AIRPORT CITY LIMITS:

A CRITICAL ASSESSMENT OF
THE REDEVELOPMENT OF BERLIN'S *FLUGHAFEN SCHÖNEFELD*

by

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Harvey Goldstein
Advisor

to Melissa

There are some who say that
communism is the wave of the
future. Let them come to Berlin.

John F. Kennedy, 26 June 1963

Abstract

A large airport and its "airport city" can be a regional economic driver. Berlin—capital of a rich nation yet home to a stagnant economy—is building a new airport. The government is involved on many different levels, as it hopes this new airport, Berlin Brandenburg International, can spur economic development. The best and chosen site for this new airport is actually an old one, Schönefeld, yet old airports tend to be near settlements dense enough to cause substantial pushback from some of the neighboring population. The inevitable anti-airport protest recently has produced a legal settlement that allows for the new airport's construction, but it curtails certain aspects that would make it more of an economic driver. Also, the various levels of government have competing motives for what sort of "airport city" development occurs nearby.

This paper examines the projected impacts—both positive and negative—that Berlin Brandenburg International airport is likely to produce. It also evaluates other claims and projections made by those for and against its construction, by placing commercial aviation in Berlin in the contexts of Germany and Europe. Next, it critiques the airport planning process and identifies the process's stakeholders, ascribing the potential impacts to each stakeholder, given three scenarios of what might happen. Finally, it recommends possible steps to improve outcomes, in Berlin or elsewhere.

Berlin will build a new airport that will meet passenger demands for the foreseeable future. The airport will be a regional transportation node, for areas beyond Berlin and Brandenburg (and even for western Poland). However, the ban on nightflights and the lack of inter-jurisdictional and public-private cooperation on "airport city" development will hamper gravely any economic impact from the airport on the region.

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Source of photo on page two: http://www.airport-technology.com

1. Introduction and background

The story of Berlin's airports is the story of the city itself. From the idiosyncratic pioneers of aviation to fascist design and planning, and from the Berlin Airlift to German Reunification, the city's 20th-Century saga can in large part be told by the history of its various *Flughaefen*. The current chapter features Berlin's three-airport system consolidating into a single site: Berlin-Brandenburg International (BBI). This paper analyzes and evaluates the contentions on either side of this massive development. It is a case study of the Berlin airport system and its plans to redevelop Schönefeld into BBI.[1] This paper will provide historical context to the present debate, assess the current situation, and measure forecasts used by both the airport authority and the relevant literature.

An airport is a major infrastructure project, and thus a decade-long drama with enormous impacts on transportation, economic development, and public investment. Berlin's new airport will be a redevelopment of an old one, Schönefeld, built by East Germany.[2] The area's initial, post-reunification optimism has passed, revealing weaknesses in the urban, regional and national spatial-economic structures. These are weaknesses that, counter-cyclically, BBI hopes to overcome as a new economic driver of the region. Meanwhile, reunification has allowed for citizens of the erstwhile East Germany to openly object to the government's airport plan, partaking in the long-denied

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[1] Schönefeld is the name of an airport, a village, and a municipality. In this paper, the word used alone will refer to the airport. The village or *Gemeinde* (municipality) will appear with its label.
[2] "East Germany" refers to the *Deutsche Demokratische Republik*. "West Germany" refers to the *Bundesrepublik Deutschland* from 1949 to 1990. The paper uses the term "Federal Government" to refer to the *Bundesrepublik Deutschland* after German Reunification.

politics of democratic recourse and mass protest. Due to the universality of these issues, large cities the world over can learn from Berlin's current experience.

A new airport is a statement of civic prominence and public art, not just a place where people get on or off planes. Asking "What sort of airport should we build?" is also asking "What sort of city or region will this airport serve?" In Berlin's case, the answer has changed (and may yet change again), but when planners first posited BBI the aspiration was to be a "global city." A global city is home to financial and political institutions that exercise control over development and norms across the planet. It is a phenomenon particular to a world with transportation and communication that have effectively "shrunk" the world, making the expression of such control possible. Until 1945, Berlin was on track to be a global city. However, due to the polycentric nature of post-war Germany's spatial-economic structure, hopes of being a global city are merely tantalizing.

Many BBI forecasts pertain to how many passengers will use the new airport. A starting point for projecting passenger levels is the "catchment" area residents. The airport claims a catchment of 10 million, even though the city of Berlin has a population of only 3.4 million. This paper tries to show where the remainder might come from. The number of passengers using Berlin airports (collectively) has increased a great deal in the past three years, and many expect such growth to continue. 2005's figure of 17 million passengers has encouraged the airport authority in its plan to build an airport to accommodate between 20 million and 30 million annual passengers. This paper will assess whether or to what degree this trend will continue, by exploring the roles of both air carriers--chiefly Lufthansa—and low-cost-carriers (LCCs) in Berlin, Germany, and

Europe. The recent phenomena of the airline alliance and the LCC boom are explored, particularly with regard to how and why airlines hub. Also, networks for air cargo tend to go to either major passenger hubs or dedicated freight hubs. This paper will project BBI's future freight levels and assess its chances at becoming some type of hub.

This paper also evaluates the arguments against BBI. Airport opponents have filed four complaints in their class-action lawsuit against the development of BBI. These are the accuracy and fairness of the noise contours, the legality of nightflights, the propriety of building the airport so close to the city, and the negative effects of construction on the local water supply. In addition, some airlines that operate out of Tegel (one of the Berlin airports scheduled to close pending BBI completion) had sought to keep their base open.

Finally, this study assesses how the airport authority, developers, and regional governments could realize their shared goal for BBI: maximizing the creation of local jobs as a result of having a new, large airport. This paper also identifies impediments to, and opportunities for, BBI's having a significant and positive economic impact, and tries to determine what components of the planning process can affect outcomes in airport development. Finally, this paper presents three scenarios of potential airport development, and judges how each scenario would impact the project's numerous stakeholders.

This paper was written while the author was based in the Economic Geography Department of Humboldt Universität zu Berlin. This department has produced two recent master's theses on the prospects of hubbing at BBI. Ulrich Hoffmann wrote in 2000 that no Berlin airport would be a major hub for a passenger airline, and Martin

Schulte wrote in 2002 that BBI would not become a hub for air cargo.[3] Today, in 2006,

the issue is far riper, as redevelopment plans have matured and the airline industry has

changed a great deal. Hoffmann used 1998 data, and since then the industry has seen the

terrorism of 9/11, the aircraft-borne SARS scare, the burgeoning popularity of low-cost

carriers (LCCs), a sustained spike in fuel cost, and the ever strengthening role of Asian

economies in the era of globalization. Regarding Berlin specifically, nearby Leipzig soon

will be a freight hub, and the lawsuit against the government's building the airport was

exhausted on 16 Mar 2006. BBI deserves a new reckoning.

1.1.   Economic development and the significance of airports

One could view the history of urban development as a series of phases, with each

phase corresponding to a preeminent mode of transportation.[4] Development focused near

water for most of civilization; then, by the railway; next, by highways; and, presently,

near airports. For many decades cities considered airports nuisances, and consigned them

to land on the urban periphery.[5] The land-use around the airport often went unplanned,

and a spatial mess resulted. However, far from being just some noisy nuisance, the

airport emerged as the new economic driver for a metropolitan region—utterly vital for

Just-In-Time supply-chains, perishable goods, industries with a high value-to-weight

ratio (such high-tech or bio-tech), and businessmen for whom time was at a premium.[6] A

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[3] Hoffmann, U. 2000. *Hubbing als Kernelement einer modernen Netzgestaltung im Linienluftverkehr – Diskussion zu den Chances Berlins.* Unpublished Diplomarbeit; and Schulte, M. 2002. *Standortfaktoren von Luftfrachtdrehkreuzen: Untersuchung des Potentials eines Grossflughafens in der Region Berlin.* Unpublished Diplomarbeit.
[4] Conway 1980.
[5] Conway 1980.
[6] Kasarda 2001.

modern airport is the nexus of industry and transportation, yet its urban development has been largely incoherent.

The discipline of economic development concerns two broad themes: job creation and quality-of-life. Generally it studies private industries and public policies that succeed in both wealth creation and wealth distribution, as well as the methods to assess and forecast their impacts. A natural subject of economic development would be a driving force behind a regional economy—an export-based manufacturing industry or a high-value service sector, for example. The development of a large international airport surely qualifies.

The potential impact of an airport on the economic development of the city it serves is not a simple function of its sums of passengers or freight. Many jobs and much investment is concentrated within the airport's boundaries, as the aviation-related firms at a major airport directly employ thousands. Also, passengers with plenty of "dwell time" in terminals spend a great deal of money at airports' attractive shopping centers. More dramatically, however, significant investment thoroughly develops the corridors between an airport and the city (or cities) it serves. Firms that utilize air cargo see site location at or near an airport as a great way to maximize their competitive advantage. Indirect employment from firms that support airside operations usually matches this amount.[7] For businessmen whose "time is money," firm location near an airport has an appreciable time-saving advantage. Hence, an airport's landside economic impact can be quite profound, helping build an urban form near or within its boundaries.

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[7] C. Al-Khatib, FBS (personal communication 25 Jan 2006)

1.2.   The Case of Berlin

Berlin's history is like no other city's. Unlike other divided capitals—Jerusalem, Belfast, Beirut, Sarajevo—Berlin is the political head of one of the world's greatest economies. Moreover, its separation was not ethnic or religious, but ideological and economic, so reunification and reconsolidation occurred at a relatively swift pace. This pace subsumed the erstwhile East Germany, whose economy suffered a massive structural shift following reunification. The collapse of its endemically uncompetitive manufacturing sector has contributed most to a regional economy with a high unemployment rate and a lack of an industrial base. Since German Reunification and the return of the capital to Berlin, massive public and private investment has poured into the city. While this investment did not change the economic base of the region, it provided the substratum of excellent infrastructure, which should improve Berlin's attractiveness for industry. A new international airport would be among the most important projects in a city full of them.

1.2.i.   Historical note

The history of Berlin gives the present airport debate the proper and necessary context.[8] The list of German pioneers of aviation features Ferdinand von Zeppelin and Otto Lilienthal. Berlin's first airport, Flughafen Tempelhof, opened in 1923. Adolf Hitler may have been the first head of state to fly.[9] In the mid-1930s, the head Nazi architect Albert Speer redesigned the Tempelhof terminal, one of this era's few extant

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[8] Berlin is both a city—sometimes two—and a state. For the purposes of this paper, it is important to recognize that Berlin is a political entity distinct from *Land* (the state of) Brandenburg, which surrounds it, and that these two states are among the sixteen that compose the country. With reference to Berlin, the terms "city" and "state" are, for the purposes of this paper, interchangeable.
[9] The visual effect of the *Führer* descending from the heavens was not lost on Leni Riefenstal in *Triumph des Willens*.

monumental structures. His design was part of a largely-unrealized urban plan for a north-south corridor punctuated by Berlin's great airport—should a visitor arrive by plane, his first impressions of the capital of the Third Reich were to be indelible by this fascist "airport city."[10]

The start of the Cold War saw the division of the country and the city, with both sides developing airports to suit their respective needs. The French, British and American sectors of Berlin composed West Berlin, while the Russian sector was East Berlin.[11] For aviation, the Russians initially utilized the Henschel Aircraftworks to the city's south, and there in 1955 the East German government opened to the public Flughafen Schönefeld, which became the country's main airport.[12]

During the 1948-49 Berlin Airlift, when the Russian army blockaded all land access to West Berlin, Tempelhof served as the lifeline of a starving, freezing city. An estimated one plane per minute landed there, saving thousands of lives with their cargo—and opening the world's eyes to the potential of air freight with precise logistics.[13] The Americans later reverted it to a commercial airport, and Tempelhof became the third-busiest airport in Europe in the 1950s,[14] but was physically inadequate for larger and more planes.

West Berlin also saw the construction of a new airport during the Cold War. In 1960 the West German government opened Flughafen Tegel on the site of a defunct

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[10] Gordon, A. 2004. *Naked Airport*. New York: Metropolitan Books.
[11] The state of Brandenburg, which surrounds all of Berlin, was part of Russian-controlled East Germany. West Berlin therefore was not contiguous to "mainland" West Germany.
[12] FBS. 2006. http://www.berlin-airport.de/bbi/rubDeutsch/rubProjekt/rubRueckblick/ rubTraditionsstandort_Schönefeld/index.html Last accessed 7 Apr 2006; Although the terminal and the eponymous village lie outside the city limits and in the state of Brandenburg, a short stretch of the original runway passes over into Berlin. This runway will be abandoned following redevelopment, and the airport will cede this land back to the respective localities: the municipality of Schönefeld and the city of Berlin.
[13] Wikipedia. 2006. http://en.wikipedia.org/wiki/Berlin_Airlift. Last accessed 7 Apr 2006.
[14] Garriga 2003.

rocket factory.[15] The next year East Germany erected the Berlin Wall. West Germany

and its allies keenly invested in the economic development of West Berlin, and

subsidized business in the city—thus inducing business passengers who flew into Tegel

as well as the development surrounding the airport. Relative to this example, the socialist

dictatorship in East Germany kept the area around Schönefeld rural, where real estate

market forces were subsumed by state control that focused development within Berlin's

city limits.[16]

1a: Berlin and her airports. From left to right: Tegel, Tempelhof, Schönefeld
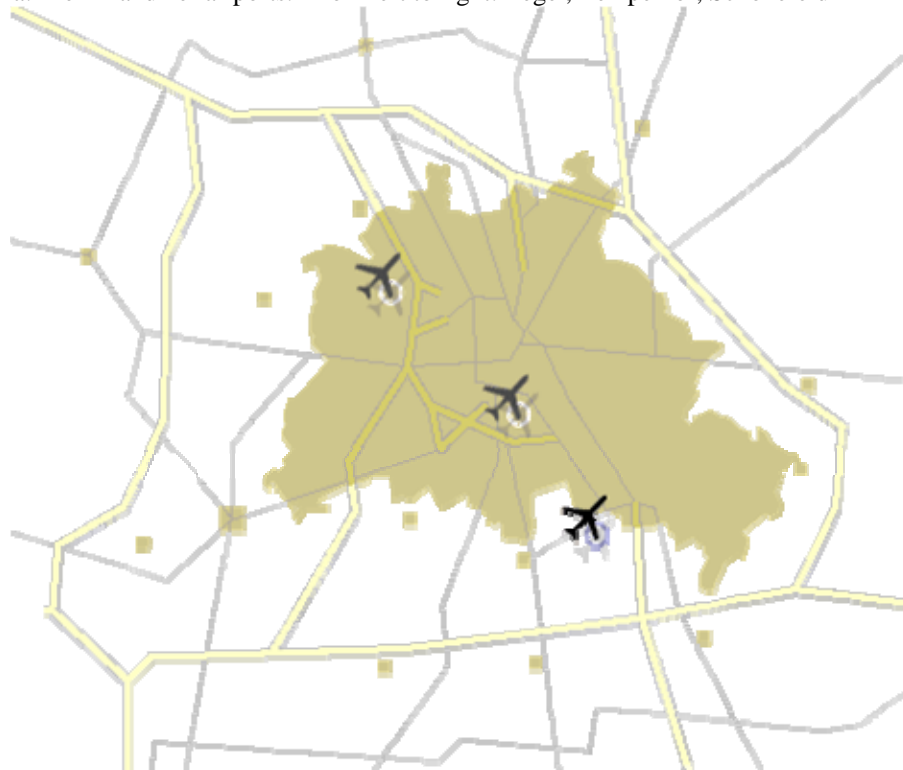
Source: http://vldb.informatik.hu-berlin.de

Schönefeld was the hub for the national airline for East Germany, Interflug, which

offered intercontinental flights (to other communist countries only) and managed all of

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[15] Airwise: Berlin-Tegel Airport History. 2006. http://www.airwise.com/airports/europe/TXL/TXL_07.html
Last accessed 7 Apr 2006.
[16] Schulz 2000; and Freund, B., Humboldt Universität (personal communication 31 Jan 2006).

the country's commercial airports.[17] Following reunification, Interflug found itself in competition with Lufthansa—one of the world's leading airlines—and simply could not cope. A potential merger with its Western sister met with political opposition to the specter of a cartel, and thus was aborted. In 1991 Interflug ceased operations and liquidated its Russian-built fleet.[18]

Tempelhof's fate would ultimately be Tegel's, as the impossibility of Tegel adapting to increases in plane size and passenger demand would make it obsolete. The Berlin Wall had rendered West Berlin spatially incapable of expanding into the

1b: A strangled airport: Tempelhof surrounded by development

Source: *GEOS* Berlin

surrounding countryside, where a newer and larger airport normally would be sited. This perverse sort of "urban growth boundary" hemmed in development to Tegel's edge. Planes, however, did expand, and flight also became more popular and affordable, particularly after the liberalization following deregulation in North America and Western

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[17] Shibata 1994.
[18] Shibata 1994.

Europe in the late 1970s. By the early 1980s Tegel had consolidated its position as the main airport for West Berlin; however, this was a pyrrhic victory, as Tegel ultimately would be a victim of its own success.

Tempelhof, Tegel and Schönefeld composed a *de facto* airport system for the city of Berlin, but this system was neither competing nor concerted, but seemingly for parallel universes. Tegel served the West, Schönefeld the East, and ne'er the twain did meet. However, the fall of the Berlin Wall and German Reunification resulted in the reintegration of the city of Berlin, including of course the integration of its transportation infrastructure. Here now was a once-and-future capital with a surfeit of airports.

1.2.ii.   From Schönefeld to BBI

In 1996 the ownership structure of Berlin's airports consolidated to suit the new political situation. Flughafen Berlin-Schönefeld GmbH (FBS) was formed to operate Schönefeld and to be the holding company of Berliner Flughaefen Gesellschaft mbH (BF), which runs Tempelhof and Tegel. FBS in turn is owned by *Land* Berlin (37%), *Land* Brandenburg (37%), and the Federal Government (26%). Once the redevelopment

1c: FBS ownership structure

Source: FBS, *Check-in*

of Schönefeld is complete, the three public shareholders of FBS will sell off their interests, thus resulting in a private authority managing one new airport: Berlin-

Brandenburg International (BBI). FBS does not currently know how or when this sale

will happen; however, once completed, this will constitute the largest airport privatization

in continental Europe.[19]

From the outset, FBS planned to consolidate all commercial aviation and air cargo

in Berlin at one airport.[20] Also, since Berlin was to be the new capital of a reunited

Germany in 2000, authorities believed that the city should have a new and large airport

befitting a capital of a major country.[21] Despite heavy public investment, the predicted

population and economic boom never materialized, so the airport's scale was reduced

from 30 million to 20 million passengers per year. The total cost for redevelopment was

estimated at 2 billion Euros: a loan of 1.17 billion Euros, with 440 million Euros in equity

to be generated by FBS and an additional 430 million Euros in equity from the three

pertinent governments (proportionate to each one's share of ownership).[22] In May 2000

FBS submitted its official redevelopment plan to the *Planfeststellungsbehörde* (planning

approval office) in Potsdam, the capital of *Land* Brandenburg.

The most notable feature of the plan called for the closure of both Tempelhof and

Tegel. The former will cease operations soon, now that legal challenges to BBI are

exhausted, and the latter will close once Schönefeld's redevelopment is complete (no

sooner than 2011).[23] Several airlines that used Tegel and were furious at its proposed

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[19] Airport Regions Conference 2003.
[20] C. Al-Khatib, FBS (personal communication 25 Jan 2006).
[21] E. Kulke, Humboldt Universität zu Berlin (personal communication 31 Mar 2006).
[22] C. Al-Khatib, FBS (personal communication 25 Jan 2006).
[23] Interestingly, the land for neither West Berlin airport is owned by FBS. Tegel is the property of the German Air Force. The Federal Government also owns Tempelhof's land, while the city owns the historically-designated terminal, which must be preserved during any redevelopment. FBS does own the land for what will become BBI.

closure sued to have that major element removed from the plan. Their effort failed in

court in late 2005.[24]

1d: Map of BBI over satellite images of Schönefeld
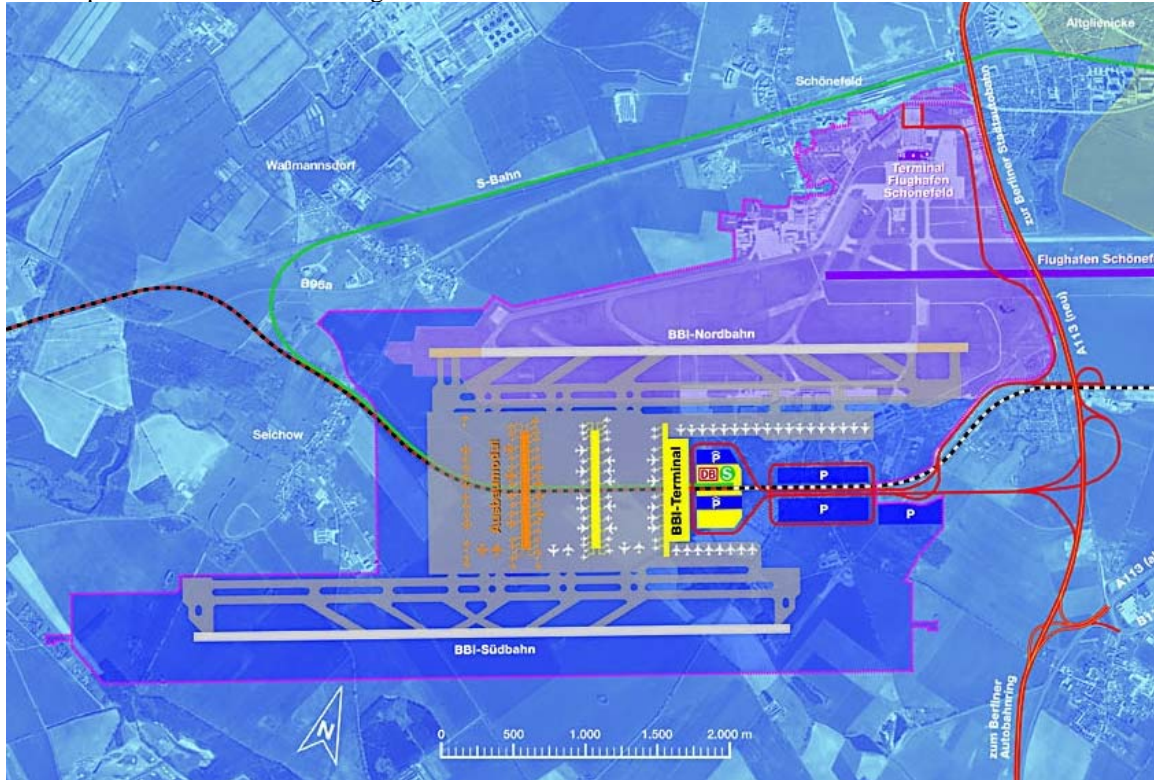
At Schönefeld, expansion will double airside capacity, from being able to handle

11 million passengers a year to approximately 22 million.[25] The meter for the runways,

taxiways, aprons and slots is the Airbus A-380, the newest and largest passenger plane in

the world, holding over 700 passengers. To accommodate such capacity, development

will enlarge the existing main runway and add a second runway of equal proportion. The

original, shorter runway will be terminated.

Like any jetport, BBI will have a massive impact on the quality-of-life for persons

living nearby. The new terminal will be between the two runways, on the site of the

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[24] J. Jänicke, FBS (personal communication 24 Feb 2006).
[25] J. Jänicke, FBS (personal communication 20 Jan 2006).

village of Diepensee. 335 residents have been relocated to two villages several kilometers away, called Deutsch-Wusterhausen and Grossziethen.[26] Other villages in the area also will be negatively affected, particularly by noise, so noise contours during landings and takeoffs were modeled for the *Planfestellungsbehörde*.

Construction will fell 11,907 trees, and FBS must replace this number by much more than 100%.[27] Possibilities include planting them along new greenways throughout the airport's property or in new parks made from the old runway. One particular green site is the *Zülowniederung*, a nature reserve near by the airport. Due to the vast open space controlled by FBS, tree replacement will not be a problem.

1e: Rendering of BBI over an aerial photograph of Schönefeld

source: FBS

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[26] J.Jänicke, FBS (personal communication 25 Jan 2006).
[27] J.Jänicke, FBS (personal communication 24 Feb 2006).

In order to build the subterranean rail station beneath the terminal, construction will involve lowering the water table, an engineering feat with a €2,500,000 price tag. Such work will require a leeching ditch and pumping station within the airport. The more sensitive task is monitoring the water levels outside the airport's boundaries, as construction could lower the water table of a wide area. Hence FBS has assumed responsibility for monitoring nearby lakes and biotopes. For instance, if an area near by the airport suffers a shrinking lake, the airport must pump its displaced water into that lake.[28]

New transportation connections will make the new terminal more accessible. Currently one can reach Schönefeld by S-bahn, regional train, bus, and car. (The S-Bahn and regional train take passengers within 2km of the terminal; from there one can walk or take a shuttle bus.) New freeways will be built to provide the new terminal access to the city's circumferential autobahn and to the city center. Rail will be extended to go under the new terminal, bringing not only the S-Bahn and regional trains, but also providing fast inter-city trains, directly to BBI. In addition, Deutsche Bahn will extend a new rail line north to the city center, for an express train only stopping at Papestraße (Südkreuz), Potsdamer Platz, and Lehrterbahnhof (Hauptbahnhof). One will be able to check-in remotely at Lehrterbahnhof, and in 18 minutes arrive at the terminal.[29]

The *Planfestellungsbehörde* approved the plan on 13 August 2004, and was promptly sued by nearly 4,000 individuals and organizations from around the area.[30] The complainants cited four grievances, generally concerning BBI's environmental impacts:

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[28] C. Al-Khatib (personal communication, 25 Jan 2006).
[29] Jaenicke, J., FBS (personal communication, 20 Jan 2006).
[30] RBB Television website. http://www.rbb-online.de/_/themen/index_jsp/key=portal_3878788.html. Last accessed 10 Apr 2006.

levels of noise, propriety of nightflights, location near an urban area, and water levels. Organized as a class-action lawsuit, the matter was put on a fast-track, as the Federal Government advanced it immediately to the highest court that could hear such a case, the *Bundesverwaltungsgericht*. The *Gericht* announced its conditional approval on 16 Mar 2006. The ensuing consolidation of commercial aviation from three airports into one will affect the airport and region in many different ways.

2.   Definitions of key concepts

Airports are evaluated and ranked in different ways. This paper will show how Berlin's airports have ranked, and how BBI might rank, relative to other airports in Germany and central Europe. BBI's projected figures are based on the aggregate data of Berlin's three airports, following the methods of the Federal Government and FBS. In comparison to BBI, the study population is the seven most active airports in Germany.[31] The cut-off is at seven because only seven German airports outside Berlin average over 2,000,000 annual passengers. This section explains standards for measuring passengers and freight, as well as various quantitative indicators of "hub" status within an airline's network or the global airport system.

2.1   Catchment

A basic statistic in airport analysis is "catchment," the residents of the area within which an airport has a centripetal pull on the majority of passengers or freight. It represents the potential for flights generated from its own area, as opposed to it being a destination or a transfer point. The catchment area can be expanded through better regional transportation links, thus increasing the population it serves. The Airport Regions Conference (ARC) uses two ratios involving catchment, as outlined by Garriga (2003). The first he calls "generation," the ratio of total annual passengers to total catchment inhabitants. The second is "concentration," the ratio of metropolitan area inhabitants to total catchment inhabitants.

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[31] The author wanted also to compare BBI with airports in other countries in central Europe, but data suppression was a prohibitive issue.

2.2   Hubs

This paper identifies different types of hubs—major, transfer, and freight—and each has different indicators of its status.

The hub is the airline industry's preeminent organizational model and the *raison d'etre* for the world's biggest airports. A hub is a node in a network, a point of transfer for both passengers and freight. It is an efficient way to manage a large network, concentrating personnel and facilities at one (usually central) location, where persons or goods are then transported on a long-haul flight (often to another hub), far away and with its own concentrated network.[32] The typical airline network is called "hub-and-spoke," eliciting the image of wheel. The geography of flight networks, of course, is not a perfect circle. There are different types of hubs, and—particularly for LCCs and freight—different types of networks.

A simple hub-and-spoke network has one central node with many exclusive links. A hub maximizes the potential city-pairs from a given number of flights; the easy contrast is with a collection of linear city-pairs. With each new spoke on a hub, the number of total city-pairs increases geometrically.[33] Following such a progression, a large transfer hub has a massive amount of potential connections. These connections are timed so that flights arriving from one direction do so around the same time, so their passengers can connect to flights leaving hub in the same direction. These phases of air traffic occur several times per day at a hub; Atlanta and Dallas-Ft.Worth each have

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[32] To maximize the economy-of-scale within the aircraft (i.e., to get the lowest possible unit cost per passenger/km or ton/km), ever larger aircraft are desired. However, consumer demand tends to only merit such vast supply of seats or cargo room on intercontinental or transcontinental flights.

[33] Roberts, Roach and associates. "How airline hubs work." http://www.r2ainc.com/pdfs/hubs.pdf (Last accessed 28 Feb 2006).

Image 2a: A simple hub-and-spoke model   Image 2b: Point-to-point network model
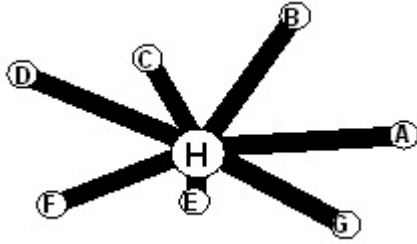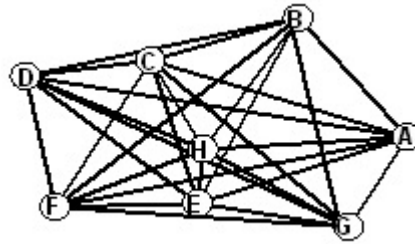
Source for both: Derudder, *et al.* (2005)

eleven daily phases.[34] This theoretical model would maximize the competitive advantage

of such a network. However, this theory does not match reality, as airports linked to a

hub also have flights to each other, and often to other hubs.

A hub requires greater infrastructure than a non-hub airport. Often an airline or a

cargo shipper will insist on having its own terminal. Long-haul flights to other, distant

hubs require wide-body aircraft, so runways, aprons, gates, *et cetera*, must be large

enough to accommodate them. Every day at a hub is a logistical masterpiece, as flights

are orchestrated to arrive and depart in waves, in order to both (attempt to) simplify air

traffic control and minimize passengers' layovers. Also, given that aircraft and personnel

needs are likely to change in the future, it is important that a hub be able to expand.

Hubs differ between Europe and the US, but these systems may soon converge.[35]

Essentially, the US air transport network has had a continental scale since its inception,

though this is only now becoming the case for Europe. The European airport system

developed with many national hubs for flag carriers, while the US system had regional

hubs irrespective of state borders. While a hub for a national airline tends to be at that

nation's capital (NB: this is not the case for Germany), many US hubs hardly qualify as

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[34] Dennis, Nigel. "Developments of Hubbing at European Airports." *Air & Space Europe, 3(1).* 2001.
[35] Dennis 2001.

business, political, or tourist destinations (Salt Lake City, Cincinnati, or Cleveland, *e.g.*).

Presently the European airport system is becoming as borderless as its American

counterpart. With the relaxation of ownership quotas, the consolidation of the primacy of

airline alliances, and the inexorable liberalization of the airline industry in Eastern

Europe, the dominant European airlines should preserve their rank.[36]

2.2.i.   Major Hub

Put simply, a major hub is a big airport. It is where people fly from and to. Often

these major hubs serve cities that are both population centers and major destinations, such

as London, New York, Paris, and Tokyo—global cities, all. Most of the world's biggest

hubs are in the US, which boasts a thoroughly developed, long-time deregulated, highly

active domestic market. European major hubs, on the other hand, tend to have a much

larger share of international flights, quite simply due to the geographical fact that

European nations are much smaller than the US.

This paper uses absolute passenger numbers for determining major hubs, and will

not attempt to analyze the airports according to how they comport to theoretical models.

The quick and conventional way to quantify an airport's importance is its total annual

passengers, which is the sum of enplaned and deplaned passengers, counting passengers

in transit only once.[37] The passenger total is the standard by which airports are ranked

across the world, and is what persons refer to when they talk about how "big" an airport

is; Derudder calls such an airport an "absolute" hub. The second most-used measurement

is total annual flights, as landing fees (regardless of the number of passengers on board)

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[36] Derudder, Ben, Devriendt, Lomme, & Wilcox, Frank. 2005. "Flying where you don't want to go: An empirical analysis of hubs in the global airline network." *Global and World Cities* research bulletin #187. www.lboro.ac.uk. Last accessed 25 Mar 2006.

[37] A passenger "in transit" stays on the plane at an airport. In essence, his connecting flight is the next destination of his original aircraft. It is a phenomenon of decreasing importance in a system of hubs.

compose a major source of airport revenue. These measurements' data are reported monthly by airports to their respective national governments, and then are compiled by various groups, such as the International Air Transport Association, the International Civil Aviation Organization, and the Airports Council International.[38] The office in Germany for its airports' data is the Arbeitsgemeinschaft Deutscher Vehrkersflughaefen (ADV), based in Berlin.[39]

Derudder's "spatial" hub attempts to show that an important hub acts a transfer point between other important hubs. His measure requires knowledge of not only total passenger numbers but also passengers on flights to/from particular cities. One cannot repeat this method without such data, which are proprietary.

2.2.ii. Transfer Hub

Other large hubs do not serve global cities—some not by any stretch of the term—but they do serve many millions of passengers who transfer to another flight. Typically such a transfer links airports of a tertiary importance with a major destination. For example, Frankfurt/Main is a massive transfer hub, with more passengers making transfers than actually using the airport as an origin or destination.[40] Also, being a transfer hub can increase the multiplier of passenger numbers on airside commercial activity, as passengers connecting flights tend to have an hour or so of "dwell time" to spend money in the terminal's shops.[41] Derudder and the ARC's Garriga both measure a

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[38] http://www.iata.org/index.htm; http://www.icao.int/; http://www.aci.aero/cda/aci/display/main/aci_content.jsp?zn=aci&cp=1-2_9_2__

[39] http://www.adv-net.org/de/gfx/index.php

[40] Derudder, *et al*., (2005) misrepresented the FAA's definition of a hub, saying it was based on an airport's transfer ratio, when in fact it is based on the percentage of national passengers served. See Reynolds-Feighan, A. 2000. "The US airport hierarchy and implications for small communities." *Urban Studies, 37(3)*; and also Federal Aviation Administration. 2001. *Airport activity statistics of certificated air carriers: Summary tables 2000*. www.bts.gov/publications/. Last accessed 25 Mar 2006.

[41] Doganis, Rigas. 1992. *The Airport Business*. New York: Routledge.

transfer hub by the ratio of annual transfer passengers (*i.e.*, at the airport just to catch a connecting flight) to total annual passengers.[42] Derudder calls such a hub a "relative" hub, but the term "transfer" is more explicit as to the airport's role in the global network.

Although its hubbing focus is on aeronautical activity, a transfer hub is positioned well to generate non-aeronautical revenues. Naturally a transfer hub would have many passengers making connections, thus spending both time and money in the terminal. It also would be the concentrated handling point for freight borne in the bodies of the home carrier's aircraft. Thus, with increased revenues from concessions and freight, a transfer hub is apt to augment the economic impact of an "airport city" development.

One type of transfer hub is the regional hub, whose focus is a domestic network. Such a quality is of little and decreasing importance to Europe, given its small countries and political union, but it is worth mentioning. Garriga employs a ratio to show the focus of an airport on its domestic flight network: an airport is a regional airport if it is a transfer hub with a domestic destination ratio greater than 0.8. A domestic destination ratio tends to decrease as passenger numbers increase.

Transfer data are difficult to obtain. German airports do report transit data, which covers passengers who do not disembark from their plane between connections. According to ADV, airports kept transfer data private until approximately a decade ago, and today it is rarely reported—unless the airport is a transfer hub and proud of it.[43] Figures must be gleaned from cooperative airport authorities.

When comparing large transfer hubs, it can be helpful to compare the number of waves of arrivals and departures. However, this paper does not encompass such a study.

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[42] Derudder, et al., 2005; Garriga 2003; and Garriga 2004.
[43] Kuna, M., ADV (personal communication 21 Mar 2006).

2.2.iii. Freight Hub

A freight hub can be a major hub, a transfer hub for a large airline, or an airport largely dedicated to serving a cargo integrator. Approximately half of all air cargo travels in the belly of wide-body/long-haul aircraft, which predominately serve major hubs.[44] As with passenger traffic, hubs dominate the network: In 2003, the four largest European hubs accounted for 50% of continental air freight and 42% of the long-haul frequencies.[45] On the other hand, dedicated freighters deliberately seek hubs at airports that are not crowded, major hubs. In order to be attractive to freighters, an airport must allow nightflights, have runways and facilities capable of handling wide-body aircraft, and suffer no slot constraints.[46] There are significant economic consequences to being a freight hub, which have been studied by Kasarda.[47] Air cargo both facilitates and creates trade, functioning as both the connection and catalyst of global supply-chains.[48] Supply-chains are dependent on the speed of a global network, and air freight is the fastest and best way to maintain competitive advantage. This advantage can be augmented by locating a firm near (or at) an air freight facility, thus enhancing an "airport city" development.[49]

Freight analyses compare annual metric tons, both loaded and unloaded. Freight in transit is negligible in Germany, and is not included in this study.[50] Garriga employed

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[44] Airport Regions Conference. 2003. *Air freight and airport regions*. http://www.airportregions.org/publications/arc_studies.htm. Last accessed 25 Mar 2006.
[45] ibid.
[46] ibid.
[47] Kasarda, J. D. 2001. From airport city to aerotropolis. *Airport World, 6(4).*
[48] Kasarda, J. D., & Sullivan, D. 2006. Air cargo, liberalization, and economic development. *Annals of Air and Space Law, 31.*
[49] Kasarda, J. D., & Green, J. 2005. "Air cargo as an economic development engine: Opportunities and constraints." Unpublished article.
[50] Freight in transit amounts to an additional 2%, and is evenly spread across all airports reporting to the ADV. Freight in transit is significant for an airport such as Anchorage, not one in Western Europe.

a freight ratio of kilograms-to-millions of passengers. Kasarda also used indicators of liberalization and transparency (the number of bilateral agreements, customs quality, corruption ratings, *e.g.*), but such measures are more discriminating when covering the developing world. Furthermore, the EU has assumed all of its member states' bilateral agreements with the US, reducing that indicator's utility.[51]

2.3   Connectivity, centrality, and frequency

Connectivity describes how many potential destinations to which one can fly from an airport. It is a fundamental quality of a hub. There are several ways to determine connectivity, and this paper follows the simplest: the ARC measures connectivity as the number of daily destinations.[52] Garriga also expounded on a "second-degree connectivity" (similar to centrality). In his 2000 thesis evaluating BBI's chance at being a hub, Hoffmann used total number of destinations as his measure of connectivity. This paper acknowledges that counting only daily destinations may be too restrictive, as some connections are weekly, some weekdays only, and many seasonal. However, such a method follows the literature and is relatively easy to measure.

Centrality distinguishes primacy among hubs. Connectivity can be confused with centrality, perhaps because the former is easier to determine. Centrality shows what pure connectivity cannot: the importance of a node in its network. While a major, well-connected hub is certainly an important node in its immediate network, it is not necessarily as important in the extended, global network. In order to name a hub

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[51] European Union. 2006. *Air transport*. http://europa.eu.int/comm/transport/air/ Last accessed 25 Mar 2006.
[52] Garriga, J. C. 2003. Airport dynamics towards airport systems. Prepared for the Airport Regions Conference. http://www.airportregions.org/publications/arc_studies.htm. Last accessed 26 Mar 2006.

"central" to the overall network, one must weigh not just its connectivity but also the second iteration of that connectivity. For example, theoretically an airport could exist as a hub to a self-contained network of city-pairs, whose destinations have few other flights. Meanwhile, another airport could exist that linked only to a few airports, all of which are major hubs. The latter airport probably would be more central to the overall network— not because of its own connectivity, but because of the connectivity of its handful of connections. There is no settled method in determining the centrality of a hub. According to eigenvector network analysis, the value of a node is equal to the sum of the number of links that each other node to which that node is linked has.[53] Given that Frankfurt/Main alone has over 200 daily connections, this measurement requires exhaustive data from around the world. This paper does not attempt to measure centrality.

Frequency reflects the rate at which certain flights are made; it shows the intensity of an airport's connectivity. This paper measures the rate at which all flights at an airport are made; a further analysis would study the rate of specific city-pair connections. Frequency compensates for the fact that connections are of varying convenience or popularity—for example, the Berlin connection to Munich is far more frequent than its connection to New York/Kennedy, even though the latter is the bigger hub. It follows that more passengers fly between city-pairs with high frequencies. However, this is not always the case, since very frequent connections tend to be flown by smaller aircraft (with fewer passengers per flight), given their much faster turn-around times and lower personnel requirements. Some frequencies are for workdays only, and focus on business travelers and destinations. Others are for weekend holidays, which can very according to

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[53] Wikipedia. 2006. http://en.wikipedia.org/wiki/Eigenvector_centrality Last accessed 7 Apr 2006.

the season. At any rate, one can glean flight frequencies with ease, but the numbers of

passengers on board is proprietary information.

This paper uses flights flown on Friday, 10 March 2006, as its data for

connectivity and frequency. The date is recent, so its data are relevant. A Friday is both

a workday and the start of the weekend, so it captures both passenger markets. Also,

March falls within the winter season, so the schedule is not distorted by summer holiday

destinations.

2.4   *Intercontinentalism*

Cattan uses international flights—some of which are long-haul—as a key

indicator of a hub.[54] Her metric is the share of all flights that are international. However,

this indicator is distorted for holiday destinations: Spain's Costa del Sol has no hub

airport, despite its airports' overwhelming shares of international flights, for example.

Archipelagic landmasses and monocentric national transportation infrastructures also

distort this indicator—in both cases under-representing the primacy of Frankfurt/Main

(and perhaps BBI). This paper expands on Cattan's metric to show an airport's share of

international flights that are long-haul, as an indicator of both hub primacy and freight

activity: "intercontinentalism."

Much useful data are not available. Data on the most-flown routes would be

ideal, as city-pair passenger totals would be quite useful in determining airport primacy.

There is no repository of this information. For each airline, this information is

proprietary. Derudder got access, through an airline, to the Marketing Information Data

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[54] Cattan, N. 1995. "Attractivity and internationalization of major European cities." In *Urban Studies 32(2)*.

Transfer database, which is the universal database for travel agents who book flights.[55]

This study does not have access to such a resource. Even so, it is less than ideal, because

direct (Internet) booking is increasingly a feature in airlines' marketing strategies and

cost-cutting techniques. Indeed, none of the LCC flight information would be in this

database.

Airports aggregate the international data to the Schengen zone, the EU, and

Europe. Schengen data are useful to airports for immigration purposes, but are of little

help to this paper. Unfortunately for data collectors, in 2003 the set of countries in the

EU expanded from 15 to 25, rendering that classification useless when comparing data

before and after 2003. Hoffmann apportioned all destinations from Berlin airports into

geographical subgroups to suggest intercontinentalism (or the lack thereof).[56] The ADV

defines "Europe" as the European continent, plus the British Isles, Iceland, and Asia

Minor (Turkey). It does not include Russia east of the Ural Mountains or Asian former

Soviet states, but does include European Russia as well as Caucasian former Soviet

states.[57]

Disaggregated data on destinations and origins would be quite helpful in

determining the number and types of long-haul routes, which Cattan and Kasarda use as

key indicators of an airport's primacy, particularly regarding freight. A good way to

define "long-haul" is a flight fully beyond a day's drive, estimated at 2,000 kilometers.

However, while the distance from Berlin to Faro, Portugal, exceeds 2,000 kilometers, it

would be misleading to characterize it as long-haul, because such a flight is obviously for

tourists, and because Faro is unlikely to have much freight to ship back to the Berlin

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[55] Derudder, et al. 2005.
[56] Hoffmann 2000.
[57] Kuna, M., ADV (personal communication 21 Mar 2006).

market. It might be possible to identify long-haul flights simply by the specific types of aircraft that fly certain routes, but that information is not readily available. This study determined long-haul routes by reviewing airports' flight schedules, and determined long-haul passengers from the *Aussereuropa* (beyond Europe) designation from the ADV.

This is a case study of BBI, and not a comparative study of German or European airports. Nevertheless, comparative benchmarks can be helpful in evaluating BBI relative to its peers. Also, should this analysis be replicated on BBI or reproduced on another, similar airport, comparative benchmarks would provide a useful roadmap.

3.   Feasibility Analysis

3.1   Passengers

All Berlin airports combined to serve over 17 million passengers in 2005. Tegel
surpassed its 2000 passenger level as early as 2003, and Schönefeld witnessed a 200%
increase over the past two years alone. Such growth is remarkable indeed, and
underscores FBS's call for a new and larger airport. The combined passenger levels of
Berlin's airports has increased 41% from 2002 to 2005, more than all other airports
reported by the ADV.[58]

3a:

Passengers at Berlin airports
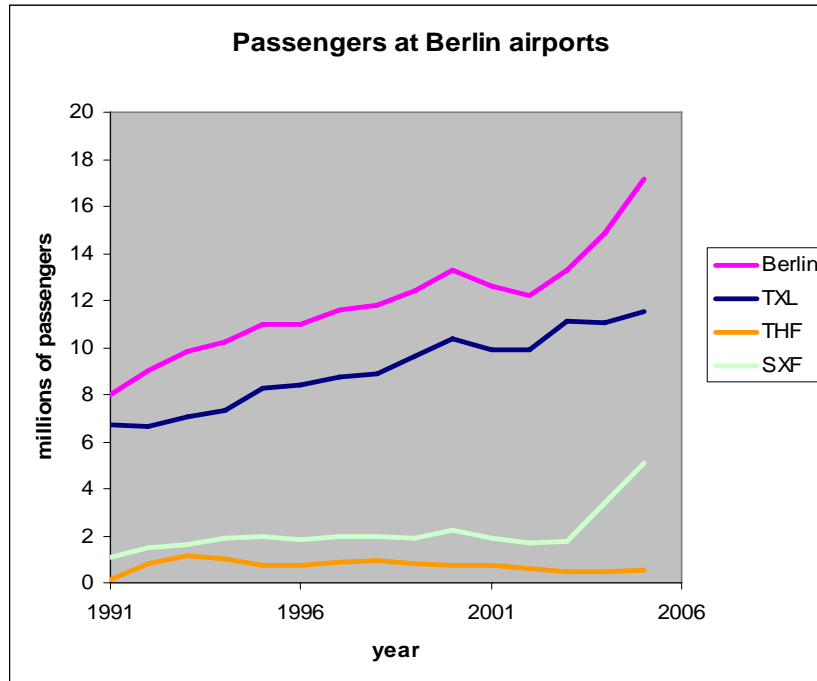
source: ADV

FBS's original plans for BBI were formulated during an earlier optimistic growth
projection: the five-year trend from 1995-99 was a 20% increase in passengers at all
Berlin airports, with over 12 million in 1999. This growth, however, occurred nearly

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[58] Due to the significant dips in passenger demand after 9/11 and SARS, it is useful to compare current
passenger demand to its pre-9/11, "normal" level. For annual data, one could use calendar year 2000 data
or aggregate monthly data from September 2000 through August 2001. This paper uses the former.

exclusively at Tegel, and could be seen as air transport's correlation with worldwide economic growth.[59] Later, when the matter was before the German supreme court (as well as the court of public opinion), FBS's marketing department pointed to the more recent passenger growth. This later spurt was due to Schönefeld's LCC boom (2003-05), and is more likely to plateau than maintain its current rate of expansion.

3.2   Catchment

The starting point for catchment appraisal is the primary urban area that an airport serves; in this case, BBI alone will serve Berlin and its 3.4 million residents. However, the city has not grown according to the optimistic forecasts that predicted a return to its status as a global city. Indeed, Berlin has not grown at all.[60] The new BBI airport will serve a city with a stagnant or perhaps shrinking population—possibly with a stagnant or perhaps shrinking economy. But there is more to catchment calculus than the primary urban area. "Greater" Berlin—including its growing suburbs in the state of Brandenburg—is around 4.3 million.[61] Berlin and all of Brandenburg are home to over 6 million.[62] Yet the airport authority claims BBI will have a catchment of 10 million persons.[63] At first glance this may seem pie in the sky, but with superb transportation infrastructure and marketing to the Polish market, this figure may not be far off the mark.

The standard way to expand an airport's catchment (for passengers or freight) is to improve its accessibility. BBI will serve as a regional transportation node that should

[59] Doganis, Rigas. 2006. *The airline business in the twentieth century.* 2nd Ed. New York: Routledge.
[60] Schultz, Marlies. 2000. "Berlin: Recent issues in urban development." *Beitraege zur Regionalen Geographie, 52*. Leipzig: Institut für Länderkunde.
[61] Gemeinsame Landesplanung Berlin-Brandenburg. 1998. *Joint planning for Berlin and Brandenburg.* Potsdam: Ministerium für Umwelt, Naturschutz und Raumordnung.
[62] ibid.
[63] Jänicke, J., FBS (personal communication 20 Jan 2006).

do much towards achieving this goal. New rail will be laid under the future BBI terminal, and fast inter-city trains will service the station. One will be able to take an express train from Leipzig or Lutherstadt Wittenberg to BBI, with one or no stops and in under 90 minutes. (The 120-minute express trip from Dresden or Hamburg is already possible, although Hamburg has its own international airport.) Also, these trains will stop at the terminal, thus eradicating the annoying (and sometimes frigid) walk from the current station to the current terminal. In other words, the transit from downtown Leipzig to BBI will be seamless. If one were to add the *Sachsendreieck* to BBI's catchment, it would rise to 9.2 million; adding the entire population of the State of Saxony, it would be 10.3 million.[64] One could also include the three cities of the State of Sachsen-Anhalt within 150 km of Berlin—Dessau, Halle and Magdeburg—thus adding another one million persons to BBI's catchment.[65] Hence the geography of this catchment area is not a circle, but a fan spreading to Berlin's south. BBI's accessibility from northern Brandenburg or the State of Mecklenburg-Vorpommern will remain dependent on the autobahn, and BBI will split catchment of this sparsely populated area with Hamburg.

An understudied segment of the Berlin catchment area is western Poland. In 2003 FBS estimated that 3% of its passengers were Poles, and it is likely that figure has increased substantially, given that Poland is now a full member of the EU.[66] 8.9 million Poles live in the four provinces that border Germany, which include the cities of Wroclaw, Posnan, and Szczecin.[67] According to a recent study by Kilian Frey at

[64] Statistical office of the free state of Saxony. 2006. http://www.statistik.sachsen.de/index/41zahlen-engl/unterseite41.htm Last accessed 7 Apr 2006.
[65] Wikipedia. 2006. http://en.wikipedia.org/wiki/Sachsen-Anhalt Last accessed 7 Apr 2006.
[66] Frey, K. (personal communication 9 Mar 2006); Poles may now work in Ireland and the United Kingdom, to which one can fly inexpensively and directly on EasyJet from Schönefeld.
[67] ibid.; Frey cited http://www.stat.gov.pl/, but the English-language website is lacking some data.

Humboldt Universität zu Berlin, fully one-third of surveyed Polish passengers traveling to Tegel and Schönefeld hail from Szczecin. This is not surprising, since that city is the closest (of the three) to Berlin and has the smallest local airport. More significantly, perhaps, is that Szczecin has a privately-run, express bus that takes passengers, thrice daily, directly to Tegel or Schönefeld.[68] Poznan and Wroclaw, on the other hand, have poorer connections to Berlin, and bus service is only public, so it stops at the central bus station in Berlin, which is quite inconvenient for those heading to an airport.

3.3   Air carriers

The airline business is a cyclical one—sensitive to oil prices, macroeconomic growth, and phenomena in passenger demand (such as 9/11 and SARS). It is a schizoid fusion of long-term optimism with short-term uncertainty. Articles regularly appear in both trade and academic journals about various aspects of the industry, but a comprehensive analysis is rare; the newest authoritative text is by Doganis (2006). The literature has focused on the consequences of deregulation and liberalization, the importance of hubbing, and, more recently, the LCC phenomenon.

Starting in the late 1970s, national governments in North America and Western Europe deregulated this industry while their airlines were unquestioned market leaders. With the best and newest planes, combined with experience in international and intercontinental competition, the dominant airlines in the West soon became the dominant airlines in the world. The liberalized competitive environment, however, invited challenges from new Western carriers and emerging Asian ones. Thus deregulation

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[68] Frey, K. (personal communication 9 Mar 2006).

initiated a new era for both airlines and their passengers—and, ultimately, for the airports that bring them together.

Even in this era of aviation deregulation and liberalization, major air carriers remain the dominant force in the airport business. Their business involves maximizing the competitive advantages from the hub-and-spoke network model, which necessarily concentrates passengers and freight throughput. Their business also emphasizes the economies of scale from ever larger aircraft, particularly on long-haul flights, to reduce cost-per-passenger and cost-per-passenger/km. Throughout the history of commercial aviation, larger planes have necessitated larger runways, different gates, and new terminals; if a major hub is to be viable beyond the short term, it must be able to expand.

This paper is not about airlines or their regulation. However, the airline business has suffered a sea-change over the last generation, as ever fewer airlines are protected by their home nations' governments. "Freedoms of the Air," *i.e.*, the rights of one country's commercial aircraft in another's airspace and airports, have exposed markets to greater competition and variety in commercial air service.[69] A parallel development has been the relaxing of ownership quotas for airlines, so that, *e.g.*, a French airline can be owned by Dutch investors. The resulting phenomenon of these liberalizations is the airline alliance, whose geographic scope and financial might make it a major impetus behind contemporary airport development. Today there are three dominant alliances, and each is "led" by market leaders in each continental market, supplemented by other carriers. No primary or secondary carrier—for any of the three airline alliances—hub at a Berlin airport. Even though alliances presently do not concern themselves with Berlin, it is

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[69] A full list of the "Freedoms of the Air" appears in the Appendix.

important in understanding both the aviation landscape into which BBI will be placed and the curious dynamic between airlines and airports.

In some cases following deregulation, the strong got stronger. Lufthansa and Flughafen Frankfurt/Main exemplify this post-liberalization success. With little market restriction, no price controls, and the expansion of large domestic carriers into more international routes, many airlines that were dominant regionally were able to grow to be dominant internationally. By extension, the airports that were these airlines' hubs symbiotically shared their success.

In other cases, the weak got weaker, and sometimes they died; the new competitive environment has led to some airlines' failures. In the US, perhaps the most notable airline to fold was Pan-American, one of the pioneers of commercial intercontinental flight. In Europe, the failed national carriers to date are Swissair (Switzerland) and Sabena (Belgium). The national carrier for East Germany, whose hub was Schönefeld, had a protected market, but it failed against Lufthansa after German Reunification. Aer Lingus (Ireland) and Finnair (Finland) still function, but each has been compelled by the success of regional LCCs to restructure its business model to that of a glorified, government-run LCC.[70]

The airline alliance, in particular, is giving Europe a hierarchy of continental hubs, sublimating the diffusion of national hubs. These continental hubs by and large are the hubs of its dominant airlines—Lufthansa, Air France / KLM, and British Airways. These primate airlines team with peers and vassals across the globe, in what increasingly resembles a dress-rehearsal for a series of massive global airline mergers once all

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[70] De Groote, P. 2005. "The success story of European low-cost carriers in a changing world." *Global and World Cities* research bulletin #174. www.lboro.ac.uk. Last accessed 25 Mar 2006; and Garriga 2004.

developed countries relax ownership quotas for their airlines. These major hubs—

airports that had served chiefly as national hubs, with more intercontinental flights as

bilateral agreements and liberalization allow—are suffering severe capacity constraints as

continental hubs. This supply constraint, in the face of ever-growing demand, has led

airlines—chiefly Lufthansa—towards having systems of hubs. Whether Berlin and BBI

fit into Lufthansa's plans is a matter for discussion.

Through its Star Alliance—the leading alliance in the world—Lufthansa has a

global role in commercial flight. An airline alliance attaches national air carriers of a

3b: Airline Alliances' market position and voting membership

alliance	Star Alliance	Oneworld	SkyTeam
est. 2005 passengers	382,610,000	242,577,000	343,600,000
global market share	21.3%	13.6%	19.1%
members (country)	Adria (Slovenia)	Aer Lingus (Ireland)	Aeromexico (Mexico)
	Air Canada (Canada)	American (US)	**Air France / KLM (Fra/Hol)**
European	Air New Zealand (NZ)	**British Airways (UK)**	Alitalia (Italy)
leaders in bold	All Nippon (Japan)	Cathay Pacific (Hong Kong)	Continental (US)
	Asiana (South Korea)	Finnair (Finland)	CSA Czech (Czech Rep.)
	Austrian (Austria)	Iberia (Spain)	Delta (US)
	Blue1 (Finland)	Japan (Japan)	Kenya (Kenya)
	bmi (UK)	LAN (Chile)	Korean Air (South Korea)
	Croatia (Croatia)	Malev (Hungary)	Northwest (US)
	LOT (Poland)	Qantas (Australia)	
	Lufthansa (Germany)	Royal Jordanian (Jordan)	
	SAS (Den/Swe/Nor)		
	Singapore (Singapore)		
	South African (RSA)		
	Spanair (Spain)		
	SWISS (Switzerland)		
	TAP (Portugal)		
	Thai (Thailand)		
	United (US)		
	US Airways (US)		
	Varig (Brazil)		

Sources: staralliance.com, oneworld.com, skyteam.com, iata.org

secondary stature to greater ones with a continental footprint. Three such alliances exist,

and Star Alliance is the first and largest. Through it, Lufthansa is allied with Austrian

Airlines, LOT (Poland), and SAS (Scandinavia). This confederation is easily the

dominant force in commercial flight in central Europe; it chooses the hubs, not the airport developers. Austrian hubs in Vienna, LOT in Warsaw, and SAS in Copenhagen.

Eastern Europe's role in airline alliances is secondary, if not tertiary. Each alliance has a "colony" of an eastern European airline—ones Western carriers helped refinance and restructure before alliances were conceived in 1994. Typically, the aircraft fleets of Eastern European flag carriers remain too large and too old to be competitive. Nevertheless, in the 1990s Lufthansa, Air France and Alitalia invested in the Polish, Czech and Hungarian airlines, respectively.[71] Less viable airlines in Eastern Europe remain unaligned in the alliance wars, including Aeroflot, which would be a tantalizing confederate, given Russia's continental scope and economic potential.

To better evaluate the potential impact of BBI, one should judge how BBI would rank among its rivals and partners in Germany. The below chart shows transfer activity, 3c:[72]
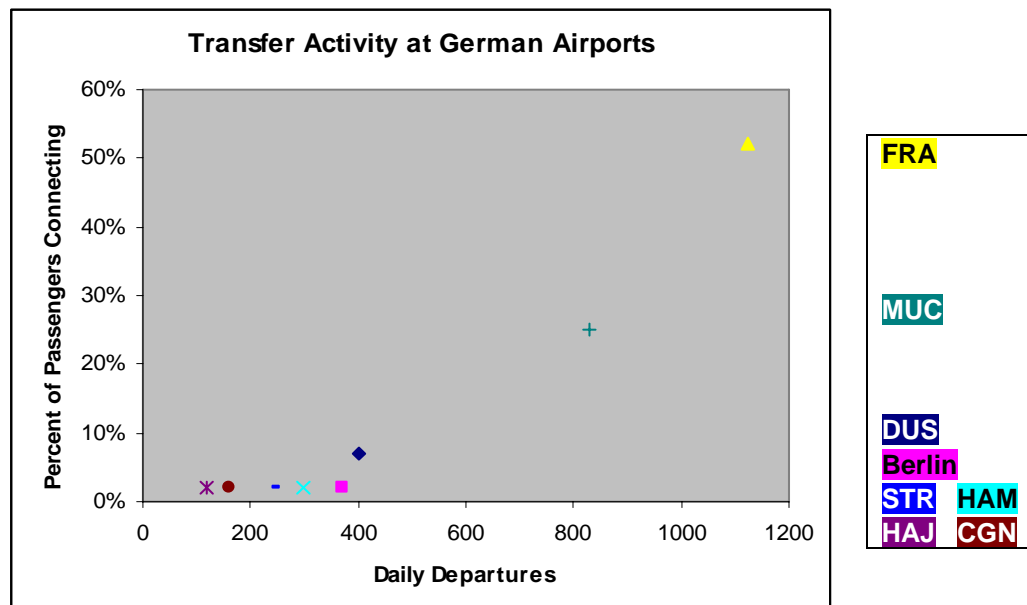
Sources: ADV and OAG Flight Guide

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[71] Shibata 1994.

[72] For this and other charts, "Berlin" represents the total of the city's three airports. The other major German airports are referred to by their call-signs: FRA=Frankfurt/Main, MUC=Munich, DUS= Düsseldorf, STR=Stuttgart, HAM=Hamburg, HAJ=Hannover, and CGN=Cologne-Bonn.

with connecting passenger estimates from ADV. For airports that are not transfer hubs—so chosen by, in this case, Lufthansa—transfer activity is minimal. Passenger "dwell time" and terminal shopping would also be relatively low.

After the closure of Tegel and Tempelhof, BBI should have nearly 20 million passengers a year. Also, with improved transportation access, BBI might increase its catchment beyond Brandenburg and into Saxony or Sachsen-Anhalt. Currently, Tegel is the hub of the second-largest German carrier, Air Berlin, which officially partnered with another German carrier, dba, in January 2006. Also, Schönefeld is the easternmost hub for EasyJet, one of the two most established and far-reaching LCCs. With improved accessibility, a political capital to serve, and a strong presence of LCCs, BBI can be an excellent regional hub.

However, it is highly unlikely that BBI would be a hub of any continental, much less global, significance. The major carrier in Germany is Lufthansa, which is one of the premier carriers in Europe. Lufthansa uses Frankfurt/Main as its chief hub, and was the original force spurring its 1994 expansion.[73] Its secondary hub is Munich's new Flughafen Franz Josef Strauss, which opened in 1992. The Munich airport's second terminal was finished in 2003, and operates exclusively for Star Alliance carriers. In late 2005 Lufthansa began its takeover of SWISS (a reincarnation of Swissair), and will use its hub of Zürich as another secondary hub.[74] Thus, it is highly improbable for BBI to be a new secondary hub for Lufthansa because that airline, together with its allies, already has several hubs in central Europe.

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[73] Freund, B. (personal communication 31 Jan 2006).
[74] Swissair went bankrupt in 2001, and SWISS was formed a year later as a merger of Swissair and Crossair; Flottau, J. 2005. "Lufthansa's Big Footprint." *Aviation Week & Space Technology 163.18.*

The following chart shows the connectivity and frequency of flights at the German airports that compose the study population. (Frequency in this case refers to the frequency of all flights, and not to the frequency of flights serving a city-pair.) This chart clearly shows Frankfurt/Main in the role of a major, transfer hub. Munich is without a challenger as a secondary hub. In fourth place, Berlin ranks just behind Düsseldorf.

3d:

Connectivity and Frequency at German airports
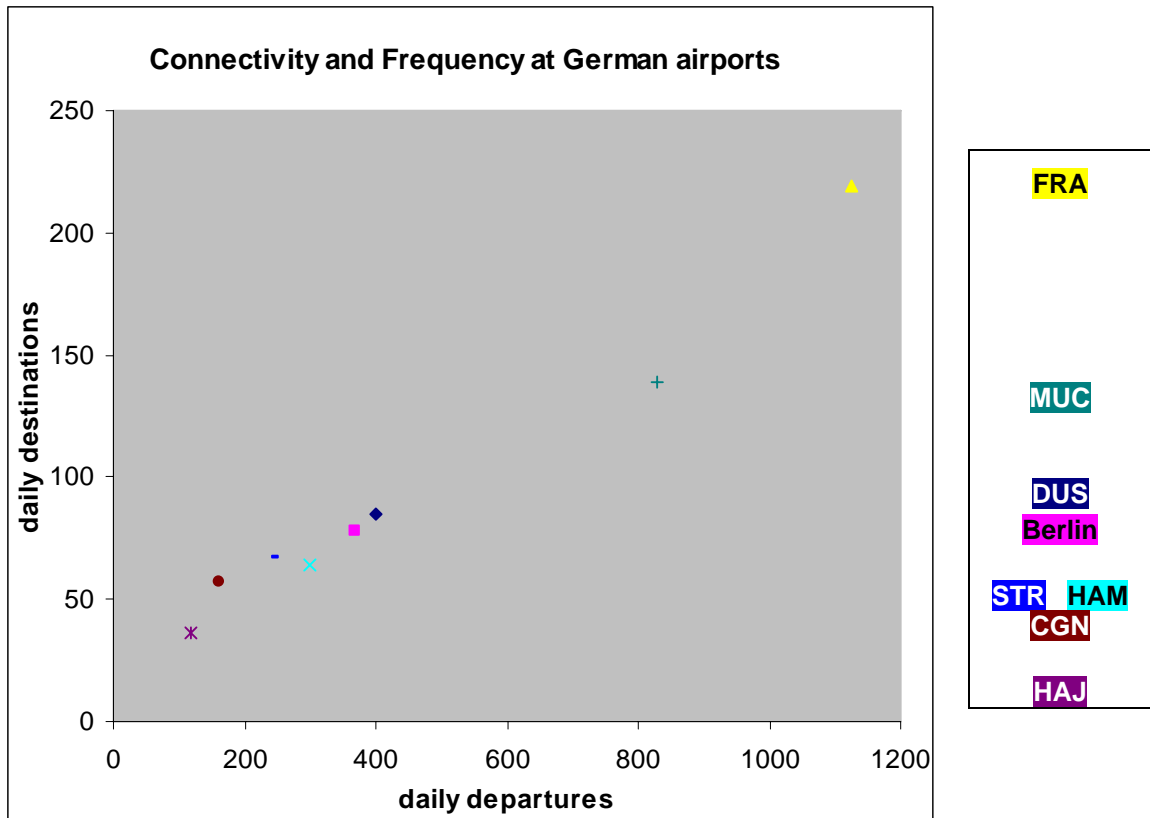
Source: OAG flight guide; data for Friday 10 March 2006

Lufthansa and Berlin do not have much of a shared history. Following World War Two, the victorious Allies produced the Four Powers Agreement that attempted to outline the shared control of occupied Berlin. This agreement curtailed air freedom to the city. Passenger flights to West Berlin could be made only on an air carrier of an Allied

42

country, ad these turned out to be Air France, British Airways, or Pan-American.[75] This curious restriction survived the wave of airline deregulation of the late 1970s, effectively denying Lufthansa air freedom in a part of its own country. The first Lufthansa plane to land in Berlin (since 1945) did so in October 1990, a year after the fall of the Berlin Wall.[76]

The following chart shows German airports' "global significance," a function of intercontinentalism and connectivity. Frankfurt/Main dwarfs the other airports, including its Star Alliance sister, Munich. Berlin ranks sixth, below even Hannover.

3e:

The Global Significance of German Airports
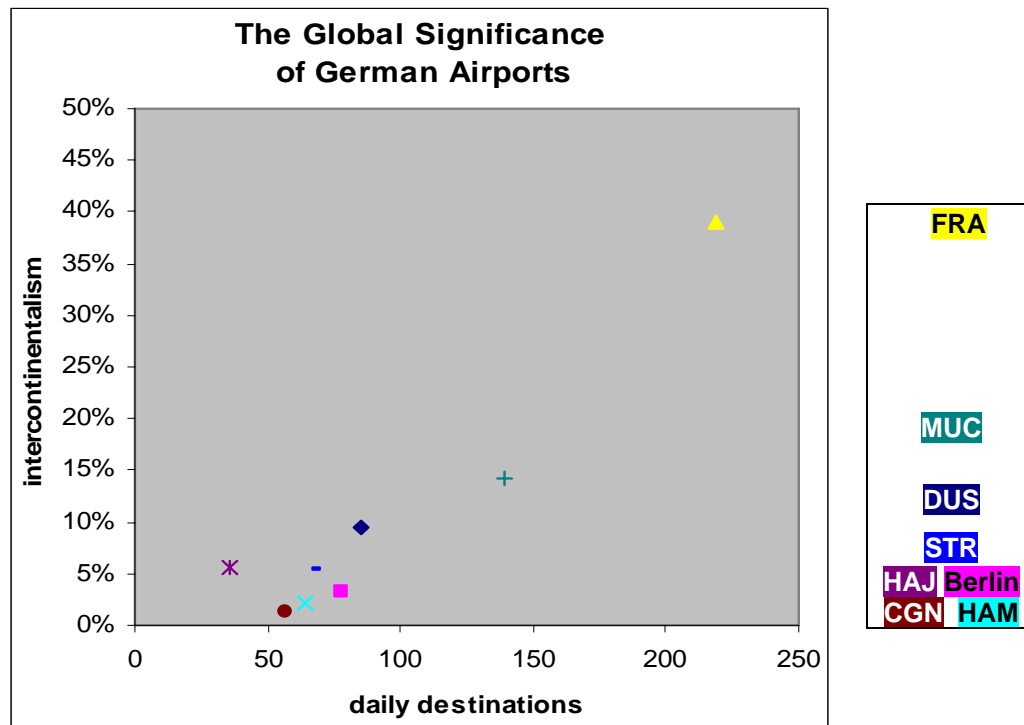
Sources: ADV and OAG Flight Guide

As the following map shows, the trifurcated airline alliances have consolidated their western European hubs. Of particular interest is the boundary between Star Alliance

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[75] Kulke, E. (personal communication 2 Feb 2006); Russia's Aeroflot served Schönefeld, but since that airport was also (and essentially) in Brandenburg, technically it could be served, and was, by East German-owned Interflug.
[76] FBS. 2006. http://www.berlin-airport.de/PubEnglish/PubTegel/PubDatenFaktenTXL/ PubGeschichteTXL/index.html#1990. Last accessed 7 Apr 2006.

and SkyTeam, which resembles the Maginot Line. Oneworld's confederation is on

Europe's periphery, and serves a more archipelagic set of destinations; it has no central

continental hub. Just as Lufthansa ran an end-around on British Airways by acquiring

British Midlands International Airlines, one should not be surprised if Oneworld or

SkyTeam do likewise, and secure BBI as a hub amid Star's Teutonic fortress.[77]

3f: Europe, colored to the alliance that dominates each large airport
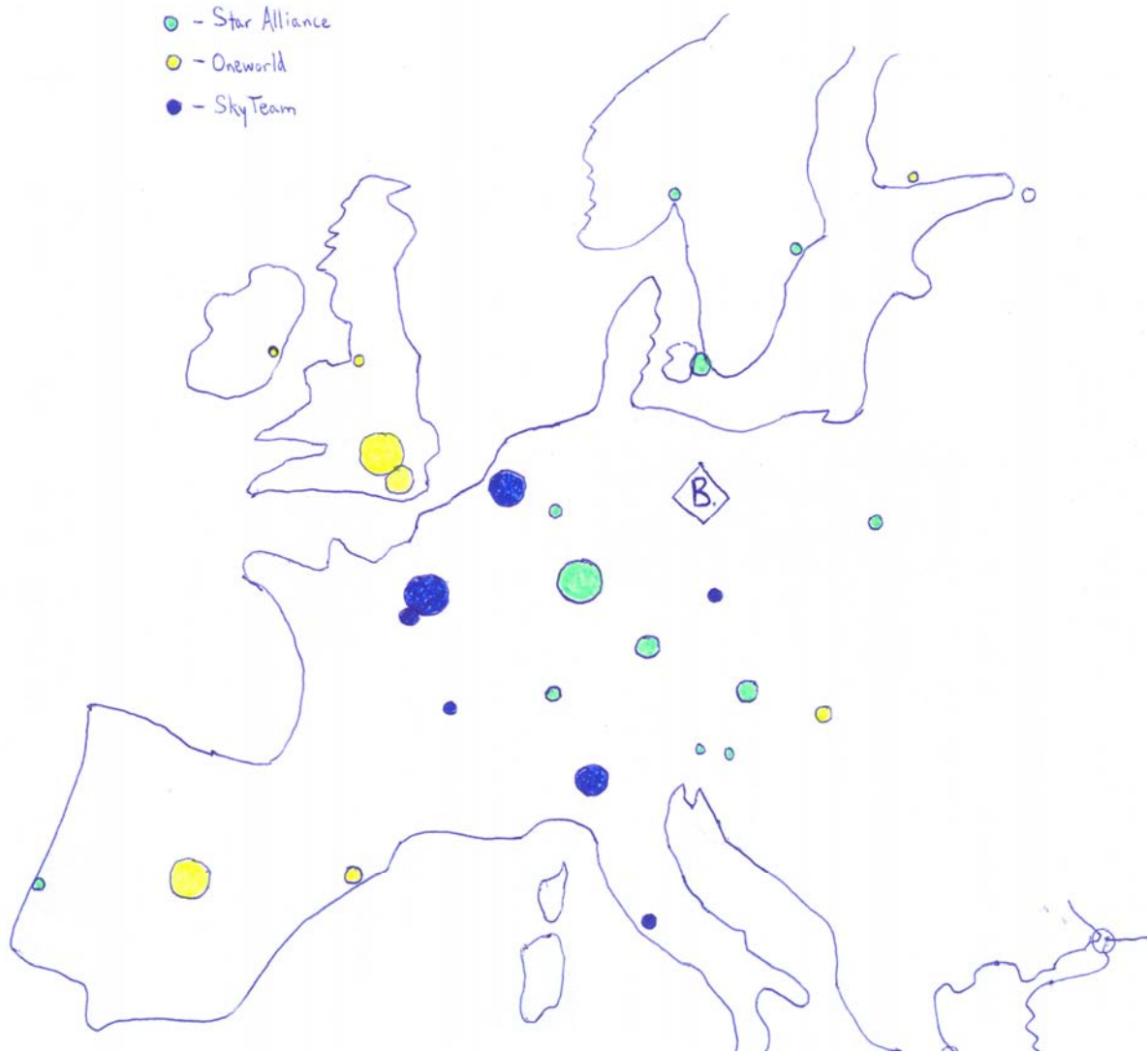
BBI's becoming an end-around for SkyTeam or Oneworld would be its best

chance at being a major hub. Lufthansa has little history with Berlin and is not

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[77] Varlet, Jean. 1992. "L'Interconnexion des reseaux de transport en Europe." *Etudes & Documents, 24(1).*

enthusiastic about the closure of Tegel.[78] Meanwhile, the third-largest airline in

Germany, dba, was founded by British Airways (to secure flights to Berlin under the Four

Powers Agreement), so there is some precedent to British Airways' involvement in the

German domestic market. Germany's second-largest carrier, Air Berlin, serves many

German airports and also hubs at Palma de Mallorca, Spain. Should dba and Air Berlin

merge, or should one or both be purchased by British Airways (or otherwise

amalgamated into Oneworld), BBI would be a top prospect to be British Airways' elusive

continental hub.[79] A possible harbinger of such a deal would be any investment by BAA

during the privatization of FBS, since BAA owns London/Gatwick, the current secondary

hub for British Airways, which would be negatively affected by such a play.

There are signs that point to Oneworld's grooming Budapest as its central

European hub. The Hungarian carrier Malev—even though SkyTeam's Alitalia

restructured it in the 1990s—is scheduled to join Oneworld in 2006.[80] Malev hubs at

Budapest Ferihegy Airport, which can handle the Boeing 747. Ferihegy currently accepts

nightflights pending a user fee, and is planning to build a new runway.[81] BAA, which

owns the British Airways hubs of Heathrow and Gatwick, purchased a majority share of

Ferihegy in December 2005.[82] Berlin and BBI seem more attractive than Budapest and

Ferihegy, considering the imminent and publicly funded redevelopment, potential

handling of the A-380, greater origin and destination travel from passengers, and

proximity to the Western European "pentagon." However, without the freedom of

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[78] Berg, Mario, Lufthansa Cargo (personal communication 3 Mar 2006).
[79] Spain, while continental, is peripheral to the "pentagon," where economic activity and affluent passengers are concentrated.
[80] Oneworld Alliance. http://www.oneworld.com. Last accessed 25 Mar 2006.
[81] Budapest-Ferihegy Airport. http://www.hungary-airport.hu. Last accessed 25 Mar 2006.
[82] British Broadcasting Company. "BAA closing in on Hungarian deal" http://news.bbc.co.uk/2/hi/business/4511168.stm. Last accessed 25 Mar 2006.

nightflights, it seems unlikely that Oneworld and British Airways would utilize BBI as a continental hub.

3.4   Low-cost carriers

Some of the traits that made Schönefeld attractive to LCCs will not exist at BBI. There are different network models for LCCs, but they all have the same business model: the minimization of costs. Typically, this results in their servicing under-utilized—and thus cheaper—airports in major cities or vacation destinations. While Berlin is yet to attain the status of vacation destination, it is still a major city, with nearly ten million persons within its catchment area.

From the consumer's perspective, perhaps the most significant result of deregulation has been the increased affordability of flight, best exemplified by the phenomenal proliferation of LCCs. They vary widely, but their business model has a few typical features: flying to secondary airports with minimal landing fees; booking e-tickets directly with customers over the Internet; having no frills on board the aircraft; owning a standardized aircraft fleet; and, avoiding the logistical requirements of hubbing.[83] This business model was first successfully executed by Southwest Airlines in the US, who by the 1990s had inspired Irish and British mimics, namely Ryanair and EasyJet. Also, many charter services became LCCs by formalizing their routes, linking numerous Mediterranean holiday destinations with one or two northern European cities. (This north-south axis of European LCCs very recently has been complemented by some east-west routes, linking large Eastern European cities with Western holiday destinations and business centers.) Some successful LCCs, such as EasyJet and Air Berlin, are large

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[83] Garriga 2004.

enough to realize the benefits of hubbing—thus straying away from the original business model. Today there are at least 50 European LCCs, putting tremendous pressure on regional air carriers to cut costs and differentiate service.[84]

Over the past few years Schönefeld has experienced a boom in LCC flights.[85] Data are not readily available on how many of an airport's passengers fly on a LCC, chiefly because the definition of LCC is mutable. However, one can assert that a major share of Schönefeld's increase in passengers is due to LCCs. One of the LCC market leaders, EasyJet, made Schönefeld its central European hub in 2003, and accounted for one million enplaned passengers after just eight months of service.[86] Also, the second- and third-leading airlines in Germany, Air Berlin and dba, respectively, and operate generally on the low-cost model.

The airport proudly touts this LCC trend as a forecast of future demand, as part of the impetus for increasing airside capacity. However, if forecasts of 20 to 30 million passengers are realized, the demand on the limited supply of slots at BBI surely will increase their price. Moreover, BBI will have no secondary airport with which to compete for Berlin air service, so it will have, in effect, a local monopoly on commercial flight. This lack of competition easily could drive up BBI's landing fees, since airlines will have no alternative Berlin airport to serve. EasyJet's lone statement on BBI is that it wants the new airport to preserve LCC service in its business model, but it is quite possible that LCCs could be priced out of the Berlin market.[87] From the airport's perspective, this would be a good problem to have, because it would mean that BBI

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[84] Skyscanner. http://www.skyscanner.net. Last accessed 7 Apr 2006.
[85] FBS. 2004. *Airport*. Autumn edition of a quarterly newspaper.
[86] FBS. 2006. *Check-in: Facts and figures*.
[87] Aust, O., EasyJet (personal communication 6 Feb 2006).

became popular for major air carriers. From the passenger's perspective, however, there would be a substantial low-cost market that would go untapped.

Two "German" LCCs were established in the US and the UK before the termination of the Four Powers Agreement in 1990, thus allowing them to serve West Berlin. Presently they are now the second and third most-traveled German carriers: Air Berlin and dba, respectively. Each recently has consolidated its position, and they market themselves as rivals to Lufthansa and not as "low-cost." In February 2006 dba purchased LTU, a well-known German charter airline.[88] This could be seen as a response to Air Berlin's "inheritance" of the fleet of Germania—another popular charter—following the death of its owner in November 2005.[89] Impressively, Air Berlin has cabotage freedom in Spain, and uses Palma de Mallorca as a hub. In March 2006, Air Berlin made its initial public offering, in hopes that being publicly traded will help finance its future expansion.[90]

3g: EasyJet leads the LCC boom at Schönefeld

Source: FBS, *Check-in*

BBI will have no home carrier, unless one counts Air Berlin, a leading LCC. Since airlines and not airports choose the hubs, an airport should not invest in more capacity for the sake of LCCs, chiefly because LCCs and their passengers contribute

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[88] Tagesshau website. "dba kauft Mehrheit von LTU." 17 Feb 2006. http://www.tagesschau.de/aktuell/meldungen/0,1185,OID5247058_REF1,00.html
[89] Flottau, J. 2005. "On the Move." *Aviation Week & Space Technology 163.20.*
[90] Air Berlin press release. 8 Mar 2006. http://www.airberlin.com/site/index.php?LANG=eng.

little, relative to a hubbing home carrier or affluent business passengers, to an airport's revenues. An LCC such as Air Berlin hubs for purposes of personnel concentration, not for purposes of connecting passengers from one flight to the next. For example, LCCs pay minimal (if any) landing fees, and their passengers rarely catch connecting flights (thus minimizing their "dwell time" to shop).[91] Also, if ticket price was more important than, say, comfort or time cost, such price-sensitive passengers would seem less likely to spend money in the terminal, even if they did have much dwell time. Thus, LCC hubbing barely involves either the aeronautical or the non-aeronautical benefits normally concomitant with a transfer hub. BBI would not realize the benefits typical of a transfer hub, despite Air Berlin's presence.

Eastern European LCCs come and go so rapidly that it is difficult to take a snapshot without it coming out blurry. However, one can make an accurate generalization: Eastern European LCCs do not fly to Berlin. The Czech LCC, Smartwings, links Prague to western hubs and tourist destinations beyond a day's drive or train ride, and Berlin may be just too close.[92] Wizzair connects Budapest, Warsaw, Katowice, and Gdansk to secondary airports of major cities across Western Europe—but not to Schönefeld.[93] Centralwings, owned by LOT, connects many Polish cities with tourist destinations, the British Isles, and some other western cities.[94] Its only German connection is Cologne-Bonn, but, like Smartwings, perhaps it is just to close to Berlin to merit flights. Out of Bucharest, Blue Air serves a hodgepodge of mostly secondary

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[91] Doganis (1992) wrote that in Europe in 1989, concessions from terminal merchants composed 16% of total airport revenue. This was the largest slice of non-aeronautical revenue, and third overall, behind landing fees (21%) and passenger fees (20%).

[92] Smartwings website. http://www.smartwings.net/en/. Last accessed 11 Apr 2006.

[93] Wizzair website. http://wizzair.com/index.shtml. Last accessed 11 Apr 2006.

[94] Centralwings website. http://www8.centralwings.com/. Last accessed 11 Apr 2006.

airports, with the only German destination being Frankfurt/Hahn.[95] The Bulgarian LCC, Hemus, links Sofia to Hannover and Cologne-Bonn, but not Berlin.[96]

Perhaps the largest LCC in Eastern Europe, SkyEurope, had a flight to Berlin and dropped it.[97] Slovakia's capital and one of SkyEurope's bases, Bratislava positions itself as the LCC option for Vienna, reinforcing the notion that the market does not support LCC service from Eastern Europe to Berlin. Typically, a flight from Berlin to Vienna via LCC would go from secondary airport to secondary airport, viz Schönefeld to Bratislava. However, the LCC option between the Berlin market and the Vienna market is Air Berlin, which links Tegel with Vienna International—showing that the LCC market for Berlin looks West, even to the Kingdom of the East.[98]

Despite the recent LCC attention given to Schönefeld, Tegel is not without LCC service. Approximately ten LCCs serve each airport. While Air Berlin serves both, the other German LCCs serve one of Berlin's airports exclusively.[99] Flying on a LCC, a passenger can reach around 50 destinations from Tegel, and about 60 from Schönefeld.[100]

3.5   *Freight*

Reiterating the conclusion of Schulte in 2002, it is unlikely that BBI will be an air freight hub. BBI's prospect as a freight hub seems even less likely today than in 2002, due to the maturation of the plans for BBI and the emergence of Leipzig as an air freight

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[95] Blue Air website. http://www.blueair-web.com/index.php?location=destinations&LANG=EN. Last accessed 11 Apr 2006.
[96] Hemus Air website. http://www.hemusair.bg/low_cost/en/index.php. Last accessed 11 Apr 2006.
[97] Garriga 2004; and SkyEurope website. www.skyeurope.com/en/. Last accessed 11 Apr 2006.
[98] Flughafen Berlin Schönefeld. 2005. *Flugplan Winter 2005/06*.
[99] ibid.
[100] http://www.skyscanner.net

hub. However, there remain some exploitable features to both the airport and the region that offer some hope.

FBS's current plans for BBI focus decidedly on passenger service. While this could be because the populace more readily appreciates the experience of commercial flight than the "invisible hand" of air freight, the emphasis thus far is one-sided. One basic reason why air freight is not a major concern for FBS is that the regional economy is struggling, or at best stagnant. While BBI will serve a large city, Berlin does not "make things." Berlin manufacturers would not generate very much air freight, since after reunification that sector was eviscerated throughout the former East Germany. Meanwhile, the Berlin government has much of its capital budget tied up in major infrastructure projects, with little remainder to dedicate towards other efforts for economic development.

For its freight prospects, FBS touts Berlin's role as a political capital and as (allegedly) an important commercial center.[101] Also marketable is the city's central geographic position on the continent as well as the excellent transportation infrastructure in Germany. It also promotes Berlin as a node in both air cargo and trucking networks in Europe. Some of these characterizations are rather optimistic, and, considering the dominance of Frankfurt/Main in air cargo in Germany, rather misleading.

Berlin was the first German city to be served by all four major freight integrators: FedEx, UPS, DHL, and TNT.[102] FedEx flies daily from its Paris hub to Tempelhof. UPS flies daily from its Cologne-Bonn hub to Schönefeld. DHL, when it was based in Brussels, used Berlin as its stopover between its hub and the Polish cities of Gdansk,

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[101] FBS. 2006. http://www.berlin-airport.de/PubEnglish/PubSchönefeld/PubCargoSXF/PubUntern_der_RegionSXF/index.html. Last accessed 7 Apr 2006.
[102] Flughafen Berlin Schönefeld. 2005. *Frachthandout*. Unpublished presentation.

Warsaw, and Katowice. (This is unlikely to persist once Leipzig's hub is realized.)

Finally, TNT connects Warsaw and its Liege hub with Tegel.

Currently, cargo travels to and from Schönefeld and Tegel in different ways.

Schönefeld allows nightflights and has a rail link, so it receives approximately two-thirds

of dedicated freighter traffic to Berlin.[103] While the current tripartite airport system

allows Schönefeld to function as the freighter specialist (relatively speaking), it is

possible that air cargo to BBI would drop significantly, relative to the sum presently

handled by Schönefeld, Tegel, and Tempelhof combined. Hence, an unsettled,

unprecedented matter will be the effect of the consolidation of Berlin's airports on the

balance of freight and passenger service. The future dynamic at BBI between cargo

borne by airlines and cargo brought by dedicated freighters may be more complicated

than a simple matter of addition; should slot space rise in demand, the airport may have

to choose one over the other. Today it appears that FBS would prioritize passenger

airlines.

Given the status of Berlin in the context of the continental European air freight

system, its freight activity is negligible. Frankfurt/Main dwarfs other German airports—

and other European airports, for that matter—when it comes to freight, due to the long-

haul flights with wide-body aircraft that frequent the airport. Since Frankfurt is within a

day's truck of Berlin, there is no reasonable chance for Berlin to be a freight hub of any

consequence, if such freight comes from air carriers. For example, 30% of the freight

moved by Lufthansa Cargo at Tegel connects with Frankfurt via truck.[104] The bulk of the

remaining 70% flies to Frankfurt, as the Frankfurt/Main-Berlin/Tegel shuttle is the only

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[103] Flughafen Berlin Schönefeld. 2005. *Check-in*; and Flughafen Berlin Schönefeld. 2004. *Check-in*.
[104] Berg, M., Lufthansa Cargo (personal communication 3 Mar 2006).

flight for which Lufthansa uses a wide-body aircraft, the A-300.[105] In addition, Air

Berlin has used available bellyspace for cargo since June 2005.[106]

Frankfurt/Main is a massive transfer hub with very many long-haul connections,

and Munich's airport is growing up to resemble her bigger sister in the Lufthansa family.

Both are within one day's truck of Berlin, as is Amsterdam Schiphol. ((FN: freight

catchment is a day's truck, or a 500-600 km radius.))   Also, most of the European hubs

of dedicated freighters are with a day's truck from Berlin: UPS is in Cologne-Bonn, TNT

in Liege, Cargolux in Luxembourg, and DHL in Brussels. Also, DHL will move its hub

3h: The top European freight hubs

to Leipzig by the end of 2006. DHL is in fact a subsidiary of Deutsche Post, so air mail

to Berlin doubtlessly will be diverted to Leipzig, thus further reducing BBI's freight

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[105] ibid.
[106] FBS. 2005. http://www.berlin-airport.de/PubEnglish/PubSchönefeld/PubCargoSXF/PubCargoNews/
index.html. Last accessed 7 Apr 2006.

loads. Considering the tonnage going to airports within Berlin's freight catchment, it is highly improbable that their Berlin-bound cargo would actually be unloaded from a plane in Berlin.

The emergence of Flughafen Frankfurt/Hahn as a complement to Frankfurt/Main is both a good example of a secondary airport and an interesting analogy to the dynamic between Schönefeld and Tegel. The ADV have reported Hahn's data only since 2004, and already the airport is the eleventh largest in Germany, essentially through its position as the low-cost option for the Frankfurt area. Furthermore, Hahn has attracted service from dedicated freighters, giving it over 100,000 tons handled in 2005 (half as much as Munich, and fourth among German airports).[107] On a much smaller scale, Berlin/Schönefeld and Berlin/Tegel mimic the relationship between Frankfurt/Hahn and Frankfurt/Main. From the Frankfurt case, one can see that a multiplicity of airports—an airport system—can be a win/win scenario; indeed, both airports are owned by the same company, Fraport AG. However, the consolidation of commercial aviation at BBI would deny Berlin a secondary airport, and the differentiation in focus and service that an airport system allows. Passengers ultimately benefit from a differentiation in service or, conversely, ultimately suffer from its homogeny.

The two charts on the following page show thousands of tons of air cargo handled at large German airports. If the two charts were combined, one would not be able to distinguish the various lines at the bottom. Frankfurt/Main's dominant position is quite clear. Despite Munich's emergence as Lufthansa's secondary hub, its freight levels are

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[107] ADV. 2006. Kumulierte Monatswerte. http://www.adv-net.org/download/presse/. Last accessed 7 Apr 2006.

still dwarfed by those of a freight hub, Cologne-Bonn. The charts also show how non-

hubs hardly matter in the world of air cargo.

3i:

Air cargo handled at German freight hubs compared to Berlin

Source: ADV

3j:

Air cargo handled at German airports that are not freight hubs
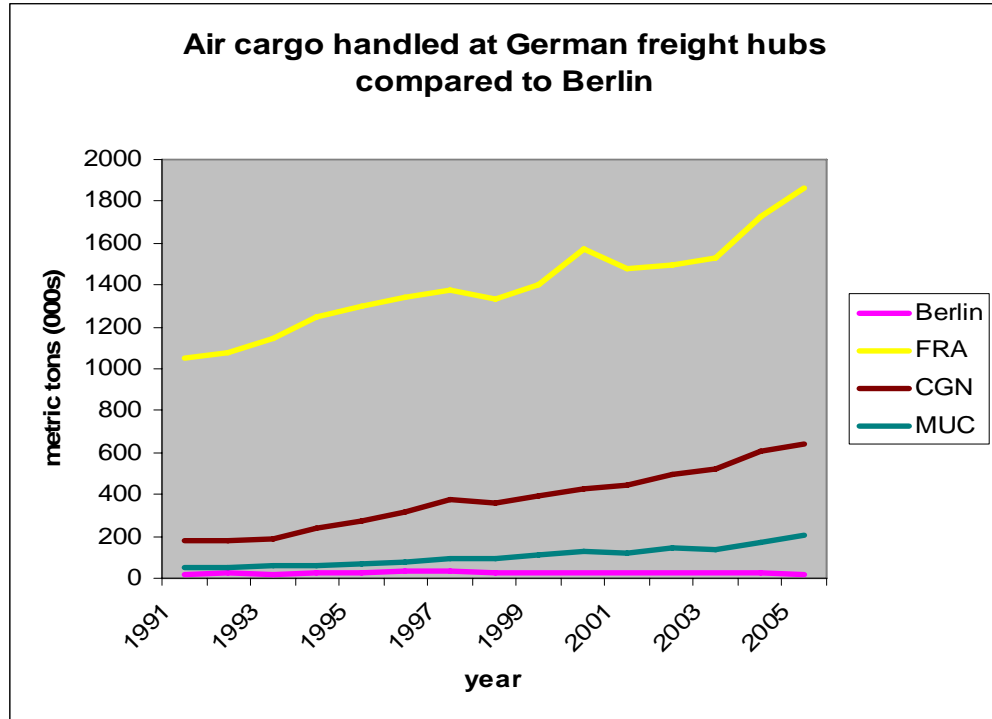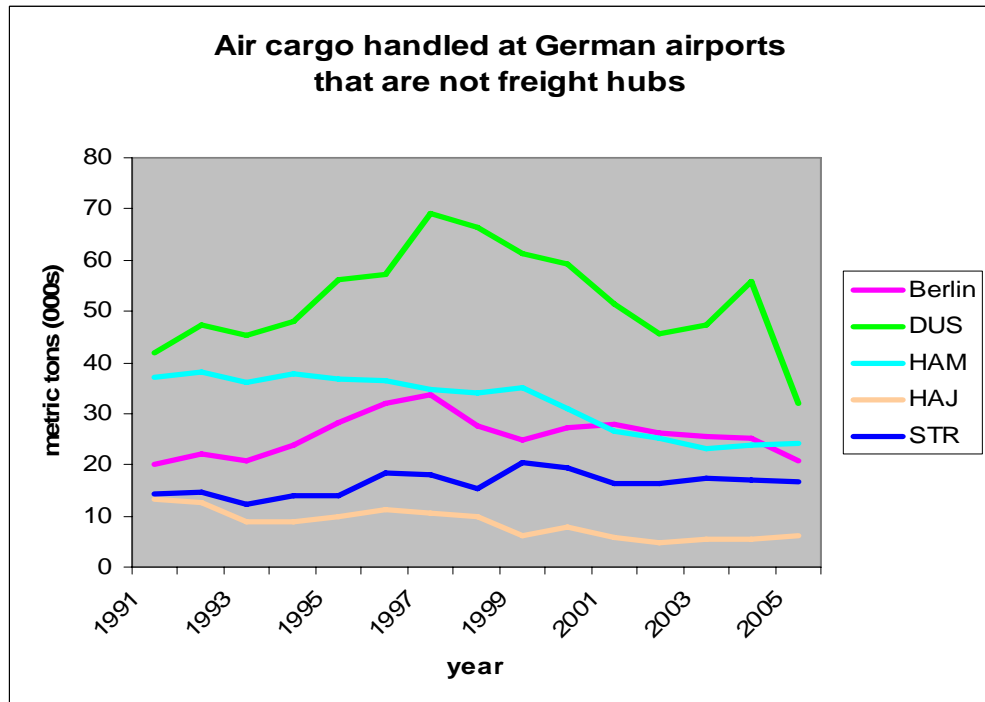
Source: ADV

There is some good news for air freight at BBI. There is no foreseeable shortage of airside capacity. Berlin lies (slightly) closer to East Asia than many other European cities—certainly closer than most continental cities with excellent transportation infrastructure. FBS claimed that 45% of air cargo in Berlin in 2004 flew to or from Asia, but the author could not locate the source of this figure; indeed the discovered data paint a different picture.[108] Regardless, Berlin's location means that flights with Asia need not navigate the air traffic above the western European "pentagon." Had nightflights been allowed, there would have been even more good news.

Berlin is beyond the catchment of only one freight hub, FedEx in Paris/Charles de Gaulle. However, Paris/Charles de Gaulle is a busy airport and with constrained airside capacity, so FedEx may look elsewhere for its European hub. It is not without precedent for FedEx to move hubs; it did so in Southeast Asia in 2005, going from Subic Bay (Philippines) to Guangzhou (China). There is also precedent for a freighter to move its European hub, as DHL is set to move from Brussels to Leipzig in 2006. Might FedEx locate a hub at BBI? This certainly would be only way for Berlin to have significant freight service—and with FedEx it would have very much indeed. First, freight hubs must be within a day's truck from the Western European "pentagon," which Berlin is (viz Leipzig). Second, the up-and-coming routes in global air freight are to and from East and Southeast Asia, to which Berlin is approximately 1,000km closer than Paris. A European airport further east likely would be too far from the "pentagon," and would lack Germany's superb transportation infrastructure. An airport further west might not have nightflights, given the population density of the "pentagon." Berlin's only bet for freight

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[108] FBS 2005 *Frachthandout*; and Eurostat "avia_goexac" dataset for 2004: "International extra-EU freight and mail air transport by main airports in each reporting country and partner world regions and countries".

is FedEx, and it is a good bet. If BBI becomes a FedEx hub, the economic impact of the airport could be great, following the effects of FedEx on Memphis, Indianapolis, and (potentially) Greensboro.

Finally, BBI could be a freight hub linked to Dubai. While this point is speculative and tenuous, as it is dependent on both Emirates and British Airways, it is worth mentioning. Emirates is an emerging air carrier, and remains non-aligned with any airline alliance. Based on its massive marketing endeavors in Britain, however, it seems keen on being a major carrier for London-to-Asia routes. Hence, its hub of Dubai would increase its already-burgeoning significance. The only London airports large enough for the necessary aircraft for intercontinental flight are Heathrow and Gatwick, British Airways' two hubs. In essence, securing a position at either of those airports (and Heathrow in particular) means coming to an understanding with British Airways, which controls a majority of the slots at each.[109] There are additional reasons why it would be unsurprising for Emirates to team up with British Airways: English is the language of business in the UAE, and a UAE firm recently purchased P&O, a major British shipping concern (which dovetails nicely with Dubai airport's being a fast-growing freight hub). Thus, from Emirates' perspective, it might want a freight hub in both Britain and the continent. Likewise, British Airways desires a centrally located hub on the continent for its Oneworld alliance. If British Airways nabs dba or Air Berlin, and thus hubs at BBI, BBI could be a freight hub for cargo shipped by Emirates with Dubai.

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[109] Wikipedia. http://en.wikipedia.org/wiki/British_Airways. Last accessed 8 Apr 2006.

3.6   Conclusion of analysis

A hub airport must have one of the following qualities: serving a global city (London, Paris, New York, Los Angeles), serving a city ideally situated politically and geographically (Singapore, Hong Kong, Miami, Dubai), or adopted as a base by a passenger or freight carrier (Frankfurt/Main, Charlotte, Memphis, Louisville). With regard to the first quality, Berlin is not a global city. Regarding the second, it is well-positioned for the Europe-Asia freight route, as aircraft would not have to negotiate the air traffic above the Western European "pentagon." However, in this respect Berlin would be a latecomer to Leipzig, and their status could change in the (unlikely) event that Eastern Europe's transportation infrastructure rises to Germany's level. Finally, pertaining to the third potential quality of a hub, BBI will be the base of Air Berlin—but not even a secondary hub for Lufthansa. If Lufthansa continues its disinterest in Berlin, BBI will hitch itself to Air Berlin and other LCCs.

4.   The Spatial-Economic Impact of BBI

The redevelopment of Schönefeld into BBI is a major component of the reinvention of Berlin into a reunited, capital city. It can be an example of architecture as public art, a work that stands as an impressive entrance for visitors—not unlike the Brandenburg Gate. However, an airport's development is not a discrete event; it affects many facets of planning, development, and urban economics. It is a major multimodal transportation link for the greater region, annually handling millions of tons of freight and millions of passengers. New roads get built, new businesses are attracted to (or priced out of) a region, and commuting and housing preferences change. Berlin will get an airport befitting a major capital, but can the airport help give Berlin an economy befitting a thriving city?

4.1   New Berlin, new Germany, new Europe

The Cold War sealed Berlin's post-Cold War fate, as the Allied powers had removed command and control functions of the German state(s) away from Berlin, to various cities in West Germany (or even to Washington and Moscow). In addition, Germany is a polycentric country, with major population centers at the Rhine-Ruhr conurbation, Berlin, Hamburg, Munich, and Frankfurt. Combined with a federal political system, one might expect such a country to have a scale-free, polycentric airport system. However, passengers and freight networks do not operate that way, due in large part to the hub-and-spoke model. Frankfurt/Main then is the primate airport for the country of

Germany, due initially to the preferences of the US military, then to the emergence of the city as a financial center, and later to the growing strength of Lufthansa.

In the years immediately following German Reunification, authorities were very optimistic towards the future of Berlin. As a divided city, its two halves composed a metropolis of 3.5 million inhabitants. With the relocation of the seat of government from Bonn and massive capital construction in former East Berlin, boosters imagined that the firms that had fled Berlin after the Second World War promptly would return. The rosy estimate was a boomtown of 6 million people, but this growth has not yet occurred.[110] First, the "risk" bonus West Berliners had received ended, along with the subsidies that the West German government had offered firms located within the "island" city.[111] Second, the manufacturing sector of East Berlin and East Germany essentially collapsed, causing massive structural unemployment from which the region is yet to recover. These great changes compelled many job-seekers to move away.

Germany's polycentricity and the economic strength of its west make Berlin unlikely to benefit significantly from the ongoing economic integration of Europe. Within the context of central Europe, Berlin is one of the easternmost "Western" cities. It is closer to Poland and the Czech Republic than to the "pentagon" of the Western core: London-Paris-Milan-Munich-Hamburg. One may be tempted to believe that Berlin is well positioned to benefit economically from the accession of former Eastern Bloc nations into the EU. However, the strong capital and knowledge linkages flow to the East from the institutions and firms in western Germany.[112] In a sense, eastern Germany

[110] Kulke, E., Humboldt Universität (personal communication 2 Feb 2006).
[111] Schultz, M., Humboldt Universität (personal communication 28 Feb 2006).
[112] Kraetke, S. 2002. "The regional impact of EU eastern enlargement: A view from Germany." *European Planning Studies 10(5)*.

gets bypassed on the freeways from Poznan to Frankfurt-am-Main or from Warsaw to

Düsseldorf. Berlin may be a slight exception to this rule—particularly regarding

German-Polish linkages—but it is the exception that proves the rule, showing that cross-

border development need not have a geographic parameter.[113]

Indeed, due to the polycentric structure of Berlin itself, airport consolidation—in

concert with numerous other major infrastructure projects—should have a profound

effect on the economic map of the city and region. Major developments over the past 15

years have concentrated most investment on an area that, on a map, vaguely resembles a

mushroom.[114] The mushroom's cap would link the two downtowns of the divided

4a: The "mushroom" of new Berlin development
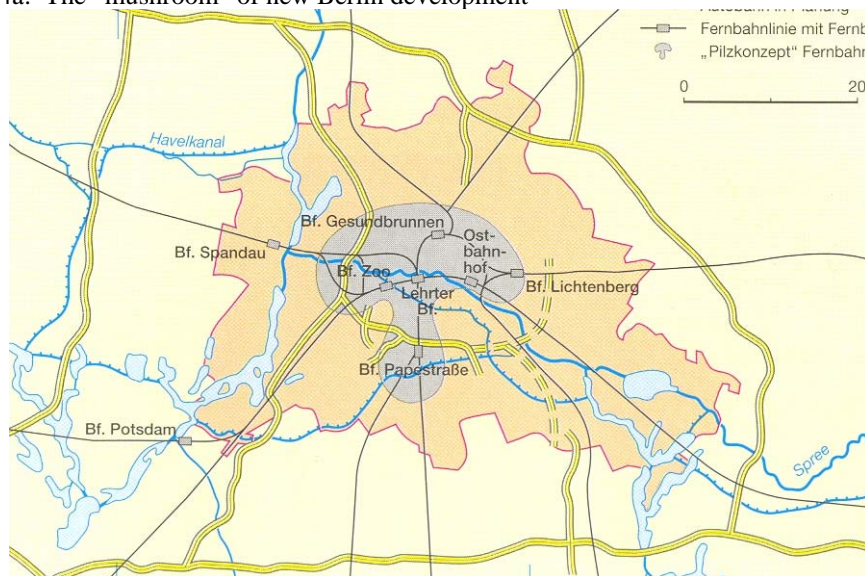
Source: *GEOS* Berlin

Berlins, Zoo Station and Alexanderplatz, with improved east-west transportation, the

construction of new embassies, and a concentration of the city's cultural highlights. As

the base of the mushroom's stem, BBI will strengthen the entire stalk. For instance, its

transportation connections will reinforce the North-South axis that approximately follows

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[113] ibid.

[114] Kulke, E., Humboldt Universität (personal communication 2 Feb 2006); and *GEOS: Lehrbuch Geographie Klasse 10*. 2001. Eds. L. Barth, U. Hertzsch, and D. Richter. Berlin: Volk und Wissen.

the eastern portion of the Berlin Wall. To this effect, the *Gemeinsame*

Landesplanungsabteilung produced a transportation plan for BBI in October 2003. A

new highway will run up the Teltow Canal, which has the necessary width because the

Berlin Wall used to run along it. The U-bahn that now terminates in Rudow would

extend to the terminal, but this project has been suspended. A new express train will run

from BBI north to Papestraße S-Bahn station, Potsdamer Platz, and terminating at

Lehrterbahnhof. The Papestraße station, which is on the S-Bahn Ring around the center-

city, will be renamed *Südkreuz* (southern intersection), indicating its elevated status.

Likewise, later in 2006 Lehrterbahnhof will become the new Hauptbahnhof (main train

station). Also a massive infrastructure project, Lehrterbahnhof marks the top of the

mushroom's cap.

Building an airport city

An airport city is a coherent and dense urban form at and around an airport. It

exploits the airport's nodal role in its regional transportation network to be an attractive

place to work, shop, and even play. It is a new downtown, yet it is in exurbia. This

downtown-like development, however, must be symbiotic with the current and future

aviation needs of the airport. If an airport city is to be sustainable beyond the short term,

it must not interfere with flight patterns or potential expansion. For its part, airport

management must emphasize non-aeronautical, landside, commercial development.

Likewise, the area jurisdictions must commit to regional planning, so the airport city is

allowed to develop in a way that both fits with transportation infrastructure and permits

future airport expansion.

Flight enthusiast H. McKinley Conway played Cassandra on the problem of unplanned airport development, and helped popularize the term "airport city" in his 1980 book of the same name. Such developmental coherence, according to Conway, requires the coordination of the systems of industry, airport management, and transportation—all under the purview, typically, of the political system. With this prescribed cooperation, an airport could maximize its economic impact. A successful airport city would combine functions (industrial parks and multimodal transit, *e.g.*) that tend to separate according to the fissures between the airside and landside of an airport, between the airport and its surroundings, or between different political jurisdictions. This conflation would make the airport a more attractive place to use, do business, and, ultimately, to live.[115]

Around the same time, Richard de Neufville and Rigas Doganis warned that existing airports would not come close to having the capacity to match demand in the near future. Existing airports the world over had been built to accommodate a regulated industry that changed according to supply (plane size, *e.g.*), but they contended that deregulation would engender an industry far more sensitive to passenger demand (cheaper tickets, *e.g.*). Airports would have to be abandoned or expanded, they argued, at a rate that the public sector did not like to operate, particularly with popular opinion somewhat jaundiced on noise pollution and expensive projects.[116] Since deregulation, worldwide passenger and cargo numbers have increased dramatically, thus spawning another generation of airports and proving de Neufville and Doganis correct.

To help finance the redevelopment (and in rare cases new construction) of an airport, a government often will privatize its aviation assets in order to attract

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[115] Conway 1980.
[116] Doganis 1992; and de Neufville 1976.

investment.[117] Airport privatization has many hybrids with public control, but its pure

form was initiated in the UK, with the British Airports Authority (BAA). BAA was

founded in 1966 as a government entity, but was sold off in 1987 at L1.3 Billion.[118]

Thanks in so small part to its operating the very profitable London/Heathrow, BAA has

enjoyed success which encouraged other privatizations. Today some firms, such as

Fraport AG or the Schiphol Group, own and manage dozens of airports across the globe.

Privatization has spurred the landside function of such airports to diversify and

blossom, as the running of terminals became a business instead of a public service. The

best example of this is London/Heathrow, the biggest European airport. It has the most

expensive passenger fees in the world, along with the most expensive square footage of

retail space in the UK.[119] Yet it has no monopoly on flight to or from London; in fact,

British Airways also hubs at London/Gatwick, and the two leading European low-cost

carriers (LCCs) base at other London airports. The activity and demand at Heathrow is in

large part due to the quality of the airport, as both a good and a service.

Airports reap most of their revenues from a variety of user-fees. Some are

aeronautical, such as the landing fee and passenger fees, while others are non-

aeronautical, drawing rents and concessions from firms located on the airport's land.[120]

Airlines, struggling from increased fuel cost combined with pressure to reduce costs due

to LCCs and deregulation, increasingly will demand lower aeronautical fees from

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[117] Derudder, *et al*. 2005.
[118] Doganis 1992.
[119] Doganis 1992; and Bruegmann, R. 1996. "Airport city." In J. Zukowsky (Ed.), *Building for air travel*. Chicego: Art Institute of Chicago.
[120] Doganis 1992.

airports.[121] Airports then must recoup such revenue from non-aeronautical windfalls—

typically from an "airport city" development.

A profit-seeking airport often will have many revenue streams that have little to

do with aviation. Intercontinental flights and hub connections allow for more passengers

shopping at a terminal, particularly at its highly lucrative duty-free shops.[122] More

landside revenue often comes from developing the land around the airport in an attractive

way, building an airport city. In 2003 Mathis and Martin Güller colorfully analyzed nine

European airport cities for the Airport Regions Conference. They found that the issue is

not whether, but how, the area between the airport and the center city will develop.

Airport city planning does not stop at the airport's perimeter, and its expansion is

continual and necessary. Targeted development encircling an airport can choke it from

further expansion, given the need for noise contours and buffer zones, while a purely

laissez-faire approach can produce spatial incoherence and traffic woes. One of the keys

to a successful airport city, then, is farsighted regional planning for both transportation

and zoning.[123] An airport city exploits its nodal role in regional transportation by

thoroughly developing the real estate around its multimodal transfer station (often the

terminal itself). The terminal might have a hotel, convention center, and very attractive

shopping—all of the amenities of the center city, but with a tarmac for Main Street.

Perhaps Europe's best example of an airport city is Amsterdam Schiphol. The

airport itself is owned and managed by The Schiphol Group, a publicly traded

corporation. The Schiphol Group wholly owns an entity called Schiphol Real Estate,

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[121] Boston Consulting Group. 2004. *Airports—dawn of a new era*. Berlin: BCG.
[122] Doganis 1992.
[123] Güller, M., and Güller, M. 2003. *From airport to airport city*. Barcelona: Litogama.

which manages property within the airport's boundaries (approximately 250 hectares).[124]

The Schiphol Group also has entered into a public-private partnership with the three

jurisdictions involved with the airport: the city of Amsterdam, the municipality of

Haarlemmermeer, and the province of Noord Holland. This team owns the Schiphol

Area Development Company, and manages the business parks and support facilities off

the airport's property (approximately 800 hectares).[125] In addition, the four joint-owners

of the Schiphol Area Development Company have teamed with other public and private

entities in the region (including KLM Airlines) to form the Amsterdam Airport Area.

This organization acts like a chamber of commerce, billing itself as a "one-stop shop" for

firms interested in locating in Europe.[126]

Willem de Trommels, former director of the Schiphol Area Development

Company, cites four prerequisites to a successful airport city, like Amsterdam

Schiphol.[127] First, the airport should not be too far from the city it serves—being

between cities works well (Rotterdam, The Hague and Amsterdam). Second, the various

political jurisdictions must read from the same page, sharing an appreciation of the

importance of the airport to inter-jurisdictional economic development. The third

prerequisite is a structured planning approach, supplied with a combined comprehensive

plan for both the airport and its surroundings, thus integrating the transportation

infrastructure and landside development both on and off the airport's territory. Finally,

de Trommels cites an active management focused on corporate organization, regional

marketing, and a pre-emptive attitude towards land acquisition.

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[124] de Trommels, W. 2006. *Presentation to the Owen G. Kenan Conference*. Unpublished presentation, Bangkok, 15 Feb 2006.
[125] ibid.
[126] Amsterdam Area Authority website. *What is AAA?*. http://www.aaarea.nl. Last accessed 25 Mar 2006.
[127] de Trommels 2006.

With hopes of maximizing the economic impact of BBI (and the windfall from this impact), in 2004 the New York-based Hudson Investment Group established the Berlin Area Development Company GmbH (BADC). In 2005 it hired Willem de Trommels to be the BADC's executive director. The BADC's efforts thus far have focused on forging a team of partners among FBS and the pertinent jurisdictions and landowners, in the hopes that a shared vision will facilitate coordinated development.

As with Amsterdam Schiphol, multiple jurisdictions play significant roles any planning process involving the land in and around BBI. While the Federal Government and the *Länder* of Berlin and Brandenburg are joint-owners of FBS, the land-use decisions around the airport are initiated by the municipality of Schönefeld, whose jurisdiction surrounds BBI and six nearby villages. In addition, while FBS owns the airport's 1,500 hectares, local farmers and land speculators from western Germany own the adjacent parcels, where BADC targets much development. BADC and the municipality of Schönefeld are cooperating to update the town's comprehensive plan to reflect targeted development. The two areas BADC wants to focus on are by BBI's entrance (to its east) and the area occupied by Schönefeld's terminal and old runway (to BBI's north). However, BADC so far has received only lukewarm cooperation from FBS—cooperation vital to the coherent development of land both inside and outside the airport's boundaries.[128]

The airport's boundary is not the only border of note. The political distinction and spatial difference between Berlin and Brandenburg make the success of a BBI airport city both a great challenge and great opportunity. Generally, yet dramatically, Berlin has a far greater population density than does Brandenburg. In the former West Berlin, the

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[128] Rabbe, R., BADC (personal communication 6 Apr 2006).

communities of Rudow and Altglienicke are the closest urban forms to Schönefeld. As their areas already are built up, it seems unlikely that business attracted to BBI would locate here; however, these towns would be well positioned as a place of residence for the thousands of employees who would work at or around BBI. Doubtlessly this would strain Rudow's and Altglienicke's social services, school system, and transportation infrastructure; if they is prepared for the changes BBI will bring, these communities can exploit the situation to the benefit of their residents and administration. In the former East Berlin, and to the immediate north of Rudow, is Adlershof, which now houses the science campus for Humboldt Universität zu Berlin. Following the model investigated by Luger and Goldstein in *Technology in the Garden*, it would be sensible for HU, BADC, and FBS to discuss the formation of a research park. This, of course, is easier said than done.

Inter-jurisdictional problems may arise. FBS is owned by three governments; it is run by politicians and bureaucrats, not businessmen. Still, FBS will seek some return on "its" investment, BBI—particularly because it will not share in the spoils of developing Tempelhof and it cannot develop Tegel (which is owned by the German Air Force). Hence, the BBI's land is the developable parcel—the airport city—that can produce revenues directly for FBS. Development outside the airport's boundaries—elsewhere, for example, in *Gemeinde* Schönefeld —seemingly would dilute the demand for space on-site at BBI and thus reduce non-aeronautical revenues for FBS. Although there seems to be a way around this, given that the pertinent government would collect taxes and fees from sites outside the airport, FBS has (at time of writing) refused offers to cooperate

with off-site developers. FBS has an interest in not developing the land surrounding the

airport, much of which would be a prime site for an airport city.

4b: The area around Schönefeld and BBI (dense settlement in green)
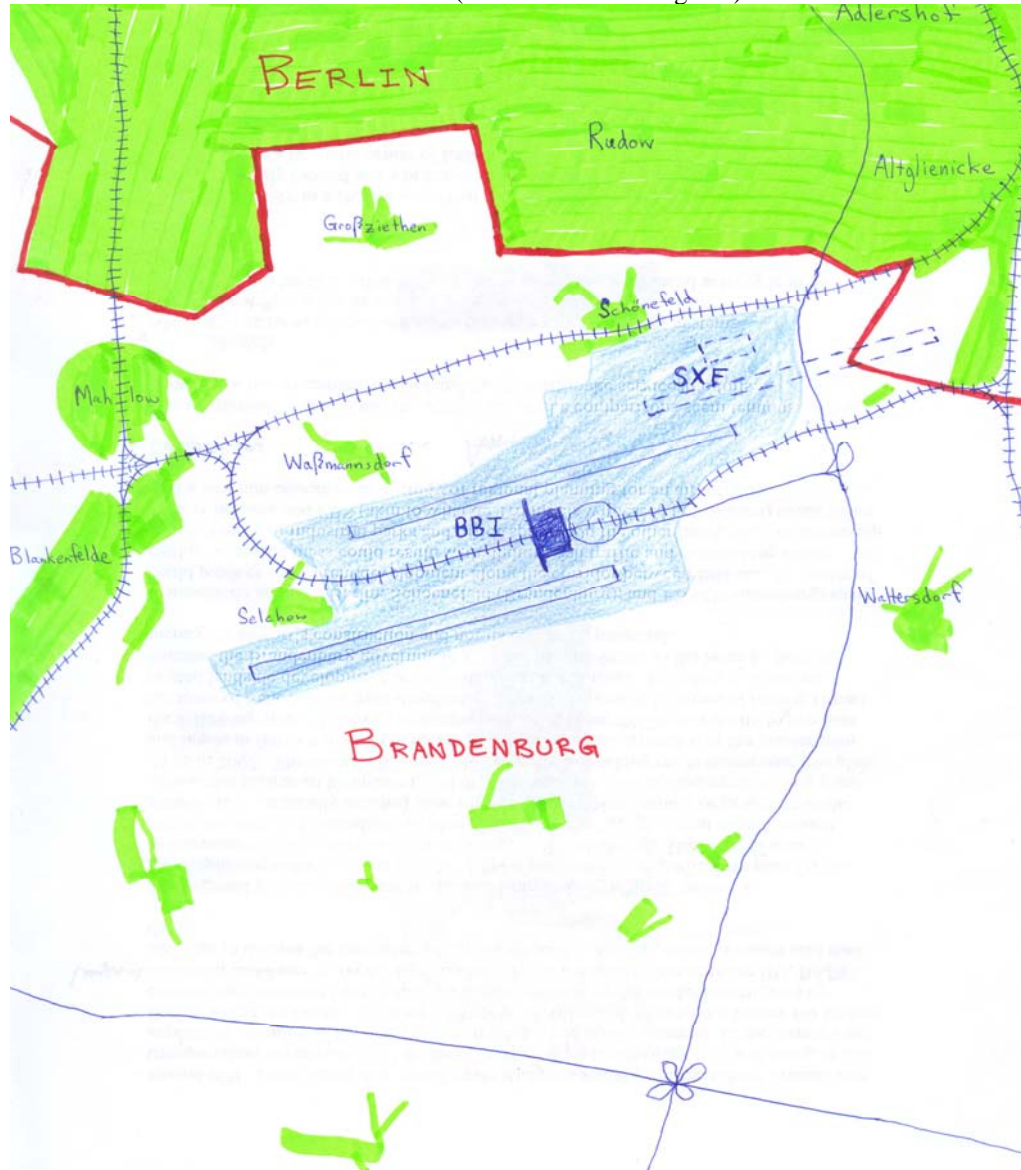
By obstructing development, FBS (and its governmental owners) are not merely

dismissing the interests of eager developers and absentee land-speculators. It also would

be subverting the (future) land-use plan of *Gemeinde* Schönefeld. The municipality has

retained a professional planner to produce a new comprehensive plan. It is a work in

progress, but the author has seen drafts.[129] Presently it is unclear whether the

Brandenburg government sees this as a problem, as the potential conflict—overruling a

local land-use plan in hopes of maximizing airport revenues—is at least a year from

being ripe.

Competition amongst Berlin, *Gemeinde* Schönefeld, and Brandenburg, easily

could produce incoherent development along the corridor between BBI and the center of

Berlin. A spatial mess could result, with nightmarish traffic and diminishing returns from

an oversupply of industrial parks and office space. On the other hand, development could

be restricted essentially to BBI itself, making the airport an island of government-

orchestrated development. However, creative leadership from politicians and FBS (akin

to what de Trommels witnessed at Schiphol) could make BBI a new and educative case-

study of regional planning for an airport city.

4.3.   FBS's own impact analysis

In 2005 professors at the Universität zu Köln produced for FBS an economic

impact analysis of BBI.[130] Their study projected employment, economic impact,

multipliers, and tax revenue, for both the Federal Government and the region (Berlin and

Brandenburg), out to 2012. Its basis was 2004, with the three Berlin airports' figures

totaled. The analysis considered one multi-year, major event (construction of BBI) along

with ever-burgeoning operations of Tegel and Schönefeld.

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[129] Jansen, T., *Gemeinde* Schönefeld (personal communication 6 Mar 2006).
[130] Braun, H., and Schneider, J. 2005. *Wirtschaftliche Effekte des Airports BBI*. Institut für
Verkehrswissenschaft an der Universität zu Köln. Prepared for FBS.

Some of the analysis's assumptions are flawed. It projects an annual increase of 500 direct hires at Berlin airports through 2012.[131] With the imminent closure of Tempelhof, thus eliminating some redundancy in operational staff, this projection seems impossible. This would be the case again in 2011 once Tegel closes. This is, in a sense, a merger, not a spin-off. Also, while construction directly will hire very many persons, these jobs will not last the entire seven years (or so) of BBI's development. Furthermore, as airlines and airports increasingly cut costs, with labor as one of their greatest cost centers, it seems unlikely that direct airport employment would steadily grow. Indeed, the meter of growth is based on passenger levels (1000 direct jobs per 1,000,000 annual passengers), which is a convenient, base-ten measuring stick that will be decreasingly precise in the twenty-first century.

The Köln analysis gives the Berlin-Brandenburg region the comps of Frankfurt, Munich, Paris, Amsterdam, and London.[132] This is hopeful if not misleading. Berlin is not a global city or even a financial capital; its economy is stagnant. Moreover, not only are the metropolitan regions quite different, but so might be the "airport city" developments (spurred in part by air cargo, of which Berlin has little). For example, the regional multiplier of Berlin's airports in 2004 was 0.9, and for 2012 it is projected to be 0.7.[133] Meanwhile, Hakfoort, *et al.*, determined Amsterdam Schiphol to have had a regional multiplier of 2.0, from 1987-98.[134]

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[131] ibid.
[132] ibid.
[133] ibid. The reported multipliers are for indirect and induced hires spurred by the airport's direct effect; *i.e.*, 10,000 BBI employees would effectuate a further hiring of 7,000 persons in the region in 2012.
[134] Hakfoort, J., Poot, T., and Rietveld, P. 2001. "The regional economic impact of an airport: The case of Amsterdam Schiphol airport." *Regional Studies 35(7)*.

Finally, the Köln analysis adds two extra layers to the impacts of an airport. Beyond the traditional analysis of direct, indirect, and induced economic impacts, there is an additional boost to regional purchasing power due to increased airline traffic.[135] Ostensibly this would be the effect of more and more passengers (from outside the region) using Berlin airports and spending money in the local economy. The employment increase from this extra layer is projected to surpass the combined effect of direct, indirect, and induced spending. There is no sensitivity analysis to account, for example, for severe capacity constraints at Tegel or an end to the LCC boom at Schönefeld. Furthermore, the Köln analysis projects additional jobs and income from firm relocation and new markets.[136] While such events are bound to occur over the next seven years, projections of 32,400 new jobs and over €1 billion in income from firm relocation and new markets seem rather unsubstantiated. The use of London and Frankfurt as comps for Berlin thus gives false hope.

In short, its false assumptions, inappropriate comparisons, and imaginary events make FBS's economic impact analysis unbelievable.

4.4.   Scenarios

Ten years have passed since the idea of building BBI first crystallized. Less than a month has passed since the *Bundesverwaltungsgericht*—Germany's supreme court— gave BBI the green light. Its approval came with a series of caveats, only one of which was made public on the day of its decision: nightflights are forbidden. This ban dramatically changes what BBI can and will become, and could even jeopardize its

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[135] Braun & Schneider 2005.
[136] ibid.

financial viability. The *Gericht* will release more conditions by April 2006, so the situation is still a bit fluid. However, the project did receive a thumbs-up, so it is worthwhile to forecast what that project might look like.

4.4.i.   Best-case scenario

If nightflights had been permitted, BBI and its airport city could have become a driver of the regional economy; this scenario assumes nightflights are allowed, making the airport attractive to both air carriers and freighters. To maximize the economic impact of BBI, FBS and area jurisdictions should turn their attention towards the landside development both in and around the airport. The site of the old Flughafen Schönefeld terminal would become a dedicated freight terminal for FedEx, having been convinced to leave its crowded Paris hub. The former parking lots and area surrounding the present S-bahn terminus would be an industrial park for firms that heavily utilize air cargo. The land surrounding the road ingress to the BBI terminal would become an office park, complete with hotels and workforce housing. Land between Adlershof and BBI would be zoned for future development, while one contiguous area would be targeted for immediate development. This could be Flugplatz Johannistal, just north of Humboldt Universität's science and business campus, which would provide the land for a high-tech research park that would bring together the worlds of higher education and business. Since these aforementioned parks would be in Berlin and Brandenburg, these two *Länder* would work together on regional planning and to create a public-private partnership, like the Schiphol Area Development Company, to manage the real estate and equitably distribute the windfall.

Regarding airside development, BBI should promote itself to the Oneworld and SkyTeam alliances as an airline-friendly hub serving the largest city in central Europe. The terminal should double as a regional multimodal transportation node. Its interior design should be modular or mutable enough to accommodate the vicissitudes of the modern airport—be it the desires of an airline alliance, the changing tastes in terminal retail, or the necessity of future expansion.

4.4.ii. Most likely scenario

The *Gericht* ruling to ban nightflights at BBI dramatically lowers the ceiling of the airport's economic impact. Certainly no dedicated freight service now will occur at BBI. A major air carrier—perhaps from one of the airline alliances—would be loath to hub at an airport without nightflights over another airport with them. Indeed, Air Berlin has threatened to leave the city after which it was named.[137]

The *Länder* of Berlin and Brandenburg want to focus development inside BBI's boundaries—using their regional planning commission to block both local interests and market forces. Nevertheless, *Gemeinde* Schönefeld is revising its comprehensive plan to accommodate the development forces concomitant with a new international airport. The effort to develop an airport city is being led by the private sector, and has met a public sector wary of taking risks and disinterested in cooperation. Also, Humboldt Universität is also not involved with landside development—research park or otherwise—even though the airport is just 6km from its Adlershof campus.

Some aspects of the likely scenario are positive. BBI will be a major node in the regional transportation infrastructure, particularly with an inter-city train station

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[137] Kaufmann, S. & Thomsen, J., *Berliner Zeitung.* 20 Mar 2006. "Air Berlin stellt Standort Schönefeld in Frage."

incorporated in the terminal. The air-rail link with Lehrterbahnhof will make check-in convenient in a part of the city that otherwise would be inconvenienced by the closure of Tegel. In addition, the new autobahn connections will improve both regional accessibility and the value of adjacent land.

The lack of nightflights could create a problem in BBI's financing as well as FBS's ultimate privatization scheme. FBS wants to secure over €1 Billion in debt for the construction of BBI, but its ability to pay back the bank(s) could be hampered by unexploited non-aeronautical revenues. A lender would see this risk and demand a higher return—one that FBS may struggle to match. Of greater gravity is FBS's 2011 privatization. The value of the airport suffers from a deflated demand for landside development, due in large part to the lack of nightflights. In short, the government owners of FBS may not get a high offer for their product. This likely could delay privatization by some years, with the governments holding out until they got a suitable offer.

4.4.iii. The status quo

"What if they don't build it?" This question was asked about the maglev train between Berlin and Hamburg, and remarkably authorities scrapped that mega-project.[138] Given the price tag and the ban on nightflights, it is useful to wonder what might happen should FBS choose not to build BBI.

First, there seems to be consensus that Tempelhof must close. It is completely surrounded by residential development; if it were truly a safety hazard it already would have been closed, but it is a perceived safety hazard. Also, the highest and best use of its

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[138] Wikipedia. http://en.wikipedia.org/wiki/Transrapid. Last accessed 8 Apr 2006.

land is not a rarely-used airfield—Berlin had zoned it for development as early as 1998.[139]

Schönefeld currently has nightflights, and the status quo would preserve that. It could still attract dedicated freighter service, but FedEx hub would be unlikely, as such a project probably would require an official approval process, and meet the same opposition and, perhaps, the same ban. Schönefeld's airside capacity is approximately 11 million passengers a year,[140] but in 2005 it served only 5 million,[141] so it could continue to grow as Berlin's secondary airport, attractive to LCCs.

Tegel, on the other hand, is suffering capacity constraints. Its status quo is untenable. Tegel's hexagonal terminal could get overhauled to make it more conducive to contemporary airline needs and passenger expectations. Such a redevelopment could build up the closest of the adjacent parking lots, particularly if it adds a connection to the S-bahn or U-bahn. However, FBS's reluctance to pour money into a nearly obsolete airport—hemmed in by development just like Tempelhof—is understandable.

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[139] Shultz, M., Humboldt Universität (personal communication 28 Feb 2006).
[140] Jänicke, J., Flughafen Berlin Schönefeld (personal communication 20 Jan 2006).
[141] ADV 2006.

5.   Planning, process, and protest

A decade-long, €2 Billion infrastructure project is too important to get wrong, yet too prominent to get right. That is to say, costs and impacts are too great to escape opposition, legitimate or contrarian. An airport's development is so time consuming as to outlast the administration that initiated it. Furthermore, whatever interests spawn an airport's development may purport a vision far beyond the next election cycle that many politicians are too myopic to see. Hence, the planning process can be quite influential in airport development, as it can provide a roadmap (and even directions) for navigating such a long and important trek—even though the adventurers may come and go.

5.1.   The case against airports

Opposition to airports will occur. Airport planners, developers, and proponents would be wise to adopt a strategy that tries to minimize and redress opposition, not defeat it. In western society, such opposition tends to seek justice in the court system, but it also has engaged in open protest. Because the chief airport proponent often is the state, opponents often feel that recourse through the political process is either impossible or too slow.[142]

Airport opponents gain their most traction on environmental issues, namely the negative impacts of noise pollution. Aircraft noise is an unavoidable aspect of the jet age, and hence an unavoidable component of airport planning. Indeed, noise is a major reason why airports locate at the urban fringe or beyond, where fewer residents can generate less political opposition. Noise is an inconvenience, to be sure, but it also reduces property values. A recent study on the impact of aircraft noise on rents in

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[142] Peattie, L. 1992. *Planners and protesters*. College Park, MD: U. of Maryland.

Geneva, Switzerland, showed that noise reduces rents about one percent per decibel.[143]

Modern airport planning requires government approval of not only the airport's land development, but also the "noise contours" above and around the greater area. An airport's neighbors are particularly sensitive to (and aware of) noise pollution at night, when most persons are at home, trying to sleep, and there is little background noise to cloak the jets' roar.[144] Owners of property within certain bounds of the noise contours have an appreciable grievance with the airport or government: the impact of decibel levels on the desirability and value of their land. And the airport or government is likely to have the means to monetarily compensate such grievances.

Another environmental issue common to airport development is water pollution. Runways, taxiways, aprons, hangars, terminals, *et cetera*, constitute a great deal of impermeable surface, resulting in massive runoffs during rainstorms. This issue is complicated by the quotidian spills from the operation and maintenance of aircraft and heavy machinery. The result is a potential for contaminated water in nearby or downstream areas.

Airport redevelopment that involves expansion (building a new runway, for example) usually requires a great deal of land acquisition. Runways and taxiways require a lot of space, yet even more acreage is affected by safety ordinances against structures on land radiating from the ends of runways—often extending beyond the airport's property. The amount of land involved is so vast that someone is bound to be negatively affected. Exurban airports gobble up farms, while airports closer to urban areas affect more persons and more valuable land. Sometimes expansion eradicates an entire

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[143] Baranzini, A., and Ramirez, J. 2005. "Paying for quietness: The impact of noise on Geneva rents." In *Urban Studies, 42(4)*.
[144] ibid.; Baranzini and Ramirez confirm this, in the "annoyance" test.

settlement. In so doing, governments tend to invoke some form of eminent domain, which can invite a property-rights backlash.

Anti-airport protest can have undertones of a rejection of current patterns of economic development, as though an airport were a threat to a certain way of life.[145] An airport can take on a symbolic role. It can embody the power of the state, the economic and (foreign) political forces of globalization, the despoliation of nature, or simply change in general. Such an anti-airport gestalt can prove quite powerful in melding different oppositional camps together.[146]

Airport protest in Germany is not without precedent. When Frankfurt/Main expanded in the early 1970s, its detractors began as a disparate mixture, yet they coalesced into a strong political opposition. One major strain was the typical anti-development concern for the environmental impact—in Frankfurt's case, the felling of trees in an otherwise-protected forest.[147] Another feature was opposition to the US war in Vietnam, since bases in Germany were expanded or altered to accommodate the needs of the US military so it could project its sometimes-unpopular force overseas.[148] Also, some citizens were alarmed at the scale of the development; many were skeptical as to how an expansive airport would benefit the city and region.[149] To them, the airport simply was not worth the bother or investment. These voices formed a chorus when a regional plebiscite on the airport's future was stymied by the Federal Government, which claimed primacy.[150]

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[145] Peattie 1992.
[146] ibid.
[147] ibid.
[148] Flughafen Frankfurt/Main was built on the site of the Rhein-Main US Air Force base.
[149] Freund, B., Humboldt Universität (personal communication 31 Jan 2006).
[150] Peattie 1992.

The airport of course was built, but its political residue remains, as the Green Party won election in that area in 1982—its first Bundestag representation.[151] Airport regulations have become more stringent since then, and airport protests in Germany essentially have moved from the airport site to the court room.[152]

The work of airport planners will be met with opposition. Planners then should approach their work with the general goal of managing a process as seemingly transparent and participatory as possible. When the time comes to decide a final settlement, no stakeholders should feel surprised, ignored, or insulted. Cautious anticipation of resistance is a vital skill for an airport planner. Regarding BBI, planners did some things well and some things poorly.

5.2.   *Planning BBI*

The history of planning Berlin's new airport is a braid of several threads. One is the airport's authority producing a plan for BBI. Another is the regional planning endeavor of the *Länder* of Berlin and Brandenburg. Yet another is the local land-use decisions by the municipality of Schönefeld. The final facet is the plan's approval process with the *Planfestellungsbehörde* of the state of Brandenburg. Although all of these threads concern various offices of, fundamentally, the same governments and constituencies, difficulties have emerged from a planning process that is decidedly top-down and occasionally at crossed purposes.

FBS consolidated its marketing and ownership in 1996, and began a plan to consolidate aviation at one airport. The first decision was site selection. It chose to

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[151] Rabbe, R., BADC (personal communication 27 Mar 2006).
[152] Kerber, M., Flughafen Berlin Schönefeld (personal communication 3 Apr 2006).

redevelop an existing airport, Schönefeld, as opposed to build from scratch on a

greenfield site. Details such as terminal design were not dealt with at this early stage; the

major issues were runway and terminal location. FBS accumulated the necessary land

and, in November 1998, projected decibel levels (at one meter's height) for what BBI

flights might produce at 30 million passengers per year (estimated at 360,000 annual

flights). The official projection for daytime noise levels is the mean projection, while for

nighttime it is the loudest. FBS officially submitted its plan for BBI to *Land*

Brandenburg's *Planfestellungsbehörde* on 17 Dec 1999.

Meanwhile, Berlin and Brandenburg failed to pass a referendum in 1996 on

political unification.[153] One response to this was to form a regional planning body for

Berlin and Brandenburg, the *Gemeinsame Landesplanungsabteilung*. In October 1994 it

produced a comprehensive plan for the development of the suburban areas of Berlin, in

Brandenburg. In February 1998 it updated this plan, but still zoned most of the land—all

save about 50 hectares around the village of Schönefeld—around the airport to stay rural.

This was, of course, before the FBS had finalized its plan for BBI. Nevertheless, these

laws are still on the books, so the would-be "development zones" for an airport city

around Schönefeld presently must retain their rural character. Now, with a large airport

in the works, this plan must be updated, and the *Gemeinsame Landesplanungsabteilung*

hopes to do so in 2007.

Following German Reunification, in 1991 the town of Schönefeld produced its

first comprehensive plan. At such an early date, this plan did not anticipate airport

expansion—even though land speculation in the area had already begun. In 2001,

[153] Gemeinsame Landesplanung Berlin-Brandenburg. 1998. *Joint planning for Berlin and Brandenburg*. Potsdam: Ministerium für Umwelt, Naturschutz und Raumordnung.

Gemeinde Schönefeld was formed, incorporating two erstwhile, smaller municipalities. Hence, its 15-year-old comprehensive plan only covers about one half of the municipality. It currently is working on a new comprehensive plan that accommodates development concomitant to a large airport. The original design of developing 1000 hectares has been scaled back to around 600 hectares, in hopes of making it more palatable to higher offices. The *Gemeinde* hopes to finish in 2006, with the goal of its being incorporated in the greater, *Länder* plan the following year.

After FBS submitted its plan, concerned citizens had time to individually contact the Brandenburg *Planfestellungsbehörde* to register their opinions. In May 2000, FBS and the *Behörde* widely disseminated the plan to the area villages, and gave residents four weeks to register their complaints. Over the following month, 67,000 persons made 163,000 comments. In 2001 there were public hearings on the redevelopment plan, but they were held in Berlin and not Brandenburg, ostensibly for the reason that only Berlin had a convention facility large enough to handle the anticipated crowds.[154] While technically Flughafen Schönefeld is also in Berlin, this site selection offended many in the communities that neighbor the airport, and helped amalgamate the opposition.[155]

The overriding issue to many concerned citizens was noise pollution. The Federal Government has laws on appropriate noise levels. Decibels are measured around all German airports, and these data are maintained by the respective *Länder* (in Schönefeld's case, *Land* Brandenburg). The *Behörde* used FBS's noise contours to grade its remuneration scale for its affected citizens.

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[154] Kerber, M., FBS (personal communication 3 Apr 2006); a meeting for public officials was held in Brandenburg, in the village of Rangsdorf. The meeting in Berlin occurred in Schöneweide, which is fewer than ten kilometers north of the Brandenburg border.
[155] Jaenicke, J., FBS (personal communication 20 Jan 2006).

5a: Brandenburg noise remuneration plan

daytime decibels	compensation
70	full mandatory buyout
65	one-time payment
60	noiseproofing
50	noiseproofing for bedrooms only

Source: FBS

For BBI there are four distinct noise contours, representing different levels of compensation to which landowners are eligible.[156] Unfortunately, the maps of the actual noise contours are too large and confusing to precisely reproduce in this paper.

On 13 August 2004, the *Behörde* approved the plan, and was promptly sued by over 3,300 individuals and organizations. The Federal Government rolled the suits into a class-action lawsuit, and accelerated the process to the *Bundesverwaltungsgericht*, the German supreme court. By the time the *Gericht* reached its decision, on 16 Mar 2006, the number of complainants had nearly crested 4,000.

At issue before the *Bundesverwaltungsgericht* are four complaints. First and foremost is noise pollution, particularly the nature of the remuneration scheme. Complainants question the justification for the thresholds being where they are, as the perceptible distinction on either side of the cusp is indistinguishable to the human ear. The second issue is related to noise pollution: nightflights. Nightflights are considered separate because aircraft noise is more salient when there is no background noise, which typically occurs during the day, and thus more apt to negatively affect property values and quality-of-life.

Also in dispute is the location of the airport itself. Development forces spared Schönefeld's perimeter because international flights and air cargo were of little concern

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[156] The current remuneration scheme is subject to change, due to the *Gericht* decision. A one-time payment is €4000 for a single-family house and €2000 for a multi-family dwelling. Bedroom noiseproofing is also the remedy for having (at least) six noise events per night at 70 decibels.

for the economy of East Germany, so current expansion is feasible. However,

complainants demand that BBI should not emerge from a redevelopment of Schönefeld,

but be built anew. They argue that it should be farther away from the city, where a more

5b: Possible sites for BBI. (Schönefeld is right-center.)
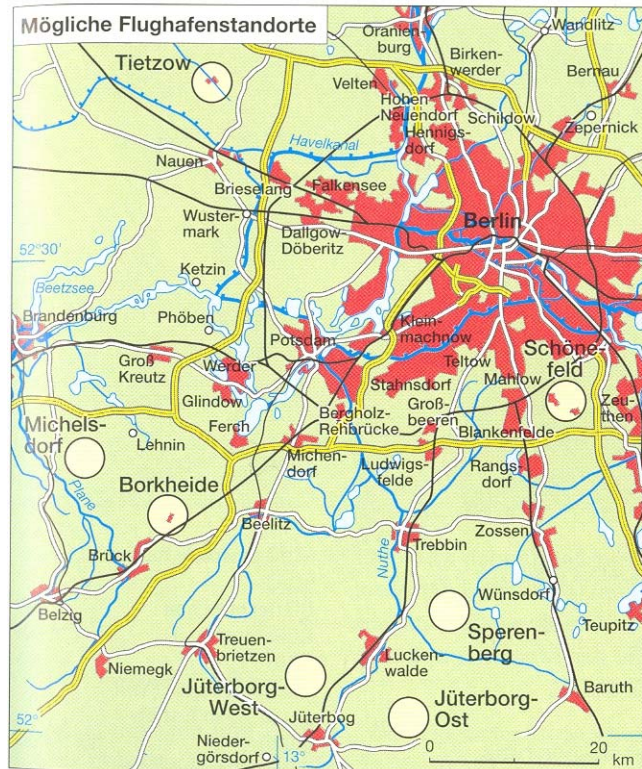
Source: *GEOS* Berlin

 rural geography would minimize any and all negative impacts. Activists preferred the

area near Jueterborg, some 40km south of Schönefeld.[157]

The last point of contention before the court is water. Given the history of airport

protest, the shade of this issue is particular to this case. The state of Brandenburg has a

bounty of small lakes. Against this backdrop, there is a fear that construction at BBI will

disrupt the water table in the area. Indeed, FBS plans to "lower" the water table during

construction. To compensate for any disturbances this construction causes in local lakes,

FBS has promised to sanitize and distribute BBI's retained water to any lakes in need.

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[157] Rabbe, R., BADC (personal communication 27 Mar 2006)

Evidently, the *Gericht* agreed with points one and two (noise remuneration and nightflights), disagreed with point three (having BBI at Schönefeld). It is yet to offer clear direction on point four (water).

The author accepts that the noise remuneration may have been inadequate. A potential renter or buyer could not distinguish the noise impact between, say, two neighboring houses that technically rest within different noise contours. Also, perhaps the remuneration scheme was not monetary enough: bedroom noiseproofing may help quality-of-life, but do nothing to preserve property values. The ban on nightflights is regretful; a more creative solution could have produced something approaching a win/win scenario, given that nightflights would have allowed for airport revenues that the nightflight-sufferers could have received. The Schönefeld site is the best available site. While the development a massive greenfield site may in fact be cheaper and cause noise pollution to fewer persons, remotely locating a major airport would diffuse all positive impacts, and surely would exacerbate traffic and the emissions therein. Finally, the uniqueness of the water issue makes it hard to evaluate. The proposed water-redistribution scheme seems, at face value, suitable.

5.3.   *Stakeholders*

With any development as massive as an airport, the list of stakeholders easily can grow too long to be useful. The following list is an attempt to identify the major stakeholders with their roles in BBI's development.

Berlin
> *Land* Berlin owns 37% of FBS. It controls the planning of landside development within its borders, including neighborhoods near BBI such as Rudow and Adlershof. The regional economy struggles and could use a boost from a

successful new airport. The city government would like to have an airport befitting a capital of a major country, as an international gateway and a matter of civic pride. The mayor, *Bürgermeister* Klaus Wowereit, supports BBI.

Brandenburg

Land Brandenburg owns 37% of FBS. All of BBI's land will lie within its territory. It can approve, modify, or reject land-use plans for an airport and an "airport city." Its *Planfestellungsbehörde* (planning office) approved the airport plan in 2004 and was sued by over 3,300 individuals and organizations. The regional economy struggles and could use a boost from a successful new airport.

Federal Government

The *Bundesrepublik Deutschland* owns 26% of FBS. It has planned, financed, and built the improvements to the area's transportation infrastructure that will serve BBI. The government's highest court ruled on the case against the planning office for *Land* Brandenburg.

The municipality of Schönefeld

Gemeinde Schönefeld, formed in 2001, incorporates seven villages to the immediate south of Berlin. The portion of Flughafen Schönefeld in *Land* Brandenburg lies within this municipality's jurisdiction, and all of BBI's land will lie within its territory. It would originate any land-use plans for an "airport city." The mayor, *Bürgermeister* Udo Haase, supports BBI. The municipality is a 7% shareholder in BADC.

Residents of the village of Schönefeld

This village lies on the northern side of the tracks of the rail serving Flughafen Schönefeld, away from the noise contours. This area was targeted for development in the Berlin-Brandenburg regional plan of 1998, which is still on the books.

Residents of the village of Diepensee

This village was part of *Gemeinde* Schönefeld. Its 335 persons will have their hometown leveled to make way for BBI's terminal. FBS has compensated them for their land and relocated them to two nearby settlements. There was only one holdout.

Residents of the villages of Wassmannsdorf, Selchow, and Waltersdorf

These also belong to *Gemeinde* Schönefeld, and will bear the brunt of aircraft noise. However, their proximity to the airport makes their land attractive for "airport city" development. Their land is not yet zoned for development, but it will be in the *Gemeinde*'s upcoming comprehensive plan.

Municipalities of Mahlow-Blankenfelde, Grossbeeren, Schulzendorf, and Eichwalde

The residents of these *Gemeinden* compose the bulk of the complainants who sued to stop or alter BBI. Their property lies within the noise contours, so its

value would be diminished by a dramatic increase in noise pollution, but they do not live close enough to BBI to be very attractive for "airport city" development.

Cities of Mittenwalde and Koenigs Wusterhausen, and the municipality of Wildau

These jurisdictions lie just south of *Gemeinde* Schönefeld, away from the noise contours. They also are near the autobahn that forms a "beltway" around Berlin, so their land is attractive for "airport city" development, but this land is not yet zoned for development. Each is a 1% owner of BADC.

The district of Dahme-Spreewald

Landkreis Dahme-Spreewald is the district of *Land* Brandenburg in which BBI and BADC's partners lie. It is a 5% owner of BADC. The *Landkreis* authorizes building permits for development in its territory, including BBI.

Berlin Area Development Company

Formed by the New York-based Hudson Investment Group, BADC hopes to facilitate a public-private partnership to coordinate landside development both inside and outside BBI's boundaries. BADC does not presently own any land, but land acquisition remains an option.

Non-resident landowners

Several investors from elsewhere in Germany or farther away own land near BBI. Foreign investors have purchased land, for example, at the ingress of the future BBI complex and around the future autobahn's exit for Adlershof. Also, several Bavarian investors speculated on land around the village of Schönefeld in the early 1990s. All are eager for the value of the land to increase in response to the demand of firms to locate near BBI.

Lufthansa

The major air carrier in Germany and European leader of the Star Alliance, Lufthansa has little business at Berlin airports, with either passengers or freight. It has a cargo office and a hangar at Tegel, so the airline probably would be loath to suffer a moving cost, given that airport's closure.

Air Berlin

The second largest air carrier in Germany has a base of operations at Tegel, and probably would be loath to suffer a moving cost. Air Berlin focuses on the domestic and German-Spanish markets.

EasyJet

One of the most successful LCCs in Europe, this London-based airline uses Schönefeld as its central European base. A number of qualities that make Schönefeld attractive to a LCC would (or could) be absent at BBI.

Dedicated freighters

While dedicated freighters hub at a Berlin airport, all four serve the city. A ban on nightflights at Tegel and Tempelhof does not prevent TNT and FedEx, respectively, from using those airports several times a week. However, a ban on nightflights at BBI would prohibit any dedicated freighter from hubbing there.

5.4. Impacts from scenarios

5.4.i. Best-case

Berlin, **Brandenburg**, and the **Federal Government** build a great airport and promptly sell off majority ownership. They also each obtain 10% control of BADC, and—together with *Landkreis* **Dahme-Spreewald**, *Gemeinde* **Schönefeld**, and the other partnering jurisdictions—work out a comprehensive plan that zones for both present and future development according to the localities' plans. This new plan allows for development in **Wassmannsdorf**, **Selchow**, and **Waltersdorf** (where noise pollution and development pressures cause most residents to move away, after realizing a gain from the sale of their properties), as well as in **Mittenwalde**, **Koenigs Wusterhausen**, and **Wildau**. Local and **non-resident landowners** work with **BADC** to develop several off-airport tracts, including land around **the village of Schönefeld**.

British Airways sponsors dba to join the Oneworld alliance, in order to share its slots at BBI, thus infuriating **Lufthansa** and prompting them to buy **Air Berlin**. Since nightflights would be allowed, the **dedicated freighter** FedEx moves its European hub to BBI. **EasyJet** hardly can afford slots, except at odd hours, and considers moving away.

Former **Diepensee** residents begin their new lives elsewhere in the region. Residents of **Mahlow-Blankenfelde**, **Grossbeeren**, **Schulzendorf**, and **Eichwalde** all suffer the noise pollution, but gain some solace from each being given 1% control of BADC.

5.4.ii.   Most likely

Berlin, **Brandenburg**, and the **Federal Government** build a great airport. The two *Länder*, keen to maximize non-aeronautical revenues for FBS, collude to forbid additional off-airport development via their ultimate control of local zoning decisions. *Landkreis* **Dahme-Spreewald**, *Gemeinde* **Schönefeld**, and the other partnering jurisdictions in **BADC** are left to develop the 50 hectares so designated in the 1998 plan: the land around **the village of Schönefeld**. **Wassmannsdorf**, **Selchow**, and **Waltersdorf,** where noise pollution reduces land values, battle bitterly with Brandenburg to allow development in the master comprehensive plan. Little or no development occurs in **Mittenwalde**, **Koenigs Wusterhausen**, and **Wildau**. **Non-resident landowners** rue the day they speculated on Brandenburg farmland.

The ban on nightflights prohibits any **dedicated freighter** from increasing activity at BBI. **Lufthansa** buys some slots and closely monitors BBI's popularity, particularly with Polish passengers, who otherwise might fly with its ally LOT. **Air Berlin** threatens to move its base to Hamburg, Leipzig or Cologne-Bonn, but decides against it because the goodwill of its brand name is location-specific. **EasyJet** easily can afford slots, and does quite well.

Former **Diepensee** residents begin their new lives elsewhere in the region. Residents of **Mahlow-Blankenfelde**, **Grossbeeren**, **Schulzendorf**, and **Eichwalde** all suffer the noise pollution, but not at night.

5.4.iii. Status quo

Berlin, **Brandenburg**, and the **Federal Government** abandon plans to build BBI, due to political pressure to keep Tegel open, the daunting price tag, and airline

fallout from the ban on nightflights. Since nightflights still are allowed at Schönefeld, the **dedicated freighter** FedEx considers moving its European hub there.

Landkreis **Dahme-Spreewald**, *Gemeinde* **Schönefeld**, and the other partnering jurisdictions in **BADC** are left to develop the 50 hectares so designated in the 1998 plan: the land around **the village of Schönefeld**. However, the two *Länder* are not hostile to (merely disinterested in) more off-airport development in the future. While this comes as hopeful news to some in **Wassmannsdorf**, **Selchow**, and **Waltersdorf**, as well as in **Mittenwalde**, **Koenigs Wusterhausen**, and **Wildau**, no concerted plans develop and little land amalgamation occurs. **Non-resident landowners** rue the day they speculated on Brandenburg farmland.

Lufthansa continues its historic disinterest in Berlin. **Air Berlin** continues its success at Tegel, where operations become quite expensive, due to constrained supply and growing demand. Air Berlin and dba consider moving some or all operations to Schönefeld. **EasyJet** easily can afford slots at Schönefeld, and does quite well.

Former **Diepensee** residents begin their new lives elsewhere in the region, rather upset that their homes were destroyed for naught. Residents of **Mahlow-Blankenfelde**, **Grossbeeren**, **Schulzendorf**, and **Eichwalde** all suffer the same noise pollution as before—but if freighter activity increases at Schönefeld, nighttime noise pollution would magnify.

6.   Conclusions, recommendations, and lessons for the United States

BBI could become a regional economic driver, but most likely it will not. Its concentration of commercial aviation in greater Berlin should result in the transfer of airport-related economic activity from Tegel and Tempelhof. However, further development of the land between the airport and Berlin probably will be curtailed. Freight activity will be minimal, just as it currently is. Passenger activity is apt to keep pace with the purchasing power of Berliners and Brandenburgers as well as the status of Berlin as a tourist destination; the recent LCC boom should plateau in the near future.

Although the closure of Tegel is a major component of the plan for BBI, it could be useful for Berlin visitors and residents to maintain it with a smaller incarnation. Presently Tegel is Berlin's primary airport, but perhaps it could a "new" secondary airport. So as not to threaten the viability of BBI, its slots and land-use could be altered. For instance, the hours of operation could be further truncated. Tegel could be preserved for LCCs and general aviation (recreational civil flight)—or at least preserved to perform such a function, if BBI becomes so successful that LCCs get priced out of their slots.

Just because Berlin is not a global city does not mean that it cannot have a "global" airport. For example, being a transfer hub of a major air carrier has made Frankfurt/Main one of Europe's leading airports, yet it primarily serves a city with only 650,000 residents.[158] Freight hubs often serve even smaller cities, such as Memphis, Liege, and Anchorage, yet give their airports a central role in global supply chains. Alas, Berlin has no home carrier with hubbing capacity, and its prohibition of nightflights is effectively a prohibition of being a freight hub.

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[158] http://www.statistik-hessen.de

Also, an "airport city" development is not an option exclusive to major hubs—Stockholm, Helsinki and Barcelona each have successful airport cities.[159] The impact of an airport city is most positively affected by the role of air freight, but even with minimal cargo activity BBI and its airport city still can attract firms. Importantly, it will be a superb, multimodal node in the regional transportation infrastructure. The challenge then is to make the most of this position, and ideally to have its various political entities and landowners work together—or at least not against each other. Their goal should be a coherent, if not cooperative, vision of what will both determine and resemble the region's spatial structure, economic development, and market demands. At time of writing, the author is not optimistic such a vision involves as great an airport city as could be built.

This case study is unique in some respects, which one would strain to compare to other cities in Europe or elsewhere. Berlin's dramatic political history has shaped the nature of its airports—and indeed its entire spatial-economic structure—that another city could not duplicate (nor should it want to do so). While the closure of small, centrally located airports is normal (Tempelhof, Miegs, *e.g.*), complete airport consolidation for a major metropolitan area is rare. Also, Berlin is replete with big projects—having the ambition, resources, and political resolve to bite off more than what the average city might be willing or able to chew.

In BBI's case the legal process, not a violent showdown with police, resolved the anti-airport protest. One of the central issues—if not the central issue—of the legal decision is the permissibility of nightflights. Popular protest to nightflights (or to noise pollution in general) is common in the US, and can be seen as part of a democratic process of citizens' registering their grievances with the government or their faith in the

[159] Güller & Güller 2003.

judicial system. However, it also exposes the need to inform the public about the positive

impacts an airport with nightflights can have on the regional economy, which indirectly

might improve land values and job prospects. While their prohibition subverts any

concept of air cargo that landside development may have had, their permission could

have opened the way for the negatively affected communities to share in, say, profits

from such development. In other words, the compensation mechanism for the negative

impacts of nightflights (noise pollution) could come from the positive impacts of

nightflights (economic development spurred by air cargo). At least theoretically, this

would internalize the externality, while simultaneously stimulating interjurisdictional

cooperation.

The case of BBI makes evident that individuals will protest against aircraft noise,

and the matter will be resolved in court. Airport planners should work towards making

the pre-trial phase of the development process as inclusive and educative as possible. For

instance, do not hold public hearings in the city of Berlin on an airport to be built in semi-

rural Brandenburg; this reinforces the notion that the airport is "for" *Hauptstädte*

Berliners. If the issue is remuneration, the problem can be solved; however, if the issue

is an insult or dismissal, the problem can prove intractable. To its credit, FBS

emphasized job creation to BBI's neighbors; perhaps an earlier and more overt method—

direct hires from the negatively affected villages, for example—would argue the point

more convincingly. Not every German village houses a Boeing mechanic, surely, but

locals may appreciate merely the gesture or opportunity. Make it their airport.

BBI has themes applicable to other areas, particularly the US, and they

demonstrate the challenges of airport redevelopment in a democratic society or federal

system. The difficulty of multiple, oftentimes competing, political jurisdictions working together on airport development is a common problem, particularly since a new jetport often sits outside the city limits of the population center it serves. Regional planning can help to morph competition into cooperation. However, although Berlin and Brandenburg jointly produce regional plans, such plans can express more political compromise than developmental vision.

Such interjurisdictional competition can be exacerbated by divergent interests on either side of the airport's boundaries, as landside development is apt to bring a coveted windfall of non-aeronautical revenue to its executors. When the developer is the public sector (*i.e.*, when the airport authority is part of the same government that determines off-airport land-use), problems can arise. Indeed, most airports in the US and Canada are run by the public sector or government-sanctioned "independent" authorities. Airport privatization would remove much of that conflict-of-interest. Also, a public-private partnership for landside development (BADC and SADC, *e.g.*) is a good practice, but it first requires a consensus-driven confederation—always a challenge.

As much as is possible across countries and continents, one can compare the cities and airport systems of Berlin and Washington, DC. Each is capital of a rich country and home to cultural treasures, yet each capital is not the primate city of its national economy. Greater Berlin and greater Washington are roughly the same size, in both population and acreage. Both metropolitan areas have three airports, which seem to serve different functions or historical catchments. While FBS manages all three Berlin airports, in Washington two separate governmental entities run the region's three airports. The Metropolitan Washington Airports Authority operates Washington/Dulles and

Washington/National, both of which lie in Virginia. The region's third airport is Baltimore/Washington (BWI), run by the state of Maryland. BWI is analogous to Schönefeld, as its Southwest Airlines presence compares to EasyJet, and its role as the main Maryland airport is like Schönefeld's being the main East German airport. Although remote from Washington, Dulles would be Tegel, being the newest and most intercontinental. National is a successful version of Tempelhof: very close to the city center, but surrounded by water and parkland, not housing.

Airport redevelopment—as opposed to new development—is the norm, if not the rule, in both Europe and North America. In the US there have been only three "new" airports since Dallas-Ft.Worth, which opened in 1973.[160] The particular challenge of a redevelopment is that an existing airport abuts denser development than does an exurban greenfield. Often this development would not have occurred on nearly the same scale if it were not for the airport's existence: US examples feature Chicago/O'Hare and Washington/Dulles. Ironically, such airport-related development later threatens the airport's existence, especially when the airport must expand or redevelop to stay attractive to airlines and passengers. The case of BBI shows that a redevelopment can be stymied by a legal settlement. Yes, the airport may be built. But should it? Without nightflights, and with the *Länder* subverting local development goals, perhaps not. It is a €2 billion question with no clear answer. Yet the question will be asked again and again, by cities all over the world. So if there is no clear answer, let this paper be a clear warning.

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[160] FAA. 1999. Press Release. http://www.faa.gov/news/news_story.cfm?type=press_release&region=southwest&year= 1999&date=122199. Last accessed 10 Apr 2006. The three "new" US airports are Denver (1995), Northwest Arkansas (1998), and Austin (1999).

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8. Appendices

8.1. Data

The following data is for large German airports in 2005, from ADV and the OAG flight guide. "Pax" is short for passengers.

8a:

Airport	MM pax	Catchment (approx.)	Generation ratio	Domestic pax	shDomes	shIntl
DUS	15.511	20	0.776	3.6	23%	77%
FRA	52.219	14	3.73	7.02	13%	87%
HAM	10.676	10	1.068	4.53	42%	58%
HAJ	5.6374	6	0.94	1.12	20%	80%
CGN	9.4522	12	0.788	3.44	36%	64%
MUC	28.619	12	2.385	9.07	32%	68%
STR	9.4059	7	1.344	2.86	30%	70%
Berlin	17.153	10	1.715	6.71	39%	61%

Airport	Daily flights	Daily destinations	transfer	M kg cargo	AusserEuropa	shIntercont
DUS	401	85	7%	32.151	1.48	10%
FRA	1124	219	52%	1864.6	20.4	39%
HAM	299	64	2%	24.216	0.24	2%
HAJ	117	36	2%	6.056	0.32	6%
CGN	161	57	2%	636.89	0.12	1%
MUC	830	139	25%	202.84	4.1	14%
STR	241	67	2%	16.681	0.51	5%
Berlin	369	78	2%	20.648	0.55	3%

Airport	flights	Mean Paxperflight	airlineFlights	Mean Paxperflight on airlines
DUS	200,621	77	185988	83
FRA	490,147	107	475591	109
HAM	156,180	68	132735	80
HAJ	88,936	63	70310	79
CGN	154,594	61	137590	68
MUC	398,838	72	374626	76
STR	160,405	59	127478	73
Berlin	239,760	72	201755	85

Kumulierte Monatswerte — FLUGGÄSTE — Januar–Dezember 2005

Flughafen	Lokalaufkommen gesamt An+Ab	%	Linien-/Pauschalflug-T/A-Verkehr An+Ab	%	Deutschland An+Ab	%	Europa An+Ab	%	davon EU An+Ab	%	Schengen An+Ab	%	Außereuropa An+Ab	%	Sonst. Verkehr An+Ab	%	Transit (einfach gezählt)	%	Gesamtverkehr (inkl. Transit) 2005	%
Berlin gesamt	17.071.063	15,5	17.050.599	15,5	6.709.712	4,1	9.790.099	23,9	7.556.894	23,5	5.401.462	29,5	550.788	32,0	20.464	19,0	82.011	-9,6	17.153.074	15,3
- Tegel	11.500.454	4,4	11.499.449	4,4	5.527.672	-3,6	5.722.435	11,4	4.519.492	15,7	3.662.084	14,8	249.342	75,5	1.005	-6,7	31.848	-6,0	11.532.302	4,4
- Tempelhof	544.494	23,3	527.495	23,6	404.517	107,5	122.887	-46,9	116.464	-27,7	114.141	-26,7	91	-46,8	16.999	13,8	1.106	4927,3	545.600	23,6
- Schönefeld	5.026.115	51,1	5.023.655	51,1	777.523	50,6	3.944.777	55,7	2.920.938	67,9	1.625.237	54,5	301.355	54,5	2.460	109,9	49.057	-13,6	5.075.172	50,1
Bremen	1.719.915	4,2	1.716.328	4,2	848.976	1,9	855.990	6,9	671.611	6,3	634.293	4,8	11.362	-12,3	3.587	0,8	19.882	-20,0	1.739.797	3,9
Dortmund	1.742.911	47,8	1.716.100	48,6	166.096	-13,7	1.473.272	84,1	1.366.011	74,3	822.029	31,1	76.741	-52,6	26.802	9,3	0	0	1.742.911	47,8
Dresden	1.745.544	10,7	1.738.828	10,4	1.135.354	13,6	560.111	6,0	342.728	9,3	341.548	9,1	43.363	-7,3	6.716	147,1	37.357	-13,9	1.782.901	10,0
Düsseldorf	15.433.590	1,9	15.424.981	1,8	3.599.400	1,8	10.344.199	0,0	7.416.735	1,1	5.958.571	0,9	1.481.382	13,8	8.609	56,8	77.400	-27,0	15.510.990	1,7
Erfurt	438.700	-16,6	414.486	-19,3	60.013	-19,7	318.655	-20,7	163.796	-32,1	157.214	3,2	35.818	-2,9	24.214	92,2	212	71,0	438.912	-16,6
Frankfurt	51.850.279	2,1	51.836.891	2,1	7.017.346	-3,7	24.463.733	3,0	18.345.535	4,8	14.274.261	2,5	20.355.812	3,3	13.388	-0,7	369.133	11,8	52.219.412	2,2
Hahn	3.001.898	9,4	2.997.603	9,5	309	-80,2	2.992.681	10,1	2.872.739	9,6	1.711.100	3,0	4.413	-71,4	4.295	-47,6	74.925	965,0	3.076.823	11,8
Hamburg	10.617.094	8,1	10.610.171	8,1	4.526.221	4,6	5.843.749	10,0	4.445.963	13,0	3.453.612	8,3	240.201	39,0	6.923	22,1	58.922	-22,6	10.676.016	7,9
Hannover	5.575.284	7,8	5.567.181	7,8	1.123.164	8,2	4.112.055	10,6	2.918.386	10,6	2.410.292	9,1	321.082	-6,5	8.103	-1,9	8.103	-18,9	5.637.385	7,4
Köln/Bonn	9.403.441	13,6	9.394.075	13,7	3.435.069	7,2	5.840.857	18,0	4.763.644	18,5	3.347.966	10,6	118.149	8,2	9.366	-19,3	48.744	-15,6	9.452.185	13,4
Leipzig/Halle	2.062.397	5,8	2.060.678	5,9	653.804	-2,0	1.198.051	10,4	708.189	22,4	644.314	17,4	208.823	8,4	1.719	-56,1	59.836	-22,3	2.122.233	4,7
München	28.503.924	6,9	28.476.549	6,9	9.068.312	3,3	15.310.901	8,3	11.975.457	10,1	9.324.963	7,8	4.097.336	9,9	27.375	10,0	115.503	-22,1	28.619.427	6,7
Münster/Osn.	1.509.411	3,6	1.489.929	4,7	425.473	3,0	1.035.443	10,3	832.359	3,0	763.660	4,8	29.013	-9,8	19.482	-42,5	31.245	0,2	1.540.656	3,5
Nürnberg	3.801.714	5,8	3.796.000	5,8	1.303.862	3,9	2.167.894	3,9	1.661.696	15,6	1.425.441	7,4	324.244	-3,8	5.714	112,2	41.996	-25,4	3.843.710	5,3
Saarbrücken	444.063	7,7	440.815	8,3	104.535	-2,4	319.159	9,5	227.977	12,1	218.715	7,7	17.121	11,6	3.248	-37,3	42.167	-11,5	486.230	5,7
Stuttgart	9.291.266	6,8	9.267.048	6,8	2.856.323	9,5	5.904.453	9,5	4.464.729	5,7	3.641.640	1,8	506.272	4,7	24.218	2,3	114.621	-5,9	9.405.887	6,6
Gesamt	164.212.494	6,3	163.998.271	6,3	43.033.969	3,2	92.542.382	3,2	70.734.449	10,6	54.531.081	10,6	28.421.920	6,9	214.223	4,8	1.236.055	-4,6	165.448.549	6,3

Kumulierte Monatswerte — FLUGZEUGBEWEGUNGEN — Januar–Dezember 2005

Flughafen	Gewerblicher Verkehr Gesamt	%	davon Linien-/Pauschalflug T/A-Verkehr	%	Gesamtverkehr (inkl. Nichtgewerbl.)	%
Berlin gesamt	215.800	9,2	201.755	9,0	239.760	7,6
- Tegel	137.288	4,1	136.481	4,1	143.067	3,7
- Tempelhof	25.660	-2,5	19.181	-4,2	34.604	-5,0
- Schönefeld	52.852	34,1	46.093	35,9	62.089	27,8
Bremen	34.022	-0,4	27.919	-0,5	42.560	-0,4
Dortmund	30.672	19,1	21.957	26,5	38.918	16,6
Dresden	29.186	3,9	26.776	5,3	36.301	0,0
Düsseldorf	189.508	0,3	185.988	-0,3	200.621	2,7
Erfurt	9.732	-11,6	6.718	-20,2	14.017	-11,5
Frankfurt	482.125	2,8	475.591	2,7	490.147	2,7
Hahn	33.377	35,8	25.461	24,3	37.283	18,4
Hamburg	133.989	3,2	132.735	3,2	156.180	4,1
Hannover	76.585	3,1	70.310	3,8	88.936	4,1
Köln/Bonn	140.775	2,8	137.590	5,3	154.594	1,3
Leipzig/Halle	30.287	-2,9	29.498	-0,9	37.905	-3,7
München	386.841	4,4	374.626	4,2	398.838	4,1
Münster/Osn.	30.901	8,5	19.818	5,6	41.030	7,8
Nürnberg	59.325	1,7	52.705	6,3	76.119	6,0
Saarbrücken	10.744	1,7	8.690	-2,0	14.202	3,2
Stuttgart	140.353	2,5	127.478	1,8	160.405	2,2
Gesamt	2.034.222	4,1	1.925.615	3,9	2.227.816	3,5

LUFTFRACHT (in Tonnen) — Januar–Dezember 2005

Flughafen	Lokalaufkommen Gesamt An+Ab	%	Ausladung An	%	Einladung Ab	%	Gesamtverkehr (inkl. Transit)	%
Berlin gesamt	20.648	-17,9	8.907	-19,9	11.741	-16,3	23.156	-16,3
- Tegel	11.246	-6,4	5.198	-13,7	6.048	1,0	12.288	-13,7
- Tempelhof	569	-2,7	259	7,0	311	-9,3	573	-9,3
- Schönefeld	8.833	-29,6	3.450	-28,9	5.382	-30,0	10.295	-30,0
Bremen	775	-13,0	499	-7,8	276	-21,1	776	-21,1
Dortmund	58	-22,7	33	22,2	24	-48,9	58	-48,9
Dresden	436	6,1	216	9,1	220	3,3	441	3,3
Düsseldorf	56.547	1,1	32.151	2,2	24.395	-0,4	57.459	-0,4
Erfurt	4.855	21,0	2.452	20,4	2.403	21,7	4.855	21,7
Frankfurt	1.864.612	8,2	935.605	11,4	929.009	5,1	1.892.098	5,1
Hahn	101.194	53,1	53.287	47,6	47.907	59,7	107.302	59,7
Hamburg	24.216	1,7	10.922	-0,2	13.294	3,3	24.990	3,3
Hannover	6.056	13,6	2.617	13,7	3.439	13,5	6.551	13,5
Köln/Bonn	636.887	5,3	317.189	5,3	319.698	6,1	650.949	6,1
Leipzig/Halle	11.006	98,3	4.573	127,1	6.433	81,9	12.052	81,9
München	202.844	21,8	98.313	21,8	104.531	16,0	208.662	16,0
Münster/Osn.	64	-88,3	53	-79,3	11	-96,2	64	-96,2
Nürnberg	10.250	-4,3	4.311	0,0	5.939	-7,3	12.034	-7,3
Saarbrücken	54	25,6	45	9,8	9	200,0	54	200,0
Stuttgart	16.681	-4,1	7.550	-5,9	9.131	-2,7	17.305	-2,7
Gesamt	2.957.183	8,9	1.478.723	10,9	1.478.460	7,0	3.018.806	7,0

LUFTPOST (in Tonnen) — Januar–Dezember 2005

Flughafen	Lokalaufkommen An+Ab	%	Gesamtverkehr (inkl. Transit)	%
Berlin gesamt	7.419	-34,2	7.457	-34,0
- Tegel	3.125	-61,2	3.126	-61,2
- Tempelhof	0		0	
- Schönefeld	4.294	33,0	4.331	34,0
Bremen	13	-12,9	13	-7,1
Dortmund	0		0	
Dresden	0		0	
Düsseldorf	135	1,3	136	28,3
Erfurt	0	20,2	0	
Frankfurt	98.528	8,1	99.437	-15,6
Hahn	0		0	
Hamburg	7.687	2,3	7.688	-39,2
Hannover	10.323	7,6	10.323	-1,0
Köln/Bonn	6.720	6,1	6.723	-35,3
Leipzig/Halle	838	111,5	838	-81,8
München	15.205	17,9	15.215	-28,8
Münster/Osn.	2	-88,3	2	
Nürnberg	2	-9,8	3	-99,6
Saarbrücken	0	25,6	0	
Stuttgart	9.351	-5,1	9.352	8,0
Gesamt	156.223	9,1	157.187	-20,6

8.2. Worldwide airport rankings

Airports in Europe are in **bold**, those in Asia are in *italics*, and those in North America are in regular type.

8c: Total passenger traffic, 2004

Rank	City / airport	Country	Code	Passengers	2000 rank
1	Atlanta	USA	ATL	83,606,583	1
2	Chicago / O'Hare	USA	ORD	75,533,822	2
3	**London / Heathrow**	**UK**	**LHR**	**67,344,054**	4
4	*Tokyo / Haneda*	*Japan*	*HND*	*62,291,405*	6
5	Los Angeles	USA	LAX	60,688,609	3
6	Dallas-Ft.Worth	USA	DFW	59,412,217	5
7	**Paris / Charles de Gaulle**	**France**	**CDG**	**51,260,363**	8
8	**Frankfurt / Main**	**Germany**	**FRA**	**51,098,271**	7
9	**Amsterdam**	**Holland**	**AMS**	**42,541,180**	10
10	Denver	USA	DEN	42,393,766	11
11	Las Vegas	USA	LAS	41,441,531	12
12	Phoenix	USA	PHX	39,504,898	15
13	**Madrid**	**Spain**	**MAD**	**38,704,731**	20
14	*Bangkok*	*Thailand*	*BKK*	*37,960,169*	26
15	New York / Kennedy	USA	JFK	37,518,143	21
16	Minneapolis-St.Paul	USA	MSP	36,713,173	13
17	*Hong Kong*	*China*	*HKG*	*36,711,920*	22
18	Houston	USA	IAH	36,506,116	17
19	Detroit	USA	DTW	35,187,517	16
20	*Beijing*	*China*	*PEK*	*34,883,190*	-
21	San Francisco	USA	SFO	32,247,746	9
22	New York / Newark	USA	EWR	31,947,266	18
23	**London / Gatwick**	**UK**	**LGW**	**31,461,454**	23
24	Orlando	USA	MCO	31,143,388	24
25	*Tokyo / Narita*	*Japan*	*NRT*	*31,057,252*	-
26	*Singapore*	*Singapore*	*SIN*	*30,353,565*	28
27	Miami	USA	MIA	30,165,197	19
28	Seattle	USA	SEA	28,804,554	29
29	Toronto	Canada	YYZ	28,615,709	27
30	Philadelphia	USA	PHL	28,507,420	-

Total passengers enplaned and deplaned.
Passengers in transit counted once.

Source: Airports Council International

8d: Total cargo traffic, 2004

Rank	City / airport	Country	Code	Tons	2000 rank
1	Memphis	USA	MEM	3,554,575	1
2	Hong Kong	China	HKG	3,119,008	2
3	Tokyo / Narita	Japan	NRT	2,373,133	4
4	Anchorage	USA	ANC	2,252,911	7
5	Seoul	South Korea	ICN	2,133,444	5
6	Los Angeles	USA	LAX	1,913,676	3
7	Paris / Charles de Gaulle	France	CDG	1,876,900	11
8	Frankfurt / Main	Germany	FRA	1,838,894	8
9	Singapore	Singapore	SIN	1,795,646	9
10	Miami	USA	MIA	1,778,902	10
11	Louisville	USA	SDF	1,739,492	12
12	New York / Kennedy	USA	JFK	1,706,468	6
13	Taipei	Taiwan	TPE	1,701,020	16
14	Shanghai	China	PVG	1,642,176	-
15	Chicago / O'Hare	USA	ORD	1,474,652	13
16	Amsterdam	Holland	AMS	1,467,204	15
17	London / Heathrow	UK	LHR	1,412,033	14
18	Dubai	UAE	DXB	1,169,286	-
19	Bangkok	Thailand	BKK	1,058,145	23
20	New York / Newark	USA	EWR	984,838	18
21	Indianapolis	USA	IND	932,449	17
22	Osaka	Japan	KIX	887,819	19
23	Atlanta	USA	ATL	862,230	21
24	Tokyo / Haneda	Japan	HND	774,113	26
25	Dallas-Ft.Worth	USA	DFW	742,289	20
26	Luxembourg	Luxembourg	LUX	712,985	-
27	Beijing	China	PEK	668,690	25
28	Kuala Lumpur	Malaysia	KUL	655,368	-
29	Oakland	USA	OAK	644,753	28
30	Guangzhou	China	CAN	632,372	-

Total cargo is loaded and unloaded freight and mail.

Figures for Anchorage include cargo in transit.

Source: Airports Council International

8.3.   Freedoms of the Air

The First: The right or privilege, in respect of scheduled international air services, granted by one State to another State or States to fly across its territory without landing.

The Second: The right or privilege, in respect of scheduled international air services, granted by one State to another State or States to land in its territory for non-traffic purposes.

The Third: The right or privilege, in respect of scheduled international air services, granted by one State to another State to put down, in the territory of the first State, traffic coming from the home State of the carrier.

The Fourth: The right or privilege, in respect of scheduled international air services, granted by one State to another State to take on, in the territory of the first State, traffic destined for the home State of the carrier.

The Fifth: The right or privilege, in respect of scheduled international air services, granted by one State to another State to put down and take on, in the territory of the first State, traffic coming from or destined to a third State.

The Sixth: The right or privilege, in respect of scheduled international air services, of transporting, via the home State of the carrier, traffic moving between two other States.

The Seventh: The right or privilege, in respect of scheduled international air services, granted by one State to another State, of transporting traffic between the territory of the granting State and any third State with no requirement to include on such operation any point in the territory of the recipient State, *i.e.*, the service need not connect to or be an extension of any service to/from the home State of the carrier.

The Eighth: The right or privilege, in respect of scheduled international air services, of transporting cabotage traffic between two points in the territory of the granting State on a service which originates or terminates in the home country of the foreign carrier or (in connection to the Seventh Freedom) outside the territory of the granting State.

The Ninth: The right or privilege of transporting cabotage traffic of the granting State on a service performed entirely within the territory of the granting State.

<div align="right">Source: ICAO</div>

8.4.   Images
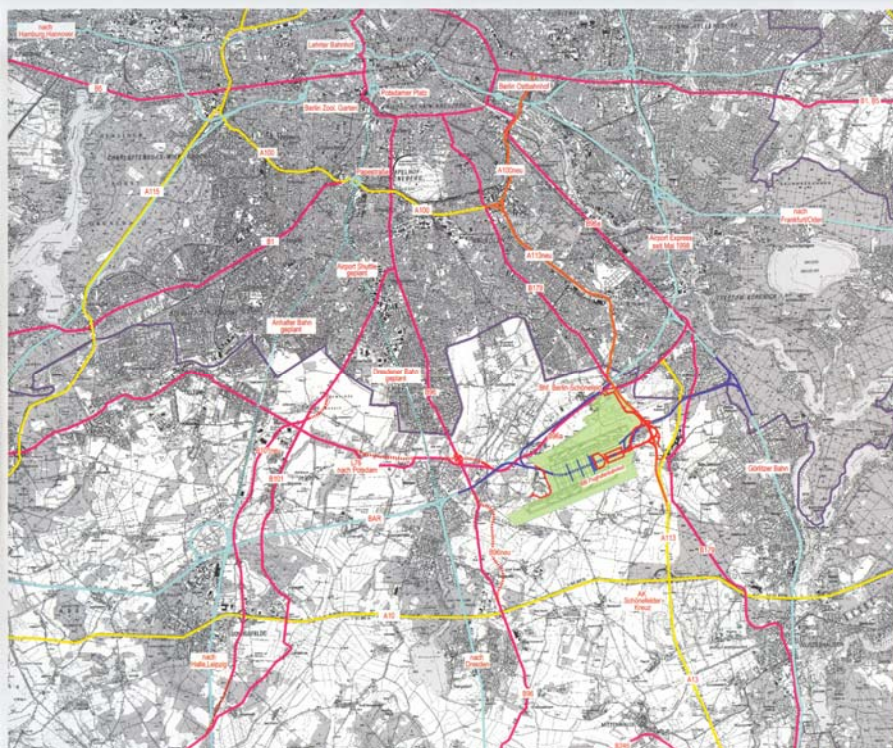
8e: Berlin in Germany   8f: Cold War Berlin
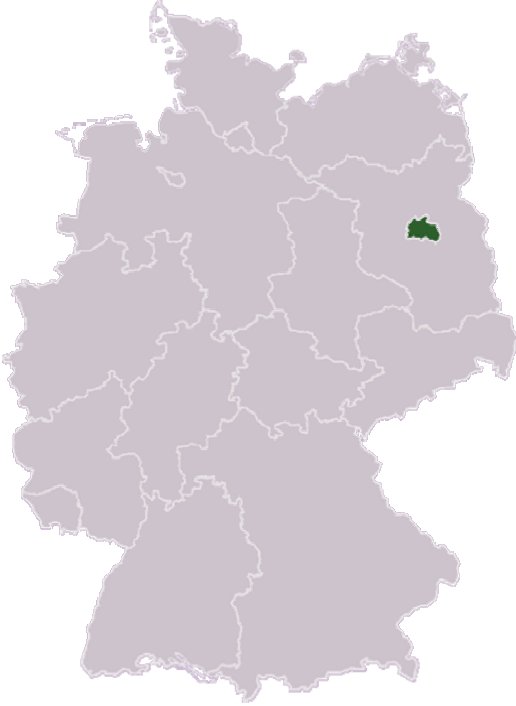
Source: http://en.wikipedia.org/wiki/   Source: http://www.historywiz.com/yalta
        Image:Germany_Länder_Berlin.png

8g: Transportation connections from BBI to greater Berlin

Source: FBS

8h: Diepensee dismantled

Der Abriss von Diepensee hat begonnen. Zunächst sind die alten Landarbeiterhäuser dran. Aus den Klinkern der Häuser soll am neuen Standort ein Spritzenhaus für die Feuerwehr entstehen.

Source: *Berliner Zeitung*, 24 Feb 2004, p.20 (Max Lautenschlaeger)