centre and aerotech park;
- A logistics export park, incorporating a cold store and customs facilities;
- A high spec airport light industrial estate; and
- A student village with local amenities (i.e. a convenience shop, post office, café, crèche/nursery and access to NHS services) for those attending the College/Academy or working on site.

All while still allow targeted opportunities for a gated 'air park' and housing development adjacent to existing settlements.

Providing the necessary up-front investment to catalyse this scale of development will be a major challenge, but the incremental approach used at Liverpool and Doncaster-Sheffield by Peel Holdings/Airports Group, may offer a model for a public-private joint venture between the Welsh Government, Vale of Glamorgan Council and Legal & General, in which development profits from one component of the scheme are recycled to bring forward the next. The key to this approach, however, is for the development vehicle being used, to securing comprehensive ownership of all developable land so that betterment value created by Welsh Government investment in St Athan and CIA is not simply captured by private land interests.

Addressing Constraints and Managing Risks

Finally, there are a number of strategic issues, which bear upon the core theme of economic benefit maximisation, that we think require further in-depth consideration to ensure they do not become future constraints or risks to the scale of ambition set out in the preceding Chapter. These are outlined briefly below.

One Airport or Two?

The Minister requested advice on whether the Welsh Government's aspirations for enhanced aviation links and a thriving aerospace cluster could be achieved on one site (this would have to be CIA for reasons of runway capability) or two (i.e. also retain and jointly operate St Athan). Having discussed the issues at some length with relevant parties, the conclusion is relatively clear cut for the following reasons:

- Runways are critical pieces of national infrastructure that should not be foregone unless it is absolutely certain they have no long-term future;
- Hawarden does not have the capacity for large-scale projects, nor is Airbus inclined to share its site with MRO or aircraft recycling operations;
- It is not clear that strategic opportunity sites with airside access on the scale required for Wales Aerospace ambitions can be developed at Cardiff Airport alone, although further work is needed to confirm that;
- There are few strategic alternatives for large-scale aerospace activity requiring runway access within two hour travel time of Cardiff, in an area which including the near South West is at the heart of the UK aerospace sector;
- A consolidation of current St Athan aerospace activity at Cardiff Airport would be costly – it has been estimated that it would cost £80million to recreate the facilities at St Athan at the Cardiff Airport site;
- Significant cost savings should be possible across the two airport operations once contracts and development ambitions are properly aligned and governance co-ordinated;
- There may be advantage in having flexibility to allocate costs and expenditures between the two sites; and
- It is also noted that Instrument Landing System (ILS) issues at Brize Norton may open up further military related opportunities at St Athan.

Accordingly St Athan should be retained and a two-airport approach to development in the Enterprise Zone adopted.

The Focus of Aviation Related Spend and its Share of the Transport Budget

With so many Welsh originating passengers crossing the border to use English airports, Welsh policy makers face another important strategic decision, which will again impact on the scale of economic impacts derived from aviation in Wales and where they are realised. The main issue being - how much effort should be spent on seeking to claw these passengers back and where does that sit as a priority within the transport and wider EST and overall budgets of the Welsh Government? For example, it could be argued that to invest in surface transport projects where a material part of the business case for the project is to make access to airports outside Wales more convenient, is unlikely to be as beneficial as investing in schemes designed to support airport infrastructure in South Wales, particularly in the St Athan - Cardiff Airport Enterprise Zone.

In North Wales, the absence of a commercial airport makes the argument for improved access to 'out of Wales' airports much stronger, although a North/South air link to Cardiff remains essential given travel times achievable on surface modes. Parts of West Wales might also justify such consideration where travel times to the national capital from significant population centres is equally long or difficult. The concept of equality of access to Welsh national institutions from any part of the country is an appealing one and Cardiff Airport is essential to achieving it.

In South Wales the leakage evidence shows that air passengers are able to make their way to other airports if they need or choose to – and so there is no case for expenditure on initiatives to encourage this. Instead, the focus should be on making it quicker and more convenient to get to CIA and ensuring Welsh business, inbound visitors and outbound holiday-makers can then access the direct or one stop connections to the key destinations they wish to get to from there.

This puts a priority on developing a critical mass of passengers and regular business users of CIA, which in turn requires the route support and surface access improvements discussed in the previous chapter. Without this, delivery of improved service standards leading to an enhanced user experience at the Airport itself and eye-catching marketing campaigns to show off what has been achieved (all of which will require some thoughtfully targeted

investment), capturing the underlying demand needed to sustain domestic and international air service connectivity direct from the Welsh Capital will be extremely difficult.

Given the pressures on Welsh Government budgets and competing demands for investment elsewhere, the difficulty of identifying the necessary capital and revenue funding for these initiatives is appreciated, but there should be no doubt that they are critical to realising the airports potential.

State Aid

The key to finding pathways through the complex state aid legislation that is associated with airport development requires the adoption of certain high-level principles:

- Eliminating the need for operational aid to the airports, thereby allowing greater leeway on route start-up and capital support without running into cumulative aid issues;
- Separating airport infrastructure investment from broader commercial projects,
- Maximising the extent of safety and security activities (policing, air traffic control, customs, fire-fighting service etc.) paid for by the state as this does not amount to state aid;
- Having an overarching strategy, that clearly identifies where carefully targeted aid can generate significant economic benefits without materially affecting the prospects of competitor airports in a 60-minute travel time (which both Bristol, Luton and Gloucestershire Airports lie outside);
- Seeking as soon as possible, notified EU approval for those elements that do amount to state aid, and being clear those that do not and in effect are the actions of a well-funded market investor taking a long-term perspective; and
- Adopting governance structures that are compatible with these other principles and managing programme financing and delivery accordingly.

As previously indicated, we see both the need and considerable merit in the Welsh Government leading the Airport Enterprise Zone development strategy, at least in the short to medium term. Therefore, developing a soundly based protocol to cover start-up aid (potentially piggy-backing on DfT's RACF approval from the Commission, but with appraisal criteria more suited to the Welsh situation) and capital investment at an early stage would be a politically and financially prudent step. The subsequent adoption of a private sector led financing and governance model, based either on the successful partnership approaches championed by Peel Airports and Canadian Trust airports, potentially offers an interesting

private led alternative in the medium to long term once the futures of both airports have been assured.

Risk Management

For a programme of this scale, significance and complexity, it is important to have in place clear and well developed risk management register (probably in a nested form to reflect the roles of different players and those they have control over and responsibility for) and associated mitigation strategies, that are regularly updated, reviewed and acted upon by those with relevant governance responsibilities.

Although we have not seen any evidence of these, we assume something along these lines exists; it might, however, be prudent to get these or any new documents responding to this report, independently audited so that the programme has a sound footing from the outset.

Programme Management and Governance Arrangements

Providing a Clear 'Route Map' to Securing the Long Term Vision

The Cardiff - St Athan Strategic Development Framework provides a coherent and logical strategic vision for the development of the three Enterprise Zones (i.e. St Athan Aerospace Business Park, Cardiff Airport and land adjacent to the Airport - the Gateway Development Zone), and a clear statement of intent. Although one or two aspects may merit revisiting as more detailed planning is undertaken, what is now required is a clearly defined and well developed 'route map' to deliver the strategy that has been set out, and the commitment of the necessary expertise and resources to realise it. This is probably the biggest gap in the large volume of documentation surrounding the airport that has been examined during the course of this study.

Typically a 'route map' of this kind would take the form of a pyramid of documents:

- This would start with a Masterplan, looking 15-25 years ahead, for each component part of the Enterprise Zone and any areas adjacent to it (e.g. Rhoose and St Athan village itself) that are relevant to its implementation;
- Sitting under this would be a 5-10 year Development Programme comprising more detailed delivery programmes for each of the three main sites;
- Then a 3-5 year Business Plan for each airport and the 'Gateway' development area; and

- An annual Budget looking ahead three years, tied clearly to the delivery of those business plans.

It would be important to revisit and update each component of the road map regularly, as their different time horizons require; and each would have extracting efficiencies from integration, engaging private partners and wider stakeholders and capturing the economic benefits of aviation related growth at their heart.

At the top of the document pyramid would be a range of active delivery orientated documents such as:

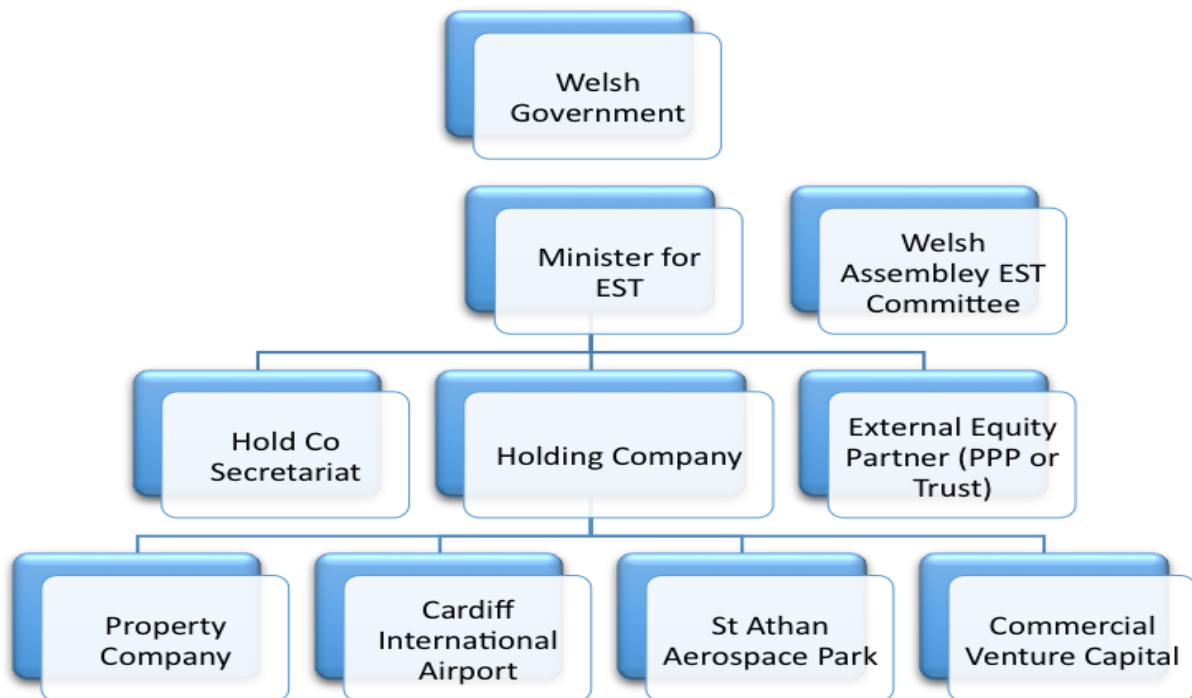
- Sub-Zonal Planning Frameworks;
- Special Development Orders – eliminating the need for complex planning procedures; and
- Project Delivery Plans.

Governance Structure

Our view is that the appointment of zonal or cross-cutting project ‘champions’ responsible to Management Boards at each location and an over-arching Enterprise Zone Board providing advice to a cross-cutting Ministerial Committee, will be required to not only to co-ordinate and drive delivery, but also to establish appropriate project oversight and programme governance. The details of these arrangements would be for officials to agree with Ministers, but we consider a structure, similar to that in Figure 16, to have merit in terms of:

- Clear reporting lines and definitions of responsibility;
- Ensuring enhanced land values created as a result of Welsh Government investment in the Enterprise Zone, and infrastructure serving it, can be captured and re-invested;
- Careful targeting of the available public resources to maximise the economic outputs secured for Cardiff Capital Region and the rest of South Wales;
- Maximising agglomeration and spillover effects from the clustering of development;
- Facilitating the opportunity to introduce significant private capital when the time is right; and
- Affording the flexibility to allow selective disposals of assets, land or equity in the main or spin-off businesses, as and when appropriate.

Figure 16: Possible Governance Structure

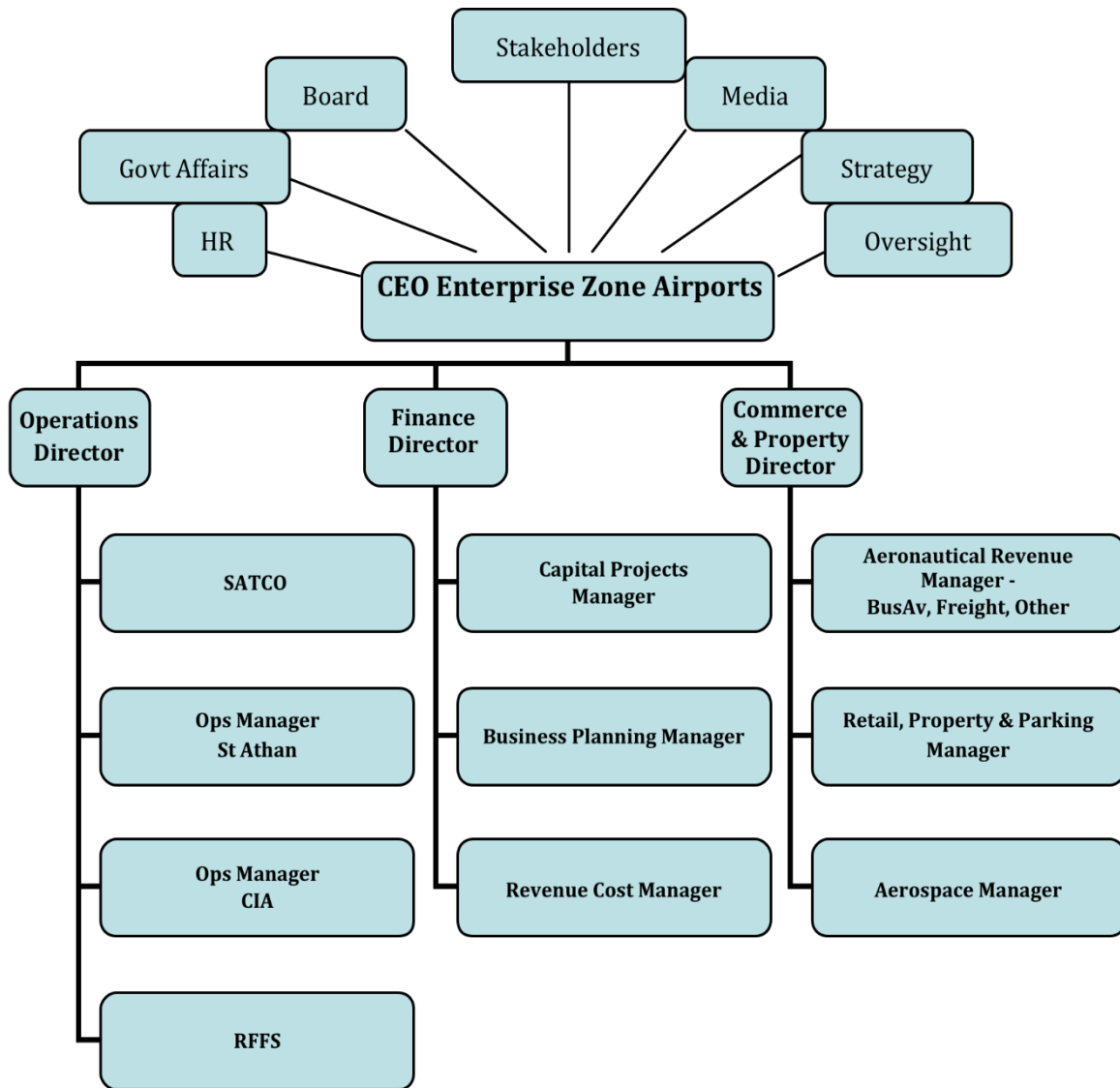


Source: Northpoint Aviation

Management Structure

In terms of a management structure to deliver the foregoing, Figure 17, sets out what is proposed. The structure envisages senior management have oversight and reporting responsibilities of both airports but that there is dedicated public facing management at each. This should provide an efficient but safe and coherent alignment of executive responsibilities, with reports to a Management Board and the main Enterprise Zone holding Company Board.

Figure 17: Management Structure



Source: Northpoint Aviation

Funding

The financing of a 20-25 year programme of development in the Enterprise Zone of the kind envisaged in previous chapters needs a far more in-depth analysis than has been possible in this study, but it is likely to be on a scale that will require a significant public private partnership and a range of sources for different components of the programme. Potential contributors include:

- The Welsh Government (route development funding, further capital grants and loans – potentially funded from future equity sales, investment in surface access links);
- The UK Government (loan guarantees from the UK Infrastructure Fund);

- Cardiff Capital Region (City Deal);
- Vale of Glamorgan Council (Land sales or capital borrowing);
- European Commission (ERDF funds, SESAR, Horizon 2020);
- The European Investment Bank (Development loans);¹²
- Private equity investors (Sovereign Wealth Funds, UK/Welsh Pension Funds, specialist Infrastructure Funds, Legal & General); and
- Private debt finance (for individual projects within the overall development).

Programme Management

There is an argument for possibly aligning this in the form of a Development Corporation to pull together the wider funding and land/surface access development aspects. This would allow the existing holding company to focus on strategy for, and oversight of, the two airports; but equally they could eventually be brought together at some future date. Failing that, there will need to be a substantive in-house and external advisory team:

- Initially to undertake the additional market research, masterplanning, project definition and stakeholder consultation;
- Then to look at programme co-ordination and time-tabling (e.g. with other major projects within the Capital Region, on the rail network and brought forward by MoD), implementation strategies including securing legislative/planning approvals and ideally cross-party political support within Wales and at a UK and European level;
- In parallel to examine options for funding, partnerships and procurement, and then to prepare documentation to support each of these aspects; and
- Finally to provide programme oversight and scrutiny for Welsh Government Ministers, the Welsh Assembly and UK Government and EU/EIB reporting lines.

This would almost certainly require the appointment of a Programme Director, with extensive aviation and programme management experience reporting to Senior Civil Servants in the Welsh Government and through them the Minister for Enterprise, Science and Transport.

¹² It has done this for several other European airports, including most recently €200m for Bergen.

Only by putting this kind of strategic support structure in place will airport management be able to focus on the day to day running of the two airports and secure project execution and closure for the opportunities that come forward.

Conclusions and Recommendations

The existence of many secondary airports is fragile, subject to many external influences over which they have no control and yet inhibited by regulation that imposes excessive costs whilst limiting commercial freedom of action. They face structural challenges of limits to potential demand, strong seasonality and the impact of consolidation and changed business models in the airline industry.

In some cases, the scale of this challenge has proved too much, resulting in closure and loss of accessibility that has been of material concern to those managing relevant local economies. Equally the direct, indirect, induced and catalytic impact of airport development is now widely accepted.

So when under Abertis's stewardship, Cardiff International Airport went into a period of significant decline, the Welsh Government faced a choice of acting to ensure Wales' capital city continued to have its own airport (as every other capital city in Europe does), or risking further deterioration, loss of accessibility and eventual closure. That it chose to take over the airport has been politically challenging and involves some financial risk, but it also gives Cardiff Capital region and South Wales more broadly, the opportunity to grasp the substantial economic opportunities that ownership of Cardiff and St Athan airports bestow. These are discussed at some length in the body of this report but include:

- The creation of a thriving regional airport with prospectively significant future realisable asset value;
- Retention of a symbolically important gateway to Wales and one that is important in realizing some of the broader ambitions of the Capital Region board to attract major events and investment in new venues;
- Securing enhanced domestic and international route connectivity that will support many of the priority sectors identified in the Welsh Government's economic strategy;
- Underpinning and expansion of a key economic cluster that is vital to the wider economy of South Wales;

- Retaining 3,000 existing jobs and providing the opportunity to generate several thousand more; and
- The potential to establish aviation-driven business district (Grover, 2013) equipping Wales with the infrastructure to compete in the new speed-conscious, globally networked economy, and attract time-critical manufacturing, repair and distribution and export focused service sector companies in a cluster that could become a magnet for the development of have value business hubs/headquarters for those who rely on frequent long-distance or international travel.

We have set out some of the constraints and risks associated with such an ambitious vision and delivery agenda and have set out our thoughts on the kind of governance arrangements, management structures and funding approaches required to address them. But given, sufficient political commitment, leadership, strong partnership working, careful management and adequate resourcing we foresee no major stumbling blocks to their realization, enabling Wales to maximise the benefits from its investment in the Cardiff and St Athan Airport Enterprise Zone.

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Glossary

ACI EUROPE	European region of Airports Council International, the worldwide professional association of airport operators
'Agglomeration economies'	The benefits that arise when firms locate near one another together in cities and industrial clusters
Air Passenger Duty (APD)	An excise duty which is charged on the carriage of passengers flying <i>from</i> a United Kingdom or Isle of Man airport on an aircraft that has an authorised take-off weight of more than ten tonnes or more than twenty seats for passengers
ATC/ATM	Air Traffic Control/Management
ATS	Air Traffic Services, provided in the UK by civil and military Air Navigation Service Providers (ANSPs) from aerodromes and Area Control Centres across the UK
BAMC	British Airways Maintenance Cardiff, located @ Cardiff Airport
Bombardier	A leading manufacturer of planes and trains, with its HQ in Canada
CAA	Civil Aviation Authority
Cardiff Aviation	A full service aircraft maintenance company
Cardiff Capital Region	Economic area defined by the Travel to Work Area of the City of Cardiff
CAT1 ILS	Category 1 instrument landing system is a ground-based instrument approach system providing guidance for aircraft, using lighting arrays and radio signals, to enable safe landing during unfavourable meteorological

	conditions
Centre for Cities	A think tank specialising in research into understanding UK cities, and how and why economic growth and change takes place in them
CIA	Cardiff International Airport
CIAL	Cardiff International Airport Ltd
City Deals	Agreements between government and cities which give the cities and their surrounding area certain devolved powers and freedom to support economic growth
Cluster effects	Cumulative causation
Core Cities	Grouping of ten of the largest UK city regions outside London
EASA	European Aviation Safety Agency, established in 2002
EBITDA	Earnings before interest, taxes, depreciation and amortization – An indicator of a company's financial performance, calculated as revenue minus expenses
e-Cube	An aviation services company based at St. Athan Aerospace Business Park, near Cardiff, U.K., which specialises in 'end-of-life' aircraft projects
EIB	European Investment Bank
Enterprise Zone	Areas in which fiscal incentives (e.g. tax concessions) and simplified planning rules, are offered to encourage business investment
ERDF	European Regional Development Fund
EST	Department for Economy, Science and

	Transport of the Welsh Government
FDI	A <i>foreign direct investment</i> (FDI) is a controlling ownership in a business enterprise in one country by an entity based in another country
Fortune 500	An annual list of the five hundred largest US industrial corporations, as measured by gross income
Finmeccanica	Italian owned advanced engineering company, specialising in the aerospace industry
FTE	Full time equivalent
GDP	Gross Domestic Product
GVA	Gross Value Added (Measure of the contribution to an economy of each individual producer, industry or sector)
HIAL	Highlands and Islands Airports
Horizon 2020	Current EU Research and Innovation programme, with nearly €80 billion of funding support available over 7 yrs (2014 to 2020)
ICAT	International Centre for Aerospace Training, Cardiff and Vale College
Mittelstand Enterprises	Small and medium-sized enterprises in German-speaking countries
MRO	Maintenance, repair and overhaul of aircraft
OEM	Original equipment manufacturer (OEM) is a term used when one company makes a part or subsystem that is used in another company's end product
PSO	Public Service Obligation: An arrangement in EU transport law where a governing body/other authority offers an auction for

	subsidies, permitting the winning company a monopoly to operate a specified service of public transport for a given period of time
Satellite towns and cities	A concept in urban planning that refers essentially to smaller metropolitan areas which are located near to, but are mostly independent of, larger metropolitan areas
SESAR	Single European Sky ATM Research: a collaborative project to overhaul European airspace and its air traffic management
TBI Ltd	An airport owner and operator, incorporated as a subsidiary of Airport Concessions and Development Limited (ACDL), owned by Spanish companies Abertis Infraestructuras S.A. (90%) and AENA Desarrollo Internacional S.A. (10%) in 2004
UAV	Unmanned aerial vehicle
UNWTO	United Nations World Tourism Organisation
TSA	Tourism Satellite Accounts are a method of measuring the direct economic contributions of tourism consumption an economy
World City	A metropolitan urban area with a great global influence on economies and processes due to financial/commercial power independent of population size

The Public Policy Institute for Wales

The Public Policy Institute for Wales improves policy making and delivery by commissioning and promoting the use of independent expert analysis and advice. The Institute is independent of government but works closely with policy makers to help develop fresh thinking about how to address strategic challenges and complex policy issues. It:

1. Works directly with Welsh Ministers to identify the evidence they need;
2. Signposts relevant research and commissions policy experts to provide additional analysis and advice where there are evidence gaps;
3. Provides a strong link between What Works Centres and policy makers in Wales;
and
4. Leads a programme of research on What Works in Tackling Poverty.

Author Details

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CARDIFF AIRPORT EXPRESS (T9)



EXTERNAL MINISTERIAL REVIEW

Prepared by:
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24 January 2014

CAE T9 Rpt Minister v8 FINAL 24Jan14

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1 TERMS OF REFERENCE FOR THE REVIEW

I have been asked to report to the Minister for Economy, Science and Transport by 24 January 2014 on:

- The effectiveness of the new Cardiff Airport Express bus service, the T9, (referred to as **CAE T9** in this review) in delivering the Welsh Government (WG) objectives for a *fast and frequent service running between Cardiff city centre and Cardiff Airport*
- Any changes that should be made to improve its effectiveness – this could include consideration of the frequency of service, stopping pattern, route, fares and ticketing options and marketing of the service
- The long term sustainability of the service and how this can be maximised

To match these categories the review has been structured under five main headings:

- Background – Setting up the Service
- Effectiveness of the current service (August 2013 – December 2013) – First Five Months Performance
- Improvement in service effectiveness (from January 2014) – Immediate Action
- Analysis of market opportunities and market data
- Long term sustainability of the service (2015 – 2018)

'Effectiveness' in this review is defined as:

- achieving the WG's objective for a *fast and frequent bus service* running between Cardiff Airport and the city centre;
- costs and market demand levels
- comparisons of the subsidy level with other bus services
- creating and achieving market opportunities for business growth
- increasing passenger levels;
- comparing these with the performance of other services both to / from airports and other newly created bus operations
- comparing operating frequencies with current and future demand and with other airport services

The review was commissioned to examine the service, its performance to date and its future in economic, market and operational terms as they relate to Cardiff Airport and how the Cardiff Airport Express (CAE T9) achieves the Welsh Government

policy objective *'for a fast and frequent service running between Cardiff city centre and Cardiff Airport'*.

However comments have been made about the operation of the CAE T9 service by local residents and Members of the National Assembly unhappy about the reductions in local bus services and commenting on the "lack of passengers" on the CAE T9.

Following several requests this review has considered the issue of providing a service for non-airport passengers although it was outside the review terms of reference. The rationale and conclusions on such an operation so far as was possible in this review are in Appendix 2.

For brevity abbreviations have been used for Welsh Government (WG) and the Vale of Glamorgan County Council (VoGC)

METHODOLOGY

I used two well established analytical frameworks in organising the material for this review. I created the **4I's** to provide a transport specific analytical tool aimed at achieving integrated transport for travellers (for the British Tourist Authority 1992). The marketing **4P's** has been long established for more general consumer market research.

Integration – the 4I's

Information, Interchange, Investment, Imagination

Marketing – the 4P's

Product, Price, Place Promotion

In preparing this review I interviewed all the interested parties (see list Appendix1) to obtain their views on the operation of the service, possibilities for improving effectiveness and to obtain financial and passenger data. I am very grateful for the time and assistance which they all gave. I was provided with all the information I requested where it existed by the Welsh Government (WG), Vale of Glamorgan Council (VoGC), Cardiff City Council, Cardiff Bus Station, Cardiff Airport, Bus Users Cymru, First Cymru Buses the operator of the Cardiff Airport Express, Cardiff Bus, NAT and other bus operators in Wales, England and Scotland and Traveline Cymru

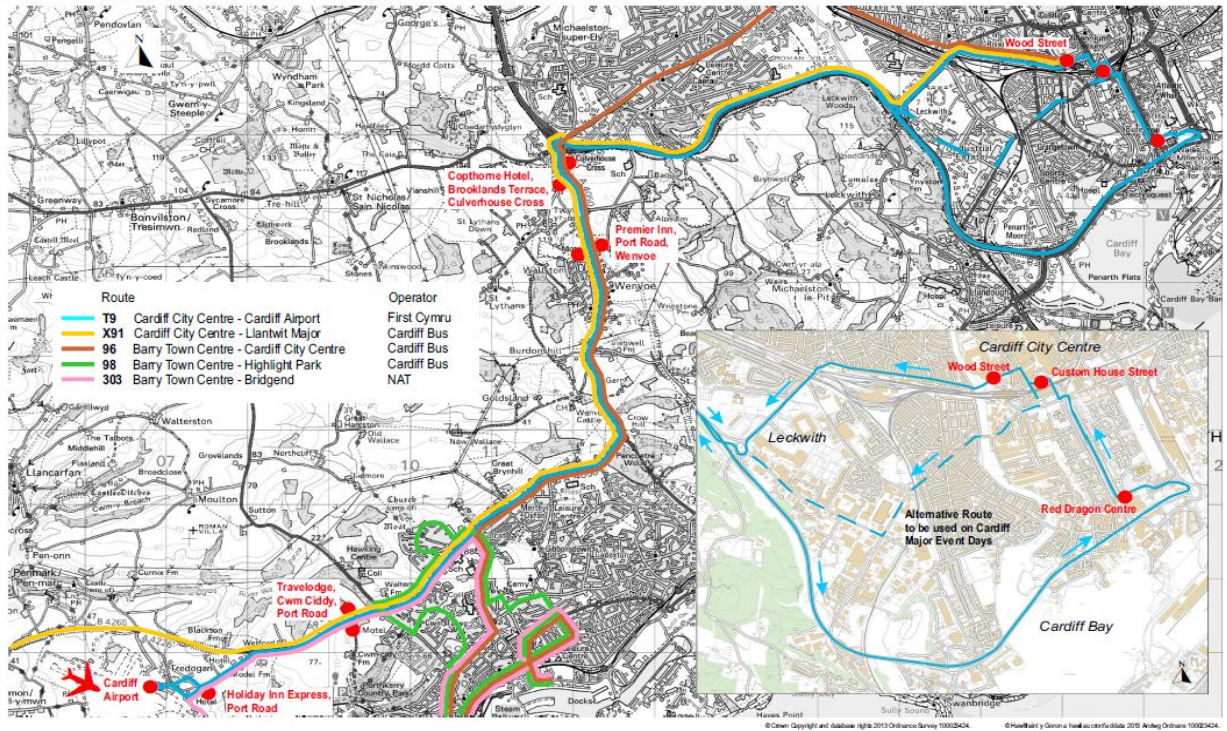
I would emphasise however that the conclusions and recommendations are mine alone assessed independently as the Minister requested

Professor Stuart Cole CBE, BA, MSc, FCILT, FICE
24 January 2014

2 CARDIFF AIRPORT EXPRESS T9 – THE ROUTE

Figure 1: Route Map Cardiff Airport Express T9 service

EXPRESS SERVICE T9 (Cardiff Airport - Cardiff City Centre)



3 REVIEW TO DECEMBER 2013 AND ACTION PLANS 2014 - 2018

3.1 EFFECTIVENESS TO DECEMBER 2013 – THE FIRST FIVE MONTHS

Background

The Cardiff Airport Express T9 (CAE T9) commenced on 1st August 2013 following a Welsh Government policy decision in June 2013 to operate *a fast and frequent service between Cardiff city centre and Cardiff Airport*

The timescale allowed limited new market research but sufficient expertise was available within government (together with the bidding operators with experience of operating airport services or services in the Vale of Glamorgan) to set a tendering process in motion.

August is not an ideal time to begin a new airport service. The high season is coming to a close and most leisure travellers (the dominant sector at Cardiff Airport) have already made their landside travel mode decision.

Current performance

The operational performance (reliability and timekeeping) is good. The contract between First Cymru (the CEA T9 operator) has provision of on board information on stops, vehicle replacement and branding and the Traffic Commissioners early and late running regulations apply.

Financial Performance

The revenue risk is taken by First Cymru which retains all the revenue. The cost to WG / VoGC is fixed in the contract but with an opportunity to extend after six months.

The original peak vehicle requirement was five buses but this increased to six when operational difficulties arose. All vehicles have come from the TrawsCymru reserve fleet at no immediate capital cost to the WG. None of the vehicles in question was at the time operational so the decision to utilise them had no impact on the TrawsCymru network. However an opportunity cost may occur in the medium term when a TrawsCymru network is established. The additional driver / maintenance costs are funded by First Cymru at no cost to WG.

The low season has resulted in a subsidy per passenger trip of £7.32; however when the summer high season is taken into account that could fall to £4.04 ppt. As the business grows in line with or faster than airport passenger numbers that could fall further to within the general limits for many subsidised services. Passenger numbers

for the year could be expected to rise to 116k compared with 21k for the first four months as we move into the high season for air travel.

A suggestion has been made to operate the CAE T9 as a local and premier express airport service. This should not be pursued as these two markets have never been successfully served with the same vehicle / service. Air travellers expect their service to be premium priced and be direct.

Passenger Demand

Passenger demand is at its lowest in winter but the CAE T9 has attracted 4.7% of the landside travel market. This with the 3% share held by the rail service via Rhoose / Cardiff International Airport station gives 7.2 to public transport. A modest assumption is made in the review on increasing this share.

The difference in demand and flight patterns will produce a different peak vehicle requirement between summer and winter particularly in the evening period.

At present the primary catchment area (80% of travellers) is within one hours travel of Cardiff Airport.

3.2 ACTION PLAN – SHORT TERM (2014)

(References in brackets refer to more detailed sections later in the report).

There are actions to be taken by the managers (7.8) of CAE T9 within the next year to increase business and make the service more attractive to passengers and therefore more effective in passenger service criteria, subsidy level (subject to an analysis of revenue risk) and achievement of the Government's objectives. Some actions could start within the years but should then continue over the longer term (2014 – 2018)

- Market research (6.5) on:
 - how can more of Cardiff Airport's biggest market segment (leisure travel) be persuaded to use CAE T9
 - the rugby / major event market
 - student market (south Wales has 7 universities with international students)
 - the full extent of the catchment areas across south Wales and how interchange may be made at Cardiff.
- Promoting CAE T9 to these market segments; creating the next phase of the advertising campaign (6.6).

- Improving information on CAE T9 at key locations – e.g. Cardiff Airport; Cardiff Central Railway Station; Cardiff Bus Station, public libraries, TIC's (7.5).
- Improving interchange information at Cardiff Airport and Cardiff Central Bus and Rail Stations including directional signs, floor vinyls, screens etc. to show clearly the route to the CAE T9 (7.5). This applies in particular on event days and Friday / Saturday evenings when the bus station may not be available. Clear market tested information should be an early action at Stand E1 to show alternative bus stop locations. Assume the passenger has no knowledge of Cardiff city centre.
- Ensure improvements to waiting facilities at Cardiff Airport are carried out. Waiting inside the Departures Hall could be a temporary measure with an information screen showing bus departures (7.5).
- Monitor production of timetables; located on board CAE T9 buses, at Cardiff Central Station information booth and at Cardiff Airport Arrivals Hall (7.5).
- Continue the dialogue through Ministerial and senior officials' action encouraging ATW and Cardiff Airport to consider onward travel within the Government's integrated transport policy for the benefit of through travellers. The CAE T9 should be a part of the discussion on Cardiff Airport's strategic business plan and its implementation.
- Continue to create new market led initiatives for the provision of through tickets to/from Cardiff Airport with ATW, Cardiff Bus, Stagecoach, TrawsCymru, NAT, National Express, First Great Western, Cross Country Trains and other operators (7.5).
- Introducing credit card facility on board liveried buses (7.7).
- Consider the CAE T9 brand. This is a longer term decision but should be included in the market research exercise (7.9).
- Consider a Quality Bus Partnership / Quality Bus Contract on the Cardiff city centre – Cardiff Airport CAE T9 alternative routes
- Analysis of the route options In particular the two way operation through Cardiff Bay and the orbital route via Greyfriars Road, Cathays Park (university and government). Both of these options should be considered with an option for a through ticket on the Cardiff Bus *baycar* (7.6).
(7.5).

- Ticket machine for rail tickets and for CAE T9 service at Cardiff Airport arrivals hall.
- Retain interior of vehicles as at present until market research to identify passenger needs in respect of the balance between seating and baggage racks. The baggage storage at present on side rack and overhead shelves is sufficient. Most business passengers travel 'light' (7.7).
- Review the operating stand at Cardiff Bus Station. The location is perfect for interchange especially with rail services, Newport Bus / Cardiff Bus X30, TrawsCymru and National Express all of which are on site 1 of one of the CDE or F stands. The issue concerns the 12.6 metre length of the vehicle and the need to reverse. Cardiff Bus Station management has been very cooperative
- Examine the PVR of five vehicles increasing to six buses and why two of the liveried Optare Tempo vehicles were /are out of service

3.3 ACTION PLAN – ACHIEVING LONG TERM SUSTAINABILITY

There are actions to be taken by the managers (7.8) of CAE T9 in the longer term 2015 to 2018. Many follow on from the Action Plan for 2014 with the same objectives of increasing passenger numbers, the attractiveness to passengers, continuing to meet passenger service criteria achieving Government objectives

- Market research (6.5) continues to monitor actions taken in previous years on:
 - Cardiff Airport's biggest market segment (leisure travel)
 - The major event market
 - The student market
 - The catchment areas across south Wales and how interchange may be made at Cardiff.
- Continuing to promoting CAE T9 to these market segments; creating the next phase of the advertising campaign (6.6).
- Monitoring information on CAE T9 is provided at key locations – e.g. Cardiff Airport; Cardiff Central Railway Station; Cardiff Bus Station, public libraries, TIC's (7.5).
- Updating and renewing interchange information at Cardiff Airport and Cardiff Central Bus and Rail Stations including directional signs, floor vinyls, screens etc. to show clearly the route to the CAE T9 (7.5).

- Improving waiting facilities at Cardiff Airport which currently are poor. Waiting inside the Departures Hall could be a temporary measure with an information screen showing bus departures (7.5).
- Production of timetables; located on board CAE T9 buses, at Cardiff Central Station information booth and at Cardiff Airport Arrivals Hall (7.5).
- Persuade through Ministerial and senior officials action the need for ATW and Cardiff Airport to consider onward travel within the Government's integrated transport policy for the benefit of through travellers. The CAE T9 should be a part of the onward travel and arrivals to the airport in its strategic business plan. That is currently in preparation / implementation
- Discuss with ATW, Cardiff Bus, Stagecoach, TrawsCymru, NAT, National Express, First Great Western, Cross Country Trains and other operators the provision of through tickets to from Cardiff Airport (7.5).
- Introducing credit card facility on board liveried buses (7.7).
- Consider the CAE T9 brand. This is a longer term decision but could be included in the market research exercise (7.9).
- Consider a Quality Bus Partnership / Quality Bus Contract on the Cardiff city centre – Cardiff Airport CAE T9 alternative routes
- Analysis of the route options In particular the two way operation through Cardiff Bay and the orbital route via Greyfriars Road, Cathays Park (university and government). Both of these options should be considered with an option for a through ticket on the Cardiff Bus *baycar* (7.6). (7.5).
- Ticket machine for rail tickets and for CAE T9 service at Cardiff Airport arrivals hall.
- Retain interior of vehicles as at present until market research to identify passenger needs in respect of the balance between seating and baggage racks. The baggage storage at present on side rack and overhead shelves is sufficient. Most business passengers travel 'light' (7.7).
- Review the operating stand at Cardiff Bus Station. The location is perfect for interchange especially with rail services, Newport Bus / Cardiff Bus X30, TrawsCymru and National Express all of which are on site 1 of one of the CDE

or F stands. The issue concerns the 12.6 metre length of the vehicle and the need to reverse. Cardiff Bus Station management has been very cooperative.

- It would appear that the bidders for the contract underestimated passenger numbers and that the revenue to the operator is higher than expected. Calculate the profit / loss made by First Cymru to determine whether the existing contract (where First Cymru take the revenue risk) should continue after the three year review point or whether revenue should accrue to WG.
- Monitor through on board operations checks, Bus Users Cymru bus compliance officers and short on board / bus stop users surveys whether passenger quality criteria / expectations for premium airport service have been achieved / maintained (6.6). They should be considered under:
 - Direct service with some en-route stops
 - Terminal point in the city centre
 - High frequency
 - Fare contestable with the taxi equivalent
 - Good information / easily recognisable branded vehicle
 - Easily available tickets
 - High quality premium service vehicle interior and exterior
 - High level of reliability and timekeeping
- Monitor demand against frequency and consider reducing the winter timetable to two buses per hour in each direction based on market research (5.4; Table 6).

4 BACKGROUND / SETTING UP THE SERVICE

4.1 CREATING THE CARDIFF AIRPORT EXPRESS

An announcement was made in the National Assembly on 11th June 2013 establishing a new express bus service between Cardiff Central and Cardiff Airport. Called the Cardiff Airport Express, service T9 would operate from the 1st August 2013.

This public commitment did not give the timescale which such a service requires to be fully assessed. It was also begun at a low point in the travel market's annual demand pattern (See developing the business below). The market research was limited and largely anecdotal so that the vehicle type, route, stopping places and frequency could not be considered in the manner such a service would have been by a commercial operator.

The availability of vehicles from the TrawsCymru network resulted from the non-introduction of the T1 service as a result of the Transport Act 1985 provision providing for no competition between a subsidised service and one provided commercially on the same Aberystwyth to Carmarthen route. This was fortuitous in that it allowed the promised start date to be achieved. The vehicles were purchased by the WG although technically owned by Powys County Council

The procurement of the service was discussed with both Vale of Glamorgan County Council (VoGC) and Cardiff City Council. They and Cardiff Airport all had an interest in the introduction and success of the service. VoG agreed to proceed with the tendering process in two stages – pre tendering notification and the invitation to tender. The tender was advertised widely through the 'Sell to Wales' website.

The vehicles were provided by the WG from the TrawsCymru spare vehicle fleet with a variant in the branding (7.9). The winning tender requires the provision of operational and maintenance staff, materials, fuel and garaging and the operation of the service according to a timetable and fares agreed with the WG and VoGC.

It should be made clear that there was no major issue in Pembrokeshire with the use of the TrawsCymru buses. The proposed T5 service could not be operated until March 2014 at the earliest if a QBC or QBP was to be introduced on the Haverfordwest to Aberystwyth T5 route.

First Cymru is a Swansea based operator with local service operations in Cardiff, The Vale of Glamorgan and between Bristol Airport and south Wales (its Greyhound brand). In the event several companies bid for the service. The three bus companies interviewed for this review were all respected operators of similar standards and

financial standing but with wide price variations in terms of the subsidy costs to WG (5.3).

The tender had to be processed quickly but had also to comply with the due tendering process and achieve best value for money in terms of cost and quality, operating government-owned vehicles and achieving the shortlist of providers. The decision on the contractor was made solely by VoGC with reference to WG on financial data.

There was a relatively short period of six weeks to put out the tender, for bidders to identify or employ staff, create an indicative timetable which met the 20 minute interval. The tender had to achieve the lowest price. But for the operator taking the revenue risk the revenue forecast is vital. For the SME this is an almost impossible task. Larger companies who had other airport express operations or for whom the revenue risk was small in comparison with total turnover may have been better placed to tender.

Cardiff City Council were supportive of the service but were not prepared to be the procurement authority. They were able to provide a stand at the Cardiff Central Bus Station (which they own); initially that was not a particularly attractive location and new more appropriate location was then allocated conveniently for the Cardiff Central Railway Station booking hall and the central business district and therefore the major hotels area. It is also adjacent to the TrawsCymru T4 (service to / from Newtown and the Canolbarth) stand and convenient for the National Express and Greyhound stands.

Discussions took place on the level of frequency of the service. Service intervals of 15 minutes, 20 minutes and 30 minutes were considered. If the service is to be of the form considered an express airport service by travellers especially business visitors then a twenty minute service frequency is the minimum requirement and this was the frequency chosen.

4.2 RECENT OPERATIONS: DIRECT SERVICE TO CARDIFF AIRPORT

In recent years the X91 Cardiff Bus service between Cardiff, Rhoose, St Athan and Llantwit Major called into the airport. This was hourly daytime Monday to Saturday to which were added in 2002 some early morning/late evening airport only journeys in response to scheduled activities at the airport growing (from new airlines operations e.g. BMI baby).

From May 2003 a five journey Sunday service to the airport was introduced and gradually more non-stop airport journeys were added.

A major change in service style and frequency was introduced from 31 October 2004 when the dedicated Airbus service began operation also operated by Cardiff Bus in a BMI Baby livery. The service characteristics were:

- a half hourly frequency throughout the daytime Monday to Friday,
- an hourly frequency in the evenings and all day Saturday and Sunday to and from airport,
- a loop around the city centre to cover the city centre hotels

The Vale of Glamorgan line reopened to passenger service with a new station at Rhoose and a shuttle bus to/from the airport terminal connecting with the hourly railway service. This was (and is) operated by Arriva Trains Wales as an addition to the Wales and Borders rail franchise. The subsequent fall in patronage on both the airport and Vale services led to the discontinuation in March 2006 of Airbus and the resumption of the airport only being served directly by the hourly X91 Llantwit local service.

From October 2009 the service was further reduced to a basic two hourly off peak, hourly peak service, but still retaining the Sunday service.

Finally from July this year the current two hourly Monday to Saturday only service omitting Rhoose and the airport was introduced.

4.3 CONTRACTUAL ARRANGEMENTS

The procurement of the Cardiff Airport Express (CAE) T9 service was through the Vale of Glamorgan Council who are reimbursed for costs incurred by the Welsh Government (WG)

The key aspects of the contract are:

- vehicles are provided by the WG (through the TrawsCymru procurement arrangement with Powys CC) and comply with disability requirements
- information on operations and changes must be supplied to Traveline Cymru
- arrangements may be made for another operator and recover any additional costs if the contracted operator fails to provide a service
- the destination and route number must be clearly displayed on the destination matrix
- publicity, timetables and other information used must be agreed with VoG and WG

- other appropriate vehicles of similar quality to be supplied if the WG Optare Tempo buses are not available; vehicles must be cleaned at least once per day
- the buses may not be used for any purpose other than the CAE T9 service
- the on board next stop audio/visual facility must be working
- branding will be decided by the WG and VoGC; no other amendments may be made by the operator without agreement
- Revenue risk is taken by First Cymru and the company keeps all the revenue or a portion if a further arrangement is made with another operator for 'add-on' ticketing. e.g. with Arriva Trains Wales; Cardiff Bus *baycar*; Newport Bus X30
- Maximum fares are set by the VoGC in Pounds Sterling and Euros. They may be reviewed annually but only in agreement with WG / VoGC
- Other contractual arrangements not directly affecting the operations and the travelling public
- The contract is for six months from 1st August 2013 with an option to extend by VoGC.

4.4 TIMING OF SERVICE COMMENCEMENT

The service commenced at the end of the main travel season. In Cardiff, particularly given its dependence on the charter market, it was about the worst time to begin. The vast majority of travellers in August and early September had already made their land-side travel arrangements. The nature of charter air travellers is that they plan far ahead, are not a frequent flyer segment, prefer familiar modes they have used previously and have in general, difficulty in dealing with unfamiliar disruption.

Consequently the lowest passenger loadings are from September to March and can be expected to pick up during the 2014 summer with effective promotion. Commercially, the service would have commenced in April 2014 with the Easter market. This would then have provided time for it to be assessed and researched in the marketing mix 4P's analysis:

- Product – frequency; type of vehicle; route; stopping pattern; hotels and districts served
- Price – testing of the market; other price options; price sensitive segments research; special rates for e.g. airport staff, BAMC, Enterprise Zone employers
- Place – where the bus service would be at the Bus Station / Airport; signage at Cardiff Central Railway Station and at the Airport in advance of operations commencement; en route bus stop flag information; Airport waiting area
- Promotion – what are the best advertising and other promotional media; managing of press commentary in advance of service commencement and preparation for operating period

Despite these challenges, the service has achieved all that was expected of it in delivering the Welsh Government's objectives *'for a fast and frequent service running between Cardiff city centre and Cardiff Airport'*

5 CURRENT PERFORMANCE – THE EFFECTIVENES OF THE CURRENT SERVICE (August 2013 – December 2013)

5.1 CURRENT OPERATIONAL ROUTE

The outbound route to the Airport runs via the Leckwith area of Cardiff; but there is no market to be developed in that area. There are no stops on this section of the route as there is no potential patronage which would justify them. The alternative route on match days is also along urban local roads.

The inbound route from Cardiff Airport to the city centre runs via Cardiff Bay. This has more market potential and avoids much of the slow moving urban road operation through Leckwith. The distance from the expressway standard southern distributor road the A 4232 Leckwith interchange to the bus station is about one third of the mileage via the Bay. Vehicle speeds via the Bay and along the expressway are three times faster and with less wear and tear on the buses' mechanical parts. This results from a constant speed along the expressway with generally no congestion.

The total journey time between Cardiff Airport and Cardiff Central along both routes is approximately the same at 33 minutes on average but timetabled as 30 minutes via Leckwith and 38 minutes via Cardiff Bay. The Bay is seen as Cardiff's second business district, the primary leisure, restaurant and cultural centre and the nation's parliamentary centre at the National Assembly for Wales.

Thus operational reliability is better along the route via Cardiff Bay with the same journey time and less vehicle wear; these have been confirmed with First Cymru, the Cardiff Airport Express operator (7.6).

Its patronage potential is therefore significantly greater than the Leckwith route. But this requires market analysis and confirmation of running times to avoid the additional cost predicted by First Cymru

5.2 OPERATIONAL PERFORMANCE (Reliability, timekeeping)

Reliability and timekeeping targets are according to the Traffic Commissioner's regulations on early (not more than 1 minute) and late (not more than 5 minutes) running for 95% of the operating period.

The contract with VoGC sets out the requirements on branding, route display provision of alternative vehicles, restrictions on CAE T9 vehicle use to the airport route (4.3).

An additional (sixth) vehicle was provided by the WG at no extra cost to First Cymru Buses from 7th October 2013. The additional vehicle requirement was to enable the regular pattern timetable service to be maintained. The problems arose from:

- Regular faults occurring with two of the five CAE T9 liveried vehicles already supplied.
- To assist with a refuelling problem as the length of the working day and the mileage operated by the vehicles exceeds the fuel tank capacity.

It was procured under a separate WG budget heading to the CAE T9 operation and was available from the TrawsCymru reserve fleet. There was no immediate cost implication for WG but an opportunity cost could arise when further TrawsCymru operations commence. All additional running, maintenance or driver payments have been made by First Cymru Buses at no further cost to WG.

Overall the vehicle failure rate is very low and well within acceptable bounds. Vehicles travel on average 40k – 50k miles each month with an average lost mileage of 50 miles – 0.1%. Twenty one services were lost (based on contractual figures provided to VoGC by First Cymru Buses) over the period 1st August to 30th November. The majority of these were engineering problems. The most significant event appears to be one vehicle out of service on 12 January 2014 as a result of a one-off 'no driver'. As a consequence one vehicle (20% of the service) was out of operation from 06.10 to 10.15. For the waiting passenger a delay of up to 39 minutes (rather than 19 minutes) was possible and this type of occurrence, though very infrequent, is one which can adversely affect the image of the business.

In most cases the failed CAE T9 buses were replaced by liveried First Cymru vehicles taken from their Park & Ride fleet. These were not of the same interior standard as the CAE T9 vehicles (although they were acceptable) and this requires further discussion between WG / VoGC / First Cymru.

However there have been out of service issues with two CAE T9 liveried vehicles provided by WG. Engineering advice suggests this is due to a poor electrical system or installation. Information from Stagecoach, the TrawsCymru T4 operator, suggests that these will be ironed out over a short period. There were ten incidents of en route breakdowns with the vehicle having to be recovered. That reliability is less than for peer group buses. The major reason for vehicles being out of service were engineering /maintenance

Driver reports are favourable. Customers interviewed reported a smooth ride although vibration occurs on certain sections of the route.

There can be operational delays to outbound journeys on Cardiff City FC home match days at the Cardiff City Stadium (Leckwith) which have interfered with the reliability of the timetable. The timekeeping also suffers on match days at the

Millennium Stadium where CAE T9 cannot operate from the Cardiff central bus station and has to use Custom House Street as the city centre terminal. This also occurs on Friday evenings and Saturday evenings when the service cannot access Lower St Mary Street. There is no specific timetable for these periods. First Cymru has been put in touch with Cardiff's events management team to ensure that any resulting disruption to services is minimised.

5.3 FINANCIAL PERFORMANCE

Costs

The total operating cost of this service is a matter for the operating company First Cymru. They also take the revenue risk.

They are contracted to operate a service according to the timetable agreed with VoG and during the period 1 August 2013 and 30 November 2013 First Cymru was paid a total sum of £156,693. The buses are provided by the Welsh Government through VoGC and are therefore also a cost to WG. The total cost to the public purse may be set out as follows (based on PVR of 4 vehicles and 1 engineering spare)

Table 1: CAE T9 – Costs to WG 1 August 2013 – 30 November 2013	
Cost Heading	£
Operating revenue support (subsidy)	156,693
Bus depreciation (5 vehicles)	19,000
Marketing (mainly promotion)	63,178
Depreciation Vehicle 6	3,800
Total cost to Welsh Government	242,691

Source: Welsh Government; VoGC, Review analysis

While the original peak vehicle requirement (PVR) was four vehicles and an engineering, spare the current PVR has increased to five vehicles. This additional vehicle has been supplied from the TrawsCymru spare fleet and is therefore an additional opportunity cost to WG. The depreciation costs are based on straight line depreciation over 15 years with a residual value of 5%. The cost per passenger on this basis (including advertising and depreciation) is £11.33 per passenger trip.

Operational changes such as lower frequencies at either end of the day leading to reduced costs should be looked at, but in the context of service quality to travellers, promoting the service and longer term demand patterns and based on market research outputs.

However the advertising costs are a one off start-up cost and depreciation an opportunity cost already sunk.

The subsidy figure shown in Table 2 refers to the Winter 2013 low season travel period and the start-up period when passengers were being abstracted from other modes. On a comparable basis for the total Summer / Winter period the subsidy could fall to £4.04 per passenger trip (Table 3).

Table 2: Subsidy per passenger CAE T9	
Many of the urban, semi – urban / inter – urban services referred to below have service frequencies of hourly or two hourly. This should be considered when making a comparison with the twenty minute frequency of the CAE T9 service.	
Period 1 August 2013 – 30 November 2013	
Total Passengers carried (1)	21,400
Total subsidy paid (2)	£156,693
Cost per passenger trip	£7.32
Based on costs in Table 2	<u>£11.33</u>
(1) Data from VoG / WG. (2) Excludes depreciation	

Source: VoGC; Review analysis

Table 3: Key Financial Comparators		
Subsidy per passenger trip on comparable routes (based on typical services) 2013		
The services are subsidised by local authorities		
	Per passenger trip	
	Range	average (un-weighted)
Urban	£0.38 - £2.42	£1.43
Semi – urban / part – rural (Inter – urban)	£0.34 - £2.77	£1.43
Rural	£3.79 - £8.74	£6.22
CAE T9*		£7.32
Annual subsidy estimate**		£4.04
*excludes vehicle depreciation. The buses involved are funded from a separate capital budget. The subsidy per passenger trip shown here is therefore comparable (but see Table 1)		
**The annual subsidy per passenger trip would fall with summer traffic (Table 10)		

Source: county councils; Review analysis.

The conclusion on the acceptability of this relatively high cost per passenger trip can only be based on comparisons with other bus service subsidy levels because no target subsidy per passenger trip was available as a yardstick.

On this basis the subsidy currently is relatively high but discussed later are possible lower subsidy rates following the development of Cardiff Airport's air passenger numbers and changes to the CAE T9 timetable. Under the current contract that increase in income will however accrue to First Cymru as it is taking the revenue risk.

5.4 PASSENGER DEMAND

The CAE T9 has already attracted 4.7% of the total (440,000) passengers arriving / departing Cardiff Airport from August – November 2013. This is a considerable achievement for a service where major publicity began in parallel with its introduction. By comparison the train service from Cardiff Central station to Rhoose / Cardiff International station connecting with the shuttle bus in 2012 carried 3%. The market view is that the 20 minute frequency, easy and convenient interchange at Cardiff Central bus / rail stations and no additional interchange together are a major attraction compared with an hourly service (Tables 4, 10).

The number of passengers carried cannot be compared with any target as none was set. The only yardstick is the assumed passenger numbers and thus revenue which was set out by the bus companies who submitted tenders. This level has been exceeded.

The level of passenger demand has been satisfactory. August inbound figures grew to around 2500 from August and plateaued at around 2300 – 2500. Outbound passenger numbers however rose from under 2000 to up to 3500 in subsequent months (table 4) Thus a reversal from a dominant inbound market (56%) to a dominant outbound movement (>60%) has occurred.

The need to introduce the service within a very short timeframe and the resulting lack of any market research data prevents any evidential based conclusion. The service introduction coincided with the Stage 1 promotional poster campaign in August – October. This was comprehensive in south east Wales and extended west as bus site advertising to Swansea, Llanelli and Carmarthen

Direction	Month				
	August	September	October	November	December
To Cardiff	2415	2565	2291	2118	1562
To Airport	1834	3490	3580	3107	2796
Total	4249	6055	5871	5225	4358
Total Rail	2424	2761	2687	2459	1986

Source: VoGC

There appears to have been some abstraction of passengers from the ATW rail service to / from Rhoose / Cardiff International Airport station (based on the patronage of the 905 bus shuttle figures). Over the August – December period of operation of the CAE T9 the passenger between 2012 and 2013 was 13,034 to 12,317 a reduction of 727 or 5.5%. Research is required to identify if there is any connection. The total public transport share of the landside market in that period was 7.7%.

Data provided through the ACTIA counts indicate the dominant pick up / set down points are Cardiff Airport and Cardiff Central Bus Station. The next most significant is Cardiff Bay. Other stops are relatively unimportant but should be seen in the light of business development opportunities

Table 5 Pick-up / set-down: Average daily % of total passengers		
Stop	Pick up (%)	Set down (%)
Cardiff Bus Station	43.1	44.5
Cardiff Airport	37.0	30.5
Cardiff Bay*	6.1	5.6
Custom House Street	1.8	5.4
Other	12.0	14.0
Total	100.0	100.0

*Atlantic Wharf / County Hall, Hemmingway Road

Source: Actia Fleet Database

Passenger / revenue growth

The only financial target / constraint was the fixed price subsidy to be paid to company operating the contract (First Cymru). The risk on costs and revenue was taken by First Cymru and passenger / revenue growth would be in their financial interest.

Below the CAE T9 service frequency is set in relation to the arrival times / departure times of flights in the current winter timetable to identify any correlation. This represents the primary movement periods for air services. The summer flight timetable has more aircraft movements

Currently during the Winter flights timetable to April 2014, the 3 – bus per hour (20 minute service interval) CAE T9 timetable operates from 04.10 (dep Cardiff Bay; 0418 dep Cardiff central Bus Station) to final departure from Cardiff Airport (23.40) arriving Cardiff Central Bus Station at 00.18

The current flight and therefore demand pattern does not require that level of service at the beginning and end of the travel / operating day during the winter period. Despite there being a significant gap in flights between 12.00 and 15.30 on Mondays and Wednesdays the other days have several flights during that period (see Fig 2 / Fig 3). It would be impossible to promote successfully such a complex variation in service to passengers.

In addition the suspension of the service during the day on certain days only saves variable costs – mainly fuel and maintenance and driver wage costs where working schedules can be amended. Other costs including some driver wages and depreciation remain the same. The effect on the subsidy figure paid requires further analysis and discussion with First Cymru

An amended winter period CAE T9 timetable is suggested in Table 6.

Table 6: Flights with associated justified ***CAE T9 frequencies (Winter Timetable)			
No. of flights (Inbound + outbound)		Winter Frequency CAE T9 (Current actual in brackets)	
Time band**		Time band	per hour
00.00 – 06.00	0		
06.00	1	04.10 – 06.30	1/2 (3)
07.30 – 09.00	1	06.30 – 09.30	2/3 (3)
09.05 – 10.30	3	09.30 – 11.00	3 (3)
11.00 – 12.00	4		
12.00 – 15.30	5	11.00 – 13.30	3 (3)
15.30 – 17.30	7	13.30 – 15.30	3 (3)
18.30 – 20.30	6	15.30 – 19.30	3 (3)
20.35 - 21.35	2	19.30 – 22.00	3 (3)
21.35 – 00.00	1 – 3	22.00 – 00.00	1 (3)
Total flights	32		
<p>*After 22.00 there are 1 / 2 inbound charter flights</p> <p>** The number of flights in each time band varies daily. The CAE T9 frequency has accounted for the variation.</p> <p>***The pattern of passenger movements for a particular flight does not correlate with passenger loadings on CAE T9. This indicates that some travellers like to arrive early at the airport while others cut it to varying levels of 'fine'. The detailed sheets on per journey loadings were made available to the review by VoGC and are available if required. For the equivalent flights the CAE T9 departures (and bus capacity requirements) are advanced by approximately 2 hours to allow for airline requirement (check – in / security)</p>			

Source: Cardiff Airport; CAE T9 timetables; Review analysis

One objective (unquantified) was the visibility of the service; it has developed a high profile operation in the city centre and en-route to Cardiff Airport. An element which may have helped is the common branding and adjacent bus station location (7.5, 7.9) with TrawsCymru T4. This has been exceptionally successful in increasing patronage and reducing the T4 subsidy to £0.05 (five pence) per passenger trip.

The CAE T9 has achieved media coverage as a *fast and frequent* high quality service from Cardiff to the airport. Media space was purchased (Phase 1: public awareness of the service costing £63,178) to give maximum publicity at e.g. railway stations and bus panels from Newport to Swansea and Llanelli.

Table 4 shows a growth in demand for a new service with future growth potential (Table 10). The service also has several peaks during the day related to arrival / departure times of flights (Fig 2 / Fig3).

Figure 2: Top 30 Busiest Services / Times of Day (Week 23 / 29 September 2013)

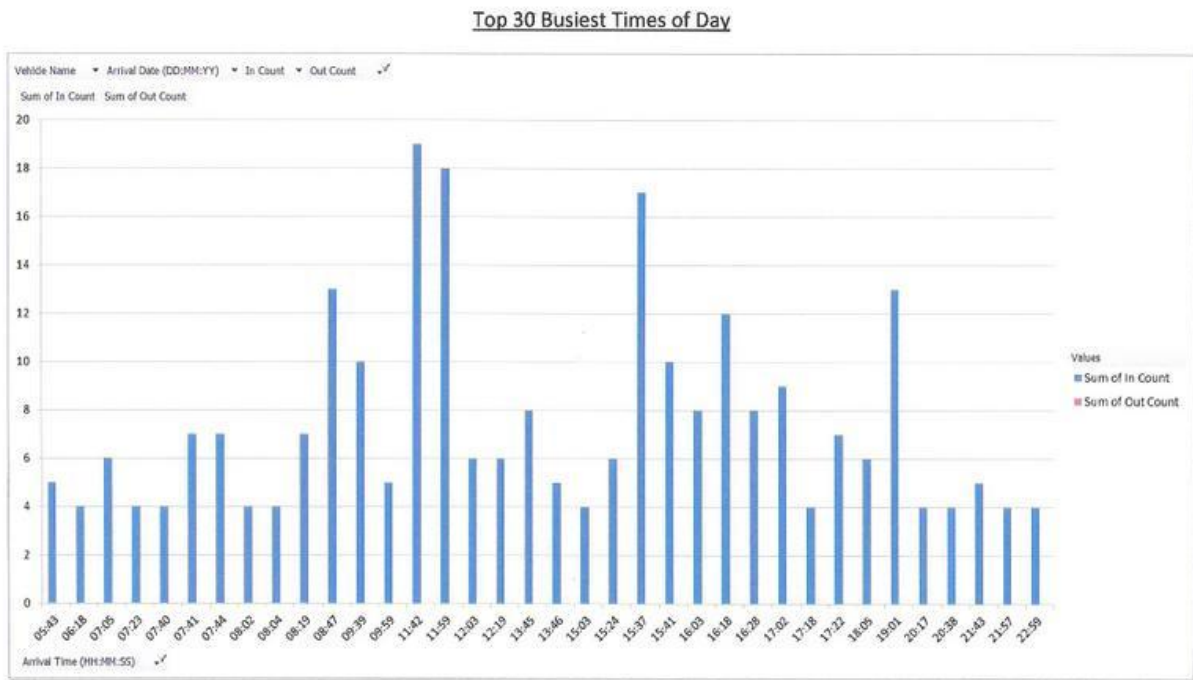
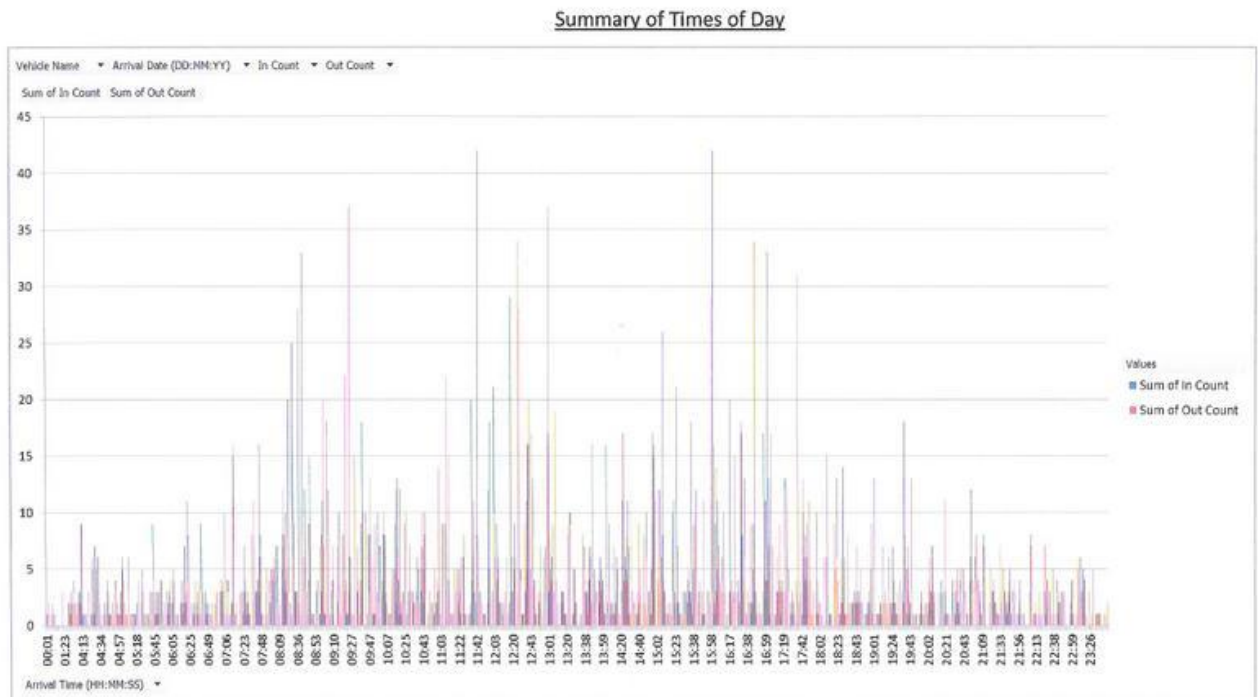


Figure 3: Vehicle occupancy by departure time from Cardiff Airport / Cardiff Central Bus Station (Week 23 / 29 September 2013)



5.5 ACHIEVING THE GOVERNMENT'S OBJECTIVES – CONCLUSIONS ON CURRENT PERFORMANCE

- It should be noted that these objectives have been achieved despite the absence of a market and development strategy which would have been undertaken had officials had more time than that available between the decision on 11 June 2013 and the start of the service on 1 August 2013
- The absence of any market research into the CAE T9 service prevented any demand targets being set and in consequence made it difficult to measure the effectiveness in terms of passenger numbers against target.
- Passenger numbers appear to have exceeded the estimates made by the bus companies who tendered and as this is the only yardstick available, one can say that the service so far has been a success. The bidders with whom I had contact all had low passenger expectations when calculating the revenue risk they had to take.
- Comparisons may be made with the rail service to the airport (Table 4) which has 3% of the market while CAE T9 has 4.7% (5.4).
- The agreed cost of operating the CAE T9 has not been changed in terms of the direct subsidy payment from VoGC to First Cymru. However an additional

vehicle has been supplied with an opportunity cost (for depreciation / capital expenditure) at some point to the WG

6 CHANGES TO IMPROVE EFFECTIVENESS

6.1 WELSH GOVERNMENT EXPECTATIONS

The Welsh Government as funder of the CAE T9 operation can expect to see develop:

- a fast (33 minute journey time) and frequent (every twenty minutes) service
- A subsidy level which is not excessive compared with other routes given that demand on the CAE T9 will take time to build up
- Evidence that there is a market for this service (shown by the current demand)
- Expectation that demand could be expected to grow as flights and air passenger throughput grows and as the promotional campaign planned for this spring generates local passengers from Wales on to charter flights (see new markets below).
- As a set of effectiveness criteria
 - Preparation for an increase in passenger numbers over the first eighteen months to two years (6.5, 6.6)
 - Journey time of 30 – 40 minutes (variable by peak and off peak operating times)
 - High level of reliability and frequency
 - Present a high quality image of Wales and the capital city to overseas visitors and business travellers

6.2 PASSENGER SERVICE QUALITY EXPECTATIONS / CRITERIA

Air passengers particularly those who travel frequently to many destinations through their own individual arrangements (i.e. not package tour customers) have a certain expectation from an airport – city centre service. They expect:

- a direct service with some set down stops inbound and pick up stops outbound within what might be called the 'city centre en route' for example
 - the Edinburgh Service 100 - *AIRLINK: Airport - City Centre* service has en route stops at Haymarket Station / tram terminal and one other;
 - The Bristol *Flyer* Airport Express Link with two en-route request stops before the city centre and seven en-route request stops within the city centre. These are located to serve CBD areas and groups of international chain hotels. The fare charge is a standard £11 (return) and £7 (single) for any journey. There are student and family fares; no reductions for part journey; holders of England (not Wales) over 60's pass holders travel free.
 - Dublin *Airlink* fare €5 (s); Aircoach several stops en – route €7 (s)
- Cardiff CAE satisfies this criterion and operates within an acceptable journey time given road types and conditions it is a fast service

- A premier exclusive air passenger service. Bus operators and airport management held the view that a mixed service serving local and airport (often international business travellers) did not work. Air passengers expected to pay a premium fare and lost revenue from them would outweigh the additional revenue from local passengers.
- A terminal point in the city centre which is convenient (within 1000m) for the majority and preferably all of – the central business district (CBD), and / or additional en – route request stops. Edinburgh: terminates at Edinburgh Waverley Bridge adjacent to the main railway station and CBD in Princess Street and George Street; Bristol: terminates at Bristol Central Bus Station via Bristol Temple Meads Railway Station either side of the CBD; Dublin: Busarras near Custom House and the traditional CBD. Cardiff CAE satisfies this criterion; it improves on Dublin and Bristol.
- A high frequency service of every 10 – 15 minutes (average waiting time 5 – 7.5 minutes). Exceptionally a 20 minute service frequency will be acceptable (and in Cardiff's case the most appropriate for daytime operation). A less frequent service, say every 30 minutes, could not be their perception of a city centre express service in the early morning or late evening if good information was available. This is evidenced in the hourly frequency service on Arriva Trains Wales via Rhoose Cardiff Airport railway station and the airport shuttle bus – a dissuasive characteristic of an inconvenient / difficult change of mode Cardiff CAE for the size of the market is a frequent service. It currently satisfies this criterion.
- A fare which is about 20% – 25% of the comparable taxi journey to compensate for the inconvenience of waiting time and also walking time at the town end
Cardiff CAE satisfies this criterion – it is a frequent service
- Information: timetable through Traveline Cymru; online and call-centre. Traveline Cymru provide a marketing and promotional service; bulk buying of advertising sites and radio/television slots
Action is required here.
- Easily available tickets. Reference is made to third party sales outlets including Traveline Cymru, airlines, (as part of their service) hotels (selling for the convenience of their residents), Arriva Trains Wales, Cardiff Airport (ticket machine in Arrivals Hall)
Action is required here.

- A high quality vehicle with seating for all (other than in exceptional services) thus giving the travel experience associated with air travel. The quality of this part of their journey will also give them a positive image of Wales and the capital city
Cardiff CAE matches this criterion
- High reliability (timekeeping and service operating) especially on the outbound journey to the airport is essential. Travellers have a high tension state because missing the flight can have many onward and financial consequences.
Cardiff CAE satisfies this criterion

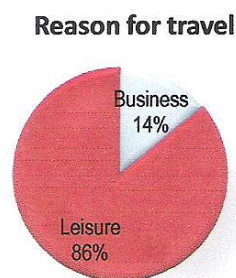
6.3 CARDIFF AIRPORT EXPRESS T9 – A NEW BUSINESS

This is a new business venture and should be judged as such. Five months is too short a period of time to estimate the eventual demand level. As a start – up service it will not be an instant ‘hit’. This applies to any business and its performance should be reviewed again 12 months’ time (tables).

This service should be compared with other new bus ventures at its current stage of development. The First Cymru *Greyhound* coach service from Swansea to Bristol Airport via Cardiff will be learning about demand patterns and would have to build up its business. The original *100 Shuttle* from Swansea to Cardiff took over from the *N&C Express* operation and had a clear market picture and has been a financial success.

The service also commenced in the low period for air travel and all UK airports have reduced throughput in the period August to February. This is particularly so for the air traveller market at Cardiff Airport is split between Business (14%) and leisure mainly charter flights (86%) and thus movements are currently concentrated in the summer period

Figure 4: Passenger Profile – Reason for Travel



Source: CAA Airport Statistics 2012

6.4 BUSINESS GROWTH

There are key answers and answers here which will determine passenger growth on the CAE T9 in 2014 and in the long term

Who is the market for the CAE T9?

- International business travellers who have a certain expectation of an airport express service
- Private travellers using both scheduled and charter flights but who are independently organised
- Charter package passengers whose travel to / from Cardiff Airport is already organised
- Independent travellers who would prefer to use an airport express service if one is available
- Passengers currently coming by car and parking
- Passengers coming from / going to parts of south Wales (primarily) via Cardiff Central by train bus or coach

What is their origin point or destination?

- Cardiff City centre as residents or business / leisure inbound travellers
- The Cardiff valleys
- Newport / Cwmbran eastern valleys
- South west Wales (from Bridgend westwards)
- Vale of Glamorgan

What was known of the markets in relation to the CAE T9?

- No extensive market research carried out
- An initial timetable design
- No relationship between the CAE T9 timetable and flight patterns.

What now needs to be done?

- A comprehensive market research exercise to identify the markets including market size, segmentation, travel patterns to/from the airport.
- The form of promotion work to be done and by whom
- Consideration of the points raised in the review on the effectiveness of the current service and the Action Plans (3.1 – 3.3; 6.5 – 6.6)
- How Cardiff Airport presents itself as equally attractive as Bristol

6.5 SPECIFIC MARKET SEGMENTS TO TARGET

International rugby games in Cardiff 2014 Season

A test of the CAE T9 service will come with the major rugby international games where Wales are playing at home

- Italy: Saturday 1st February 14.30
- France: Friday 21st February 20.00
- Scotland: Saturday 15th March 14.45

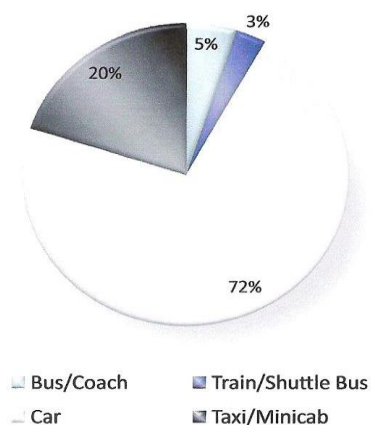
Travellers from Italy and France may arrive on charter flights and are likely to have coach transfers to their hotels as part of a 'package'. However independent travellers on the new Cityjet service to / from Paris along with KLM to/from Amsterdam would provide a possible market surge on Friday and Sunday operations. Visit Wales could identify promotional opportunities at e.g. departure airports, rugby clubs.

At the city centre end international rugby games and other major events at the National Stadium cause diversions of bus operations to/ from the bus station. To minimise inconvenience for passengers and retain the CAE T9 good experience perception the changes e.g. terminating / beginning outbound journey at Custom House Street or elsewhere should be clear to arriving passengers not familiar with the city centre. This will then help relieve the tension associated with outbound journeys

Student market / Enterprise Zone employees

This is a potential market with five universities in south Wales with a high proportion of overseas students. The numbers and revenue would depend on which scheduled airlines were attracted to Cardiff Airport. Students might be offered a discount fare.

Figure 5: Land side modal split – passengers travelled to the airport

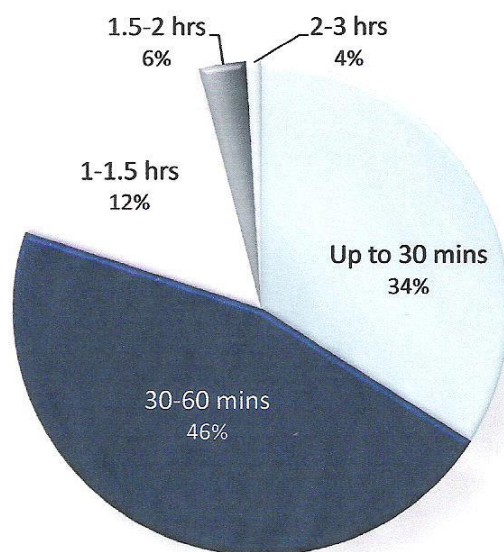


Source: CCA Airports Report 2012

At present no market data is available on the current use of the CAE T9. A market survey of passengers and of potential passengers is required to provide an analysis of e.g. journey purpose, source of information about the bus link; would they prefer to book with their air ticket.

CAE T9 Catchment area

Figure 6: Journey Time to / from Cardiff Airport



Source: CAA Airports Report 2012

Eighty six per cent of the Airport's catchment area in Wales followed by Scotland (6%) – the likely result of a frequent service, south West England (3%) and Northern Ireland (2%) with worthwhile percentages in the Netherlands (3% via KLM), France (2%) and Eire (3%). This is reflected in journey times of under an hour for 80% outbound travellers to the airport.

The majority of outbound passengers (96%) started their journey in Wales dominated by Cardiff (28%), Swansea (11%), Bridgend (9%) and the Vale of Glamorgan (9%). Several other counties along the M4 and A470 corridors contributed about 4% each. Monmouthshire's percentage was 1% not surprising given the choice of Bristol and Cardiff with an almost equal journey time.

There is evidence of residents in south Wales travelling via Bristol because there are more destinations or there are more flight options to / from other airports. The same applies to inbound travellers even if their destination is Cardiff.

The catchment area possibilities are

- Cardiff central residential, hotel, government, academic and business areas
- Areas further away but which are well connected by public transport e.g. Valleys towns, Newport, Cwmbran. There is a geographical point to the east and north east of Cardiff where the competitive market is served by Bristol, Birmingham and London Heathrow. Here overall journey costs (all side and air travel) will have an effect on airport choice
- Those same areas where part of the home end journey is made by taxi or private car to connect into the bus or rail network and where considerable savings are to be made in the journey cost to and from the Airport.
- The market research has to analyse these different market segments

6.6 ACTION PLAN – MARKET OPPORTUNITIES

The actions during 2014 and 2015 - 2018 to be drawn from this data in terms of market opportunities are:

- The leisure market is the major possible source of business for the CAE T9 in terms of absolute numbers. However it would seem (from limited data and evidence from Bus Users Cymru) much of that traffic traditionally travels to / from the airport by private car, organised minibus or is driven by friends often on a reciprocal basis. If none of these is available the alternative mode is public transport or an overnight stay in Cardiff. But as this is the dominant market segment it could, if successfully tapped, provide a significant source passenger numbers. There is a need for a literature search and additional economic analysis for the Cardiff / south Wales market into the travel cost impact (cross price elasticity) and convenience (service elasticity) of alternative modes.
- Air passengers to Cardiff city centre on business for a one day trip or staying overnight at a city centre hotel or an hotel nearer to the airport is a significant potential market which should be the subject of market research. This is particularly so on early morning departures between 06.00 and 07.00 of which in the summer timetable there are six – three charter flights and three business services (Amsterdam, Edinburgh and Glasgow). Data is required on this market segment. It has been suggested that this is the best market to exploit in absolute terms even though it is a small percentage of the total Cardiff passenger market.
- Exploring opportunities with inbound scheduled carriers – e.g. KLM, Citywing, Vueling, Flybe, Aer Lingus, Eastern, Germanwings.
- One international airline in discussion with Cardiff Airport had a fast premier bus to / from the city centre as one of its decision criteria.
- Those residents living nearer or in the city centre are similarly a possible source.

- Residents of west and north suburban Cardiff travelling on early flights are unlikely to travel by taxi to Cardiff Bus Station and then by CAE T9. They are likely to make that taxi journey directly to the airport.
- Travelling in both directions via Cardiff Bay could grow the market through passengers being guaranteed the return trip without going through Cardiff Central Bus Station as at present. This could be trialled on a pilot basis with confirmation sought in the market research exercise
- There has been discussion on whether the CAE T9 should also act as a stopping service for local travellers. The standard fare (currently £5 / £8) would be payable as it does for air travellers riding to/from intermediate points en route. Cardiff Bus commercial services (96, X91) on parts of the route could attract anti-competition legal action against VoGC and WG. From a market growth point of view there is an opportunity for another source of revenue but this is a short term expedient and would lose air passengers and is not recommended.(Rationale regarding local services is in Appendix 2).
- The present stopping pattern at Culverhouse Cross and at the Premier Inn Wenvoe, the Travelodge Cwmcuddy and the Holiday Inn Express Airport should be reviewed in the light of demand as part of the market research. They may have an impact on early morning flights for overnight stayers. Other stopping points should be considered in purely commercial terms as air passenger revenue generators.
- Suggestions were made by some of those interviewed that the CAE T9 should travel around the bus box in central Cardiff from Custom House Street via Churchill Way, Dumfries Place, Greyfriars Road and Westgate Street. This could open up the hotels market in that area. Market research is required on this potential market segment but operational cost implications and previous market / revenue experience suggest this would increase the net loss (and subsidy required) on the service.
- There is a serious competitor for the Swansea area market where the Greyhound (operated by First Cymru) service provides competition with a direct two – hourly frequency service from Swansea Bus Station to Bristol Airport. Counteracting travel pattern will benefit CAE T9 and Cardiff Airport business plans. However it could be turned to advantage as it could connect with the CAE T9 at Cardiff Bus Station on an hourly basis.
- Connecting feeder services into / from CAE T9 could be achieved through advertising / promoting the interchange facility at Cardiff Central Bus Station, with arrangements made more effective with through ticketing. There are opportunities to be developed with rail operators – Arriva Trains Wales, First Great Western, Cross Country Trains – and other bus operators – TrawsCymru Cardiff Bus, Stagecoach, National Express, NAT, First Cymru, Newport Bus, First Cymru Greyhound – in terms of advertised connections at Cardiff Central Bus Station.(7.5).

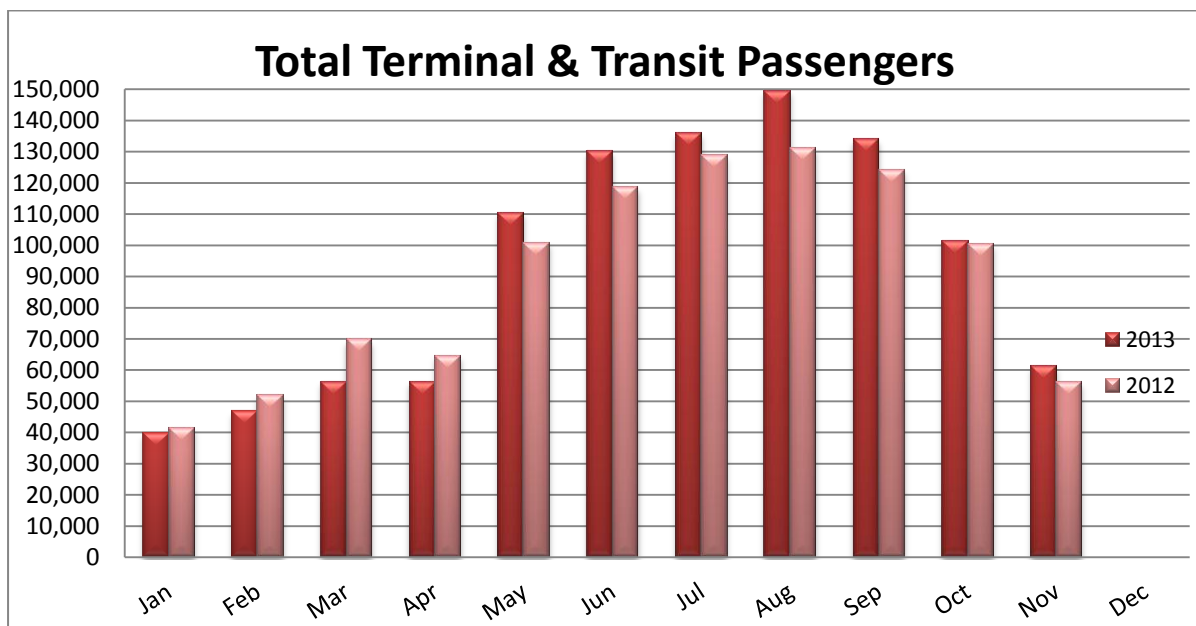
- One aspect of travel which most people try to avoid is the inconvenience of interchange. Firstly there is the transfer of luggage, buggies, young children plus themselves. Secondly, there is the insecurity of guaranteed interchange timing and will the next vehicle be in place for their onward journey. This will be a particular difficulty in persuading those who have previously travelled to Cardiff Airport by car that public transport works, and for them. This again is a part of the market research now required to progress the CAE T9 service.

7 LONG TERM SUSTAINABILITY OF THE CAE T9 SERVICE

7.1 SUMMER TIMETABLE IMPLICATIONS FOR THE CAE T9 MARKET

This provides a far greater number of inbound and outbound flights at Cardiff Airport compared with winter timetable. The 2014 plan has increased the number of Tuesday / Friday (typical weekdays) flights over summer 2013 from 60 to 76 flights per day and over the winter timetable from 32 flights per day. The summer market thus has more passengers from which to draw.

Figure 7: Cardiff Airport Summer / Winter Passenger Levels



Source: Monthly Passenger Aircraft Movements Cardiff Airport (Lisa Morgan 15/01/2014)

There is general agreement in the bus and air travel industry that the success of the CAE T9 is dependent on the number of flights to / from Cardiff Airport. This could be significantly assisted by the other market / marketing opportunities suggested above if the promotion and connectivity elements are effectively developed.

Table 7: Cardiff Airport's passenger forecast 2013/14 – 2017/18

Period	million passengers	% growth on previous year
2013 (Forecast)	1.017	
2013/14	1.071	1.1
2014/15	1.155	7.8
2015/16	1.592	37.8
2016/17	1.663	4.5
2017/18	1.958	17.7

Source: Cardiff Airport

Cardiff Airport appears to have halted the decline in passenger numbers and has achieved growth of about 9% year on year during the summer. Monitoring the monthly trends will provide a useful indicator of trends in potential CAE T9 growth. The summer period May to September is the high demand period.

It is suggested above (Table 6) that the Winter 2013 – 14 (current) operational pattern has a 20 minute frequency from 05.30 to 21.30 and an hourly frequency earlier and later. Based on the number and spread of flights over a typical day and the likely number of passengers in different time bands a different pattern of service on the CAE T9 could be justified during the summer period (Table 8). The passenger loadings should be reviewed in determining the frequency. In particular the degree of demand from the charter market (Table 8)

Table 8 CAE T9 Summer service pattern / flights / air passenger estimates					
	Aircraft operations		CAE T9 Operations		
Time band	Number of flights (1) (inbound / outbound)	Air passenger throughput (2) based on aircraft capacity	Passenger forecast (3)	Frequency both directions (4)	Average Loading (5)
00.0 – 04.00 (6)	5	540	54	1	
00.0 – 06.00	0	0	0	3	
06.00 – 07.00 (7)	4	620	62	3	
07.00 – 08.00	4	150	15	3	
08.00 – 09.00	6	410	41	3	
09.00 – 10.00	6	850	85	3	
10.00 – 11.00	5	380	38	3	
11.00 – 12.00	6	760	76	3	
12.00 – 13.00	2	360	36	3	
13.00 – 14.00	5	640	64	3	
14.00 – 15.00	1	80	8	3	
15.00 – 16.00	2	60	6	3	
16.00 – 17.00	2	100	10	3	
17.00 – 18.00	3	180	18	3	
18.00 – 19.00	3	100	10	3	
19.00 – 20.00	3	90	9	3	
20.00 – 21.00	3	140	14	3	
21.00 – 22.00	4	360	36	3	
22.00 – 00.00(7)	2	360	36	1	

Sources: Cardiff Airport; Review analysis

Notes

Airport and overall CAE T9 market:

- (1) This is based on mayfly figures from Cardiff Airport
- (2) Air passenger potential throughput inbound and outbound based on the type of aircraft expected to operate and assuming a high load factor. The load factor figures are commercially confidential and not available to this review.
- (3) This forecast is based on the lower assumption of 10% of air passengers will use CAE T9. When this is taken into account together with an expected modal split change towards CAE T9 of 10% of air passengers that is the basis of the estimated figure. Further research into market trends and a fuller economic forecast is required.
- (4) The capacity per hour for seated passengers on the Optare vehicles is 220 (inbound and outbound total) with the existing seating /baggage rack layout. This is three buses per hour in each direction.

Inbound / Outbound passenger forecasts based on:

- (5) Average loading derived from dividing passenger numbers by the number of vehicles. A profitable bus operation is achieved with 8 – 10 passengers per vehicle for the whole journey. All CAE T9 passengers pay a full flat fare which covers the whole journey even though they may only make part of it. There is a split of inbound and outbound passengers to be input into the forecast.
- (6) These are all inbound passengers. The expected transfer to CAE T9 is expected to be low as there is no onward public transport from Cardiff Central bus/rail stations. Low loadings would therefore be assumed.
- (7) These are all outbound passengers. A proportion may stay overnight in Cardiff or airport associated hotels. But this number would be the subject of further research. Low loadings would be the likely assumption. The 06.00 departures have to be served by CAE T9. The average bus loading column is included by way of completeness of analysis. Any forecast would be made on the basis of market research.

The analysis of potential summer passenger traffic should be included in the market research study. Pre 04.00 early morning and late evening passenger movements would not normally justify a frequency of 3 buses per hour. Cardiff Airport is however a diversionary airport and allowed to operate 24 hours a day. This could account for the number of night flights (London Heathrow has to close to air traffic between 00.00 and 06.00). Subject to market research on land side modes of travel an hourly service or a 'meet the plane' option could be considered at these times. Cardiff Airport should also be asked if there is a potential demand for employee transport. This however is also limited by a very limited / lack of local public transport into and out of Cardiff Central by bus /rail between 23.00 and 05.00.

It is difficult to quantify the likely number of leisure / charter travellers who might use the service as there is no previous years data or market research available. This data should be produced by the market research study.

Table 9 shows the spread of passengers between low (winter) and high (summer) seasons for travel

January	39	)	July	134)
February	48	) Winter	August	148)
March	55	)	September	132	) Summer
April	55	)	October	100)
May	108	)	November	60)
June	128	)	December (estimate)	30	) Winter
Annual forecast 1,017,000					
Annual estimate 1,037,000					

Source: Cardiff Airport

The passenger numbers in August to November are at start-up winter levels. These have been extrapolated to create an annual pattern for any year. This shows:

Winter 287,000 pax 27.6%

Summer 750,000 pax 72.4%

7.2 LONG TERM PASSENGER FORECAST

The extrapolated passenger figures for summer and winter CAE T9 assuming a constant modal split would be 16,304 passengers for one year (based on 2013).

When the air passenger forecast provided by Cardiff Airport is then applied to CE T9 passenger numbers the result is Table 10.

Cardiff Airport (CA) passenger forecast		CAE T9 passenger forecast			Subsidy per passenger trip	
Year	Cardiff Airport Passenger forecast (000's)	Cardiff Airport (CA) Passenger Forecast rate growth	CAE pax Based on CA rate/growth(1)	CAE rate/growth assuming 10% + additional (2)	Cardiff Airport rate/growth (1) £p	CA+ 10% rate/growth (2) £p
2013	1,037	-	116	-	(7.32) 4.04	-
2013/14	1,071	3.2	120	132	3.91	3.56
2014/15	1,155	7.8	129	141	3.64	3.33
2015/16	1,592	37.8	178	195	2.64	2.41
2016/17	1,663	4.5	186	204	2.53	2.30
2017/18	1,958	17.7	218	239	2.15	1.96

Source: Cardiff Airport; Review economic analysis

Notes

- (1) This assumes that the same modal split will continue as at present and that it applies to charter/leisure and business markets.
- (2) This derives from effective advertising/promotions leading to increased use of CAE i.e. modal split of land side mode changes in favour of CAE. This is a modest assumption; increases the percentage; reduces the subsidy per passenger trip.

A more in depth forecast will be required to assess modal split and the relationship between CAE T9 passenger growth and the Cardiff Airport forecasts.

However the general view in the airport express bus and airport / airline market is that the service will attract increasing numbers of leisure travellers. It will take time to make inroads into the existing drop-off, taxi and car to park segments but if the service is made permanent and with increased promotion both through advertising and word of mouth, then usage could grow.

There is an large group (average 600 passengers) of late night /early morning charter passenger arrivals between 22.00 and 03.00 on a typical day. Whether these

passengers would use an hourly service is dependent on connecting public transport services available at Cardiff Central bus and rail stations within a reasonable waiting time. This is not the case at present.

Another important service provision is for both passenger segments for series of departures between 06.00 and 07.00 on summer mornings. These require an arrival time at Cardiff Airport of 04.00 to 05.00. This could, following market research and service trials, justify an earlier departure from Cardiff Bay and Cardiff Central Bus Station to arrive at Cardiff Airport in good time for the 06.00 flights out and possibly attract passengers from the 03.10 / 03.45 arrivals.

The daytime market from 08.00 to 20.00 is the more like to be a generator of passengers as there is frequent onward and feeder public transport available to the south east conurbation and to other parts of south Wales. Any further modal change and the level of convenience at the point of origin / destination will also be a consideration for passengers making the decision to use the CAE T9.

It should also be noted that if a large percentage of charter passengers were to use the CAE T9 its capacity would be inadequate. That is not likely to be a short term issue but should be considered in the medium (3 – 4 years) term.

It is also suggested that the usage of CAE T9 could increase at a faster rate than the annual forecast increase of scheduled flight passengers travelling through Cardiff Airport. There are several factors for believing this:

- The new Cityjet services have had a high media profile up to now and the Airport expects their services to be more attractive to business travellers than were Flybe's.
- There are better schedules on the Glasgow and Edinburgh flights. The Flybe operation was not providing suitable day return schedules in both directions particular in the Glasgow case. The price elasticity effect has stimulated demand on the Edinburgh service. This will naturally help these core domestic routes to grow in volume. This will be alongside passenger numbers travelling on KLM, Eastern, Aer Lingus, Citywing, Flybe, Germanwings and Vueling.
- In the short term these airlines are the most likely to provide users of the CAE T9.
- Taking Vueling as a particularly interesting example. Traffic on that operators Barcelona route had 40% originating in Spain while in its other three routes 20% of passengers began their return journey in Spain.
- As more flights serve Cardiff Airport, demand for the CAE T9 would be expected to increase (see above and Longer Term Sustainability section below)

The airlines are one of the best promotional resources for CAE T9. Means should be found through Cardiff Airport to promote the service – possibly on board.

7.3 FARES

Given the nature of the customer profile and the experience of business travellers that segment's expectation of a frequent, fast, express service into city centres all over the industrial world would lead them to the CAE T9 once they have become aware of the service.

The CAE T9 fare structure at present is shown in Table 8

In making comparisons with other airports CAE T9 the fare between Cardiff Airport and Cardiff Bus Station is about in the middle.

The basis of fares is not merely on distance travelled. Factors such as own price elasticity and cross price elasticity (e.g. between car parking and fuel v bus fare), market price segmentation (single / return; family tickets); what the market will bear; and service elasticity – quality; convenience; total journey time.

Example standard fares for are in Table 11

Airport	Single Adult	Return Adult
Cardiff*	£5 (€7)	£8 (€10)
Bristol *	£7	£11
Edinburgh*	£4	£7
Dublin	£4.95 (€6)	£8.25 (€10)
London Heathrow		
Heathrow Xpress	£21	£34
Heathrow Connect	£9.90	£19.80
Underground Zone 6*	£5	

Source: Airports / Public Transport Operators

*National Concessionary Travel Cards are usable in each country. Freedom Pass is available on the London Underground; not available to Heathrow on Heathrow Connect – only to Hayes Station.

As in all airports there are discounts for students and family tickets are available. The Bristol Flyer carries free of charge those passengers holding an England concessionary fares, over 60's pass (with a restriction that it cannot be used

between 04.00 and 09.00 when there is an hourly service or there is the morning business traveller peak.

This is a premier service and the full fare standard of £5 / £8 (with advertised discounts) is payable no matter what the length of the journey – e.g. to intermediate hotels or Cardiff Bay. There are no and should not be any incremental fare stage basis.

The decision to provide free travel for Wales concessionary pass holders parallels the policy in England and should therefore be applied here – as it does bring in additional revenue. It will also avoid adverse comment.

7.4 TIMETABLE OPTIONS: CARDIFF AIRPORT EXPRESS T9

Meet the flight

The principle of operating a bus for each flight was once tried at the BEA terminal in central London up to the 1960's and the opening of the Underground Piccadilly Line to Hounslow West and then Heathrow Central. This had a dedicated bus guaranteed to meet each outbound flight. However as these vehicles departed every five minutes and were available to passengers on all flights then a convenient alternative was available for any flight. Adopting this principle in Cardiff is unlikely to be successful as no alternative is available if a departing outbound passenger arrives late at Cardiff Central. The general view expressed was "it is almost impossible to promote such a service simply and easily understood by potential customers". It is unlikely to attract much custom from the existing air passenger market. There was some support for this option in the winter months. However a counter argument was that the reputation for frequency, reliability and convenience built up in the summer market would be lost.

Although this option gained some support amongst respondents the overall view was that it would save some costs but that net revenue would fall and would damage the CAE T9 which was now beginning to become known as a standard pattern timetable (SPT) service. The SPT on Arriva trains Wales has been shown as a key element in its driving up passenger numbers. This operating principle may be appropriate as suggested below for late night arriving flights.

Conclusion: this is not a viable option and is not recommended to be taken forward for the primary CAE T9 operating period (04.00 – 22.00) – see below.

Fifteen minute service frequency

This is currently seen as not merited; "overkill" was a description given even in the summer months to serve the present demand level. By way of comparison the

original service frequency in Bristol was a coach every 30 minutes. As the airport expanded through a combination of low cost and charter airlines so passenger numbers increased and the Flyer increased its frequency at busier times giving the variable pattern of departures in current operation. This principle applied in Cardiff Airport is examined below.

Conclusion: the 15 minute frequency is not recommended.

Twenty minute service

The current service interval (frequency) at Bristol Airport is

06.00 – 14.30: 10 minutes

14.30 – 19.00: 15 minutes

19.00 – 00.00: 20 minutes

00.00 – 04.20: Hourly

Research carried out for this review at Bristol Airport showed as the airport has grown and the operating frequency has increased the passenger perception at Bristol Temple Meads railway station and at Bristol Bus Station is of a turn up and go service where the average waiting time is a few minutes during the day. A *Flyer* service A1 vehicle is on or approaching the Airport stand at all times during the day and at short waiting intervals up to midnight. Using the *Flyer* requires time planning by passengers at night and early morning.

Current CAE T9 twenty minute frequency: despite a lack of direct market research there was clearly sufficient experience and knowledge in the set up team to come to the compromise of 20 minutes which is a reasonable service interval for an airport the size of Cardiff. This is certainly the case for the summer timetable. The usage should be monitored carefully during the next year to identify more accurately the demand pattern.

A service interval of less than 20 minutes does not in the perception of business passengers constitute an airport express. Most would accept such a frequency for an airport of Cardiff's size with an average waiting time of 10 minutes. A normal service interval of 30 or hourly would fail in the same way as the train connection has only had moderate success because of its hourly service and the need to change modes at Rhoose station under uncomfortable conditions.

It is however a difficult balance. Even though there may not be many flights a 20-minute frequency is needed because of delays in aircraft movements, at baggage handling inbound or if a traveller misses the bus there is another within their 'comfort zone' particularly on outbound flights. In addition the current promotion and press commentary indicates this frequency and to change it after such a short time in operation can reduce passenger confidence in any future operation.

This balance is also between passengers needing to feel secure that they can get to the airport in time for check in to their flight and providing a frequency which reflects the flight patterns. This given that the service has now started and any return to for example a 'meet the flight' format would lose the confidence of potential passengers. There is also the more buoyant summer market to develop and that is the next stage in improving the effectiveness of the service.

Off peak service every 30 minutes / every hour

This is likely to be acceptable in the shoulder period and the off peak late night. There is an issue of several summer period charter flights arriving between 22.30 and 04.00 carrying around 600 passengers. This segment also faces a lack of frequent public transport to / from Cardiff central bus and railway stations between 22.00 and 05.30 (trains) and 19.00 and 07.00 (bus). However market research and a trial period during the summer could give a more robust decision basis. The full cost saving implications for subsidy should also be assessed.

Conclusion on timetable options

- Retaining the 20 minute service interval with high quality operation (timekeeping, reliability) will grow the revenue than changing the frequency to meet particular aircraft (inbound and outbound). Aircraft are delayed and the air pattern may vary which will be confusing to passenger.
- The 04.00 – 06.00 services outbound are required to serve the four important 06.00 departure set of services. It is possible that a 30 minute service frequency does serve them but the start time of 04.10 is required as – it provides just enough time for check – in. These are: KLM scheduled flight to Amsterdam (50 passengers); three charter flight operated by Thomas Cook / Thompson (540 passengers). Further market research is required.
- A 15 minute service interval is not merited.
- Variable service interval in the off peak of 30 minutes or hourly..
- No action should be taken immediately to introduce a new service for the late night / early morning market segment (22.00 – 04.00). However, the current service should be reconsidered to meet two late night charter services on a meet the flight or hourly basis some robust market research has been undertaken.

- No timetables have been placed at the Airport, on the buses or at the Bus Station. Drivers commented on a lack of publicity as a big issue with customers. There is very little advertising at Cardiff Airport (7.5). Timetable leaflets are essential and should be introduced immediately.
- Traveline Cymru provides on-line and call-centre information sources on CAE T9 and connecting services.

7.5 INTERCHANGE CONNECTIONS

At Cardiff Airport

The current waiting facility for inbound passengers is poor. It consists of a bus shelter and no more. The information on CAE T9 is limited to a very small print timetable inside the shelter at a low level. For outbound passengers it is reasonably convenient. At Bristol the *Flyer* A1, Greyhound service to / from south Wales and the Bath Bus Company A4 *AirDecker* service to / from Bath and Keynsham deposits passengers outside the ground floor departures door. The departing inbound (to Bristol) *Flyer* and other airport services (e.g. Bath Bus Company A4 and the Greyhound services) stand are located outside the Arrivals area. Passengers are then able to remain in the dry, warm terminal to await their bus.

Prior to the complete redevelopment of the front of the terminal immediate action (which should have been carried out already) is required as follows:

- Clear signage from the Arrivals Hall to the CAE T9 service bus stop is not present. The poster at present is not sufficiently 'in your face'.
- Signs are needed on the arriving passengers' route to the exit – on both sides and overhead with a guidance line in CAE T9 livery along the floor.
- Repeater signs at the western end of the Arrivals Hall outside and along the route to the bus stop.
- A sign outside the Departures Hall exit should invite passengers to wait for their CAE T9 inside.
- An area next to the revolving doors would give a view of the arriving bus. A timetable dot matrix or real time (eventually) would indicate the next CAE T9 service. Currently This is the quality of interchange and of passenger experience required.
- The timetables in the bus shelter are out of date. These I understand are the responsibility of the VoGC.

The investment programme for the terminal building appears to be concentrating on the inside of the structure. The Airport has to take responsibility for providing a high quality passenger experience outside the terminal building also. This not only serves

the CAE T9 customers but provides that image of Wales the Welsh Government is attempting to supply

A bus and train ticket booth inside the Airport could provide sales via credit card and through tickets to destinations beyond Cardiff by train, Greyhound, TrawsCymru and National Express. A process for payment of commission (12% was said to be fair for the third party seller) or a £5 / £8 add-on to the rail ticket price. This might be operated by NCP's desk in the Arrivals Hall as there is the bigger issue of connectivity. A train ticket machine might be installed (the cost estimate given was £35,000) and ATW should be asked to include the CAE T9 in the system.

At Cardiff Bus Station

Cardiff has the benefit of the Central Bus Station and Cardiff central railway station being adjacent. There is however little integration neither of services and operations nor of sufficient inter-modal signage or information.

When overseas visitors or Welsh travellers arrive at Cardiff Bus Station the information on interchange e.g. where other services are located is poor. An opportunity arises for improvement particularly as the spatial area involved is relatively small.

Cardiff Bus in justifying the bus box claimed that only 12% of bus passengers interchanged with other services and therefore they have never pressed for interchange information. The CAE T9 departure bay is ideal for connections with other bus or coach services and with trains. It is adjacent to the TrawsCymru service and the similar branding gives a clear integration perception.

Cardiff Central Railway Station

Information quality has improved slightly with an electronic timetable inside the railway station main booking hall. The Information Booth however has limited bus information and the CAE T9 is given as a second service to the airport rather than the first by Arriva Trains Wales (ATW) staff.

The initial poster based advertising campaign was comprehensive and any rail passenger could not have failed to see them. They were placed in a wide geographical range of stations and the CBS sites were paid for. ATW did raise a concern about competition legislation if they were seen to be giving preferential treatment to CAE T9 over any other service.

There remains a limited amount of bus information at the Arriva Trains Wales Information Bureau at Cardiff Central Station. Signage (overhead as at Bristol Temple Meads; Newcastle Airport to indicating the walking route to the CAE T9

stand is well- located in the bus station (D1); for rail / CAE T9 interchange. Overhead signs in both central underpasses and vinyl foot and eyelevel / overhead signage continuously en route.

ATW should be encouraged, as the Wales and Borders franchise holder, to display CAE T9 information prominently. They might make the point that as the CAE T9 was in competition with their train service via Rhoose. ATW shouldn't therefore as a business, advertise the CAE T9 as passenger / revenue abstraction may occur because the rail service has only a third of the CAE T9 frequency. However as the rail service is such a small proportion of their total income ATW was not averse to integration.

Advantage should be taken of a First Great Western initiative at Cardiff Railway Station. An 'ambassadors' scheme is to be created (as at Paddington Station) to provide help for train passengers of FGW and ATW) Interchange information on the CAE T9 could be included. Any competition regulation issues should be dealt with. Many are exaggerated by operators.

But the point here is one of integrated public transport for the travellers' benefit. This is a perfect opportunity for the Minister to show the Government's commitment to integrated public transport when two services both funded by subsidy should and will be directed to work together for the benefit of passengers (even if only in the new rail franchise). It also creates an opportunity to create the basis for integration which I have detailed in my response to Professor Kevin Morgan's review of the Metro governance being undertaken for the Minister.

Joint ticketing

Connecting feeder services into / from CAE T9 could be achieved through advertising / promoting the interchange facility at Cardiff Central Bus Station, with arrangements made more effective with through ticketing. There are opportunities to be developed with rail operators – Arriva Trains Wales, First Great Western, Cross Country Trains – and bus operators –Cardiff Bus, Stagecoach, National Express, NAT, First Cymru, Newport Bus, TrawsCymru, Greyhound (First Cymru) – in terms of advertised connections between both sets of services at Cardiff Central Bus Station.(See interchange section above).

Joint advertising of services on a reciprocal basis would help promote both sets of services.

One potential joint ticketing operation in particular was identified by both Cardiff Airport and First Cymru. The express service X30 operated between Cardiff and Newport by Newport Bus / Cardiff Bus and terminates at Cardiff Central Bus Station with an easy flat surface connection (although with improved signage) This service

could help provide an inroad into the Newport – Cwmbran market. This market is currently split between Cardiff and Bristol airports

Third party ticket sales

There are several third party ticket outlets

7.6 ROUTE OPTIONS

Outbound via Cardiff Bay

The inbound route from Cardiff Airport to the city centre runs via Cardiff Bay. This has more market potential and avoids much of the slow moving urban road operation through Leckwith. The distance from the expressway standard southern distributor road the A 4232 Leckwith interchange to the bus station is about one third of the mileage via the bay. Vehicle speeds via the Bay and along the expressway are three times faster and with less wear and tear on the bus' mechanical parts. This results from a constant speed along the expressway with generally no congestion.

The total journey time between Cardiff Airport and Cardiff Central along both routes is approximately the same at 33 minutes on average on the route surveys in connection with this review. However the timetabled timing is 30 minutes via Leckwith and 38 minutes via Cardiff Bay while operational reliability is better along the route via Cardiff Bay with less vehicle wear.

However First Cymru has also given indicative figures which imply considerable extra cost. Operating inbound (as at present) and changing to outbound operations via the Bay would involve an extra 2.8 miles and 10 minutes extra running time per round trip. The round trip at present is 1h 15m. This change First Cymru estimate would take 1h 25m. This would be a very tight timetable and the extra bus (i.e. a fifth vehicle with the engineering spare referred to above)) would be required to operate throughout the day. It totals 160 extra miles per day; 1120 miles per week. First Cymru calculate total annual extra subsidy cost of approximately £70,000. This estimate should be discussed before a decision is made

Of course there are proposals for reducing frequency in the early morning and late evening which might compensate for some of that cost increase.

However the Bay is seen as Cardiff's second business district, the primary leisure, restaurant and cultural centre and the nation's democratic centre at the National Assembly for Wales. Its patronage potential is therefore significantly greater than the Leckwith route but at present pick-up / set-down is relatively low. The market

research study following this review would need to estimate the extra revenue which could be generated.

One alternative is that the service in the 'central area including Cardiff Bay and the city centre is an orbital service. It would therefore pick up and set down at the Red Dragon Centre for both inbound and outbound passengers. Passengers would then stay on the bus at Cardiff Central Bus Station and continue their journey to the Airport. This would mean an inbound journey time to the Bay of 30 minutes and a return journey via the Bus Station and Leckwith of 45 minutes. This would incur no extra subsidy cost but the market research would need to be clear on the passenger view of this extra time.

City centre orbital

Suggestions were made by some of those interviewed that the CAE T9 should travel around the bus box in central Cardiff via John Lewis, Churchill Way, Dumfries Place, Greyfriars Road and Westgate Street. This could open up the hotels and university markets in that area. Market research is required on this potential market segment to identify passenger numbers and potential additional revenue to cover the additional costs of an extra bus, daily crew, fuel and maintenance. This assumes the additional bus would be provided from the TrawsCymru fleet by WG. An indicative extra subsidy cost to provide this is £60,000 per annum. There are operational implications set out below.

Evidence provided in respect of the BMI baby branded service indicated that when that service traversed via Custom House Street, Marriott Hotel, Jury's Inn (now the Park), Dumfries place, Greyfriars Road, the Hilton, Westgate Street, Angel / Crest (now Holiday Inn Express) hotels the demand did not justify the additional operating costs. If this is still correct the market research exercise should identify that.

One possibility is to provide a Cardiff Bus pass (for an additional price) to be included in the CAE T9 ticket for use on the *baycar* which is clearly branded and can link passengers at Custom House Street to the above areas

7.7 VEHICLE QUALITY / DESIGN

The expectation of air travellers in western Europe is that airport express vehicles will be relatively new, smartly turned out, cleaned regularly and in the main have seating capacity sufficient for them to sit down. The better door location is a front and middle section access. Not all airport-city centre buses have this facility as it is again a feature which reduces seating capacity. There is a delicate balance between seating luggage space and access: considerable market research is required into the passenger market for that particular airport; there is no 'one size fits all' solution.

There also has to be luggage space but many business travellers now 'travel light' to avoid a delay in the baggage hall on arrival. Consequently for them overhead racks are as important as luggage racking.

Having examined the interiors of several airport services in UK and other EU states there is quite a variation in the internal vehicle layout. Some have considerable space for large items on floor based shelving racking but with no overhead racking; others are more of the layout on the CAE T9. The large luggage items tends to be with leisure travellers which of course forms Cardiff's biggest overall market but which as seen above will take some time to attract.

The general view on the present Optare vehicles is:

- They are more than adequate for current and near future demand and with the smart seating present a high quality image of Wales – which is their subliminal function.
- No change should be made to the internal fittings as when a vehicle is changed with seats taken out and other fittings put in either it is a very expensive refurbishment (at up to £40,000 per bus) or it results in an unattractive finish where often items don't fit properly. Even a simple refitting is expensive (at £10,000 per bus).
- There is a presumption that these vehicles would be returned to their original design function on the TrawsCymru network for which they were designed so changes would have to be made again.
- The Optare Tempos currently in place fulfil the requirements of the traveller which is the prime objective. New vehicles purpose built for the CAE T9 service would have two sets of exit doors and a baggage area reflective of the market research in relation to passenger type.

Charge Card on board

This would be a useful benefit for passengers who now buy most of their travel requirements using charge cards (credit, debit or purchasing cards). For corporate purchase this is almost mandatory within organisations as accounting control of employee travel becomes far more efficient (fewer expenses forms) and employees reduce the amounts of their own money involved in reimbursement. There are several mobile formats offered by banks e.g. Barclays Merchant Services and others.

A taxi operator referred the Review to London taxicabs where one of the major banks offers a card service. Drivers are then paid via their control company. In the case of the CAE T9 this would be paid directly to First Cymru Buses. Cards may be

used on both Severn crossings although there was some 'lack of enthusiasm' from the operating company before their introduction.

In accounting terms this seems to have no obstacles. It would operate as with any other card system. Cardiff Airport and Cardiff city centre are both within strong signal areas. It was suggested that there was a technical problem to be overcome.

All Great Britain passenger train companies accept card payments. First Great Western for example does not have direct transmission but download the credit card machines at the final 'clocking off' point.

The availability of charge cards on board should be evaluated.

National Express do not currently have them aboard their coaches but at many bus station locations they have ticket offices where they are available.

They could be available via a ticket booth for both CAE T9 and onward travel or with an agent located in the airport arrivals hall. In both cases there is a cost attached. One suggestion made was to use the £40,000 earmarked for luggage racks to cover the estimated £35,000 for ATW to install a ticket machine for both trains and CAE T9 in the Arrivals Hall.

7.8 MANAGEMENT OF CARDIFF AIRPORT EXPRESS (T9)

It is also clear that no one organisation is responsible for the CAE T9 operation. It involves the Government, VoGC, First Cymru Buses, Cardiff Airport and Cardiff City Council Bus Station. This is a hindrance to the effectiveness of the CAE T9. One person or organisation has to be given responsibility to fund and direct all public sector facilities and contracted private sector operations involved in the CAE T9.

The establishment of TrawsCymru Limited as a government owned company (as discussed between the Minister and Professor Stuart Cole) could provide the strategic route management within which this route should be. The separate branding of the airport service and of the long distance bus network is a separate issue.

7.9 BRANDING

Options

Two options present themselves

1. Cardiff Airport Express T9

This brand has been in place for six months and rarely is a commercial brand changed once it has been exposed to the market. A consumer view may be formed that the product is to change markedly and that there are flaws in the current product. In the case of the CAE T9 the product is developing well and building up a reputation for quality and reliability. The market research to follow this review will provide a better scientific indicator of the CAE brand value but anecdotal evidence from passengers would indicate a high level of acceptance and satisfaction.

A total of £63,178 has already been spent on presenting the brand and the service to the travelling public and this would have been wasted.

The present mix of a member of the WG strategic family of services with three indicators of special service

- The aircraft cartoon on the side is indicative of its function. This could be enhanced.
- The route map clearly shows its route and its primary destinations (Cardiff Airport and Cardiff city centre).
- Is an express service – limited stop and dedicated to the air passenger. The Welsh version *Bws Gwenallt* is a shuttle service. This may not have been intentional but it could be an optional name at some stage

However for the present the current brand should remain.

2. Specific Airport Brand

This would be a totally new brand but possibly using the same colours to represent Wales. The function of the bus link is to transport air passengers but also to be a part of promoting Wales' qualities to inbound travellers.

Any brand change still has to create an image of an express service serving air passengers to Cardiff Airport. Were it to 'mimic' other airports, names such as *Flyer*, *Airlink*, *Airbus*, *Airport Express*, *Airport Shuttle*, *Aircoach* and others might be used.

The important aspect of any brand is that it is obvious, simple, and does 'what it says on the tin'.

The second brand option with a highly distinctive brand is favoured by Cardiff Airport but marketing professionals have suggested keeping to Option 1 above for the time

being as it has now become established. Had however time been available / taken before the start of the service then more ideas could have been considered.

But consideration should be given to a gradual brand change over the next two years if the service is to continue. *The Cardiff Airport Express / Bws Gwenol Maes Awyr Caerdydd* brand however being retained. *Bws Gwenol* could change to *Bws Cyflym* in the longer term.

7.10 LONG TERM SUSTAINABILITY – CONCLUSION

A business development process for the CAE T9 has been dealt with under the heading of what needs to changes to improve effectiveness. These actions relate to both the medium term and the long term.

The actions to be taken are shown ion the action plan section at the beginning of this review.

The future of the Cardiff Airport Express T9 service is directly linked to the future of Cardiff Airport. In the longer term the passenger levels on CAE T9 will relate to growth of passengers and flights operating through Cardiff Airport. As passenger business builds up for the airport then CAE T9 will grow and may become profitable.

To be profitable there has to be eight passengers on average over the whole of a bus route and on all departures over the day. This will cover all costs and prior to fuel price increases produced a profit margin of about 13% – 15% but currently this margin is under 5% . It was suggested by bus operators that a premium fare might reduce the passenger average to 5 / 6 but increased again to 8+ depending on the final concessionary fares payments formulae.

However under the present contract the additional revenue will accrue to the contract operators First Cymru who have taken the revenue risk. Depending on how the CAE T9 business level changes it would be a consideration to take the revenue risk into the Government's hands. There could still be an independent bus operator (that is recommended) but contracted either through Cardiff Airport Limited or through a TrawsCymru Limited format (discussed above).

The long term here must be over the five year business plan based on considerations inherent in the purchase of Cardiff Airport by the Welsh Government.

If an airport is owned by a public body then it is in its interests to provide the required level of connectivity to / from the city centre it serves.

If the predictions based on the Airport's own growth rate or a higher growth rate in CAE T9 passengers is achieved then the CAE T9 is sustainable in the longer term.

The short to medium term (the next three to five years) future has been discussed above. If the airport achieves its passenger targets there is every need to maintain and possibly increase the frequency of the CAE T9.

If the airport greatly exceeds its targets and becomes a major focal airport as envisaged in the Western Gateway / Welsh Government proposals to the Airport Commission (chaired by Sir Howard Davies) then the WG should be evaluating a new rail link directly into the airport from either the South Wales Main Line or the Vale of Glamorgan line (the latter option has been strategically assessed and costed in a report by Professor Stuart Cole in 2012 for Legal & General Insurance Limited).

APPENDICES

APPENDIX 1

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APPENDIX 2

STOPPING PATTERN: LOCAL SERVICES

Legal issues

Any issues regarding competition regarding the transport industry e.g. route competition e.g. The Transport Act 1985, a firm of solicitors, suggested by First Cymru as specialising in transport related legal matters are Backhouse Jones , www.backhousejones@aol.com Telephone 01254 828300.

I mention the legal issue as it was raised by Cardiff Bus who pointed out that it operates commercial services along part of the route and could decide to take action against VoGC / WG inn respect of the CAE T9.(see below)

Current service provision

Local residents could use the premier airport express service CAE T9 so long as it does not dilute the primary objective of a *fast and frequent service between the city centre and Cardiff Airport*. However there are no examples of local and air passengers use the same service successfully for the airport service and it is not recommended here.

It is unlikely that it could be achieved in the medium term for several reasons:

- The demand level for airport customers is not yet clear. The summer schedules will bring more passengers and the patronage is intended to grow. If it does not the CAE T9 service will not be justified
- The demand pattern for capacity during the course of the day will be variable as it is at all other airports studied for this review – Bristol, Newcastle, Dublin and Edinburgh. There are some CAE T9 services which have 90% load factors and some with full and standing. Passengers are encouraged to await the next service but not all wish to and preference has to be given to airport customers. Performing a local service in addition to an airport service will reduce its effectiveness
- No information has been presented on local demand patterns. At exactly which stops is the local passenger demand? And if one stop is served will other demands follow?
- Cardiff Bus operates two commercial services along parts of the route. A half hourly interval service (route 96) operates from Culverhouse Cross to the Colcot roundabout (Five Mile Lane / Port Road / Barry Road) with 40% of

passengers using concessionary bus passes. This operates Monday – Sunday during daytime and an evening hourly service is supported by VoGC. Route X91 operates every two hours along the same common length of route. It would not then be possible for the CAE T9 to compete (i.e. to pick up or set down passengers) along this section of route. If it did then Cardiff Bus would be entitled to take legal action for abstraction of passengers from a commercial service by a supported service. This is a consequence of the Transport Act 1985 and subsequent competition legislation.

- Carrying local residents could provide additional revenue through the CAE T9 also being a 'local' service. However on balance this is not recommended on commercial grounds as air passengers who have paid a premium fare may be lost (as in the case of Edinburgh and Dublin's original airport services).
- They also have a concern for baggage security 'Sensible' business- based stops at key locations (e.g. Cardiff Bay and at hotels or within the central business district) are accepted as normal.
- Air passengers pay a premium fare for a direct service and experience has shown that their perception is any stop is for airport travellers exclusively and overall revenue could fall by serious numbers.
- They do not wish to see local stops served as this they perceive these as a delay in their journey. The tension element in air travel interchange times is apparent.
- The security of individual items of baggage has also been raised when it is located on racks at the door of the vehicle. There is considerable research on this issue.
- The fare would remain as standard (£5 / £7) for all passengers as it does for air passengers travelling e.g. to an hotel.
- The conditions of carriage of the CAE T9 (as shown on the timetable) indicates that passengers must be travelling either to or from Cardiff Airport but do not have to be Airport customers. This is to prevent reducing the effectiveness of the service.
- Air passengers respond negatively to being on a local stopping service Passenger numbers were not built up on Dublin and Edinburgh airport services when local stops were included. Other cities in Eastern Europe soon abandoned using local services for air travellers.

- Up to three extra stops could be made on the existing route without incurring additional running time according to First Cymru. This will depend on loadings at particular stops. There is an unacceptable risk on a service where the timetable is already tight and where First Cymru have already been supplied with an extra OptareTempo vehicle from the TrawsCymru fleet at an opportunity cost to the Welsh Government.
- While acceptance of concessionary passes for air travellers is a positive market decision it could further dilute this service when used by local travellers.
- Concessionary pass holders would not be deterred by the pricing policy but it would be a commercial mistake not to allow these passes to be used by Airport customers as at present

Conclusion on stopping services

From the CAE T9 viewpoint where this review sits there is a hope that the service will develop passenger numbers. There must have been some indicator or policy base. Consequently while not all buses will be full many will have good loadings. In commercial terms if the average loading on all vehicle journeys exceeds 8 fare paying passengers it will be profitable.

It is possible for the CAE T9 to call at up to a further three bus stops but only on the existing route and the current timetable is tight at 1h 15m for a round trip. The requirement of a sixth vehicle to be provided at WG expense indicates this No further stops could be included no matter what the local pressures might be If the CAE T9 is to remain a premier service.

In the view of Bus Users Cymru and bus operators the CAE T9 was an express service with few stops otherwise it became a local service. Even if additional stops were inserted above the existing hotel stops they must be 'sensible' and related to the Airport – for travellers, employees and other regular visitors.

Local demand appears to have a 'Turnham Green' / 'Cribyn' element where variations are made in the service and timed stops as a result of local pressure and which are then not used because the demand does not exist. It is a familiar occurrence in the provision of public transport in particular where public funding is involved.

If there was this level of demand that local pressure suggests. Cardiff Bus would have identified it and amended their local services accordingly

There is a clear risk of legal action if the CAE T9 competes with Cardiff Bus commercial services on the route. The terms of carriage issued with the timetable imply that all passengers must be destined for the Airport. (See Fares section above)

Creating a 'mixed' premier / local service would not be advisable and could not be recommended. Trying later to change one back into a premier service only, following a demand increase from airport customers would be probably worse than never offering a premier / local service.

However a critique and further analysis should be made in terms of current local services, suggested service pattern, stopping points and market demand data as a separate review exercise.

The policy decisions here are:

- Does the WG want a premier airport service or not?
- Is WG prepared to pay for it in subsidy.? This is particularly the case if Cardiff Airport passenger forecasts are fulfilled then subsidy could be reduced and may become a commercial service.

By virtue of paragraph(s) vi of Standing Order 17.42

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