airports as
multimodal
interchange
nodes

the airport,
a city
of the 21st
century

from airport
to
airport city

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ARC
AIRPORT REGIONS CONFERENCE

BARCELONA
REGIONAL

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presentation

The Airport Regions Conference (ARC) is a network of regional and local authorities across Europe involved in the current activities and the future development of a major international airport situated within or near their territory.

The ARC was launched in 1994 and legally fully established in 1999. There are currently twenty member regions, together representing a population of over 70 million people and including more than 20 international airports in western Europe.

During the last few years, the ARC's "Transport and Surface Accessibility Working Group" has been considering the problems related to the landside accessibility of airports. A document has been published, "Promoting public transport at airports" (ARC, February 99), with the important recommendation that public transport should target a 50% share of the trips to the airport.

Up to now, the airport has generally been considered a location for which accessibility was to be provided. But this place where thousands of people go to work or to take a plane is far from being merely a traffic node. In fact it is growing to such an extent as to become as large as a middle size town with a great concentration of activities.

This concentration of activities and accessibility induces other developments, some of them closely related to airport activities (aircraft maintenance, airport service industries, hotels...) and others just taking advantage of the position (convention centres, shopping malls, office buildings...). Hence, we are facing the birth of "airport cities".

In the "global economy", airports are becoming the main gateways to the world. Metropolitan areas, regions and countries all need convenient and fast connections to these gateways. This means all types of surface transport infrastructure: local roads and motorways, local, regional and high speed trains, etc. The airport is, therefore, becoming a multi-modal transport interchange node.

At ARC, we strongly believe that local and regional authorities, with their large expertise and considerable responsibilities in the field of city and land-use planning, have to play a crucial part in this process. This study has been undertaken to help all of us better understand these phenomena and provide guidelines to face this challenge.

January 2001

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Today, airport development generates phenomena of which airport regions are as yet little aware, and which have not yet found appropriate responses in local and regional plans and strategies. Too much is still subsumed under the term 'airport' and only means an airport's core business, air traffic. The potential to see airports in a more differentiated way, including the roles they can play in networks, and their effects on development opportunities, remains unused.

Airports are not just airports anymore. Airport operators have assumed new business orientations with a stronger focus on landside developments. To cope with land prices, airport sites have to match the quality standards of downtown business districts. Airports start to show the quantitative dimensions - in terms of workforce, size, visitors - and operational requirements of cities. With increasing integration in regional and High Speed Train networks, they become focal points of landside transport - **'multimodal Interchange Nodes'**. As they enhance their role as regional and global interfaces of European regions, airports are transforming into centres of activity within them. Their network position is a strategic advantage that makes airports new development poles, or simply **'Airport Cities'**.

Most Airport City and airport accessibility schemes are as yet designed from an airport point of view. Local and regional authorities are not yet sure how to handle or participate in the making of an Airport City. Interchanging at the airport is not yet a regional strategy. Often, the authorities are not used to the scale of the developments nor to the forms of co-operation required, and instruments may not be adequate. With a straightforward entrepreneurial reasoning replacing 'public' management, and the forthcoming privatisation of airports, responsibilities between the airport operator and the surrounding local governments are not clear.

The report results from the desire to understand the two phenomena, Airport City and Airport Interchange, and how they can be fitted into the airport region. Nine major European airports and their regions have served as cases. The wide variety of development stages, forms of collaboration and approaches chosen with respect to the two issues shows clearly that a successful Airport City and Interchange development requires tailor-made instruments. It would be an illusion to believe that approaches can be copied from Helsinki to Milan, from Vienna to Gatwick and vice versa - there is no pat solution.

The present report does not suggest that Airport City or Interchange are neither inevitable nor always necessary. It provides, rather, a vision of the spatial and infrastructural influence of the airport upon its direct and wider surroundings. Most importantly it outlines and investigates the conditions under which airports, Airport Cities and Interchange nodes are now developed - not least, to restore a certain clarity to the relationship between airport and airport region.

To maintain lucidity between the general trends and the specific solutions, between what actually happens and the conditions under which it happens, the report is organised in three parts, each conceived as a separate 'book'. They can be read in any order.

PART 1 Conclusions and recommendations, is operative: it focuses on the fundamental changes taking place, and on the new tasks and the demands of the parties involved, and it suggests respective action.

PART 2 Trends Compared, is rather analytical: it compares and distils general trends, spatial and functional characteristics and provides the backing for the conclusions drawn in Part 1.

PART 3 Airport Short Stories, gives individual accounts of specific features and manifestations of Airport City and Airport Interchange in each of the nine airport regions.

index

1

conclusions
and
recomme

Foreword: New cities at global and regional interfaces

As markets grow to a global scale, competition between regions and metropolises increases. Air traffic being the adequate means of transport, airports become critical assets for their regions.

Airport development is a mixture of benefits and nuisances. It is highly controversial in that it generates an unprecedented demand for land to guarantee flexibility for expansion of airport capacity, and in that it unfolds large noise zones over the local territory, prejudicing its development. Consequently, discussions between airport operators and public authorities about airport development are very complex, but at the same time unsatisfactory. To focus on air traffic growth and environmental nuisances only seems too narrow a view, as the respective positions are most encrusted.

Airport regions are not just molested land. The contemporary airports are amongst the most characteristic elements of metropolitan areas, and decisive motors of their transformation. Aspects like the development of an Airport City - a high-quality accommodation of airport spin-off - and multi-modal accessibility in the airport area with the airport as a potential interchange node in landside transport, should be brought to the forefront of the discussions. These are new parts of recent airport concepts, but they are also crucial for municipalities, the main city and the region. ››

>> If an Airport City is built, it must not stay an airport operator's own venture, but rather become an integral part of the whole region. If accessibility to the airport is improved, accessibility throughout the region can most likely be improved along with it: besides the Central Station, a new opportunity to interchange can be offered to commuters in general.

Airport City and Airport Interchange are inter-dependent, the development of transport infrastructures and of real estate in the airport area cannot be looked at separately anymore. Otherwise massive real estate development around the airport and increasing congestion could well generate additional burdens and new conflicts. A detached Airport City can disturb the regional balance and simply overrun local development strategies and economic structures through its size and development speed. The economic spin-off may end up in the wrong place with respect to the capacities in transportation networks.

A strong position of public authorities in this respect, representing their interests and ideas, helps to improve solutions. If Airport City and Interchange potentials remain unconsidered, one looses the opportunity to create value for the disadvantaged parties and compensate for nuisances. After all, Airport City and Interchange are precisely two points where region and municipality could hook up to airport development and profit from it.

Hypotheses

Airports are the Central Stations of the 21st century.
They are about to rewrite the geography of the urban territory, in a similar way as Central Railway Stations have. As the new intermodal traffic nodes, they are attractive also to land-uses other than those related to airport activities only, a trend that is not to be underestimated.

1 - an Airport

Accessibility to the Airport, Airport City and Interchange node are strategies in combination.
The huge investments in landside transport infrastructures can sustain three major ambitions:

1. Guaranteeing landside access to a major airport: a massive infrastructural effort, indispensable to sustain airport growth. But the provided capacities are not fully exploited by the airport alone, as they are so conceived to handle the airport's peak demand.
2. Building an Airport City: a substantial infrastructural effort too, as similar access standards have to be provided as those that apply to the main city.
3. Providing appropriate means of public transportation to cope with the rapid formation of poly-centric metropolitan areas. As a new regional and international interchange node, the airport station contributes to adapting regional networks to the contemporary metropolitan condition.

2 - an Airport City

Airport City is an urban planning task.
The contemporary airport is a rapidly changing system requiring a good basic layout. Airport development is as ambitious a project - if not more daring - than Central Station re-development. Airport planning is a step away from purely 'technical airport planning' towards an urban planning process and, in particular, towards integrating land-use and transport planning. It is, however, highly specific, with a double agenda that has to be satisfied: the making of an Airport City without interfering with the airport's ability for manoeuvre.

3 - the polycentric metropolitan region

The Airport Interchange:
one intervention
to sustain 3 ambitions

Airport Cities can no longer remain white spots in the development plans of municipalities and regions.
They are still designed by airport operators. There is a clear gap between the growth of Airport Cities, and respective development plans or strategies available to municipalities and regional authorities. Even though they would have a certain experience in dealing with the urban planning issues of a 'city', they have not developed a clear standpoint. Good examples of Airport Cities are, as yet, the exception.

Airport City is not limited to the airport.
An Airport City is not just another business park on the airport platform: it includes developments stimulated on areas beyond the perimeter. In the most marked cases, this may lead to the formation of a new regional pole based on the airport's outstanding accessibility.

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AMS
LGW
FRA
ZRH
MXP VIE
BCN

Trends in airport development

The new airport image

Airport operators launch a new 'airport image'. This new image no longer relies solely upon terminal architecture or runway capacity and passenger numbers. Two recent trends become integral parts of this new image: the airport promotes air-rail intermodality and assumes a new business orientation.

The airport as a product - Intermodality increases the competitiveness of the airport. Investments (by airport and rail operators) into the quality of the airport station, but also into dedicated bus services to and from the airport, have become crucial to the potential for accommodating further growth. Extra revenues from non-aviation activities have to compensate for the decreasing income from tax-free shopping, as well as for the increasing expenditure needed to expand and maintain the airport's infrastructure. The airport suggests that meeting, doing business and shopping could be carried out at its location. Once a mere airfield with a terminal, the 'airport product' actually becomes much more complex. Airport City is a comprehensive venture.

Exporting a brand - The new airport image is also the new brand. It is aimed at the dynamics in the international market of airport development. Airport operators no longer limit their activities exclusively to their airport location. They aim at exporting their specific 'airport brand' to become involved in airport and Airport City development in other places. To strengthen their international position, airports have started to form airport alliances. Privatisation is considered essential by airport operators in order to be able to participate in this global market. Control over the majority of the capital and entrepreneurial management are prerequisites.
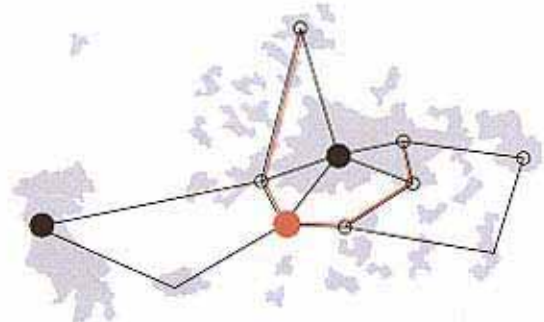
An image discloses ambitions. Intermodality and business orientations appear in different graduations in the slogans of different airports. While some still stress their quality as an airfield, others shift the emphasis to a combination of air traffic, intermodality and real estate development, and ultimately to a new 'airport product', an Airport City.

+ BUSINESS ORIENTATION

+ TRANSPORTATION QUALITY

World's best airport

A unique meeting place

Three terminals - one airport

Creating AirportCities

Participation	Planning	Airport Operation			(Real Estate) Development
(developing)	(developing)	(operating)			(developing)
INTER-NATIONAL	PLANNING	PAX	AIRLINE	COMMERCE	REAL ESTATE
	PROJECT management and consulting		SERVICE	ICT	

• involvement in other airports (Schiphol internat.)
• Airport alliances (Pantares: FRA+AMS)
> Airports at the beginning of a new era

• new at ARN

some operators keep planning and project management inside airport operation

• internal communication
• operational management

• Commercial development
• Land development at the airport
• Surfaces, Real Estate, Logistics (FIF Frankfurt)
• Schiphol Real Estate BV (SRE), Malpensa Real Estate BV

Reorganisation of the airport authority

Extending their range of activities, airport operators leave the status of being (exclusively) a 'transport operator' behind. They become increasingly market-oriented enterprises.

Business orientation - The new strategies result in a radical reorganisation of the company structure. Around the core business of air traffic - passenger and airline handling, as well as commercial services and retail outlets - new business departments evolve:
(1) a master-planning department,
(2) a real estate branch (their own land-use and real estate development company), and
(3) international affairs in order to claim a share in the global airport development market.
The organisation of an airport begins to look like the management of a local authority: safeguarding a public task (facilitating air traffic) and, at the same time, developing the own territory.

New norm - To also assume the role of a real estate developer and public transportation operator, is a major change in the philosophy of airport operation. At the dawn of privatization, a straightforward entrepreneurial reasoning becomes the norm and replaces 'public' management. Running an airport now means developing and operating, besides the airport and the airport terminals, also its landside infrastructure, as well as the total package of companies and services present around an airport.
Departments are split because of differing management cultures: airside planning, the core competence, is still rather conservative, while the new business departments are very market-oriented. A 'total concept' is necessary to balance airside and Airport City development. The airport attempts to transfer its status of planning authority from the airside to all its new business activities on the landside, a move containing inherent conflicts with local and regional authorities.

Responsibilities - The reorganisation of the airport operator is not limited to a certain type of airport ownership: it applies to public-owned enterprises (AMS, BCN, FRA, MXP) just as it does to privatised airport operators (VIE, ZRH), and even to state-operators (ARN). Often, those introducing new ideas are new people, or - as is the case with BAA - no change in the management team means that the business orientation stays very much the same.
With recent (VIE, ZRH), and up-coming privatisations (AMS, FRA), two questions are disquieting: How are responsibilities re-assigned between airport and local/regional authorities with respect to the new activities of the airport? Should it be the airport operator's exclusive domain not only to run the airport, but also to develop real estate at this major regional and international interchange node?

By establishing new business branches, airports become ever more market-oriented enterprises and prepare for participation in the international airport market.

ZRH

AMS

BCN

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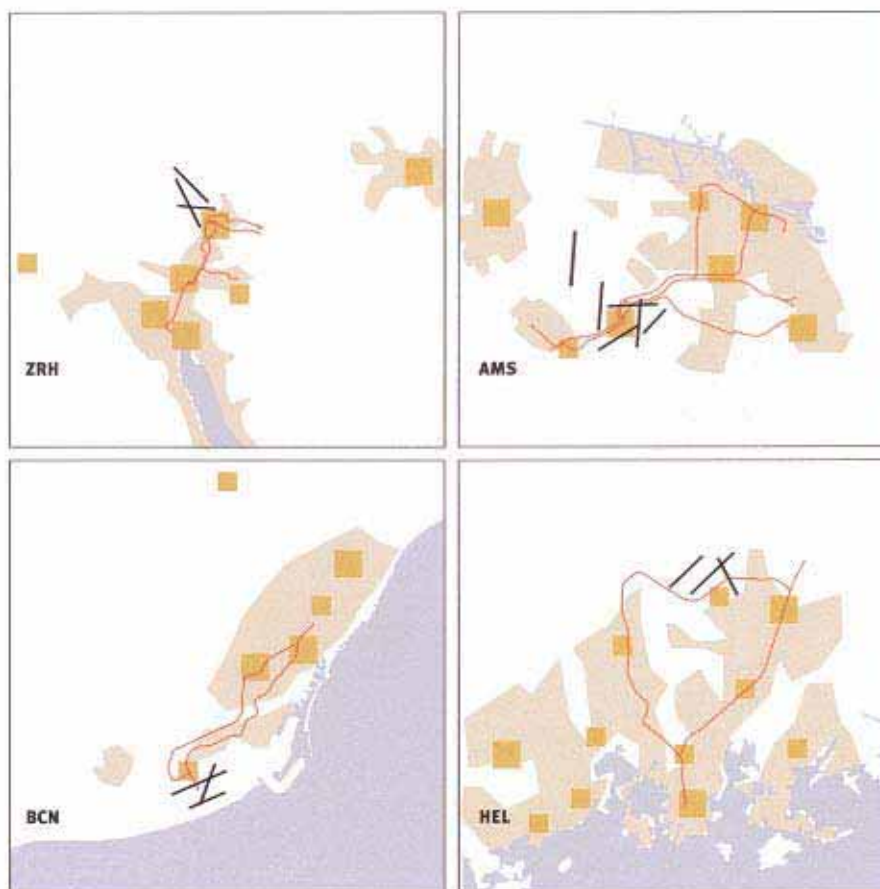
Airports: new hot-spots
in polycentric regions

Airport City
• In principle, the Airport City is the more or less dense cluster of operational, airport-related as well as other commercial and business activities on and around the airport platform. However, this cluster is called an Airport City only if it shows the qualitative features of a city (density, access quality, environment, services).
• An Airport City does not stand aloof. It is not detached from the airport's surroundings, but is part of a broader regional strategy to take advantage of the spin-off of the airport, combining transport and land-use planning.

The term 'airport city' has also been used differently; when it first appeared in the USA in the 1970s, it mainly meant industrial and business parks right next to an airfield. In Europe, airports have recently started using it as a label, indicating their new business orientation: they are not only facilitating air traffic, but are also offering commercial services. In Helsinki, the airport municipality uses the term for itself: Vantaa, the airport city.

Airport planning

Airport planning has become a subtle act of balance between providing space of manoeuvre for the airport infrastructure, and stimulating the development of non-aviation activities.

Complexity - The airport platform becomes increasingly complex. Reservations on airport territory are made to guarantee the flexible development for airport infrastructure in the future. Activities are re-distributed to provide extra development sites for such facilities as hotels, commercial business, conference facilities - all of which can be very profitable.

Opportunism - Some of the most fundamental transformations, however, happen in the surroundings of the airport. For local authorities, for whom a growing airport means above all growing constraints such as noise, limitations to housing development, or traffic congestion on access roads, a major airport also provides the potential for commercial developments.
Driven by market forces, local authorities often launch their own development projects close to the airport and along the main access infrastructure, without co-ordinating them with other authorities or with the airport. Given the type and scale of such developments, there is an inherent danger that local land-use authorities do not have at their disposal the appropriate instruments to withstand developers and investors. Such fragmented initiatives further enhance the pressure on the land surrounding the airport and prejudice the flexibility of its operation.

Planning - The question arises if, due to the increasing importance of the airport infrastructure, the field of action of airport planning needs to be defined much more broadly. Classical airport infrastructure expansion plans will no longer suffice to integrate all these aspects.

New Cities in the Metropolitan Area

Airports are gaining new centrality. This is not only due to the growing importance of air traffic in a global market. The High Speed Trains, which started to change the map of Europe, will also change the map of airport regions, as they will not only stop in the city, but also at the airport.

A city without territory - The surroundings of the airport, and in particular the areas between the airport and the centre of the main city, are one of the most consistently growing parts of the metropolitan area. A concentration of traffic infrastructures, in some cases bundles of several parallel roads and railway lines, gives rise to a new piece of city - the 'Glattal-Stadt Zurich', the 'cash-corridor' Amsterdam, the Llobregat Delta Barcelona or the E18 corridor in Vantaa. Against the background of such developments, the airport area gains an enormous regional relevance.

But an Airport City is 'a city without a territory': there is no territorial authority corresponding to it. Often, with the exception of Helsinki and Arlanda maybe, the area around the airport that undergoes the greatest changes lies within the territory of several local authorities. These territorial conditions make it very difficult to meet the Airport City's new centrality. Co-operation within this urban area has not yet been achieved on a regular basis, but has been confined to resolving common problems, as is the case with the growing noise impact of the airport.

Strategic network position - The airport becomes enmeshed in a larger urban system, where traffic movements to and from the city centre are complemented by a strong demand for connections between other regional centres. Regional authorities are busy setting up public transport initiatives to cope with these new (tangential) traffic flows. Not surprisingly, many of the projects in the pipeline for the next ten years – as in Amsterdam or Helsinki - connect to the airport. As a matter of fact, the airport area attracts a major share of the regional investments into infrastructure. This definitively marks the strategic position of the airport station within the regional transport networks.

Polycentric - In today's metropolitan areas, centre-subcentre relations are no longer so dominant. Not proximity to the city centre, but a strategic network position is essential for the success of a new development, giving rise to very well accessible new centres. The airport is the most prominent one of them. In such a polycentric metropolitan area, centres start to compete with each other, demanding new strategies of collaboration between authorities. However, the transformation of the metropolitan area is still apparently in contrast to regional spatial planning, which has not yet caught up with these changes neither in terms of guidelines, nor in terms of a regional plan.

ZRH

AMS

MXP

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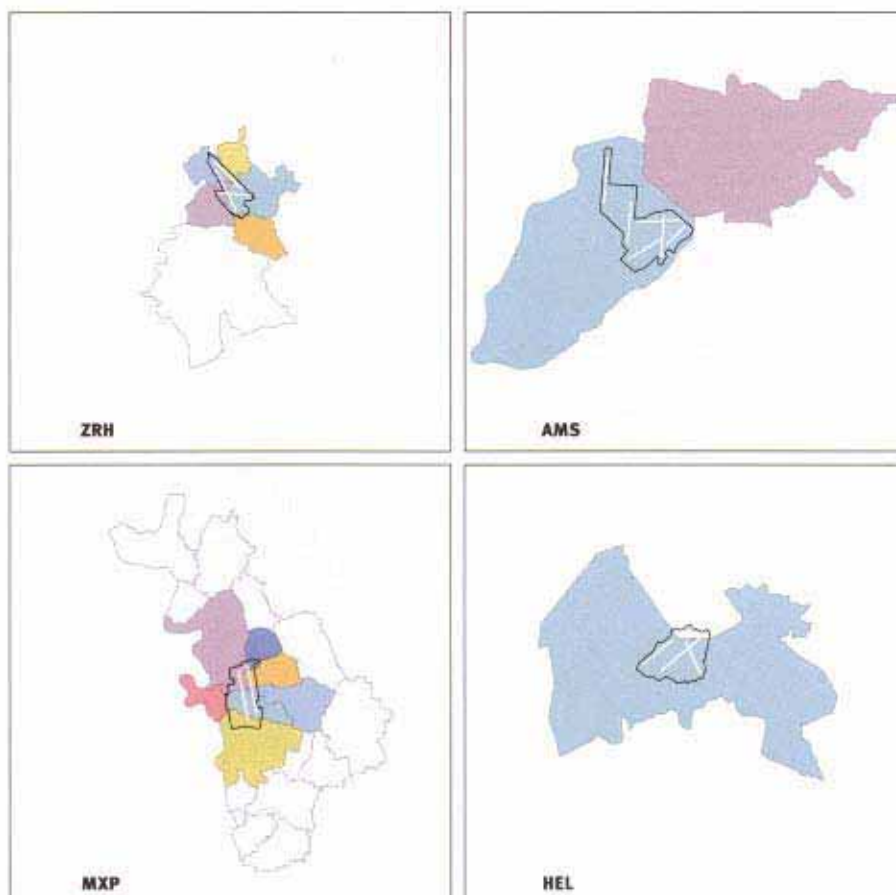
The Airport City:
a city without territory

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Multimodal interchange node

Public transportation has moved to the foreground of the discussion. Road and highway access to the airport are increasingly prejudiced due to congestion and capacity bottlenecks in the airport area. This is a result largely of the general saturation of metropolitan highway networks. In addition, environmental impact assessments of airport expansion, and overall maximum pollution limits force airport operators to actively reduce road traffic movements related to the airport.

Interchange without policy - With so much investment being put into public transportation and into improved services, it becomes increasingly attractive to use the airport station as a landside interchange for non-air-passengers. In some regions (Zurich, Amsterdam), the airport has already become one of the top multi-modal interchange nodes, but with the sole exception of Zurich airport station, there is no quantitative evaluation of this function yet. The airport station is used as an interchange, but it is not yet part of the official policies.

Intermodality at airports is usually focused only upon air-rail interchange. The quality of the interconnections is still argued only from the perspective of the air terminals and has not yet been made suitable for a landside interchange function. Interchanging is as yet only a welcome by-product, with the consequence that its potential contribution to a higher modal split of public transportation cannot be accessed. Only a part of the transport potential generated by major investments in landside accessibility is actually exploited.

Faster and convenient - Nevertheless, a qualitative evaluation seems possible. Often, landside interchanging at the airport offers faster connections, which makes the airport station itself attractive for commuters to and from the region. An Interchange at the airport allows to access areas of the region which are as yet poorly served via other interchange nodes, and access from outside the metropolitan area can be more convenient via the airport.

Location factor - As regional and international traffic interfaces of European regions, airports are very attractive to business development not only on the platform, but also beyond it. It is urgent for local and regional authorities to understand the major urban potential around this transportation node.

DEFINITION

Airport Interchange
• Airport Interchange is the airport station's function as a node in landside traffic networks: it not only serves air traffic passengers and airport employees, but is also used to interchange between regional and national networks (rail-rail, rail-subway, rail-bus, bus-bus etc.).
• Airport Interchange requires a convenient inter-connection of all modes of transport. It can be spatially more or less compact. Usually, the railway station hall is the core of the Interchange.
• The Airport Interchange is part of an overall access concept of an Airport City.

What the hub is on the airside, the Interchange Node is on the landside

Demands in airport development

Developing the Airport City

Airport growth is about two issues: quality and quantity. Local and regional authorities need to be assured of valuable development on the airport site. The airport operator needs to be able to access new landside revenues to compensate for a negative return on investment in aviation infrastructures. The question arises as to whether the airport operator could make additional income elsewhere, relieving the pressure for business development on the airport platform. This is an important issue to balance growth on- and off-airport.

Common development of an Airport City would be urgent considering the commotion caused by the new business-oriented image of airports. However, developing an Airport City which is not limited to the airport perimeter is unknown territory, terra incognita, for the municipality as well as for the airport operator. Often, the new airport concept is still vague and in the making, leaving the surroundings with uncertainty as to what they have to expect (e.g. business strategies, growth expectations). They suspect additional burdens, competing development activities on the airport platform, and unclear responsibilities in land-use. The formation of airport alliances will also introduce powerful foreign players in local developments, which might further increase tensions.

In terms of size and organisation, the airport area becomes comparable to the city

Local authorities are confronted with a large-scale, rapidly changing airport, which exceeds by far the kind of tasks to which they are used. The scope of land-use planning by local authorities does usually not include strategic planning. 'Integral development strategies' would be necessary to include all the different interests and constraints in the airport area. Only then will it be possible to (eventually) compensate for nuisances by fostering economic development within noise contours, or to reduce the pressure on the housing market in the airport area.

Overall access quality

The prospect for fast, attractive real estate development close to one of the top multi-modal interchange nodes in a region is self-evident. But there is a discrepancy between the status which on- and off-airport development sites have, and their quality of access by public transportation in general. Often, business developments on the airport and in its immediate surroundings were realised without corresponding local and regional public transportation initiatives. Even though physically close, many of these sites lack convenient public transportation in comparison to other development areas in the airport region.

The constant reorganisation of the airport platform at most airports leads to a fragmented layout of the platform, not at all congruent with the new airport image. Landside accessibility at the airport is very high at the interchange node itself, but is far below 'urban' standards on the rest of the territory. If public transport initiatives are limited to air-rail interchange only, more than 50% of the traffic movements to and from the airport are disregarded: those movements which are not generated by air passengers, but by airport employees and visitors, whose modal split is far lower than that of air passengers.

Different positions

New developments lead to new requirements, but the respective positions assumed are very different and often not co-ordinated. To avoid conflicts a better tuning of approaches is required.

Airport operators seek to attract activities that complement their operations either functionally or financially. Therefore, they start to set up comprehensive concepts encompassing airport operation and business development, eventually even beyond their platform.

Local authorities want planning security. They have to deal with all the nuisances from air traffic and congestion on their roads, which significantly impair the realisation of their own interests. They are often inclined to join the dynamics of the airport and to get their share of the development promoted through the airport's image.

Regional (and national) authorities seek to guarantee the airport's operability and minimise environmental impacts. They intend to guide development on and around the airport platform in such a way that it does not adversely affect the desirable development of other regional poles. Urban development will have to be concentrated on sites with high and preferably multi-modal accessibility.

Investors and developers (including airport subsidiaries) demand clarity and development security in order to be willing to make investments. They need guaranteed site conditions, including accessibility in general and access to the airport.

Transport providers - airlines as well as landside transport providers - seek to optimise their services, including joint ventures to exploit synergies (e.g. air-rail) and to enhance intermodality. In exchange for the high pre-investments in infrastructures, they demand a share in the development opportunities they create through their services.

Future tenants demand ever more high locational quality. Proximity to the airport alone is no longer a strong enough argument.

HEI
ARN
AMS
LGW
FRA
ZRA VIE
MXP
BCN

	aviation activities
	undisputed
	metropolitan

Profit

	CORE-BUSINESS	AIRPORT-RELATED	AIRPORT-ORIENTED	PROFITING
high value/m2	terminal services: duty-free, etc.	international logistic headquarters	international business activities (headquarters); WTC (international trade centre)	shopping ICT-business other offices
	handling	post-, courier services test- and training centres catering	hotel conference restaurants medical care centre	entertainment science park research & development education
	airplane maintenance	flower-fair EDC (europ. distribution centres) parts-centre	value-added logistics international exhibition center	pharmaceutics industry high-tech industry electronic industry food industry
low value/m2	freight centres		expo centre of regional economy; large-scale, international transport and distribution	regional transport and distribution companies recreation, golf course

Relatedness to air traffic

Core business   **Image**

Discussing an adequate package of activities for the Airport City

Selectivity and Branding

International airports are magnets for all kind of business activities. At first, they were mainly directly related to the airport and to air traffic, but recently, other companies have started to settle there increasingly, due to the status of the airport location or the good connections offered. However, what wants to be at the airport is not always what really needs to be there. Local and regional authorities are especially concerned about a type of activities which was once monopolised by the cities: business activities, shopping, high-tech industries and leisure facilities.

In good times especially it is necessary, but also an advantage, to be selective in regard to the kind of activities that are admitted and accommodated in the surroundings of the airport. Restrictive policies are urgently needed to guarantee manoeuvrability and to give priority to airport-related activities on the scarce land. But local authorities also want to diversify the local economic structure or maintain previous activities, to depend not only upon an airport-related economy.

Selectivity comes with Branding. Thus, being selective means also promoting sites close to the airport for specifically airport-related activities, for which airport regions compete internationally. Focussing on such a segment of activities can add to the portfolio of metropolitan regions with their well-established centres. In half the airport regions analysed (AMS, MXP, ARN, BCN), clear typecasting has, to a certain degree, been applied to the different development sites, establishing a brand and marketing tool.

It seems obvious to assume that a certain hierarchy between the development plans in the airport area is necessary, including the operator's ambitions on the platform itself. The fact that most of the sites are rather close together, and part of a densely urbanised area, makes it improbable that all sites are equally adequate candidates for a successful and valuable urban development. Selection is necessary between the locations according to function, position in the transportation networks and value. It has to be possible to postpone certain developments and give priority to others.

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Strategic planning

Regional planning is lagging behind. To integrate potential Airport City development and the Interchange function of the airport station in the metropolitan area, specific regional strategies are required. Regional planning is expected to provide guidelines and exert a steering role concerning these two phenomena. Most regional authorities have so far been reluctant or lacking the tools to get involved, notwithstanding the serious regional concerns to balance a potential Airport City with other regional development poles. Often, regional plans combine only the initiatives of local land-use plans, and do not provide a vision and growth criteria for a larger territory.

Regional development strategies will need to directly hook up to transportation planning. In the years to come, landside congestion will be one of the most serious bottlenecks in airport development. Until recently infrastructure has been planned in reaction to the growth of the metropolitan area, a supplement to economic development. Now, the potential to guide development via infrastructural investment starts to be recognised. Infrastructural planning regains a central position in spatial planning - this is most visible in Barcelona or Zurich. But its come-back has yet to be consolidated. Most regional authorities, the traditional transport planning authorities, have as yet been hesitating to transfer this opportunity into integral strategic plans.

Not only do such integral plans seem a bridge too far today, but also most transport planning authorities are still focussing on providing 'connections'. Facilitating 'inter-connections', or developing interchange nodes, has yet to break through into regional and national policies. Such a change in infrastructural planning requires parallel concepts for the spatial development around future interchange nodes.
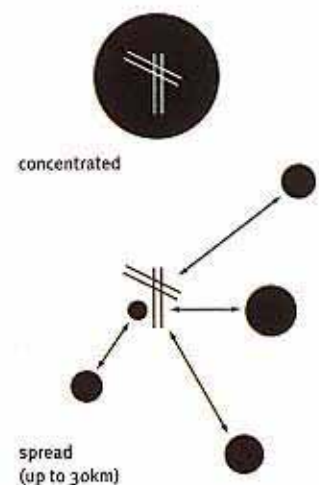
Co-operation

Several often conflicting interests overlap. But responsibilities are usually split between various authorities: the municipality is (almost always) the land-use planning authority. The region is usually the transportation planning authority. This exclusive distinction is no longer adequate for approaching the mutually dependent issues and tasks facing each one of them. Schemes for the accommodation of airport-related activities and for an Airport City, that involve all the (major) development sites of a region, and that harmonise them with transport networks' development, require co-operation, integral investment strategies that overcome the usual segregation of accessibility and land-use planning.
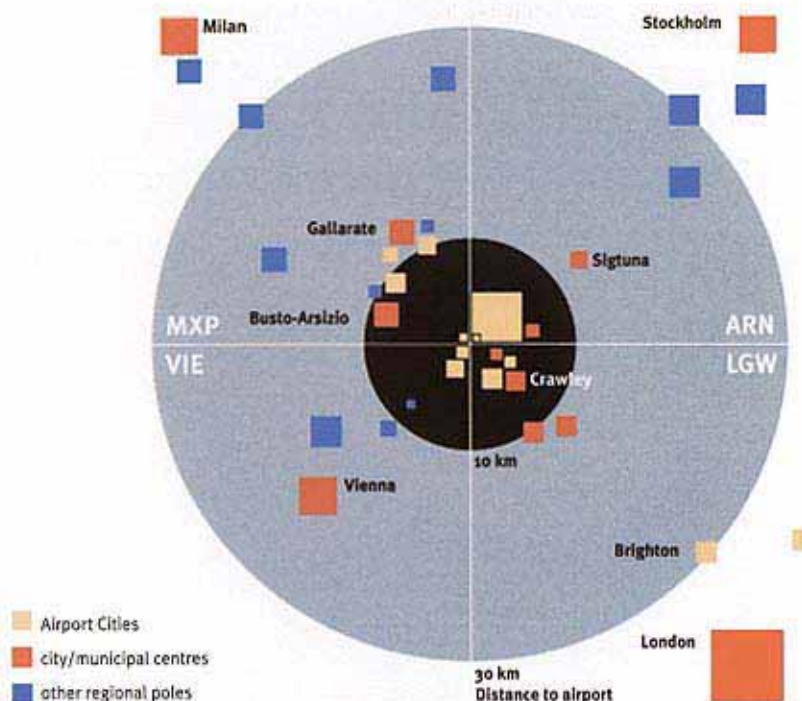
Due to existing administrative boundaries in the airport area, co-operation in airport-related matters cannot be guaranteed. An overall development concept, site development, marketing, regional co-ordination and accessibility need to be tackled in new forms of collaboration.

Positions to be taken by regional authorities concern
- a careful evaluation of the strategic position of the airport within the regional transportation networks: a possible interchange function.
- the accommodation of airport-related economic development: concentration around the airport versus accommodation elsewhere in the region.
  the consideration or the rejection of the airport location as a regional development pole in the metropolitan area.

concentrated

spread
(up to 30km)

Different choices regarding airport-related development in the region

Milan
Stockholm
Gallarate
Sigtuna
MXP
Busto-Arsizio
ARN
VIE
LGW
Crawley
10 km
Vienna
Brighton
London
30 km
Distance to airport

- Airport Cities
- city/municipal centres
- other regional poles

Tuning development in the region: If well accessible, very diverse sites can participate in the 'airport economy': city centres, IT-parks or neighbouring municipalities

19

AMS   ARN   BCN   FRA

MXP   HEL   LGW   ZRH

        VIE
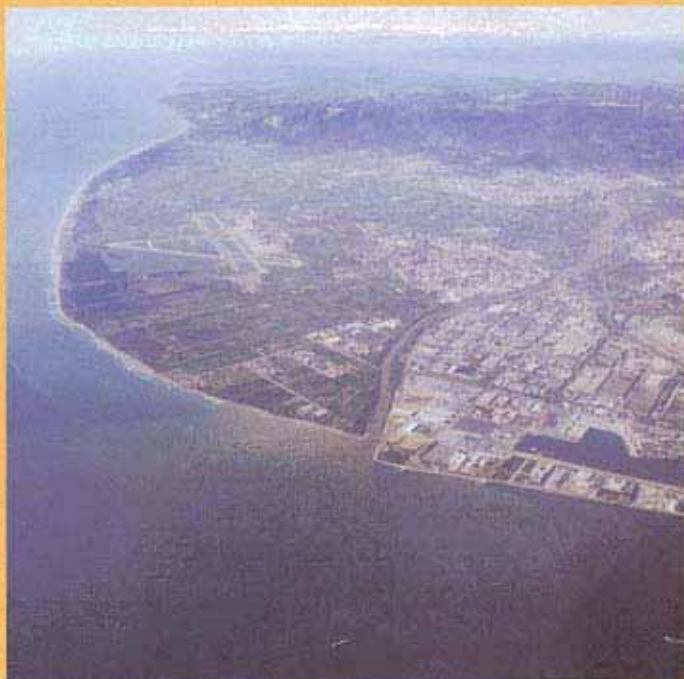
13+1 Recommendations

Adequate instruments are required for a successful integration of Airport City and Interchange development. Some regions have developed such tools. They are specific initiatives to tackle potential frictions and to increase the advantages that can be drawn from these developments within a particular context.

The thirteen plus one recommendations are not an action package which can directly be applied to any situation. Rather, they are considerations that have to be made concerning the accessibility and the opportunities for economic development at airports.

ACCESSIBILITY AND INTERCHANGE DEVELOPMENT

BCN

1. Apply the same standards for accessibility in the airport area as in other urban areas.
For a successful promotion and realisation of development areas, it is indispensable to guarantee the availability, density and quality of the transport infrastructure. The accessibility of the Airport City requires more than accessibility to the airport terminals alone: the Interchange needs to be complemented with fine distribution by public transport to all of the Airport City. Vast surfaces as well as often dispersed facilities and development areas demand a complete traffic management.

Reference: BCN - subway line 9, AMS - Zuidtangent and Sternet, ZRH - Stadtbahn, LGW - Gatwick Direct/FastWay

FRA

2. Develop the airport station as a second (inter)-national railway station in the region.
Most of the attention given to (inter)-national rail access at the airport is still due to its advantages regarding air traffic (substitution, catchment area). Chances are thus missed out to use it as a landside gateway in the region. Attention must be paid to efficient inter-connections between (inter)-national railway and the regional transportation networks. The potential economic impact of such a node will be considerable, as businesses see good international railway connections as an additional locational advantage.

Reference: FRA - AirRail terminal, AMS - Schiphol as HST-South and -East station, ZRH, LGW - North-South Thameslink

ZRH

3. Enhance Interchange development at the airport, make it a 'hub in regional public transportation'.
At present, interchanging is just a welcome side effect. But it must become a regional policy. A first quantitative evaluation of the interchanging is crucial in order to assess its potential for regional accessibility.

The same principle that makes an airport a hub makes an airport railway station a regional hub: reaching a critical mass through transfer passengers means that extra services and higher frequencies can be offered, to and within the region. Repercussions upon the modal split to the airport, particularly in employees' traffic, will be considerable. At the same time, measures have to be taken to limit car access, including restrictive parking policies at the airport.

Reference: ZRH - IC-trains/regional rail to regional rail/light rail, AMS - IC-trains to regional rail/bus services, LGW - (co-ordination needed), FRA - ICE to regional rail

ZRH

4. Focus upon the quality of the Interchange node.
The success of the Interchange depends upon the efficient integration of all means of landside transport and its functional and spatial quality. The multi-modal Interchange node at the airport now needs also specific concepts for spatial development around it. The Interchange not only needs to be optimally connected to the air terminals; it can also become a new focal point in the airport organisation. A central position for the Interchange is a prerequisite for the success of the Airport City.

Reference: ZRH - vertical stacking of all means of transportation, FRA - horizontal organisation, AMS - Schiphol Plaza: central position of the station hall

AIRPORT CITY DEVELOPMENT

HEL

5. Increase clarity about future responsibilities of the authorities involved.
Both airport operators and local authorities are unfamiliar with how to collaborate in making the Airport City. New tasks and new organisation structures demand a re-definition and re-distribution of responsibilities, as well as new land-use strategies, in view of the deficits and disparities that have determined much of the former collaboration.

Reference: **HEL - Vantaa's involvement**, BCN - El Prat's involvement, LGW - Crawley's control

ARN

6. Be selective: reserve sites for airport-related activities.
There is a need for being specific and critical of what has to be on-airport or in its direct surroundings, and what can be further away. Reserving sites for a specific activity will bring market advantages and allow the development of made-to-measure accessibility. Selectivity with respect to programme can become a crucial tool to increase complementarity with other regional poles.

In good times, offering different site profiles can improve opportunities in a region which competes with other European regions. In bad times, clear priorities help avoid competition between different sites in the region and give the fewer potential investors long-term security.

Reference: **ARN - Arlandastad**, AMS - Schipholzone

AMS

**7. Apply branding: develop marketing strategies
   (in co-operation) for a specific type of activities.**
Concepts aimed at specific target groups are necessary in order to promote and market the airport area. Clear labelling also makes it easier to guide an area's development. However, branding of the airport area alone is inefficient: branding must also apply to other development areas in the region.

Reference: **AMS - SADC**, ARN - NELC, BCN - Logistic Platform

MXP

**8. Be clear about which areas have development priority:
   when, where, how much!**
This means replacing 'opportunism' by 'orchestration' in the airport area. There are clear discrepancies in the development opportunities between airport sites and regional sites. Sites on or around airports can often be developed much faster. More central sites in the city require more pre-investments and more complex development cooperation. Development will need to be fine-tuned to regional transportation networks, to the co-ordination with surrounding municipalities and to the need to maintain the airport's development flexibility to react to eventual strategic changes in air traffic types.

Reference: **MXP - aim of the Piano d'Area Malpensa**, AMS - AAArea

BCN (AENA)

BCN (BR)

INNOVATION AND MADE-TO-MEASURE TOOLS

9. 'Airport planning' has to move towards 'urban planning'.

In order to achieve urban quality, land-use and accessibility need to be integrated. Urban quality requires a good disposition of all activities (both aviation and business, parking, hotels and shopping) in relation to the access infrastructure. This might imply considering off-airport sites as alternatives to more remote on-airport sites.

An Airport City is not limited to the airport platform. Proven urban planning tools like master-planning or Public Private Partnerships (PPP), adapted to the specific situation at an airport, can be very valuable. A Project Office for an 'Airport Zone' may be necessary, set up as a PPP (potential partners: regional/local authorities, AA, landside transport providers, landowners, investors). Fundamental agreements on infrastructure and master-planning are indispensable to creating clarity and transparency.

Reference: BCN - Balancing AENA and Barcelona Regional plans, FRA - AirRail terminal, VIE - office park, AMS - AirportCity, HEL - Aviapolis PPP

An Airport City is no ordinary planning task! Special attention is required due to continuous and rapid transformations of airports, the size of the interventions, the need to guarantee the operability of an airside, the fact that running an airport is a concession and not just a business or a public administrative function, the extra-ordinary accessibility, nuisances and their constraints on programme.


ZRH

10. Compile regional development strategies that assign the airport a specific role.

The position of the airport within the metropolitan area is to be defined with respect to other development poles. This requires the simultaneous creation of new concepts for the other poles and centres in the region, avoiding also possible programmatic overlaps and similarities. Development opportunities in the airport region must be directly co-ordinated with the regional transportation plans. Clear development perspectives, based on harmonisation with adaptations of the traffic networks, increase the attractiveness of a region as a whole.

Reference: ZRH - Centre Areas, AMS - regional structure plan, ARN - regional plan 2000/2030, BCN - Deltaplan, HEL - Helsinki Metropolitan Area Vision 2020
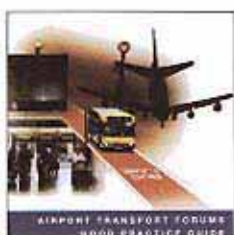
11. Create a permanent forum for airport-related issues.

The ongoing increase of air traffic and nuisances generated by it, as well as a lack of clarity about airport growth expectations, seem to paralyse local authorities. Discussions about the airport are limited to these aspects and to concrete airport expansion projects. A permanent forum is needed to approach more fundamental issues over a longer time span independently of the airport's recurring airside expansion plans.

Such a forum is also a potential platform for negotiations, to balance the advantages and disadvantages of a big airport and its growth with respect to its surroundings.

LGW

Reference: LGW - Airport Transport Forum, AMS - Bestuursforum Schiphol, FRA - Mediationsgruppe, VIE - Mediationsgruppe, (MXP - Consultancy Malpensa 2000)

12. Determine an 'Airport Zone': an area of co-ordinated action.

The clear designation of an Airport Zone, including specifications of activities to be accommodated there and quality guidelines to be fulfilled, helps overcome uncertainties for all the parties involved, and guarantees flexibility in airport planning. The Airport Zone is an instrument for strategic action and co-operation to integrate all elements of the Airport City and airport area: traffic, housing, nuisances and commercial development. As such, it can be the basis of the master-planning scheme for the airport area.

Reference: AMS - Schipholzone, MXP - Area Malpensa, ZRH - Zurich Airport Centre Area (in the making)

13. Co-operate in the development of real estate throughout the region.

A 'total concept', a master-plan for the airport area including all developable locations, will enhance development mutually while exploiting the specific potentials of each site. For this purpose, frequently established marketing co-operation can be translated into appropriate development co-operation.

AMS

If every municipality (local authority) launches its own individual business site, potential (international) investors will be reluctant to react. "You've got to create critical mass in your region, if you want to play an important role for airport-related and airport-oriented business". This is impossible with a series of fragmented initiatives. The market wants security about where which type of activities can be realised, and within which time span sites will be developed.

If this is not done, chances are missed out for
- the guidance of the developments' quality,
- guaranteed accessibility and quality of the infrastructural networks, and
- an efficient marketing of complementary sites with a specific image.

Reference: AMS - AAArea, HEL - Centre of Logistics, ZRH - Centre Areas of the Canton of Zurich

Redefine 'airport competitiveness' on the basis of the total 'airport product'.
Today, questions of airport capacity expansion dominate airport master-planning. The creation of Airport Cities, or at least the introduction of this concept in order to reach a new level of quality and coherence in airport development, can shift the focus in airport planning. It re-introduces other issues (of qualitative growth) such as accessibility - especially public transportation -, interchange quality, real estate development, and eventually the making of a new regional pole.

But Airport City is not only about the quality and developments on the platform. It is an opportunity to overcome fix positions of airport operators and public authorities regarding airport development and environmental impact. Airport City and Airport Interchange can give hand for compensation and profit for the disadvantaged parties.

"With future airport and Airport City development, make sure that today's losers become winners too."

trends
compared

introduction

1. The bigger the airport, the bigger the area/urban territory affected (both beneficial and adverse impacts). 2. The bigger the airport, the bigger the likely discrepancies between the local territory and the international airport. 3. The more dynamic the airport, the smaller the possibilities of influence from the local and regional authorities.
4. Rapid airport growth generates additional demand for co-ordination and co-operation.

From Airport to regional Interchange...
Due to the success of air traffic in the last decade, airports have become places where tens of millions of passengers leave and arrive, and where tens of thousands of employees facilitate this transit.

Being the main gate of a region to the world, it is necessary to link the airport not only to the main city itself (by highway, shuttle-bus or shuttle-train),

within a range of 500km. The stop at the airport not only allows for the substitution of some air traffic, but is also a convenient access-point to the High Speed Train network for the region.

The reorganisation of air traffic, and as a consequence the increasing concurrence between airlines, has led and will lead to more concentration of the intercontinental air traffic onto a small number of airports (hubs), where transfer between flights is significant. Network integration at hubs is likely to be over-proportional: the integration into the High Speed Train network is more crucial due to airspace congestion at hubs; and as more air traffic destinations can be offered to the regional community (and economy), more service and business functions will be attracted. At hubs, where employees make up a much greater share in landside traffic than at other airports, a more balanced network integration is required as compared to airports where primarily point to point connections to the main cities are needed for air passengers.

integrated airports
non-integrated airports
other integrated airports
> 250 km/h
+/- 250 km/h
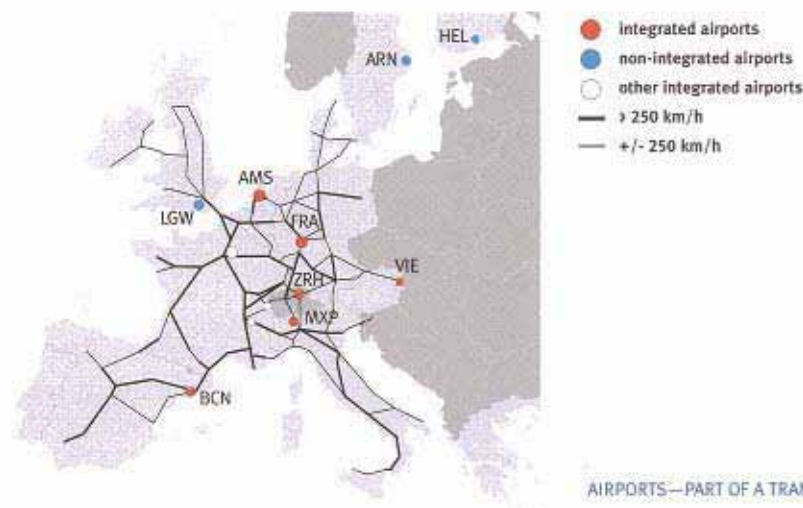
AIRPORTS—PART OF A TRANS-EUROPEAN NETWORK

but to also integrate it into the various regional and national traffic networks (public transport and road). There is, above all, an urge to improve access to public transport networks, since airports are increasingly enmeshed in larger urban areas - with road-congestion as a threat to the performance of all big airports - and are required to undergo environmental impact assessments for major airport-investments. If optimal transfer opportunities can be offered, the airports' railway stations can become regional interchange nodes or regional hubs.

The European High Speed Train network is being extended and many continental European airports will be directly connected to this network, to exploit synergies between air traffic and High Speed Trains: the TGV to Paris, Barcelona, Amsterdam and Brussels (indirect), the ICE to Berlin and Frankfurt, and the Eurostar to London (indirect). High Speed Trains offer fast connections between metropolitan regions, and are ever more competitive to air traffic

...and to Airport City
Where many people are passing through, there are opportunities for business. The multimodal connections at all levels (local, regional and national/international) tend to trigger urban developments around and directly on the territory of the airport. Ever more economic activities with an only more or less direct relation to air traffic settle there: logistic activities, (inter)national businesses, high-tech industry, trade and convention centres, shopping facilities, and other urban activities. Airports have become centres on their own, in the most radical cases pacemakers of entirely new cities.

Airport operators themselves increasingly seek to cash on landside developments, real estate and concessions. Aviation income does not suffice anymore to finance airport infrastructures. Additional resources are required. This enhances the accumulation of services for travellers, visitors, employees and business companies. At London-Heathrow, Paris-Roissy or Amsterdam-Schiphol,

commercial activities (shopping, revenues from renting out space, advertisement, etc.) have become good for up to 50% of the airports' profits. Real estate development has become an important part of the total 'Airport Product'.

Airports are major concentrations of workforce, equivalent to the inhabitants of a small city. Now, some Airport Cities become also home to functions that were once monopolised by cities.
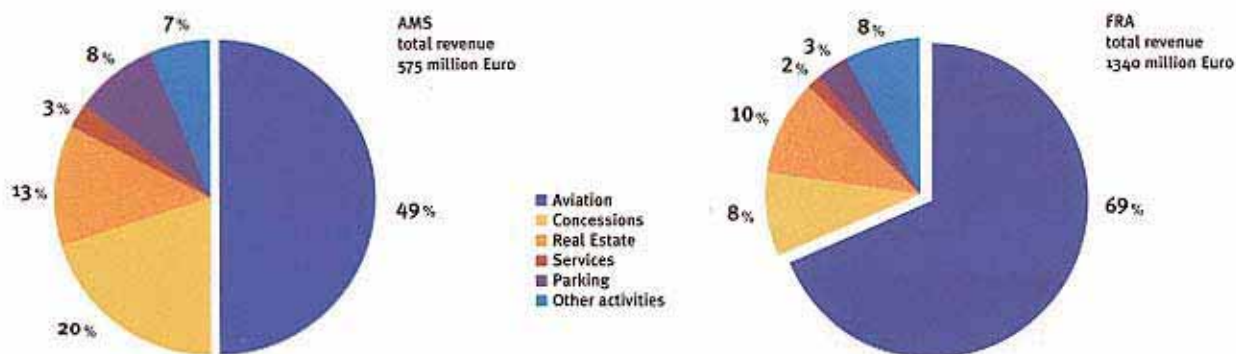
Integration of Airport City and Airport Interchange
The position of the airport within the airport region needs to be revised. The integration of an Airport City with all its consequences is a major challenge in airport development for local and regional authorities. The exploitation of the airport's potential function as a multimodal interchange node is just starting to be discovered. First successes have been registered in limiting the constraints that come along with rapid airport (city) development, and in maximising the benefits for the metropolitan area.

Principal trends
However different the stages of development, however different the aspirations of the airport operator, however different the regional strategies, an analysis of the conditions in nine European airport regions clearly reveals four principal trends when it comes to Airport City and Interchange development:

1. The airport transforms the metropolitan area, in a similar way as Central Railway Stations have. As airports evolve into new 'cities', common 'centre-versus-subcentres' concepts have become outdated.

2. Contemporary airport planning means balancing airside and landside demands within a comprehensive 'total concept'. The planning of such a development pole, an Airport City, is no more a purely technical, but also an urban planning task.

AMS
total revenue
575 million Euro

7% · 8% · 3% · 13% · 20% · 49%

Aviation
Concessions
Real Estate
Services
Parking
Other activities

FRA
total revenue
1340 million Euro

8% · 3% · 2% · 10% · 8% · 69%

NON-AVIATION REVENUES (E.G. REAL ESTATE) GET INCREASINGLY IMPORTANT FOR AIRPORTS

For every airport region, an adequate and specific solution has to be found. Not to develop an Airport City in the immediate surroundings of an airport, but rather to spread the benefits in a larger territory, as at Gatwick airport, can also be a choice.

Airport City and multimodal Interchange are closely related trends in airport development. Fully integrated concepts, which combine land-use and mobility, will become more and more relevant in the future. But planning a contemporary airport, or rather Airport City planning, is no ordinary planning task. It is a 'terra incognita' for both the airport operator as well as the local and regional authorities.

3. The High Speed Train link to the airport, and the airport's increasing integration into regional public transportation networks, change the image of the airport station. The interconnection of the different means of transport (not only with respect to air-rail) is a prerequisite for operating a multimodal interchange node for the airport region, or more simply a regional hub.

4. The impact of the airport reaches far beyond its perimeter, resulting in a large number of initiatives close to and further away from the platform - mostly spontaneous, few times co-ordinated. The integration of the airport into regional economic and transportation strategies requires new forms of collaboration between the different authorities.

The corresponding patterns of the 9 airport regions have been mapped in scale in four series of plans.

HEL
ARN
AMS
LGW
FRA
ZRH
MXP VIE
BCN

new centres in metropolitan areas

A first decisive factor for the principal differences in Airport City development at the nine European airports is their respective position in the metropolitan area:

- at the periphery of a city, within an agglomeration of more than a million people: BCN, HEL, VIE, ZRH
- in a conurbation of several cities, a metropolitan area: AMS (Randstad), FRA (Ballungsraum Rhein-Main)
- remote to a major concentrated metropolitan area: ARN, LGW
- enmeshed in a densely populated, but fragmented environment: MXP (at the periphery of the Milanese metropolitan area).
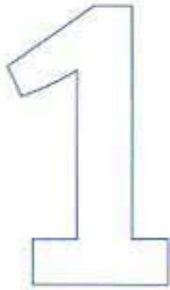
Airports transform the city

Airports have started to transform the shape of the metropolis. They have a major and visible impact on the structure of the urban area. Herein lies a certain analogy between airports and Central Railway

- **Amsterdam** is undergoing a radical re-orientation onto its former southern periphery, a corridor containing all major infrastructures of the Randstad including Schiphol airport. The 'Zuid-As' is not only becoming the number one business location of the Netherlands, but also a major new housing area for the city.
- **Helsinki** will see the realisation of a major 'Logistic Activity Zone' along the 3rd ring-road (the E18 TEN route), with an Airport City - the Aviapolis - as the show-piece.

These cases show that the influence of airports on real estate developments is strongest within some 10 km or a travel time of 15 minutes. Within this zone of influence one often also finds other, independent development poles, and even the main city itself (Zurich, Frankfurt).

The three airports ARN, MXP and LGW, which are located at some 40-60 km from the city, show different development patterns. They are too far out to be alternative locations for business
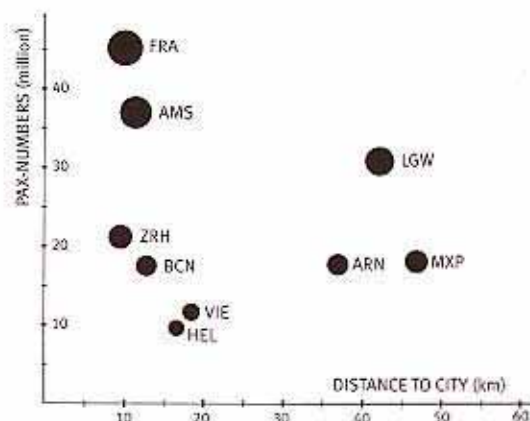
CLOSER TO OR FURTHER AWAY FROM THE CITY CENTRE

Stations. In just the same way and as strongly as Central Stations influenced the growth and shape of the cities, airports now enhance the tendency of an economic shift from the main cities towards the urban periphery in metropolitan areas. This shift is the result of better infrastructural conditions around the airports (major ring-roads, public transportation corridors and the airports themselves) as compared to other, more central locations.

Six of the nine analysed airports are only some 10-15 km away from the centre of the metropolis. These airports trigger major re-formations of the cities. New service centres arise, and (inter)national logistics and distribution centres are created; but also small and medium-sized enterprises and other urban activities, including housing, follow the dynamics.

- Between the centre of the city of **Zurich** and the airport, unprecedented quantities of new urban substance have been built over the last 15 years. Literally, a new city is in the making, the 'Glatttalstadt'.

functions that seek proximity to a city and only require good accessibility to an international airport. Consequently, if these airports have or will assume the role of new economic development poles, the activities to be accumulated will be more specifically airport-related (as in Arlanda with the North European Logistic Centre). The impact on the structure of the metropolitan areas (Stockholm, Milan and London) remains minimal. Here it is much more crucial to foster interactions as well as to avoid conflicts between the airports and the local context.

Airports as new development poles

Airports are among the strongest motors in the transformation of cities into polycentric metropolitan areas. This change is of course not solely airport induced. Most metropolitan areas in Europe are currently confronted with new upcoming centres. Surrounding municipalities have gained independence with the recent urbanisation processes. Peripheral areas and

nearby regional centres have grown much faster than the inner cities have been able to. The position in relation to the main city centre has become less important than a strategic position within regional/national networks. The recent connection of several airport regions to the European High Speed Train network - one stop at the airport and one at the Central Station - will further enhance the reorientation of the metropolitan areas, an effect which is as yet only visible in future plans for Amsterdam and Barcelona.

Cities are not independent entities anymore. They are part of metropolitan areas, and eventually of urban systems. The new dimension and structure of metropolitan areas represents a challenge to traffic-planning. Radial relations from and to the centre of the main city have become less dominant, while relations between the new regional or metropolitan centres become ever more important. Regional transportation initiatives have been launched to respond to these trends, introducing new tangential links through the former

New centres require new policies

The 'centre-versus-subcentres' concept has become outdated. A shift has to take place from plans that define central and peripheral activities, to strategies that organise complementarity between the different regional centres. Nevertheless, current policies - especially for major airports - still seem to be dominated by an anxiety about a new centrality of airports.

Autonomous developments at the airport are met with suspicion. The concept of Airport City is accompanied with a deep distrust (doubt) and concern by local and regional authorities about the kind of activities which are to be realised on the airport. It has to be taken into account, however, that an Airport City alone, such as at AMS or FRA, amounts to less than 5% of the total office floor area and future capacity of business area in the main cities, and is often smaller than other new development hot-spots in the region. Also, it primarily competes in a market where the choice is not made between one or another pole in a certain region, but between different regions as such.

ZRH Glattal-Corridor   AMS Zuid-As   HEL E18 Corridor
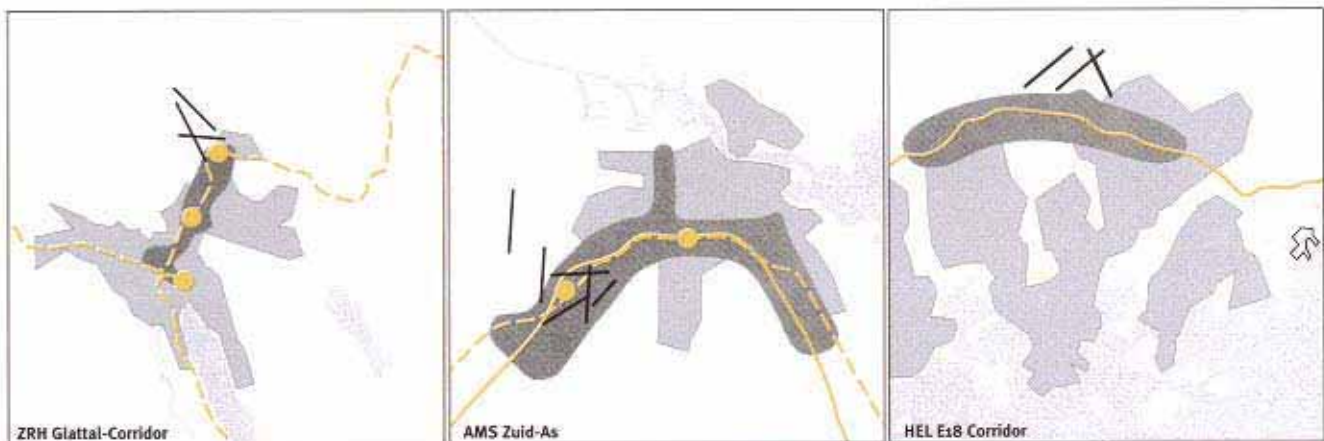
AIRPORTS START TO TRANSFORM THE METROPOLIS

peripheries; often, they at the same time aim at a better integration of the airport in the metropolitan area. An upgrading of these regional networks will enhance the 'decentralisation' of the metropolitan area.

The trend for concentration is particularly strong around airports. Some airports already employ the largest daily workforces of the region besides the main city (FRA: 62'000, AMS: 51'000), sometimes in more than 500 enterprises. The airport creates its own, major housing demand, which in some regions has become a serious issue for regional planning, due a shortage of developable land nearby. The bundle of networks coming together at the airport is also attractive for functions other than airport-related activities.
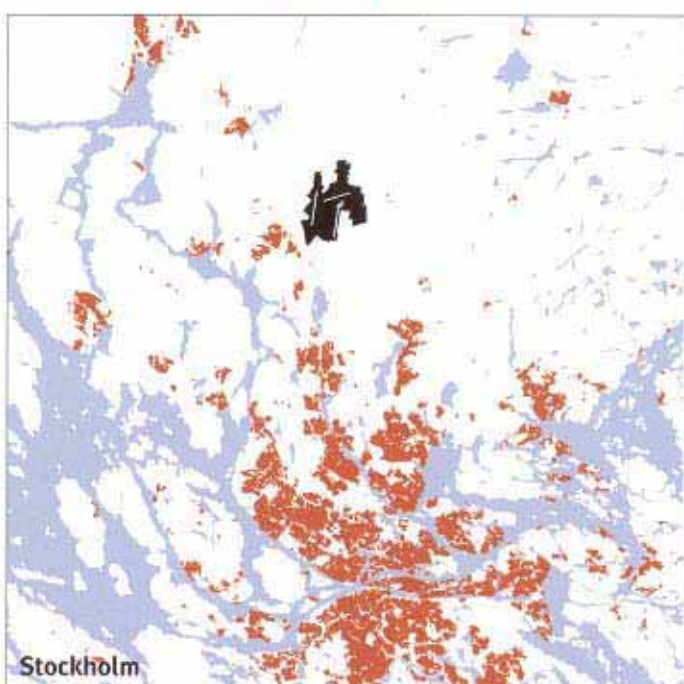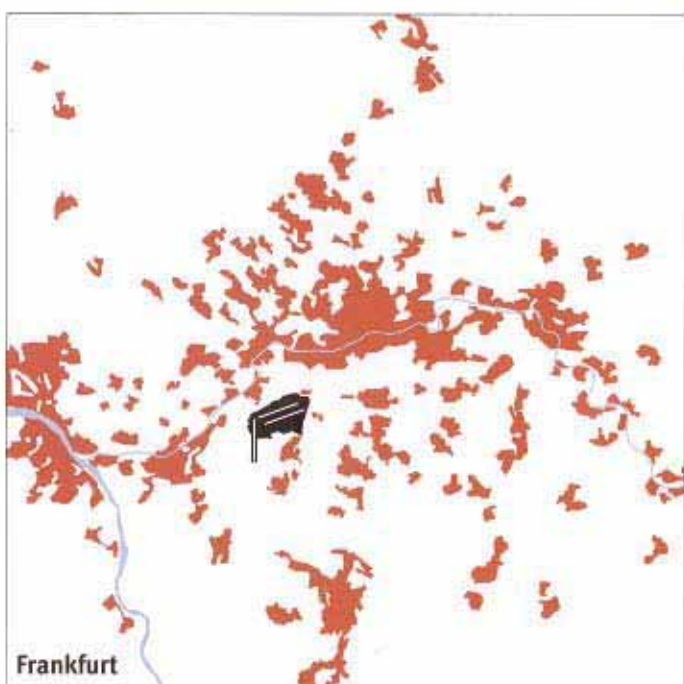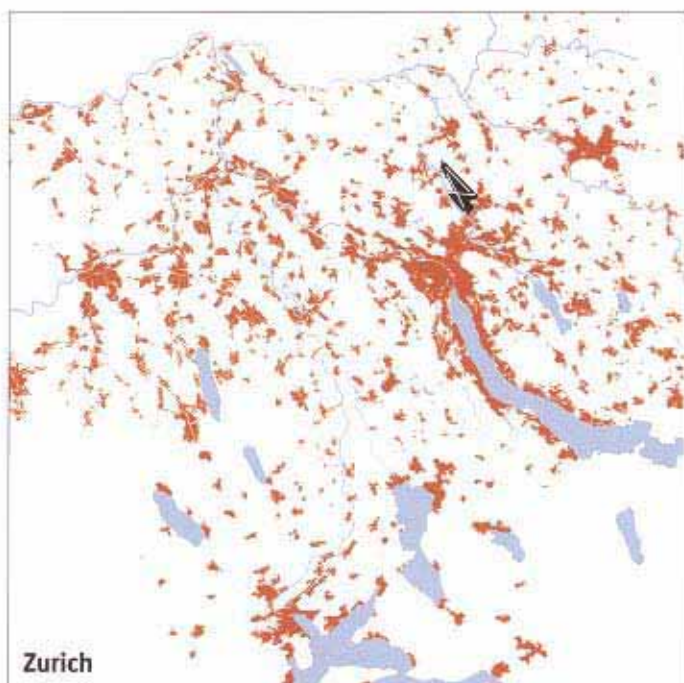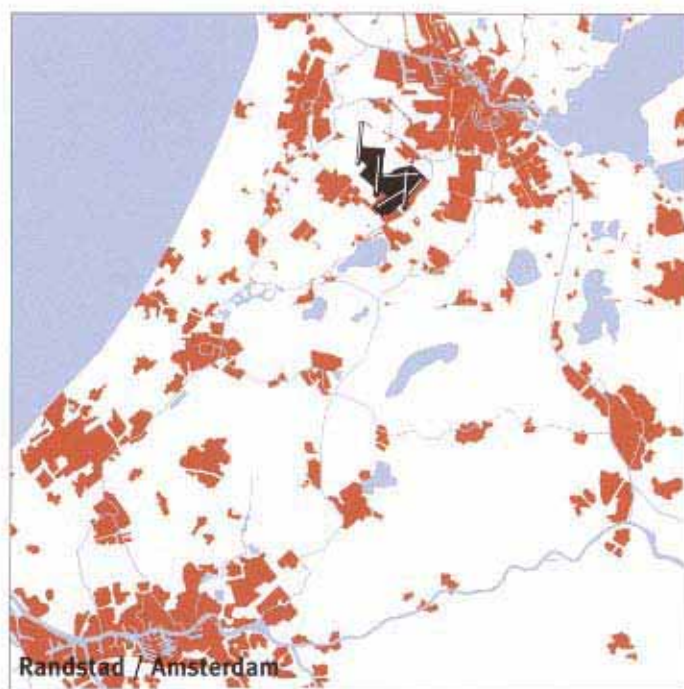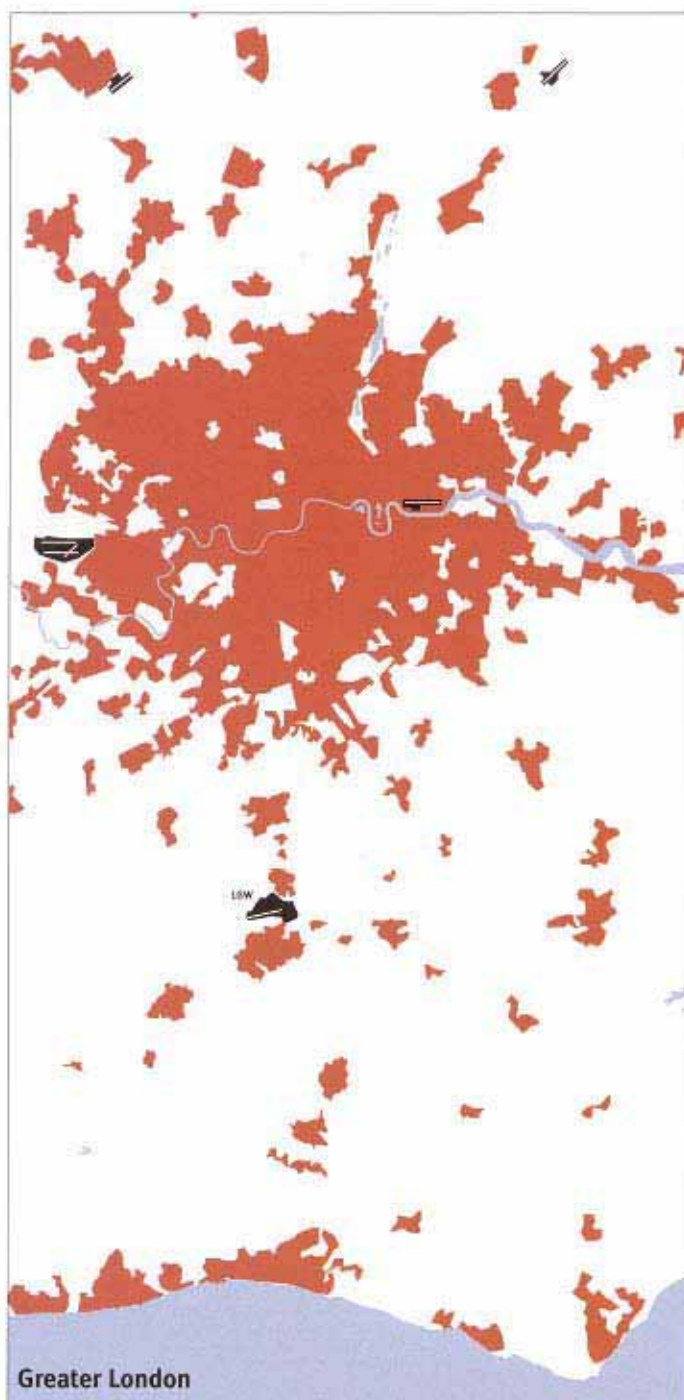As the most advanced examples of Airport City tend to become home to functions that were monopolised by cities, it is urgent to rethink the role of the airport as a development pole in the metropolitan region.
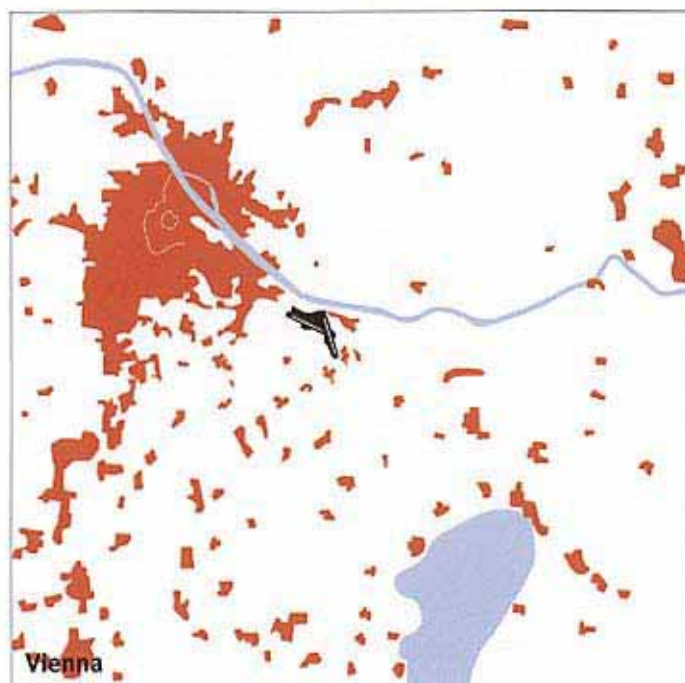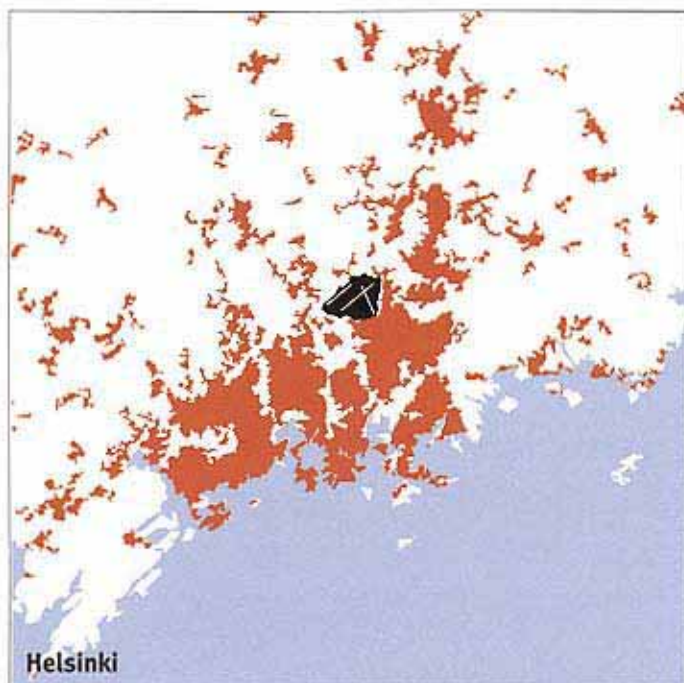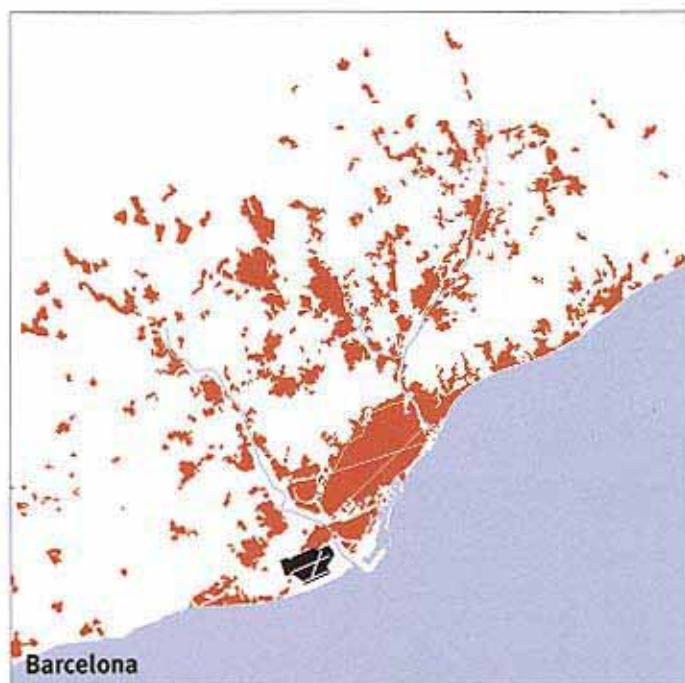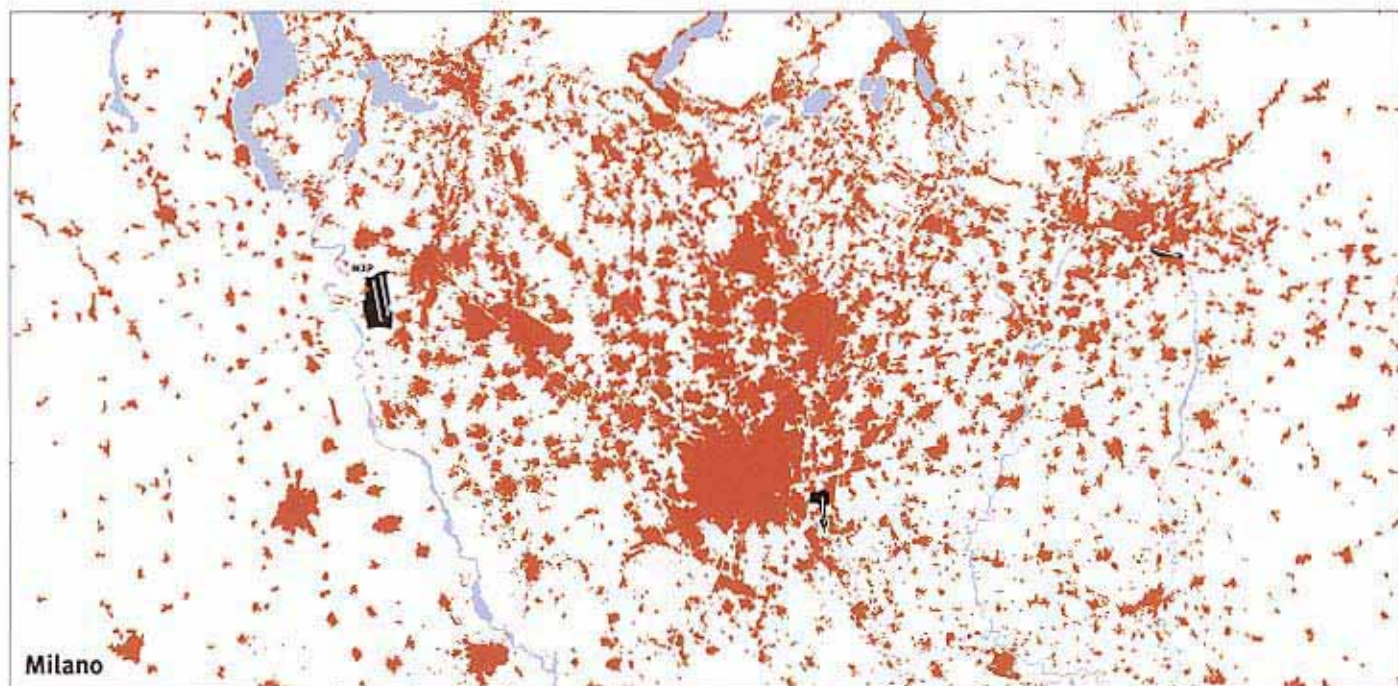
There is as yet no unanimous agreement on the content of an Airport City: it seems to have been a fast stunt, a branding concept by the airport operator aimed at a growing international airport market. This conflict has come to the foreground of the discussions in Amsterdam (Schiphol's 'AirportCity' concept) and Frankfurt.

Towards regional strategies

Most regions have set out strategies or specific economic initiatives to integrate the airport into the system of other existing regional centres. They go alongside major initiatives to improve the accessibility between the airport and these central metropolitan areas. Crucial questions hereby are: is airport development to be limited to functions vital for the operation of an airport? In case the airport and its immediate surroundings are to assume the role of an Airport City, what are the particularities of this new centre with respect to the other regional centres?

• **Zurich airport Centre Area:** the airport is part of one of the 5 main regional 'Centre Areas', declaring it a development hot-spot of the Canton of Zurich.

Frankfurt

Greater London

Randstad / Amsterdam

Zurich

Stockholm

Milano

Barcelona

Helsinki

Vienna

0   10km   50km

Development of these areas is to be stimulated due to their proximity to major public transportation nodes. The Airport Centre Area will include housing, recreation and autonomous economic growth just as much as airport-related activities and companies attracted by the airport. Backbone of the strategy are fast and frequent public transportation links between the main centre areas.

- The **city of Geneva** stresses strategies to distribute activities like research, high-tech production, logistics and business parks equally across the airport and the other existing poles, while guaranteeing very good connections with the airport itself.
- **Amsterdam's Zuid-As** is developed as one in a series of highly qualified poles on the city's territory. Inevitably, an Airport City on the airport platform is perceived as a threat to the ambitions to make the Zuid-As the international business location of the region. In the regional structure plan of the province of North Holland, Schiphol airport itself is therefore not to grow into an Airport City. This is a major contrast to the airport operator's own ambitions. According to the

regional and local authorities respectively. In addition, the development of a wider airport area exceeds the existing boundaries of land-use authorities, which makes new co-operation necessary. Co-ordination at the regional level would seem most natural, but is often still a least desirable solution for local authorities and private parties as well as the airport operator.

Space for manoeuvre

Airports were set up at or outside the border of the cities on greenfield sites - just like railway stations 100 years before them. Today, most airports are no more beyond, but enmeshed in the metropolitan area. Even literally remote airports like Gatwick, Arlanda and especially Malpensa have increasingly become incorporated in fast growing local urbanisations. However, in comparison with central districts of the City, the surroundings of the airport still offer the advantage of higher availability of land as well as a very high accessibility. As a consequence, there are many competing claims on the same territory: housing, business development, airport capacity, green areas.
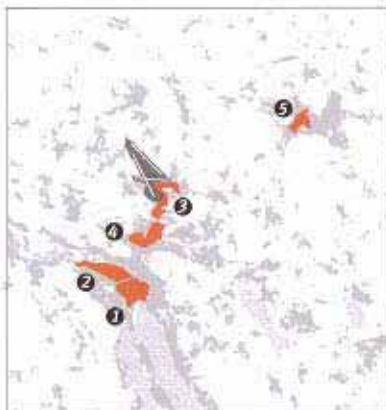
ZURICH CENTRE AREAS
1 Zurich Downtown and Central Station area
2 Zurich West Urban Redevelopment
3 Airport Centre Area
4 Zurich North Urban Redevelopment
5 Winterthur Urban Redevelopment

"ZURICH-AIRPORT AS A NEW REGIONAL CENTRE"
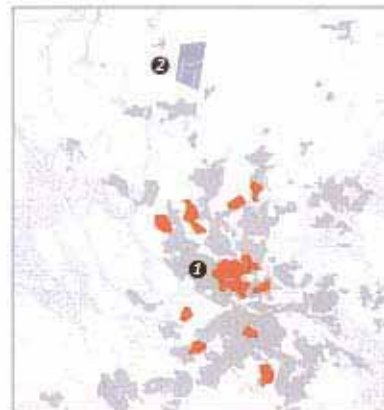
STOCKHOLM REGIONALPLAN 2030
1 Regional centres
2 Airport: "platform for heavy infrastructure"

"ARLANDA-AIRPORT AS AN INFRASTRUCTURAL PLATFORM"

province, the focus has to lie on the airport's hub function, a major asset for the other poles and their international allure.

- **At Gatwick airport,** the choice has been to explicitly not develop an Airport City at the airport. To achieve a regional balance, the airport's spin-off - which can be expected to be considerable at a 30 million passenger airport - is to be distributed thoughout a wider territory.

However, most of these regional strategies are only partially binding. In most cases, regional plans only have a character of guidelines and can stimulate investment.

At the basis of the strategies lies an efficient integration of land-use and mobility. But there is an inherent lack of correlation between transport planning and land-use strategies at a regional level. This is a result of strictly separated responsibilities in most planning systems: transport and land-use planning are split between

To safeguard airport operation and guarantee flexibility in airport development, three challenges have to be addressed. More air traffic means that an ever larger amount of territory will be affected by noise. The same territory is designated for or already occupied by local housing. Sites close to the airport are preferred development locations for all kinds of commercial activities. The same sites are valuable reserves for the future expansion of specifically airport-related activities and of the airport territory. Landside access to the airport can be prejudiced by an intensive urbanisation of its surroundings.

Several instruments have been developed to control, restrict and select further urban growth in the vicinity of the airport:

- **noise contours** (at all airports), which restrict housing construction, but allow for some economic development within these contours. The position and size of the noise contours not only depend on technical facts, but to a great extent also on political agreement. They are

currently the source of the fiercest disputes about airport development.

- **strategic sectors** to reserve sites for specific economic development around the airport (SADC, etc.).

Development does not always prevail. As the airport becomes increasingly enmeshed in the metropolitan area, 'no development zones' (no-go-zones) are a very successful tool to limit further urban growth towards the platform, and to guarantee the quality of the natural environment:

- **buffer zones** in Vienna and Amsterdam and strategic gaps in West Sussex around Gatwick, to limit urban development in the whole zone and to guarantee open green areas on the long-term inside the metropolitan area.
- **natural areas/parks** like the Danube- or Ticino-river parks, the green belt of London, the city-forests of Frankfurt.

An airport system for a metropolitan area: e.g. MXP

The biggest metropolitan areas of Europe, London and Paris, both have seen an airport system arise,

consequence, its integration into national and international rail networks is not strongly sought: the critical mass of passengers could be missing. The airport's integration into regional networks is likely to be less intensive too, and even the direct connections between the airports, to truly use them as a system, are unlikely to be realised. The experience in London shows that there is no real demand for improved landside connections between the airports.
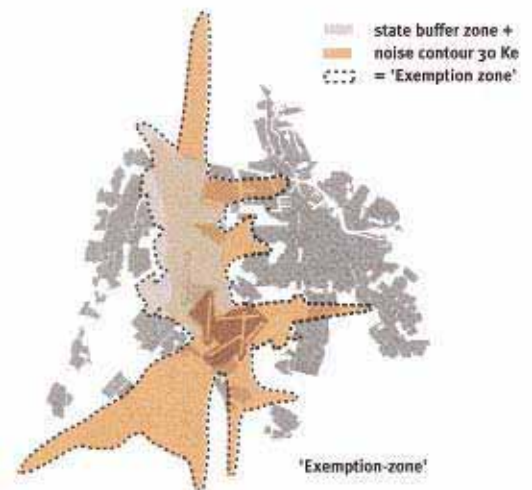

state buffer zone +
noise contour 30 Ke
= 'Exemption zone'

Amsterdam 1965   Amsterdam 2000   'Exemption-zone'

AS AIRPORTS GET ENMESHED...   ...SPACE OF MANOEUVRE NEEDS TO BE GUARANTEED

mainly, but not only, to cope with the demands for extra airport capacity.

The greater Milano area is now confronted with similar questions. Malpensa airport will sooner than expected face capacity constraints, as its surroundings already are very heavily urbanised. Maybe even more crucial, Malpensa lies at the western-most edge of the metropolitan area and the Lombardy region. Thus, it is not the obvious airport-choice for a large part of the greater Milan area and the eastern half of northern Italy. Therefore, studies are undertaken to evaluate the creation of a Milanese (Malpensa, Linate, Bergamo, Brescia) or even northern Italian airport system (Venezia, Bologna, Bergamo/Brescia, Malpensa), instead of a single major hub at Malpensa. Such a Milanese system shows surprising similarity to the geography of the London airport system.

For Malpensa, this means that it might not become a concentrated hub airport for Northern Italy. As a

HEL
ARN
AMS
LGW
FRA
ZRH
MXP VIE
BCN

2

the airport domain

Often, airports are perceived as entities with their own rules, their own dynamics, their own legitimacy, that are beyond the control of local and regional authorities. But a closer inspection reveals that the parameters have changed. Today, airports are far from being closed entities.

An analysis of the contemporary condition of an airport reveals the urgency to re-think airport planning. If the airport evolves into an Airport City, it should be planned as if it were a city, not just a runway, a terminal and a parking lot. If multimodal connections are built up to the regional hinterland, the terminal should be reconceived as a regional interchange, not just a departure hall. These two on-airport trends offer points of contact to hook up to where local and regional involvement becomes interesting and possible.

Airport City is a trend - from Barcelona to Helsinki,

Airport design was once a purely aeronautical matter. But as the concept of airport is adjusted and stretched beyond precedent - in terms of image, rules and development -, the landside becomes ever more determining and can have a major influence on the choices made. The different proposals for Barcelona airport, or the discussions about a new terminal model for Helsinki airport, show that airport planning cannot be considered a blank sheet - 'none of my business' - anymore. For the landside development, common strategies have to be sought by the airport and the surrounding territory (municipalities and the metropolitan area) together.

The airport domain has changed. The prime task remains to guarantee the efficiency of the core business of the airport (air traffic). However, the airport domain does not only consist of runways, but includes major real estate development, an Airport City, and an Interchange. To balance airside and landside, airports are forced to develop an overall masterplan (a total concept).

1930

AMS 1960
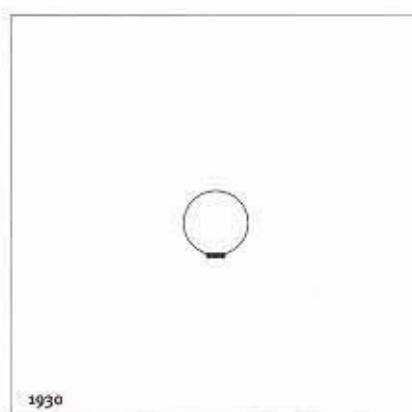
THE AIRPORT DOMAIN: FROM AIRFIELD...
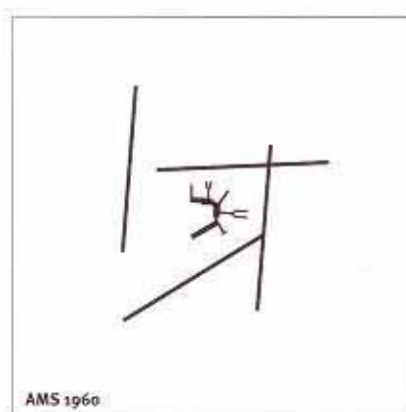
from Vienna to Amsterdam. In spite of clear indications of this trend, one is not yet sure how to design or conceive Airport Cities. Most plans for these 'cities' are still made by a transport operator, the airport authority.
Airport Cities are being built very fast - quasi proportionally to the increase in airplane movements and driven by the opportunities to cash on real estate development around airports, compensating for the enormous investments in airport infrastructure. If no measures are taken, this is likely to happen without the participation of the regional and local authorities. No one foresaw the success of airports in establishing a new identity, and planning authorities have been unable to invent and implement strategies at the speed demanded by air traffic evolution.

As airport operators pursue this new airport typology, the most disconcerting question for the region is: Is the kind of 'city' growing at the airport desirable for the metropolitan area?

Airports have a special status giving them a certain liberty in the operations on their territory. But as they leave the realm of a simple airport operator, to build an Airport City, questions regarding the limits to the airport domain arise: does the special status also apply to Airport City development? Who's responsibility should it be to design and to govern this 'city'? If an airport works as a city, does it require new organisational structures and new forms of collaboration (corporate structures rather than market forces)?

Local and regional authorities do not have much influence on the way airports are run, nor on air traffic growth in the long-term; but they have experience in spatial planning, precisely what is required for efficient integration of Airport Cities and Interchange Nodes in their context. To be able to participate in the making of a contemporary airport and in particular in Airport City development, as well as in the shaping of their wider impacts, it is urgent for local and regional

authorities to understand the development of an airport, including the spatial aspects of airside development as well as airport organisation: these are the considerations made by the airport operator, as he extends the range of his tasks.

As much as airports start to get involved beyond their own territory, regional authorities have to think about what happens within the airport territory. The airport perimeter ceases to be a boundary within which decisions are to be taken solely by the airport operator. When it comes to the renovation and expansion of the airside facilities, the surrounding authorities need to get involved. At the same time co-involvement of the airport operator beyond his territory will become ever more common, as not all elements of an airport (city) of the 21st century will find place within the limits of the 'technical area', and as real estate developments in the airport's surroundings are very attractive sources of additional income also for the airport operator. Any insistence on the original concept of airport - a planning enclave behind a fence - would

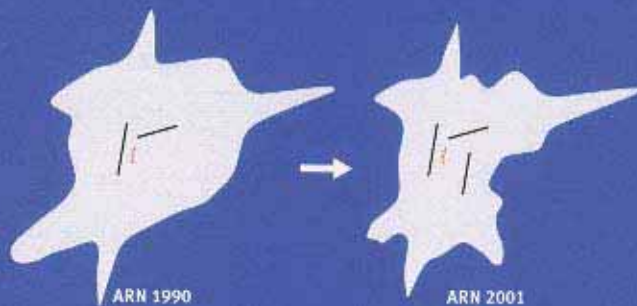HEL 2010

BCN future
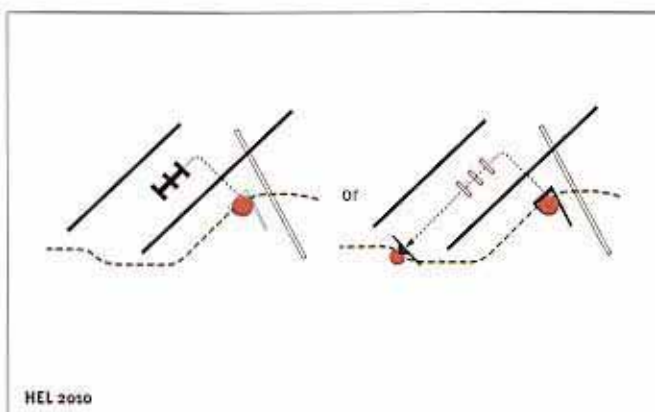
...TO AIRPORT CITY

inevitably lead to major tensions between operators and authorities, particularly in the cases where these questions are not dealt with carefully before the process of privatisation.
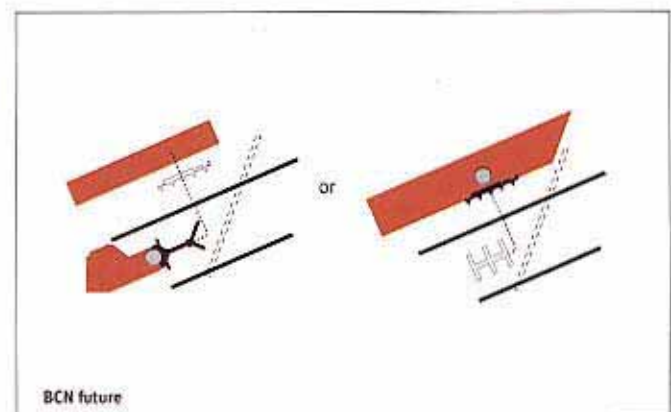
- Around 1930: an airfield.

- AMS 1960-2001: a classical example for an airport (of the 60s and 70s) with a central terminal around which runways have been set up for all possible wind directions.

- HEL after 2000: new parallel runways in principle allow for two terminal concepts: a new terminal between runways, or satellites between the 2 runways with the main terminal remaining in its present location. But terminal and railway station cannot be considered separately.

- BCN future: a terminal model can mean a different position of the railway-station and a different Airport City. This requires involvement of land-use and transportation authorities. Barcelona's design evolution shows the two extremes of contemporary European airport design: a highly efficient airport terminal system versus a new urban centre around an Airport Interchange.

intermezzo

The core sectors of the airport business are airline handling, passenger transport, freight transport and related commercial activities. Before we de-cipher the trends towards Airport Cities and Airport Interchanges, it is important to understand the decisions taken by airport authorities when it comes to the renovation and expansion of their existing airports, and some concepts about what in general has been proper airport design, the design of the airside.

ARN 1990   ARN 2001

AIRCRAFT GET LESS SENSITIVE TO SIDE-WINDS

Runway capacity

To accommodate ever more air traffic, airports need to be able to operate several runways simultaneously. As aircraft are getting less sensitive to cross wind, runways are nowadays preferably set up in parallel, which allows for the greatest number of slots (landings and take-offs). Due to turbulence behind landing and starting aircraft, the minimum distance between runways should best be no less than 1350m.

The preferred location for terminals is between the runways, allowing airplanes to easily access fingers or aprons, without having to taxi across the parallel runway. Yet, landside accessibility to this point can be more difficult (HEL), and space to accommodate other activities (car parking, hotels...) can be rather scarce.

One-Terminal (telescope)   Multi-Terminal

AMS   FRA

    ARN

Satellite   Modular

ZRH   CDG

HEL
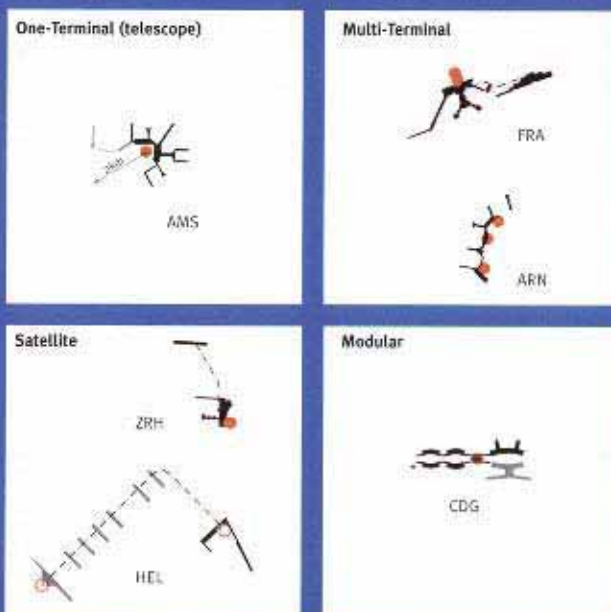
AS TERMINALS GROW, DISTANCES TO THE INTERCHANGE NODE GROW, TOO

Terminal capacity

The terminal capacity is in the first place determined by the length of the line of transition between airside and landside, and consequently the number of gates available at piers. The continuous need for more terminal capacity leads to spider-shaped, telescopic terminals (AMS, VIE), to the creation of multi-terminal systems (LGW, LHR, FRA, ARN, BCN), or to the creation of satellites connected to the main terminal by a people mover (often underground) (CDG, ZRH, MXP, future HEL).

The sheer size (or length) of the terminals of an airport of 20 million passengers per annum or more (4-7 piers!), makes it difficult to operate from one central core. Distances that need to be covered are too long, and therefore other internal accessibility concepts are required. Two basic principles appear: an internal people-mover (LGW, FRA, AMS (future), ZRH (future)) or more than one railway station (ARN (3), LHR (5), HEL (future) and MXP (future)). This concept appears especially valid for trains which explicitly serve the airport (Arlanda Express, Malpensa Express, Heathrow Express)


Iberia/
One World   Lufthansa/
Star Alliance

BCN   FRA

AIRLINE ALLIANCES DEMAND DEDICATED TERMINALS

Dedicated terminals

In the United States, main airlines have built their own terminals (e.g. JFK). Most European airports, on the other hand, feature terminals serving all airline companies simultaneously, as air traffic liberalisation nowadays encourages free access to terminals for all companies. However, airlines and particularly airline alliances start to demand dedicated terminals, in order to reduce connecting times for transfer passengers (part of the hub concept) and to improve passenger convenience. At Frankfurt airport, the new Terminal A has exclusively been developed for the Star Alliance, and was financed by Lufthansa and the airport together.

In principle, the continuous growth and reorganisation of terminal facilities would make dedicated terminals rather

ONCE...

...NOW
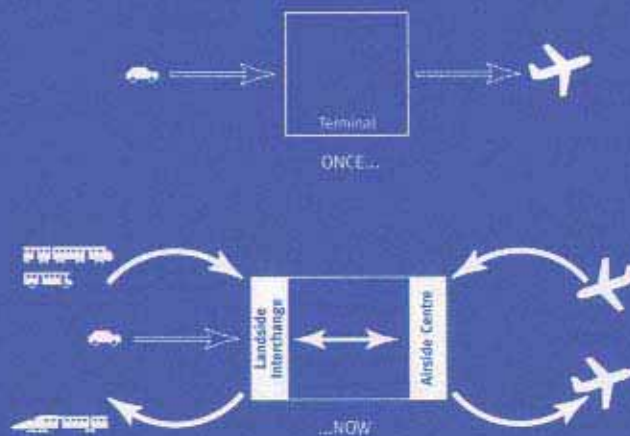
SCHIPHOL RAILWAY STATION IN THE CORE OF THE TERMINALS

THE NEW AIRSIDE CENTRE AT ZURICH AIRPORT

easy. Yet, split terminals make landside access to all terminals inefficient and often very complex. This, amongst other things, jeopardises the urge to exploit synergies between air traffic and High Speed Trains aimed at reducing connecting time for transfer passengers between the two.

New terminal buildings

The centre of airports used to be the departure hall - between parking lots and the apron area. Growing air traffic led to the growth of the departure hall, or eventually to the realisation of several departure halls, maybe even in split terminals.

The increasing integration in public transport networks with the consequent landside interchange development, and the growing percentage of transfer passengers on the airside, introduced a new trend in the transformation of existing terminals and the design of completely new terminals. Given the size of the terminals and therefore the long distances to be covered, terminal functions are decentralised. The central departure and arrival hall, where all transfer and check-in activities took place, is gradually replaced by a concept of two well-connected poles in the terminal area:

• the railway station: a multimodal Interchange

The railway station or multimodal Interchange, which also includes check-in facilities and baggage claim for air passengers, is a regional interface:

When railways started to serve airports, the station was usually set up as close as possible to the departure hall (short and fast ways for passengers). In certain cases, however, the arrival of the railway had a much stronger impact: it led to a reorganisation of the terminal, making the station hall the centre of the airport (AMS). This trend is picked up in many airports today. The station hall - or Interchange - becomes one of the core elements also for airside passenger operations: providing with check-in and baggage reclaim (FRA, ZRH). The interest of airport operators in a convenient and beautiful station grows.

• the Airside Centre

The Airside Centre, where distribution of passengers between the satellites, peripheral fingers, etc. takes place (typical for single-terminal concepts without dedicated terminals), is an internal interface for transfer passengers.

The growth of the airside into a big and often complex system, with various terminals or satellites, and sometimes the need of shuttles/people-movers to connect them, has led to the desire for a switchboard, a central unit, co-ordinating passenger movements through the airport, while itself being a common lounge. Airside Centres were and are introduced in a position that allows for short and efficient connections to all passenger areas, and particularly also to the Interchange, the other pole.

Both poles develop their own attraction for commercial and business activities. The railway station gains features of any major interchange node in the metropolitan area - as e.g. the Central Station -, which can lead to an accumulation of urban activities, particularly shopping. The Airside Centre, on the other hand, evolves as the core of shopping, restauration, leisure and lounges at the airport. The transition between the Interchange and the Airside Centre becomes most crucial, which has led to the development of internal transport systems connecting the two in Stansted, or direct and short walking connections in ZRH, ARN and FRA.

HEL
ARN
AMS
LGW
FRA
ZRH
MXP VIE
BCN

airport cities

3

The next airport renovation

Airports not only get bigger, they are also continuously being updated. Airports always changed very fast. They were constantly redesigned, runways were added and the terminal structures were adapted to provide with additional gates. The extraordinary leap of air traffic in the last decade has initiated a further renovation of the airport, but this time a more radical one than before. The latest generation of expansion plans is stimulated not only by the necessity to add asphalt or gates: it involves the landside layout at least as much as the airside facilities.

It is a self-evident necessity to reserve space for airside and operational activities - the core business of the airport - in order to provide flexibility for future expansion to the airport machinery itself. To handle steadily increasing volumes of cargo and passenger traffic, continuous enlargements of the airport-facilities (terminals, freight handling, maintenance, car parks, etc.) are required.

Three categories of activities can be distinguished at airports, with more or less direct relation to air traffic:

* **core business:** activities that are part of the technical operation of the airport, directly supporting the air traffic function. They are also called aviation activities.
* **airport-related or ancillary activities:** activities that have a direct relation to air-freight or air-passenger movements, e.g. logistic and distribution activities or hotels. They choose to locate at the airport or in its surroundings due to its (inter)national competitiveness.
* **airport-oriented activities:** they choose the airport or the airport region due to the image of the airport and of already established businesses, and its excellent (as related to other regional development sites) landside accessibility. The price of the land, not their relation to air traffic, will automatically determine which of these activities will be able to settle close to the airport.

THE AIRPORT CENTRE: ONCE A PARKING FIELD (**AMS** 1977)...

...NOW A VALUABLE RESOURCE FOR MORE PRESTIGIOUS ACTIVITIES (**AMS** 1998)

Upcoming with the new business strategies of the airport authorities there is a desire to provide locations close to the airport's centre to non-aviation activities that bring high revenues. Sites in the immediate vicinity of the Airport Interchange are the most attractive business locations. In addition, airport operators - just like port authorities - intend not only to handle freight, but to also get involved in logistic and light industrial activities adding value to the growing volumes of freight. Cargo Cities become increasingly appealing in this respect, and they sprout in the more remote corners of the airport territory. To exploit air freight seems especially attractive if there is an opportunity to combine it with other freight flows (sea-ports) or in conjunction with already established distribution-centres (the Aalsmeer flower fair in Amsterdam) or logistic terminals (Busto-Arsizio/Gallarate rail-terminals near Malpensa).

On the platform, an increasingly diverse mix of

The latter two types of activities can be subsumed under non-aviation activities. However, it is not possible to make clear-cut distinctions between the categories, and the affinity of the manifold activities to them is likely to shift; also, they differ from airport to airport according to air traffic types.
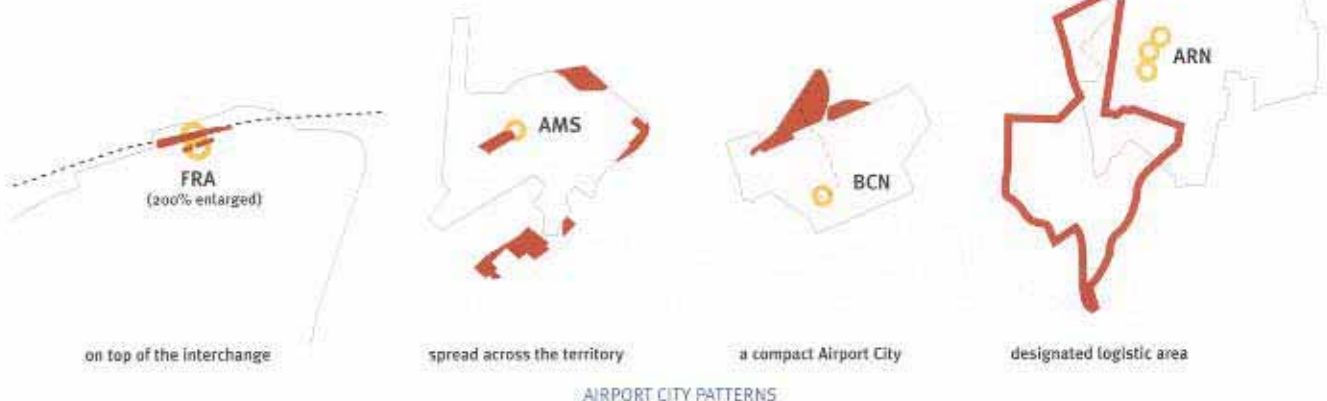
activities competes for space and privileged sites. The pressure on the airport site is high and the disposition of the space on the airport territory is on the move. Platform organisation becomes increasingly complex.

Further land acquisition to expand the airport perimeter is no longer a guaranteed solution. As the city grows towards the airport, the organisation of airside facilities (runways, terminals, freight-handling, maintenance, fuel-storage, etc.) has to deal with increasing constraints. The quality and capacity of the accesses is critical, and the impacts on the local/regional environment have to be limited.

We are left with a dilemma: particularly bigger airports located close to or within urbanised areas feel a high pressure on their land. They are forced to devise strategies to maintain space for manoeuvre, in order not to be suffocated by their own economic success in the long-term. Challenged to resolve the scarcity of land, airports are adopting new land-use strategies, which use the land more efficiently.

near the Interchange and thus close to the centre of the airport are becoming too valuable for parking and freight handling purposes. These activities are removed step by step from the core to make place for an expansion of the terminals and the realisation of non-aviation activities. For the land close to the terminals, prime-site prices are paid, comparable or superior to the best locations in the nearby city: 300 Euro/m2 for AMS and FRA. Not only is short-term parking being stacked on various levels, but even building on top of infrastructures and terminals is no longer the exception. The 170'000 m2 of commercial surfaces on a platform above the AirRail terminal in Frankfurt are probably the most extreme example of 'intensive land-use' at the moment. Until recently, such enormous pre-investments were only thinkable in downtown.

But not only the central locations of the airport platform are affected. Switching of positions starts to take place even at the periphery of the airport site. Schiphol for example plans its new business parks on earlier remote parking areas.

on top of the interchange · spread across the territory · a compact Airport City · designated logistic area

AIRPORT CITY PATTERNS

Switching of positions

Even though not part of the core business, some of the non-aviation activities have become essential to running a contemporary airport (income, added value). This challenges current hierarchies in the platform organisation. Demands of cargo handling, airplane maintenance, catering and parking facilities etc. are weighed against the demand for more hotels, logistic activities, conference and business facilities. A new distribution of activities on the platform seems inevitable.

The device is to creatively maximise the value of scarce land. At airports which know a rapid growth of air traffic and of non-aviation activities, this leads to a 'switching of positions' within the airport perimeter. A new balance has to be found between functions which need to be there and others which are willing to pay and therefore are profitable for the operator.

At Frankfurt, Schiphol, Vienna and Zurich airports - all relatively close to the city itself - the positions

Different patterns of Airport Cities:

on the platform (initiatives of the airport operator):
* on top of the Interchange (ARN: SkyCity, FRA: AirRail terminal)
* compact, concentrated (HEL, BCN, VIE, MXP)
* distributed across several sites of the platform (AMS, ARN, ZRH), occupying also remote corners

designated areas:
* areas for airport-related logistic and other business activities being developed in collaboration and partly outside the airport territory: Arlandastad (ARN), Schiphol Zone (AMS) or Aviapolis (HEL)

not present:
* in LGW, the regeneration of old industrial areas and of the town centre have priority; the airport spin-off is channelled into them.

FRA

LGW

ZRH

AMS

MXP

ARN

VIE (main alternatives)

E

C

HEL

BCN
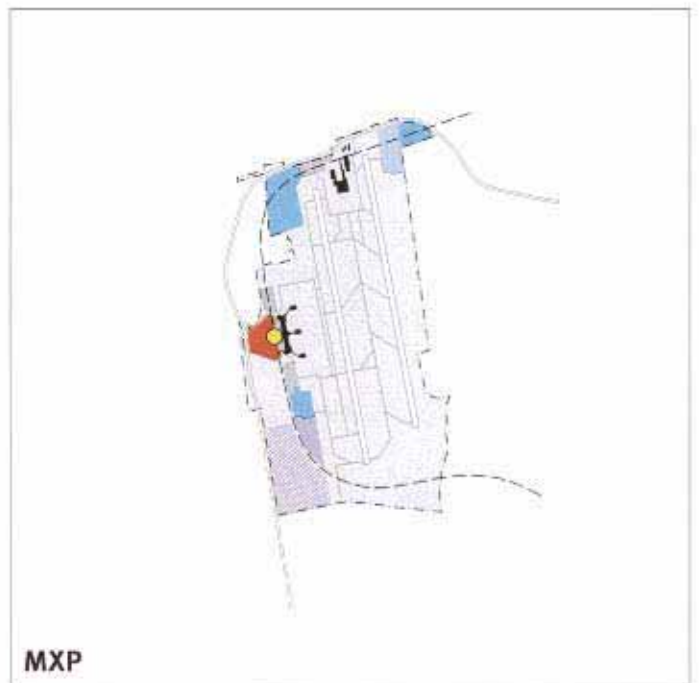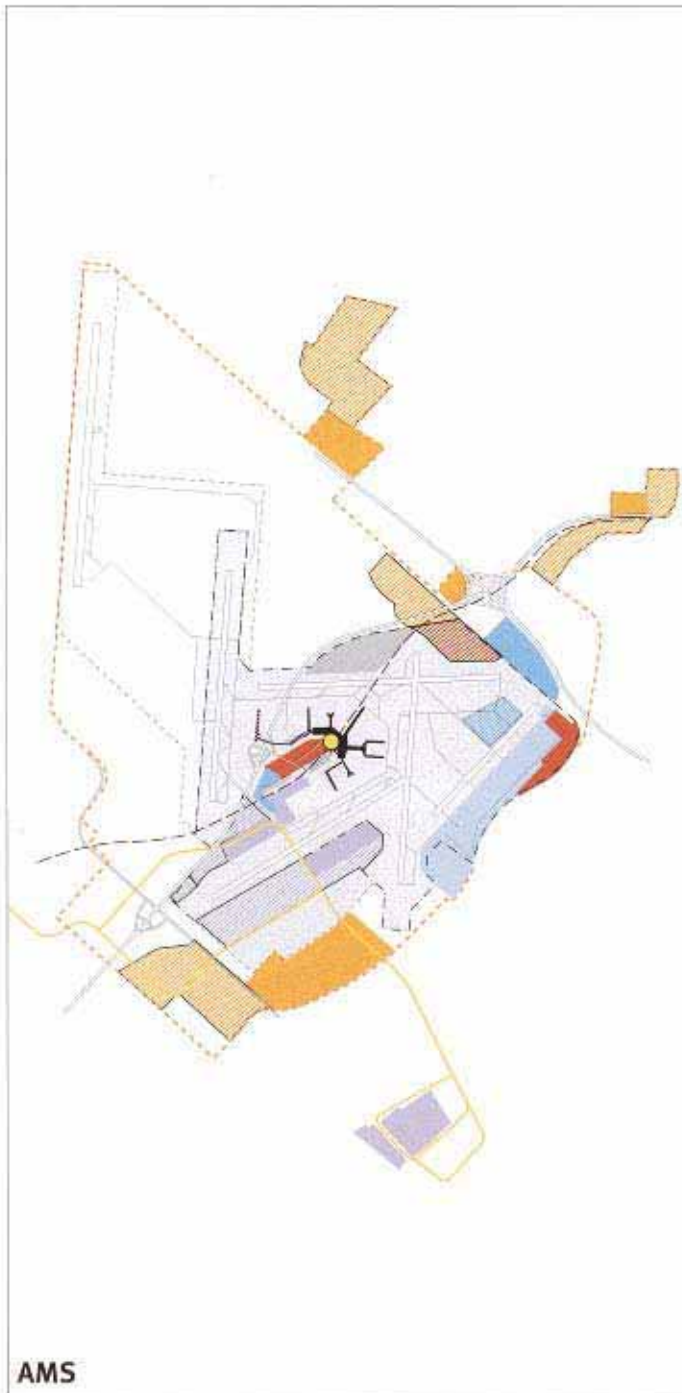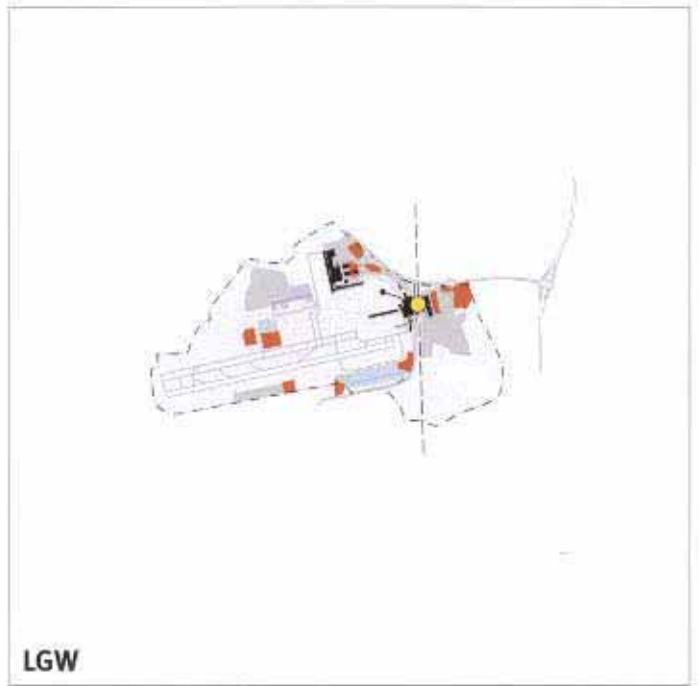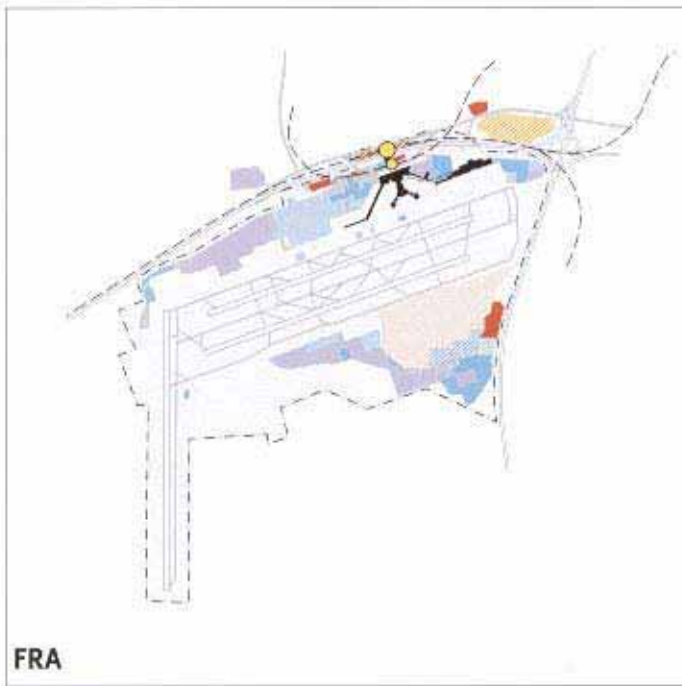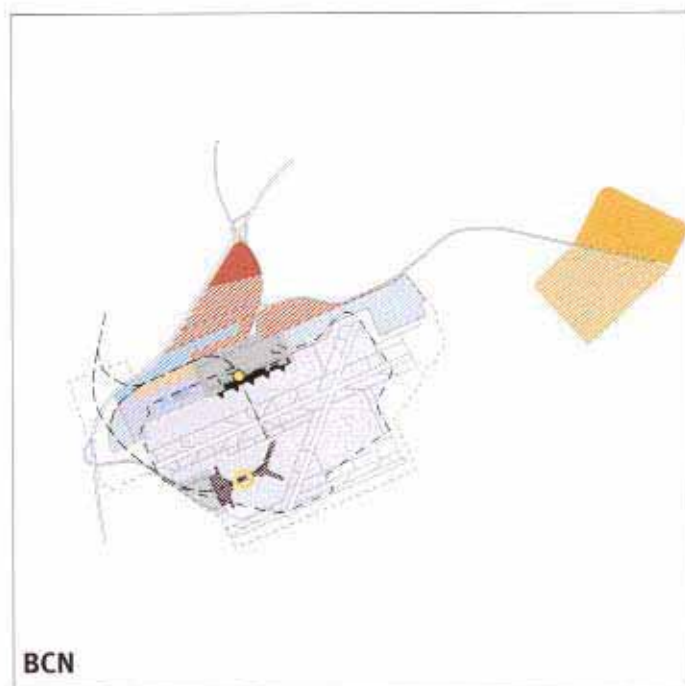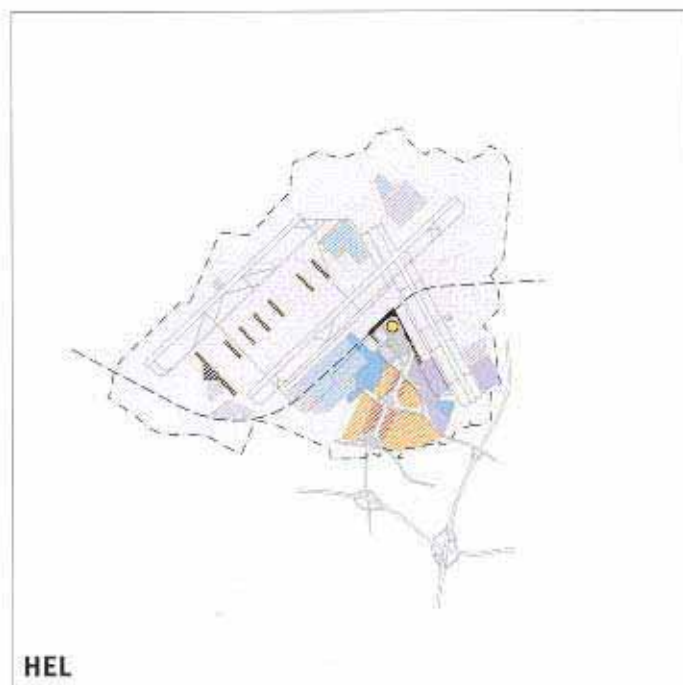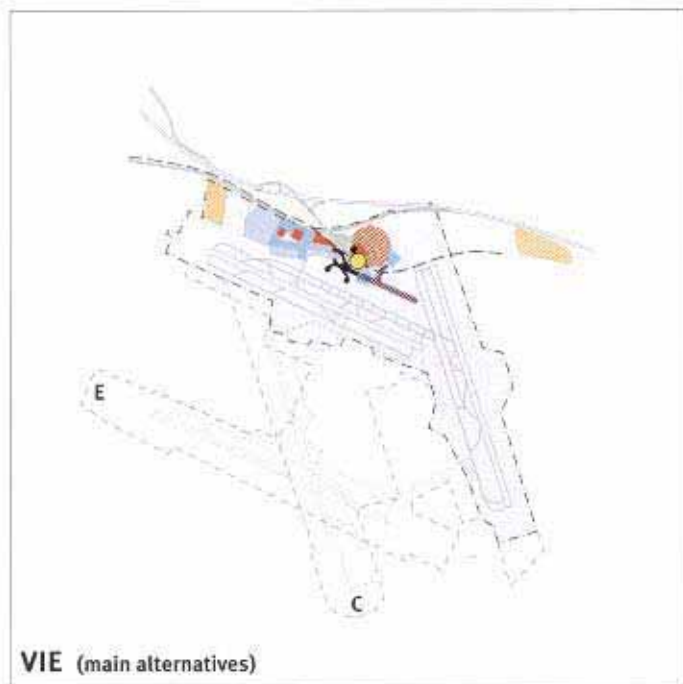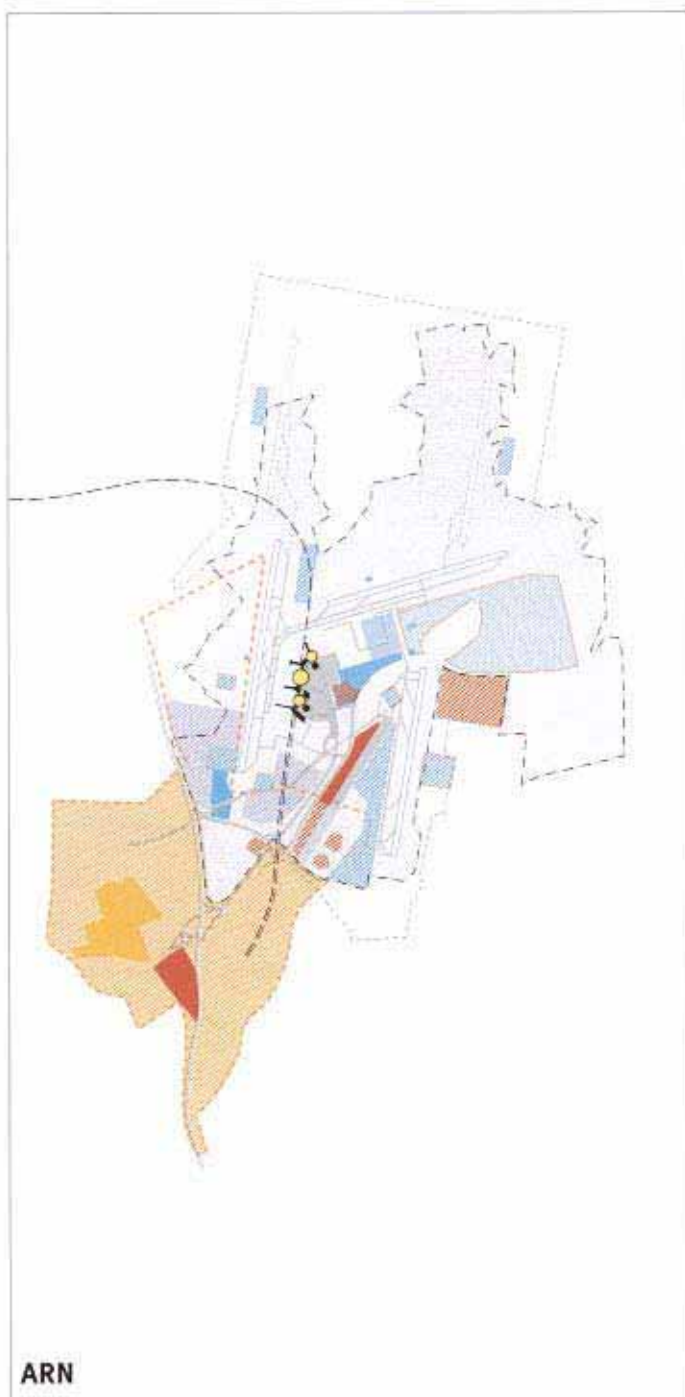
	Aircraft maintenance
	Airport support services
	Freight
	Terminal areas
	Tertiary activities
	Logistics
	Parking
	Reserve
	Airport Interchange node
	Airport Perimeter

0   5km   10km

HEL
ARN
AMS
LGW
FRA
ZRH
MXP VIE
BCN

The perimeter gets tight

There is no direct correlation between passenger numbers or tons of freight handled and the size of the airport platform. Gatwick, Nr. 5 in Europe, shows the smallest platform with 674 ha. Arlanda airport, medium-sized in terms of passenger numbers, is a giant with 3000 ha. The size of the platform does also not reveal the business orientation of airport operators - bigger does not mean more Airport City. Airport perimeters were not conceived to accommodate major landside developments, but in the first place to guarantee future capacity expansion.

Today only, the size of the perimeter starts to be measured against the elasticity required for the operation of an airport and the increasing ambitions to accommodate extra business and commercial development. However, switching of positions and the intensification of land-use on the platforms has, at many airports, become insufficient to guarantee capacity expansion and to accommodate the demand for more aviation

get control over more land for other, non-aviation activities. Often, however, as the growth of the airside capacity is already controversial enough, local authorities want to strictly limit expansion to operational activities only. At most airports, airport expansion for non-operational activities is heavily disputed. In order to free space in crucial positions on its platform, the airport is forced to come up with strategies that require collaboration with its neighbours.

The 9 airports apply different strategies to get land both to extend airport capacity and to provide operational flexibility while accommodating additional activities:

- **expansion** of the territory of the airport (ARN, BCN, HEL), in abundant quantities to not only provide new manoeuvrability and extra airside capacity, but also to include new sites for non-aviation activities within the perimeter. Due to legal mechanisms, co-ordination with the surrounding municipalities will not be necessary.
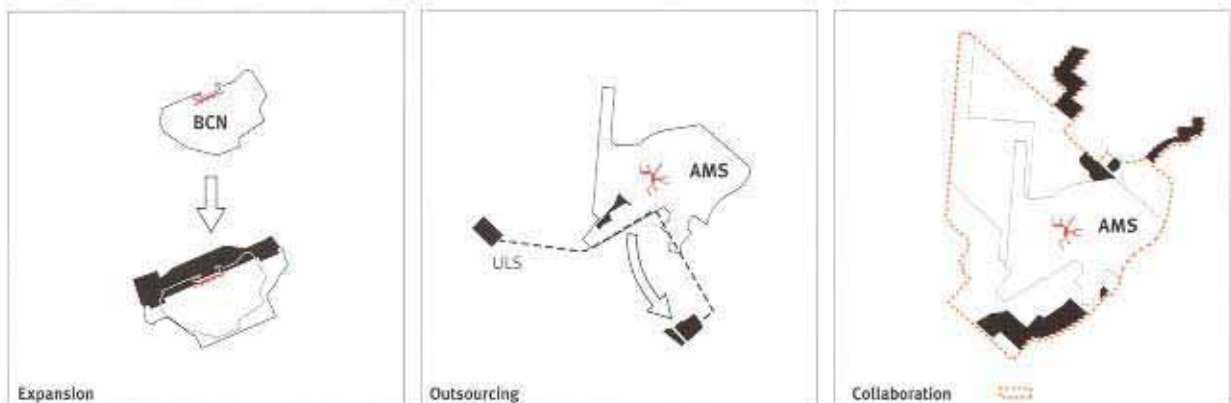
DIFFERENT STRATEGIES TO EXPAND (AIR- AND) LANDSIDE CAPACITY

facilities, and particularly also for other more profitable non-aviation programme. Around many airports with a strong growth of air traffic (aviation facilities and eventually new runways) and at the same time increasing ambitions for more business development, the airport perimeter gets tight.

In Zurich and Frankfurt, the narrow and peripheral terminal zones between the apron area and the airport boundaries (highways) are densely packed. Frankfurt has, due to its recent past as an US airbase, still abundant on-airport sites available for runways or commercial activities. In Zurich a new, wider perimeter is to provide new breath. It is in principle limited to airport infrastructure only, but clear restrictions have not yet been formulated, so that parts of the expanded area might be used also for non-aviation activities.
As airport growth requires capacity adaptations on the airside, with new operational facilities and eventually new runways, airport operators sometimes see this as a chance to simultaneously

In Barcelona, space for a typical Airport City was included in the expansion plans. In Arlanda, part of what earlier was 'Arlandastad territory' has been included in the perimeter expansion to allow the airport to develop business activities on its own. Helsinki airport profited from perimeter expansions to the North to free land for a future 'Aviapolis' in the southern part of its territory.

- **outsourcing** of core business activities from the centre of the platform to the immediate airport surroundings (AMS, ZRH). To allow for further expansion of the terminals, and for additional profitable businesses, some of the core business, like e.g. long-term parking, freight handling or catering, can be relocated to the surroundings of the platform, as long as they remain well connected to the core of the airport. This sometimes requires a major infrastructural effort: Schiphol connects future remote cargo areas way beyond its own territory, next to the worldwide operating flower fair, with an automated 5 km long underground logistic system

(ULS) to the platform and to a new air-rail service centre for freight.

- **collaboration** with local/regional authorities beyond the proper perimeter (AMS, LGW, FRA) to guarantee space for airport-related activities in the vicinity of the airport that are crucial to the success of the freight operation of an airport. In Frankfurt, the airport launched a joint venture with the Hoechst industrial company, to develop extra logistic activities on a former production site of the latter. Within the Schiphol Area Development Company (SADC), the airport and local/regional authorities co-operate in the development of specifically airport-related activities (mostly logistic activities) in the immediate vicinity of the airport. An internal ring-road provides direct access form all these sites to the platform (even though some are located at a considerable distance from the freight areas).

The growth of an Airport City might limit the performance of the airport itself. Even though

started. It is very difficult to get a hold on these developments, due to new and, at least in the short-term, more efficient dispositions of activities on the platform, and due to the necessity to safeguard optimal performance and elasticity of the core business of the airport.

The most challenging aspect of this development is the search for integration between the dynamics inherent to airport development and a long-term quality of the latter. It is as ambitious - if not more daring - as Central Station redevelopment. Airport planning is a step away from purely 'technical airport planning' towards including aspects of an urban design task and integrating all aspects of a contemporary airport, the benefits as well as the nuisances.

Airport planning has an established tradition of infrastructural planning focussed on airside and landside infrastructures, with the one exception of the architecture of the main terminal. Given the constant redesign of airports to cope with the growth in passenger and freight numbers, airport

ZRH   10km!   FRA   LGW
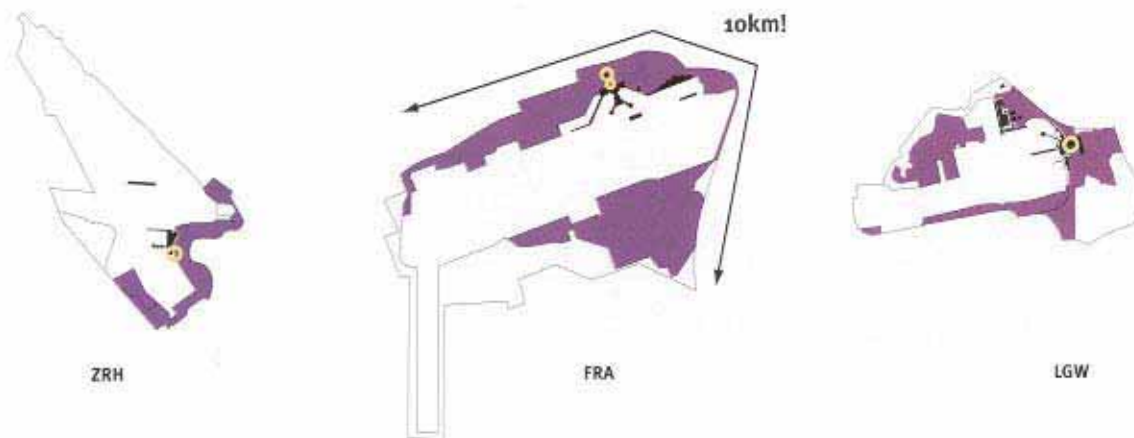
DISPERSE NON-OPERATIONAL AREAS MAKE ACCESS DIFFICULT

Airport City developments can often not be made responsible for traffic congestion on the national highway networks connecting to the airport - Airport City developments in AMS and HEL are said to cause only 3-4% extra traffic on external roads -, one aims at reducing the airports' dependence on singular access points to these networks that could become bottlenecks. The three highway exits to Helsinki airport, or the secondary road network in Frankfurt, forming a ring-road around the airport and linking it to Frankfurt city without using the main highway, are exemplary.

Towards an Urban Quality Management
An Airport City is constantly challenged by the pace of development and the permanent transformation of the airport infrastructure, as well as a series of runways sitting right at its centre. The airport reaches unseen levels of spatial complexity; not only in what concerns the endless renovation of its terminal buildings, but most of all on its entire territory, where a major reorganisation has just

planning has been a step by step planning which led to a patchwork-like airport layout on the landside. Due to the tight perimeter, within which ever more demands need to be satisfied, the airport platform becomes increasingly fragmented: FRA has set up facilities both to the North and to the South of the runways; AMS and LGW feature facilities all around the periphery of their perimeters. The lack of space often does not allow for a compact set up of facilities and Airport City; BCN is an exception due to its perimeter expansion and the simultaneous creation of an Airport City from scratch.

The fragmentation can be problematic not only for the co-ordination of activities on the platform, or for airport operation, but also to guarantee quality of the developments. This situation is even more unsatisfactory as airports in general and the new business activities in particular often are functions creating many workplaces. Landside accessibility to the Airport City is very high at the Interchange itself, but is far below 'urban' standards on the rest

HEL
ARN
AMS
LGW
FRA
ZRH
MXP VIE
BCN

of the territory, which often stretches over several km. It will therefore become ever more important to fine-tune the organisation of the Airport City with the accessibility to the different parts of the airport platform.

The current landside organisation of airports lacks quality in this respect and in terms of urban environment standards. Real estate development around airports tends to look all the same, industrial polygons and business parks without extra quality, that do not match the high ambitions of competing airport operators and airport regions. The concentration on road access has usually made landside grounds an inscrutable jumble of access roads and parking lots. The goal to overcome the merely functional set-up and to create a quality also for the surroundings is rarely met.

The image of the airport needs a face-lift if it is to be successful in offering a new airport product. Airport operators have started to apply

Unknown teamwork

To think and operate beyond the airport perimeter - in either direction - is terra incognita. Both airport operators and local authorities are unfamiliar with how to collaborate in the making of an Airport City. It demands levels of communication between local authorities and the airport operator, and planning approaches, that most airport and local planners have never encountered before.

Strategic land-use and real estate management on the airport have evolved as new tasks which are claimed by the airport operator, as they have become part of the management of his territory. Often, however, local and regional authorities question such a broad portfolio of activities, as soon as they clearly distinguish operational and non-operational activities for the platform. This is the case in HEL with the airport as a 'traffic zone', where responsibilities are not intermingling, as areas for non-operational activities fall back under

ARN'S DESIGN IS BASED ON THE EFFICIENCY OF TRAFFIC FLOWS
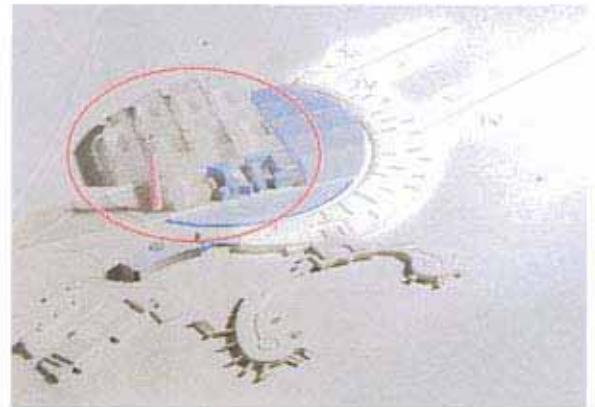
VIE TESTS URBAN DESIGN PLANS FOR ITS CENTRE

instruments of urban planning to their territory. VIE launched an urban design competition for the whole central airport area to transform it into a business city, AMS commissioned an overall green space concept for Schiphol Centrum, the core of its heavily marketed 'AirportCity'.

This face-lift and improvement of quality does not only need the airport operator's initiative. It is however still rare that local authorities get involved in establishing criteria for the quality of the Airport City developments. The efforts of the metropolitan area of Barcelona are an exception in this respect. The city has demanded accessibility by subway
to the entire airport platform according to the standards for other urban development sites - as a prerequisite for their agreement on the development of a yet to be built Airport City.

the planning authority of the municipality.

All the land-use mechanisms on and around the platform, switching of positions, intensification of land-use on the platform, platform expansion, outsourcing, and the collaboration on sites beyond the platform, make the organisation, functionality and connection of all airport-related areas and activities increasingly complex.
At the same time, the quality of the working environment in these areas, and their integration into the local context, becomes ever more important. Airport City is not limited to the airport, Airport City planning does not halt at the airport perimeter. It is a planning task that requires integration of operational flexibility for the airport infrastructure with the ambition to achieve a disposition within the perimeter and in the entire airport area which guarantees quality not only in the Airport City, but also for the surroundings.

It is likely that the most successful Airport Cities will be conceived by airport operators and local/regional authorities together. First approaches are visible in Barcelona and Helsinki Vantaa, while in Amsterdam and Malpensa authorities are struggling for mutually acceptable clear forms of co-operation.

THE AIRPORT IN VANTAA'S MASTERPLAN: THE NEW AVIAPOLIS (RED TRIANGLE) WILL BE TAKEN OUT OF THE 'TRAFFIC ZONE'.

HEL
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AMS
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FRA
ZRH
MXP VIE
BCN

multimodal interchange nodes and access to the airport city

The classic airport railway station has been developed as a satellite of the main city's Central Station, or eventually as a stop on a single railway-line. The new airport station, however, is much more than a simple station in regional/national railway networks. At the contemporary airport (and its Airport City), a multimodal interchange node evolves, offering connections between different modes of landside transport on nearly every scale.

The airport does not only provide transit from landside traffic to air traffic. Transfer between the different landside networks becomes ever more attractive, as the networks of High Speed Trains, national railways or coaches, and of local and regional public transportation converge at the airport. These opportunities have made the airport the second main railway station of the regions in Zurich, Amsterdam and Frankfurt. Furthermore,
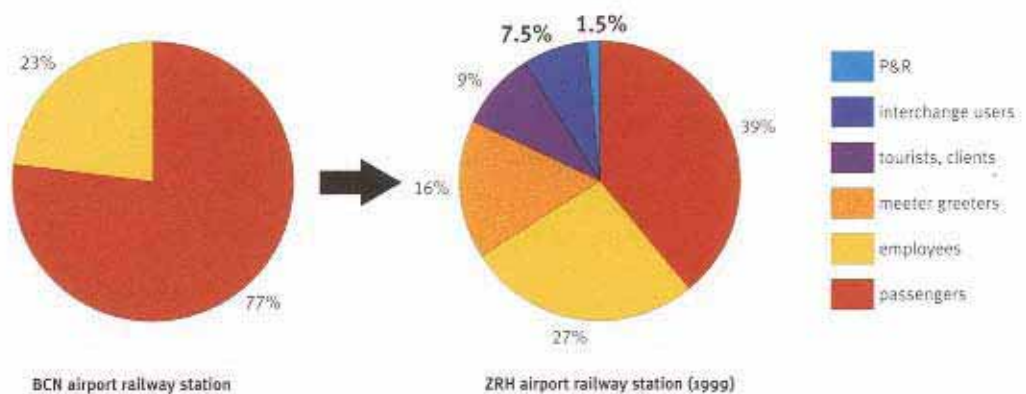
Sometimes, like in ARN or in ZRH, the adverse environmental impacts of air traffic and airport-related road traffic are together subject to a common maximum pollution limit. Such tools have proven to be most effective in stimulating new public transportation initiatives.

A wider concept of accessibility
Landside traffic at airports shows more diversified demand patterns, as it has to serve a larger variety of people that are not all directly related to air traffic:

- **air passengers**
- **transfer passengers** between High Speed Trains and air
- **airport employees**
- **short time users** of the airport and of the Airport City (visitors, tourists, clients, meeter-greeters)
- **general commuters** or travellers making use of the regional landside interchange node.

More than 50% of the traffic movements from and to

BCN airport railway station

ZRH airport railway station (1999)

P&R
interchange users
tourists, clients
meeter greeters
employees
passengers

LANDSIDE TRAFFIC AT AIRPORTS IS NOT JUST AIR-PASSENGERS

transfer between air traffic and long-distance High Speed Trains that connect to other major population centres is urgent to free airspace at overcrowded airports (substitution).
To achieve integration of all means of transport, it is no longer sufficient to connect each mode well to the air terminals. Major efforts have to be undertaken to establish direct convenient connections between all landside modes, to stimulate the use of the airport station also for non air traffic purposes.

An improved accessibility and the Interchange are not self-motivated goals and self-generated necessities. As the airport grows, public transportation moves to the foreground of discussions. Due to road congestion and the major environmental impact of car traffic, ever more road traffic will have to be substituted. Due to air congestion above major European airports and the environmental impact of air traffic, ever more flight movements will have to be substituted.

the airport are not generated by air passengers. While the share of public transportation of the passenger segment is rising (and often already more or less satisfactory) at most airports, the share of employees and visitors is usually 10-20% lower. To improve their share, local and regional transportation facilities, which better integrate the airport and Airport City into the metropolitan area, are given top priority. A regional interchange function of the airport could mean more passengers on the trains, which in turn means that more services become feasible - an improvement especially with respect to the problematic segments.

All nine airports feature radically different schemes of landside accessibility: Helsinki is a bus terminal, Malpensa a shuttle-train stop, Zurich a regional hub, Frankfurt also a deviation in an ICE line. A comparison of such different conditions inevitably requires a certain degree of abstraction. However different the specific cases, it becomes evident that the common understanding of landside access to

airports does not suffice anymore. The facilitation of the traffic flows from and to the airport remains the core task.

But with the integration into High Speed Train networks, the upcoming interchange quality of the airport and the growth of Airport Cities, new challenges appear:

- What will the respective role of the airport station be in relation to the Central Station of the main city?
- Could an Airport Interchange not be a welcome tool to improve interconnection of existing regional networks?
- How can an ever larger community of airport employees, spread out over an ever larger airport territory, be served with public transportation services of urban standards?

Access to the Airport City

Airports that grow beyond 20 million passengers become major regional centres of workforce with long work-cycles (often 24 hour service economies). They feature between 500 (BCN) and 1400 (AMS)

whole airport platform that covers several square kilometres of territory. The access quality on the rest of the platform is limited as compared to the standards of development sites downtown. To guarantee an 'urban' access quality in the whole Airport City, regional authorities (sometimes in collaboration with the airport operator) have launched new regional public transportation lines, in a way as to provide several stops on the airport territory and in the adjacent business parks: the Zuid-Tangent Amsterdam (4 stops on airport territory, and another 3 on the Beukenhorst business park south of the airport), Linea 9 Barcelona (6 stops foreseen on two subway lines), Stadtbahn Glattal Zurich (6 stops).

The airport operators themselves recognise the urgency to provide alternatives to car-use to the platform employees. Freight handling, maintenance, catering, business parks, logistic centres and remote parking are so dispersed on their territory that efficient internal means of transport have to be developed to keep the whole Airport product

Schiphol Sternet   Barcelona   Gatwick Direct   Zurich
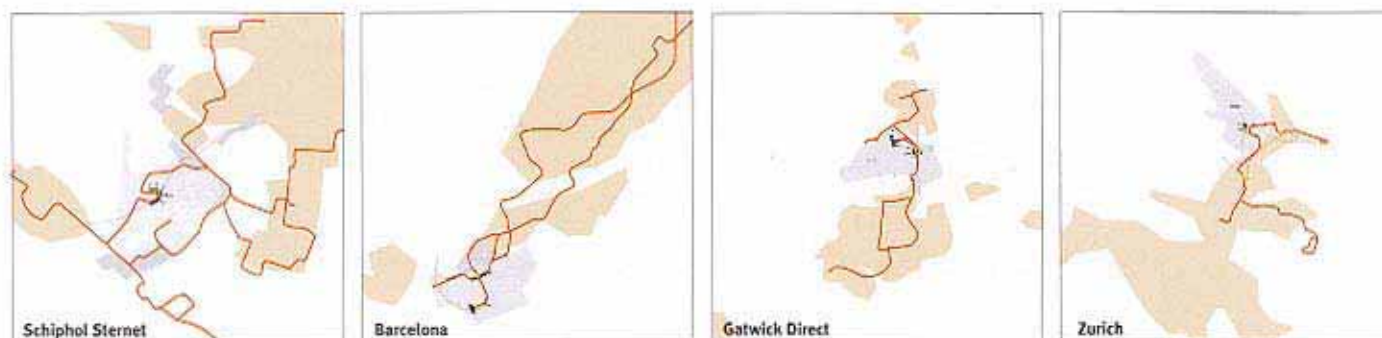
PUBLIC TRANSPORTATION INITIATIVES TO LINK TO THE METROPOLITAN AREA: AIRPORT-FOCUSED SERVICES AND METROPOLITAN NETWORKS

workplaces per million passengers per annum. At big airports and home-bases of air carriers, the improvement of productivity of operations decreases the ratio employees/passengers considerably (AMS had 2200 employees/million pasengers in 1990), but is partly compensated by new on-airport business development: in absolute numbers, the amount of employees continues to grow. Smaller airports like Barcelona, with few additional facilities, and being no home-base, are expected to reach 1000 employees/million passengers with the planned airport expansion and the making of a completely new Airport City. This levelling is to be attributed to the increasing share - in extreme cases already a majority - of employees in the Airport City not working for airport authority and air carriers.

The sheer size of airports in employee numbers challenges local and regional authorities to develop new criteria for the integration of the airport into the metropolitan area. The airport station can only provide top access for a very limited part of the

operable. Furthermore, airports are under increasing pressure to consider all possible measures to be environmentally friendlier. As all major airport investments to expand capacity have to undergo environmental impact assessment, an improved local integration into public transportation networks is a good compensation.

Usually, such services would have been provided by the public authorities. But particularly airport operators with an entrepreneurial business orientation - operators like BAA or Schiphol Group, who are experienced with integral airport development concepts - have launched their own local transportation services for their commuters and workforce. A high access quality is also one of the crucial assets for the development of Airport Cities. Together with local and regional authorities, airport operators participate in setting up and running bus services within a reach of some 10 km, a radius within which many employees are recruited. The BAA service 'Gatwick Direct' and Schiphol

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ZRH
MXP VIE
BCN

Group's 'Sternet' link all airport sites to the airport station and to the urban centres nearby the airport, making the airport the focal point of a whole new transport system locally or eventually even regionally.

In other cases, possibilities to extend on-airport transport systems (people movers or similar systems) are being studied. Frankfurt evaluates an elongation of its SkyLine people mover system, and Arlanda studies a people-mover system between the terminal area, the future on-airport business park some 2 km to the South, and eventually even Arlandastad and Märsta, with their so-called SkyCab.

A platform-focused versus a regional approach
Under pressure to efficiently use all left-over areas of their tight territory, airport operators tend to favour a 'platform-focused' approach to allocate additional non-aviation activities. Hereby even peripheral areas of the airport platform, which are as yet poorly accessible except by car or by an airport shuttle-bus, are promoted as potential business parks or sites for own staff (the Lufthansa headquarters in Frankfurt, some 1.5 km west of the

however, require collaboration of the airport operator with the municipalities across the boundaries of their respective territories. The advantage of these sites is their superior access quality as compared to remote airport sites. Such integral development concepts still have to overcome major obstacles, for example how airport operators can raise real estate income outside their own territory (as is being discussed in AMS). Vienna has made first attempts with its Airport Business Park.

Due to the controversial reactions of local authorities to recent business plans of airport operators on their own platforms in Schiphol, Frankfurt and Zurich, first agreements for co-ordinated off-airport development there seem just a matter of time.

A second international railway station: 'dipole' concept
The High Speed Train (HST) is expected to relieve the overcrowded air-space, and to provide relative advantages (as compared to air traffic) in time and comfort on shorter distances between European cities (not the Scandinavian regions).
The airports of Frankfurt, Barcelona and Amsterdam
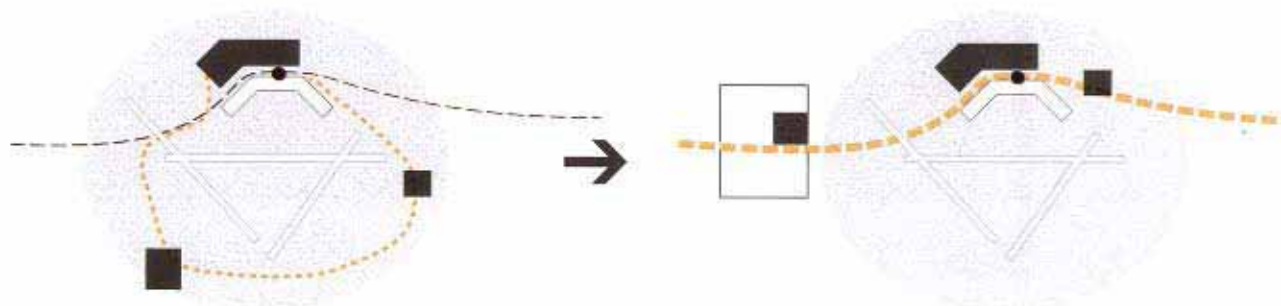
AIRPORT OPERATORS FAVOUR A 'PLATFORM-FOCUSED' APPROACH ...   ...BUT BETTER ACCESS ELSEWHERE ENCOURAGES A 'REGIONAL' APPROACH

station, the Schiphol business parks some 3, respectively 5 km north of the station, to name but few examples). These projects profit from the fact that they do not require co-ordination with the surrounding municipalities - but at the same time they form a potential source of new conflicts about development opportunities and accessibility.

Often, these sites are also less accessible than potential development sites in the airport surroundings, which raises the question whether strategies for common site development outside the airport territory should not be considered more often an alternative to developing remote airport sites.

The regional public transportation initiatives around airports form the basis for and support a more 'regional' approach to airport development. It would make use of the fact that there will soon be opportunities for very well accessible sites not only on the airport territory itself but also in its immediate surroundings. Such an approach would,

consider the integration into the HST network a crucial factor to improve the competitiveness of their airports (enlarging the catchment area) and to provide an alternative to European air traffic for hub airports. The substitution of short-haul flights is expected to free up to 15% of the airport capacity for additional long-haul flights (AMS: 5 million passengers by 2005, FRA: 5% of the slot-capacity and, to compare, CDG: 7.5 million passengers by 2000). But the integration 'air-rail' has not yet been achieved. DB and Lufthansa have plans for joint air-rail services, and SNCF and Air France too, which will require co-ordination of the services of both transport systems: integrated ticketing and streamlined flight and train schedules. The latter seems the most demanding task, since the frequency of High Speed Train services would have to be fine-tuned to the series of waves that are typical for the flight-plans of major hubs.

Another aspect of the HST integration of the airport is not less interesting. In airport regions, High Speed

Trains usually call twice: at the airport and at the Central Station. As these stations are rather close to each other, the question arises whether it is possible to have two 'central stations' within one metropolitan area.

The airport has become a major public transport node very recently and is very well accessible by road. At the same time Central Railway Stations have come to a halt with their capacity to accommodate extra train-connections. In order to balance the role of the two stations and to guarantee interconnection of the HST network with the regional public transportation networks, concepts for this 'dipole' are being elaborated, attributing different roles to the two stations. In principle, two choices can be distinguished. In Frankfurt and Barcelona, the airport will remain only a High Speed Train stop. In Amsterdam, the airport is also a second (inter)national interchange between HST services and local/regional networks.

In Frankfurt, the respective roles of the two stations were subject of an extensive study of how to integrate HST networks with regional public

FRANKFURT: ONE REGION - TWO HST STATIONS

transportation. Frankfurt Central Station, the main node in regional networks, had to stay the major interchange point from High Speed Trains to regional trains. For this purpose, which exceeds its current capacity, it has to undergo a major reconstruction with new underground through tracks for the ICE. In Amsterdam, on the other hand, the presence of the airport and the future HST link will lead to a reorganisation of the city's territory and its networks. A 15 minute detour around the city to reach Central Station, and a lack of capacity there, led to the choice to have the ICE and TGV stop in a new southern station on the Zuid-As, with optimal connections to local and urban public transportation. This station is supposed to make Amsterdam's former periphery truly the new international centre of the Netherlands. The old Central Station will remain the most important regional interchange node.

With the connection to the HST network, major international airports expand their function as

international gateways to the region. As the HST system will become a large-scale 'metro-network' of the club of Euro-regions, its stations gain a new centrality also within the metropolitan region. This enhances the urge to refine the connections between the city and the airport, as well as between the airport and other development locations (public transport and road). Otherwise (see Amsterdam) the airport location might prevail in terms of its international access quality and the availability of developable land, thus offering more attractive investment conditions, which can lead to conflicts between the airport operator and the surrounding local authorities. In Zurich, the major redevelopment of Central Station will be linked several times an hour in less than 10 minutes to the airport. This could make the Central Station very interesting also for Airport City functions - the airport virtually as a city-airport.

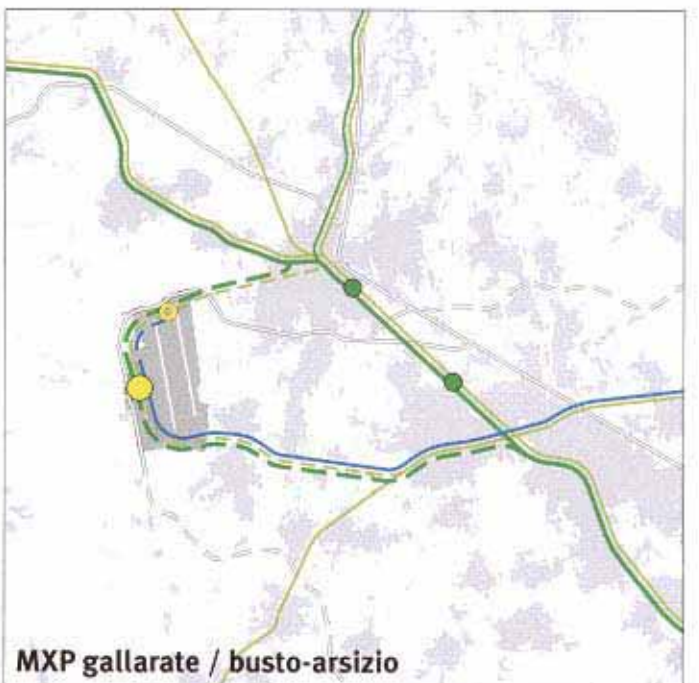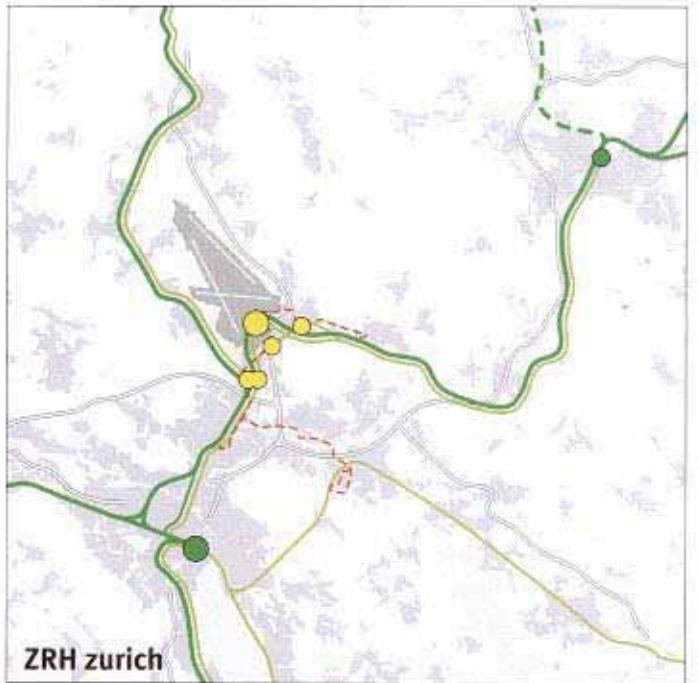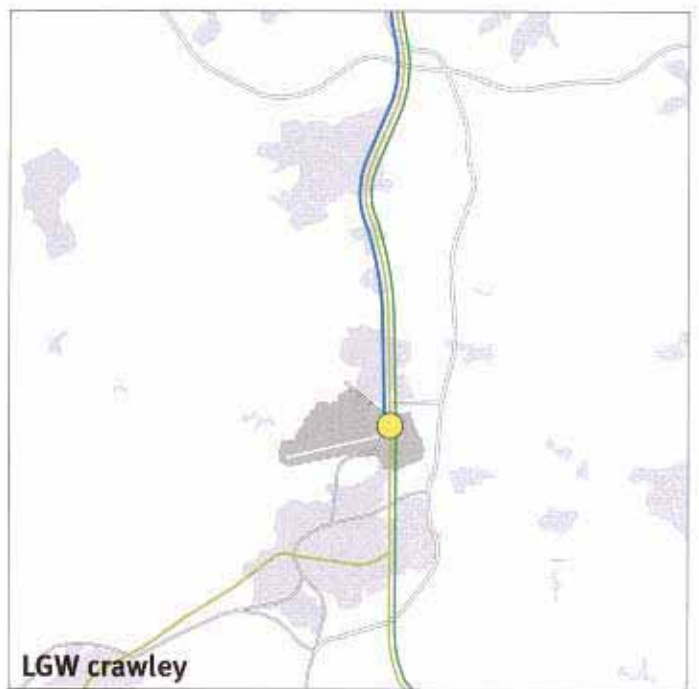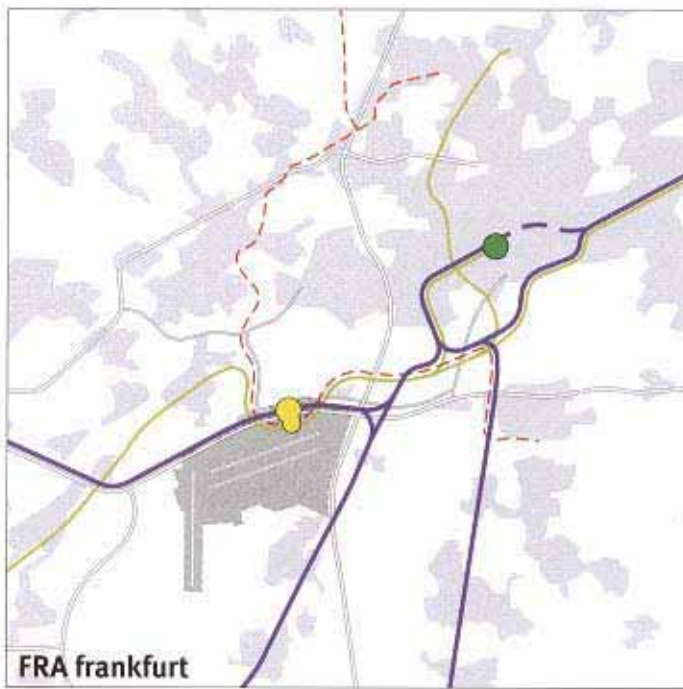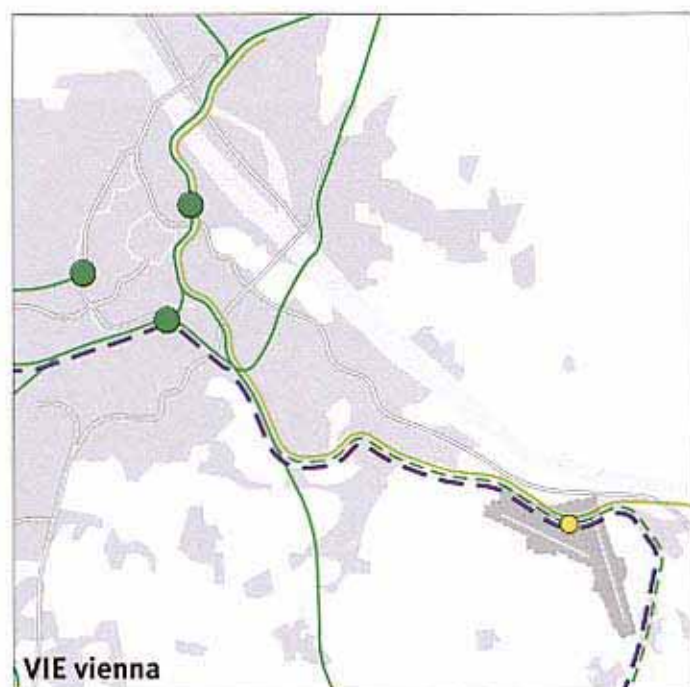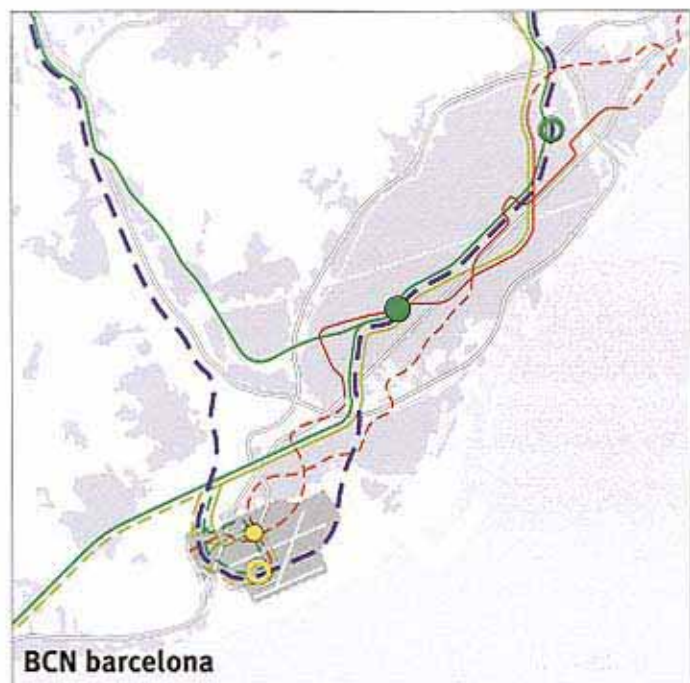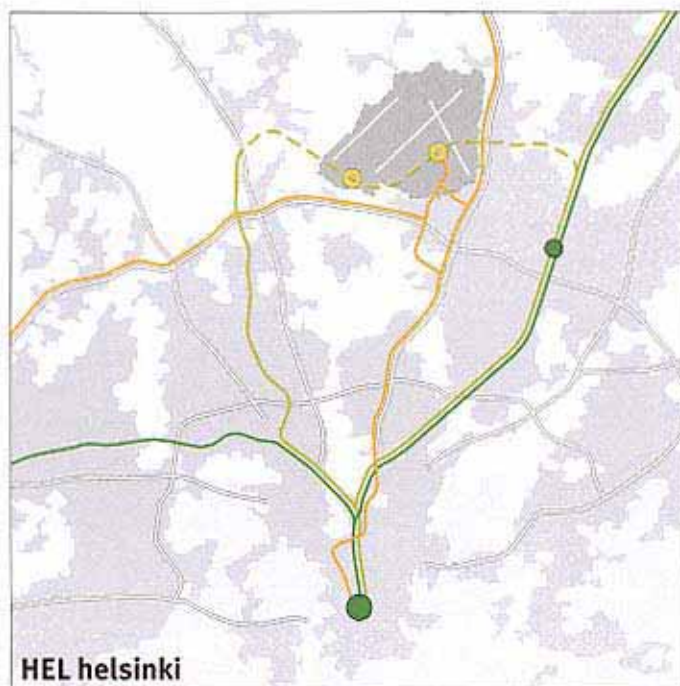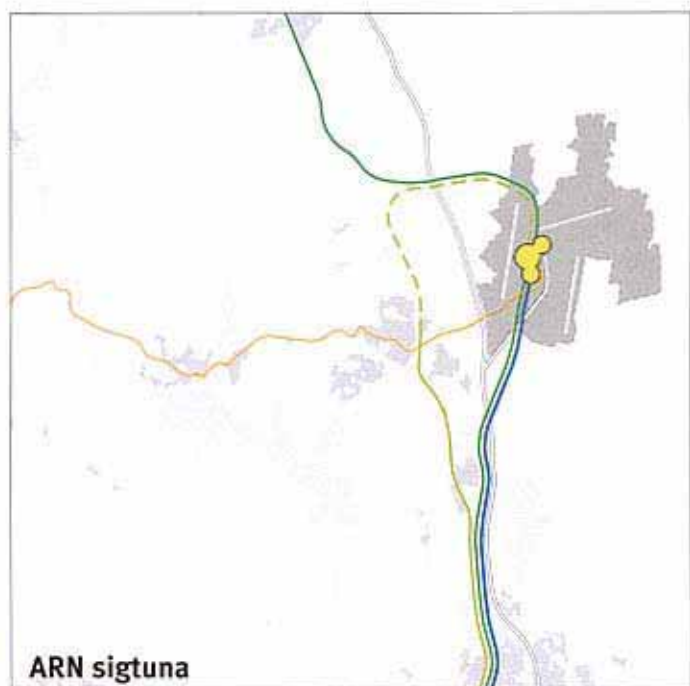### Multimodal Interchange: a landside 'hub'?
Airports, once erected at the fringe of urban areas, today lie in heavily urbanised areas along some of the most intensively used thoroughfares of the metropolitan regions. The capacity of the same roads

ZURICH: CONSOLIDATING A REGIONAL INTERCHANGE

that provide access to the airport is often exhausted by everyday commuter traffic. The natural growth of traffic movements in the region, and the growth of passenger and commuter traffic to the airport, have a cumulative effect. Given the precariousness of the situation, initiatives on all levels to improve the attractiveness of public transportation in order to guarantee access for the various users of the airport - passengers, employees and visitors - seem to be unavoidable, and most effective.

The regions have to struggle with the fact that regional public transportation networks are still very much centre-oriented. They link regional subcentres (formerly peripheral areas) to the core of the metropolitan area. The urge to better integrate the airports appears at the same time as comes up the commitment to improve tangential links along the periphery of the metropolitan area. These links are to offer an alternative in traffic segments where the car is very dominant. Since radial arteries suffer major congestion problems and connections

FRA frankfurt

LGW crawley

AMS amsterdam

ZRH zurich

MXP gallarate / busto-arsizio

ARN sigtuna

HEL helsinki

BCN barcelona

VIE vienna

National Highway

National Highway (planned)

High Speed Train

High Speed Train (planned)

Dedicated Link Airport-Main City

Intercity Train (thick line = part of TEN)

Regional Railway

Regional Railway (planned)

Metro/Light Rail (planned)

National/Regional Bus Service (where no Railway)

Airport Interchange Node

Main City Railway Hub

(regional and metropolitan lines: only direct services
to the airport indicated;
local and regional bus services: not indicated)

0   5   10   20km
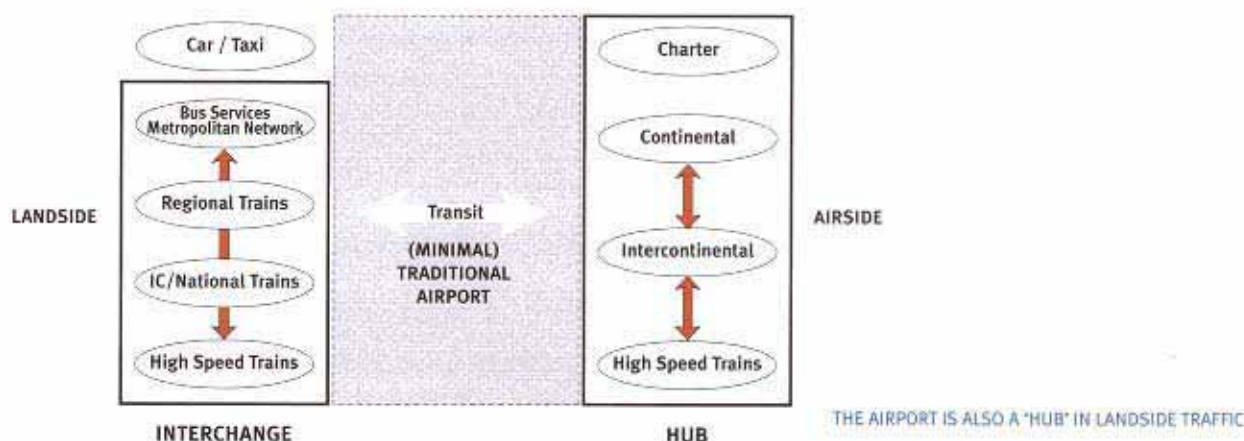
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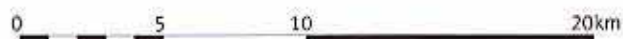
between more peripheral areas become more important, tangential connections are top priority in Helsinki, Milano (Pedemontale), Amsterdam and Frankfurt.

A look at the regional transportation plans for the next 10-20 years shows a surprisingly clear common pattern in all airport regions. A large share of ongoing and future investment in regional public transportation Infrastructure as well as road extensions is concentrated around the airport. New tangential regional lines run also via the airport. The railway station at the airport is seen as a welcome opportunity to interconnect these lines with the other existing rail services and thus to improve the regional public transportation network. The Frankfurt-Regionaltangente West (due by 2007), Amsterdam-Zuidtangent (2002), Zurich-Stadtbahn (2005), Vienna-S-Bahn 9 (2003), and the Helsinki-Marja line (after 2011) are such new connections in the pipeline.

What the hub airport is on the airside, the multimodal interchange becomes on the landside. The fact that landside accessibility brings together different means of public transportation at all levels

(local, regional, national and international) allows to develop an Interchange or landside 'hub' around the airport station. The opportunity for an Interchange depends on the integration of the airport into national public transportation networks. The stations at ZRH, AMS, FRA but also LGW airport are already used to interchange. But with the exception of Zurich there is as yet no clear indication of the relative importance of the airport station as an interchange node in regional networks. It might be used to transfer between means of transportation, but this trend can not be put into numbers yet. Respective studies have yet to be started up, and thus the airport station has not yet been considered as an interchange node in current or future policies. A qualitative evaluation seems nevertheless possible. What are the potential benefits? In general, an interchange function at the airport - e.g. from IC-train to metropolitan network - is desirable, if the airport allows to access areas of the region which are as yet poorly accessible via other interchange nodes, and if access from the outside of the metropolitan area is more convenient via the airport. Often, the Interchange at the airport offers faster connections, which makes the airport station itself

LANDSIDE ... Car / Taxi ... Bus Services Metropolitan Network ... Regional Trains ... IC/National Trains ... High Speed Trains ... Transit (MINIMAL) TRADITIONAL AIRPORT ... Charter ... Continental ... Intercontinental ... High Speed Trains ... AIRSIDE

INTERCHANGE ... HUB

THE AIRPORT IS ALSO 'HUB' IN LANDSIDE TRAFFIC

Three different 'stages' of evolution of airport railway stations can be distinguished:
1. **a halt at the airport** (VIE, MXP, HEL (future)), and an interchange elsewhere in the region (in the centres of Vienna, in Gallarate, and in Tikkurila and Myyrmäki respectively).
2. **a multimodal airport station** (ARN, LGW, BCN), respectively a major bus-station (HEL).
3. **a multimodal Interchange** (AMS, FRA, ZRH): In ZRH close to 10% of the passengers in the railway station are 'interchangers'. At these airports major efforts are being undertaken to install additional terminal functions directly at the Interchange and thus improve passenger convenience.

attractive also for commuters to and from the region.

The same principle that makes an airport a hub, starts to make an airport railway station a regional hub: when a critical mass is reached through transfer passengers, more connections can be offered. The repercussions on the modal split to the airport, particularly of employees' traffic, will be considerable. This is all the more important since the modal split in the traffic to the airport has often remained below the regional average. And for airports like ARN or ZRH, where the region or state sets a maximum pollution limit for the operation of the airport, the reorganisation of landside traffic can guarantee growth on the airside.

In order to ensure success of the efforts put into public transportation, these concepts need to be accompanied by restrictions on private car use (parking fees, road pricing) as significant tools to tackle landside access congestion, and therefore

guarantee airport operability in this respect.
As central areas are too valuable for car parking, and car use is to be limited, an interchange function between car and public transport - park&ride (P&R) - is mostly undesirable at the airport: it contributes to congestion on access roads, and occupies car parking places that are calculated for the airport's own demand (employees and passengers). At Gatwick airport, P&R occupies a considerable amount of the airport's parking places, notwithstanding the considerable parking fees; but at 45'000 parking places, there are no severe constraints to parking opportunities for employees and passengers as yet.

Possibly, P&R may become a more interesting concept, however, in linking car and High Speed Train: the airport's High Speed Train station is better accessible for cars from the region than the main city's Central Railway Station. And - it is not in vain that the High Speed Train is promoted as if it were an airplane service. Substitution of short-haul air traffic will increase this notion.
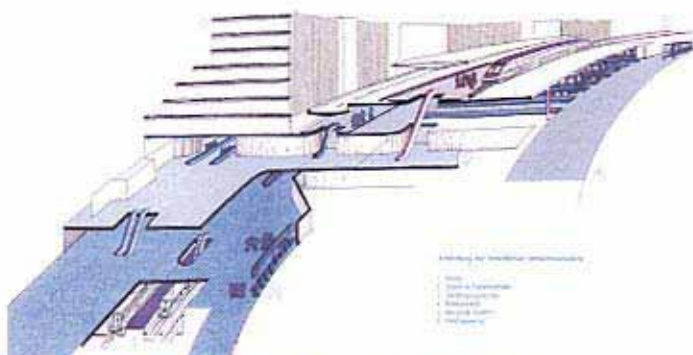
Quality of inter-connection
The Interchange function, and its beneficial effects on transport networks in the region - an improved public

Financial involvement of the airport operator will be necessary to guarantee the quality of the interconnection, as much as it has already been so for the provision of the services available today at airports like Frankfurt, Amsterdam and Zurich. In LGW, the fact that at this moment no Airport City development around the railway and bus node can take place, must be considered one of the main reasons for the poor quality of interconnection. It seems that BAA and the landside transport operators are reluctant about creating an Interchange without getting the opportunity to exploit it in terms of real estate development. There, the question must be raised how to achieve an Interchange and Interchange quality, without an Airport City.

More than simply getting to the airport
In comparison with other poles in the metropolitan area, the airport is one of the best accessible public transport nodes. This trend is not to be underestimated. The accessibility of airports will improve further in the future. Enormous pre-investments in landside accessibility have been done, mostly to expand the air traffic function. Now it is crucial to anticipate the potential added value such an interchange node can have for the further development of the metropolitan area, and to be aware

ZRH: A VERTICAL INTERCONNECTION OF ALL MEANS OF TRANSPORT
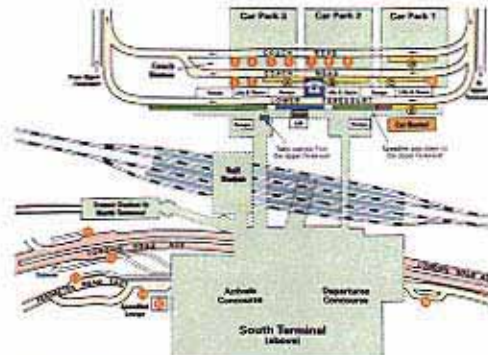
LGW: INTERCHANGING ONLY VIA THE TERMINAL HALL

transport offer and additional connections - can only really be reached if the quality of the interconnection of the different modes of transport is guaranteed.

Co-operation between transport providers, the airport operator, and even airlines, is crucial for the quality of the Airport Interchange and the operation of specific services to improve accessibility also to remote platform and Airport City sites by public transportation. In Zurich, the airport operator, Swissair and SBB, the Swiss Federal Railways, work together on the extension and radical upgrading of the station hall to connect to all public transport means at the airport, and will establish services such as check-in and baggage claim in the railway station. These initiatives are explicitly also aimed at increasing the airport's landside interchange function.

In contrast to ZRH, the several privatised rail and bus operators at LGW lead to a lack of interchange quality. They have no common goal to exploit synergies; an interchange also requires extensive co-ordination of services in terms of schedules and spatial links.

of the local urban potential of such a multi-modal Interchange. This emphasises again the importance of an optimal interconnection between High Speed Train and regional networks, and a careful evaluation of the airport's role as a regional development pole.

Access quality is no longer just a question of getting to the airport. In the struggle to achieve a higher share of public transport to the airport, it is imperative to also consider
- the Interchange function at the airport in the first place, together with an increased Interchange quality.
- a connection of programme to the infrastructure ('platform-focused' versus 'regional' approach). Highest efficiency in this respect can be expected when building on top of the Interchange, the same way as is done in Central Railway Stations.
- urban access quality for all sites on the airport platform and in the Airport City: the surface to be covered is often several km2 large and many km long; the density of workplaces requires fine-distribution in most areas.

HEL
ARN
AMS
LGW
FRA
ZRH
MXP VIE
BCN

5

regional context of the airport city

International airports have become magnets to all kinds of business activities. First, activities were mainly directly related to the airport (air traffic), but then other companies settled ever more often, due to the image of the airport location or the good connections offered.

In the most advanced cases, a variegated, heterogeneous complex of activities settles around the airport which eventually starts to compete with Central Business Districts and other existing centres of the metropolitan area. The co-ordination of the new role of the airport and its Airport City with other established and developing poles in the metropolitan region needs a sort of typecasting between the different centres. The airport, however, primarily competes in a market where the choice is not made between one or another pole in a certain region, but between different regions as such.

Often, there is an inherent danger of traffic congestion

Airport-related economic activities and existing structures need to be fine-tuned. Therefore, and particularly in regions where traffic connections to the airport are good, the airport's spin-off must not necessarily be concentrated around the platform, but can also be accommodated in disperse sites throughout the region, contributing to a more even development balance.

The nine airport regions show different 'development stages' of these spatial and economic processes. Different approaches are taken to the dominant problems. In general, it seems crucial to relate land-use strategies to the available capacity of traffic networks. Also, strategies to exploit the potential economic benefits of air traffic growth have been developed that could eventually compensate for some nuisances generated by air traffic.

Initiatives around the airport platform

The expansion of the airport and its strategic position in infrastructural networks have made airport surroundings one of the most attractive locations for economic activities in the periphery of the cities. Business

96%

4%

The business floor area of an Airport City (non-aviation) alone, like at AMS or FRA, amounts to less than 5% of the total business area in the main cities, and is often smaller than that of other new development hot-spots in the region.
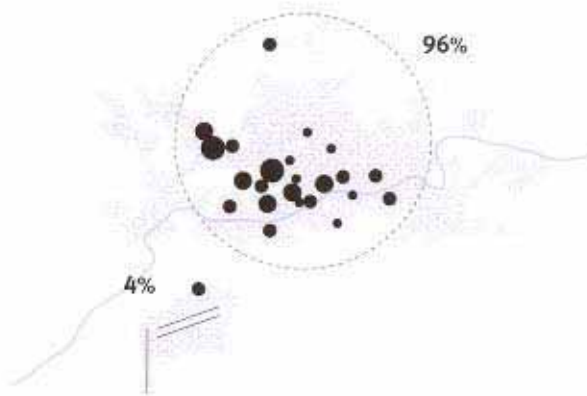
CURRENT AIRPORT CITIES ARE NO DOMINANT POLES IN THE METROPOLIS

around airports, especially if transport policies and consequently investments into traffic infrastructure are lagging behind the accommodation of economic activities. Such an imbalance is risky, as major investments, if not restrictions, will be required to keep the whole operation going.

The economic effects and benefits of an expanding airport are not limited to the airport territory, but are spread out over a larger territory. They are usually much bigger beyond the airport territory than on the airport platform itself. The increasing number of employees in companies and enterprises that consider the airport vital for their success, and therefore settle in its surroundings, can be expected to exceed the increase in employees on the platform by far.
As these effects do not encounter virgin ground, it is essential to achieve a balance with other initiatives and interests in the surroundings of the airport. Existing local and regional economic structures, which often are of a different, smaller scale, can easily be overrun by concentrated Airport City development.

opportunities are high on sites next to the airport platform. In several cases, local authorities, as well as airport operators, have launched their own and often opportunistic plans to exploit the attractiveness of the airport and to profit from the rising land-prices around the airport. In Frankfurt and Gatwick major protected green belts, as well as so-called strategic gaps, limit these opportunities in order to safeguard the local environment and the manoeuvrability of the airport.

Municipal initiatives are evident at Malpensa (Trade Park, Vizzola), Helsinki (E18 corridor) or in Zurich, where the municipality of Opfikon-Glattbrugg offers, amongst others, a housing and business location that - with 15-20'000 employees - is alone just about as big as the whole municipality today. In Schiphol, the municipality of Haarlemmermeer developed an enormous business park of 250'000 m2 just south of the platform, very much to the irritation of the close-by city of Amsterdam. Often, these are initiatives of developers that are welcomed by the territorial authorities around the airport. Co-ordination is difficult, if not neglected, not

least since such projects often exceed the scale of projects which smaller municipalities are used to handle. In these cases, there is not much control over whether what is developed has a direct relation to air traffic.

Initiatives of airport operators outside the airport perimeter become ever more common, too. The recent reorganisation of airport operators led to the formation of airport-owned land development and real estate development companies. Airports obviously try to accommodate a large share of valuable business and service activities (airport-oriented activities) on the airport territory itself. However, space on the platform is scarce. As a consequence, airport operators start to develop sites beyond their territory, more or less like other private investors would. This is not anymore for operational purposes only (as were an outsourced airline administration, catering, etc. as in ZRH), but to make extra revenues by developing land in the airport surroundings. In order to maximise their income, airport operators preferably launch these initiatives by themselves:

development activity which still exists due to a lack of instruments to co-ordinate airport-related development in the larger airport area at MXP. Airport operators show ever more expertise in developing land for activities which (for whatever reason) seek the airports' vicinity. With them exporting this expertise to get globally involved in developing such activities, another very adroit player introduces himself in the arena of the airport region.

All these developments put an increasing pressure on the sites surrounding the platform. Spontaneous initiatives by local authorities are opposed by airport operators who fear for the elasticity and manoeuvrability of the airport in the long-term. The latest initiatives of airport operators are met with controversial reactions from local and regional authorities, who claim that an airport operator has to run an airport, not to develop land in its surroundings. Current instruments (like the 'Piano d'Area Malpensa' or the 'Richtplan Zurich') seem to be insufficient to avoid competition and conflicts between development initiatives of the airport and local authorities. Other forms of development co-
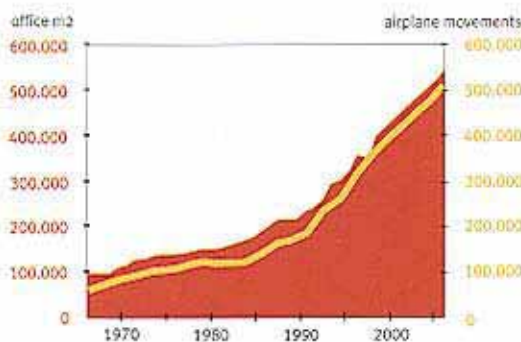
SCHIPHOL AIRPORT: OFFICE STOCK GROWS PROPORTIONAL TO PLANE MOVEMENTS
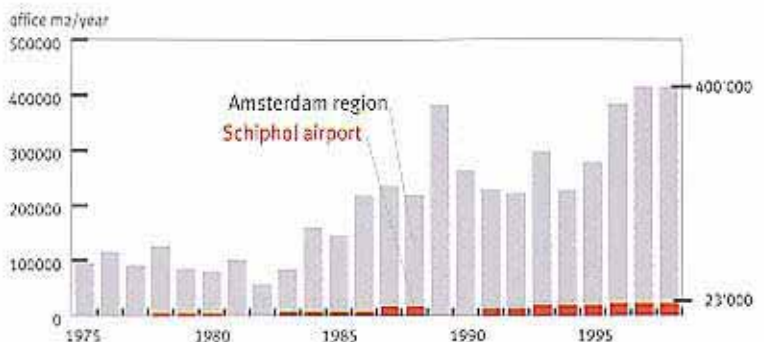
OFFICE GROWTH PER YEAR IN THE REGION VS AT THE AIRPORT

- **Vienna Airport plc** has created a 'Vienna Airport Business Park' development company, to develop an off-airport site with the same name.
- **Frankfurt airport** collaborates with the 'Hoechst'-company in the development and promotion of a former industrial area for logistics.
- with **Schiphol Real Estate (SRE)**, Schiphol airport participates a.o. in the development of the 300 ha logistic area 'A4-zone' (with SADC and the municipality) and develops business parks close to Dutch regional airports, in collaboration with the respective municipalities.

The most extreme case of real estate development by an airport operator can currently be witnessed in Malpensa. It is, however, not the SEA, the operator of the Milanese airports, but a new Malpensa Real Estate plc, a non-Italian company with a 60% share held by Schiphol's SRE, that has become involved in real estate development around Malpensa airport, developing three areas with logistic businesses and an office complex. SRE fills up the vacuum of

operation are required which could eventually involve non-operational sites on the platform as well as the surrounding development locations. In Helsinki (Vantaa) and Barcelona (El Prat), airport platform sites for the development of non-operational activities (Aviapolis) are reverted to the land-use authority of the municipality.

Regional authorities are also concerned about a balance in the region concerning land-use, and fear additional stress on traffic networks. These were e.g. the reasons in Amsterdam for the making of the SADC (15 years ago), when intensive development of the airport surroundings was expected.

Balance of economic developments in the airport region

International airports have become major assets for the city and the region and are important motors in the respective regional economies. Airport-related developments contribute to the competitiveness of a metropolitan region in an international context. The market for airport-related activities is a global market, within which enormous investments are done. Many international or internationally active businesses seek a convenient location with respect to the airport.

Some regions have already shown a certain concentration of international headquarters or logistic operators for many years, a positive signal towards the type of businesses that follow airport development (Amsterdam, Helsinki, Barcelona). In other regions, however, there is a major disparity between strongly airport-related economic activities and the existing economic structure. A careful integration of the different structures is the aim of initiatives in Malpensa or Gatwick.

authorities and other logistic operators seek co-operation with the involved municipalities.

- **in Stockholm**, Arlanda airport is, besides developing its own 'Arlanda Logistics Centre' on the platform, co-operating with the airport municipality Sigtuna in a common initiative, Arlandastad, which includes a more general 'North European Logistics Centre' NELC.
- in **Amsterdam**, a 'Schiphol zone' has been set up around the airport within which development is undertaken by the Schiphol Area Development Company (SADC), a joint-venture of local and regional authorities, the airport and the national investment bank.
- **Helsinki**'s E18-TEN corridor hooks up to both airport and port, and is to a great extent reserved and promoted as a major Logistic Zone. A 'Centre of Logistic Expertise' is to stimulate development.
- in **Barcelona**, the Llobregat Delta has been designated a Logistic Platform for the metropolitan area, reserved to accommodate the spin-offs of both port and airport.
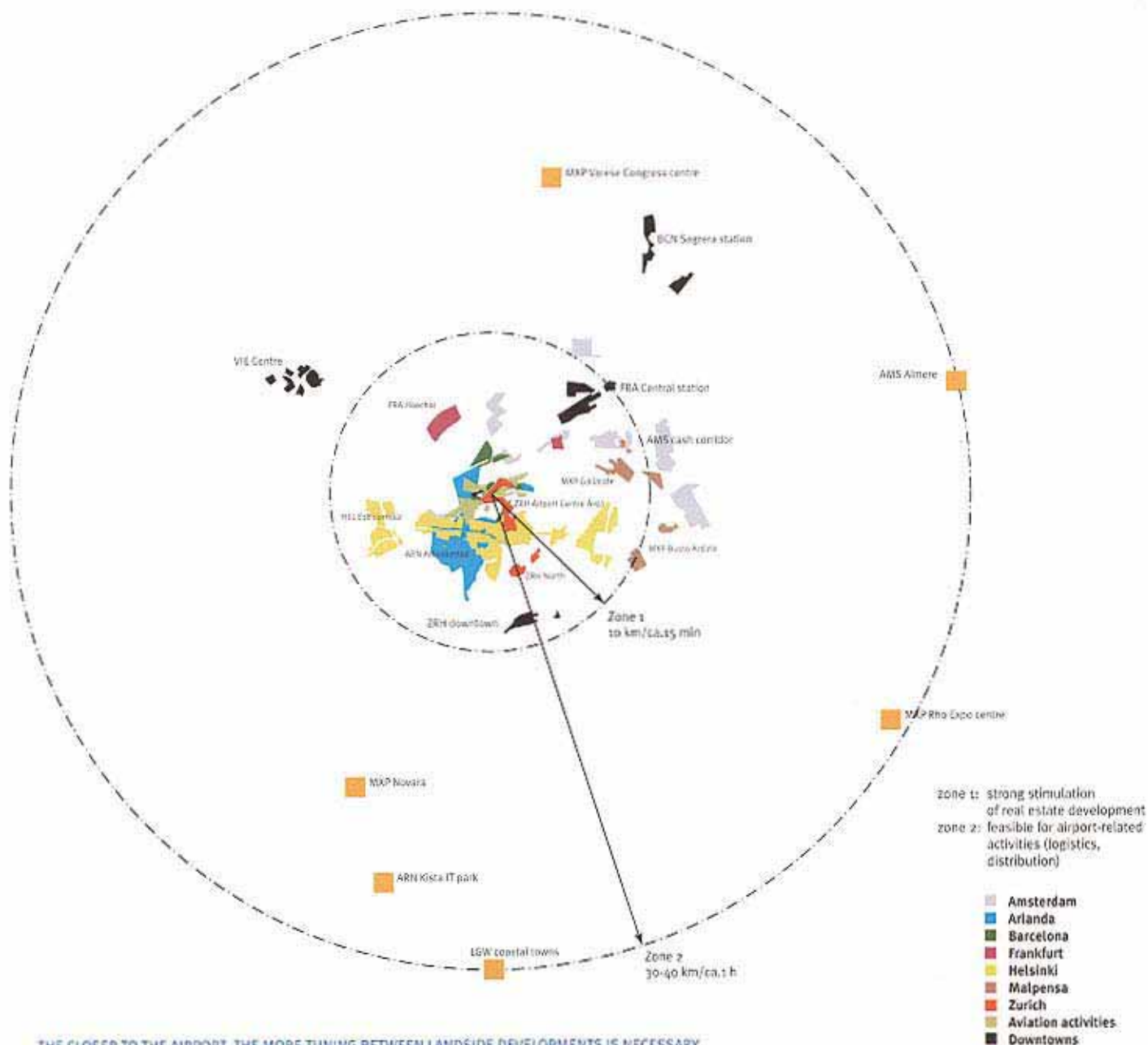

SADC AMS

Piano d'Area MXP
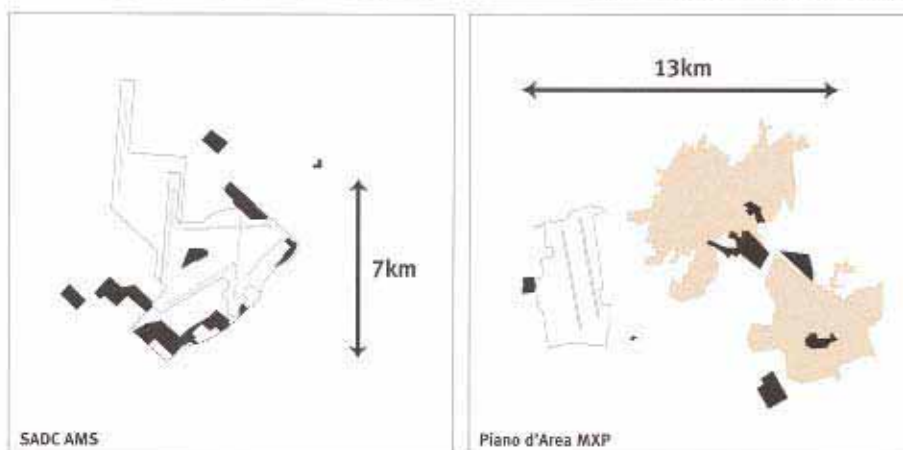
TWO REGIONS, TWO CONCEPTS: CONCENTRATION OR SPREADING OF AIRPORT-RELATED ACTIVITIES

Nearby: strategic land-reservations for airport-related activities...

Where the airport is proclaimed as an important generator of economic activity in the airport region, local and regional authorities have set up initiatives to guarantee the making of zones for logistic and other airport-related activities right at the doorstep of the airport. They are to complement the regional economic profile in attracting additional international(ly oriented) airport-related activities. To provide sufficient space for such activities requiring good access to the airport platform in the long-term, Amsterdam, Arlanda, Barcelona and Helsinki feature reservations of compact development sites in strategic locations close to the airport. Particularly where synergies of several potent infrastructures such as ports and airports can be expected, the reservation of strategically favourable sites for logistic operators (not only those handling air and maritime freight) is important to generate economies of scale. To establish such zones, where development can be promoted, co-ordinated and monitored, airport

...or further away: regeneration of the metropolitan area

Airport-related activities require good and fast access to the platform, to freight-handlers and to the terminals. A good integration in metropolitan and regional public transportation networks, as well as in the highway infrastructure allows therefore to reconsider other more remote locations.

For airport-related activities, a direct access to the airport is more important than immediate spatial vicinity. To settle closer to the city becomes possible, if access to the airport can be guaranteed. At 15 minutes road and rail distance to the airport, the booming Northern urban periphery of Stockholm is the preferred location of IT and high-tech businesses in the region, businesses that have a substantial inclination to international relations and thus to air traffic. In most airport regions, a comparable zone of influence around the airport includes, apart from the airport itself, other regional development poles, major hot-spots (the Amsterdam Zuid-As) or even the main city itself (Zurich). Munich airport, on the other hand, - a remote greenfield airport - shows a

Map labels (clockwise from top):
- MXP Varese Congress centre
- BCN Sagrera station
- VIE Centre
- FRA central station
- FRA Flughol
- AMS cash corridor
- AMS Almere
- MXP Lainate
- ZRH Airport Centre Area
- HEL Espoosaka
- MXP Busto Arsizio
- ARN Arlandastad
- Zone North
- ZRH downtown
- Zone 1
  10 km/ca.15 min
- MXP Rho Expo centre
- MXP Novara
- ARN Kista IT park
- LGW coastal towns
- Zone 2
  30-40 km/ca.1 h

zone 1: strong stimulation
of real estate development
zone 2: feasible for airport-related
activities (logistics,
distribution)

- Amsterdam
- Arlanda
- Barcelona
- Frankfurt
- Helsinki
- Malpensa
- Zurich
- Aviation activities
- Downtowns

THE CLOSER TO THE AIRPORT, THE MORE TUNING BETWEEN LANDSIDE DEVELOPMENTS IS NECESSARY

major concentration of activities around the platform, but little impact beyond its immediate surroundings, due to poor network integration.

Activities like logistics and distribution are even less sensitive to remote locations. By comparing Gatwick, Amsterdam, and Arlanda, it becomes evident that such activities can be located as far as 30-40km from the airport, provided transport connections (also with public transport) are sufficiently good.

- The municipalities surrounding **MXP** airport see the accommodation of airport-related activities on their major brownfield sites - 10-15 km east - as a chance to stimulate regeneration of the metropolitan area.
- The spin-off of **LGW** is as much as possible distributed in West Sussex County to benefit run-down areas. Crawley, the airport municipality, can only accommodate functions that reinforce its role as a regional centre. BAA Gatwick considers it possible to locate certain airport-related activities in coastal towns, an area in strong need of regeneration.

- Around **AMS**, municipalities like Almere -30 km to the east - would like to divert some airport-related activities to their territories.
- In **FRA** most of the spin-off of the airport is 'silently' subsumed in company sites all over the airport region.

Land-use and mobility are thereby closely related: a concentration of the spin-off at the airport itself (in an Airport City), or its accommodation in the main city and in other poles and areas of the region, are two different spatial and economic schemes requiring different infrastructural concepts.

Spontaneous development versus collaboration in the airport region

Experiences in Arlanda, Amsterdam or Gatwick, and tensions in Malpensa, Helsinki and Zurich, show that there is a need to find a good balance between concentrating a certain kind of programme close to the airport and distributing other airport-related

programme in the immediate or wider surroundings. However, such a regional development concept - an approach which is favoured mostly by local and regional authorities - needs lots of steering, much more than the spontaneous accommodation right next to the airport. But it is likely to generate less conflicts and bottlenecks.

Most of the developments which could in some way be said to be induced by the presence of a big airport in the regional territory, are rather spontaneous and autonomous initiatives of developers, airport operators and municipalities. These initiatives not only compete with each other, but also impair relations between the airport operator and the authorities. Such spontaneous development can also reduce the extent to which an airport region is able to benefit from the presence of a big airport:

- Spontaneous local initiatives, where every municipality develops its own company sites, compete for similar clients, international investors in the airport area. Yet, the market demands a certain clarity on when which developments can be

Little has been done as yet in this respect in a co-ordinated way. Local and regional authorities have often yet to get aware of the economic impact of the presence of a major airport, its size and its influence on the structure of the metropolitan area, as well as of the opportunities for them to hook up to these dynamics.

As these are not observed, the burdens on airport municipalities are likely to grow due to increasing congestion on roads and public transport and the difficulty to pursue own perspectives. At the same time, the imbalance in the region in terms of economic development and accessibility is increased. Airports threaten to be suffocated by the pressure on land-use (over-development) and accessibility in their area, which in turn makes the allocation of airport-related activities increasingly inefficient.

Clear and specific policies with respect to the access quality and the Airport Product, as well as a specific and suitable offer for the different categories of airport-related activities – instead of a 'laissez-faire' approach – make a difference. They allow all players

1   e.g. ARN   2   e.g. HEL   3   e.g. ZRH
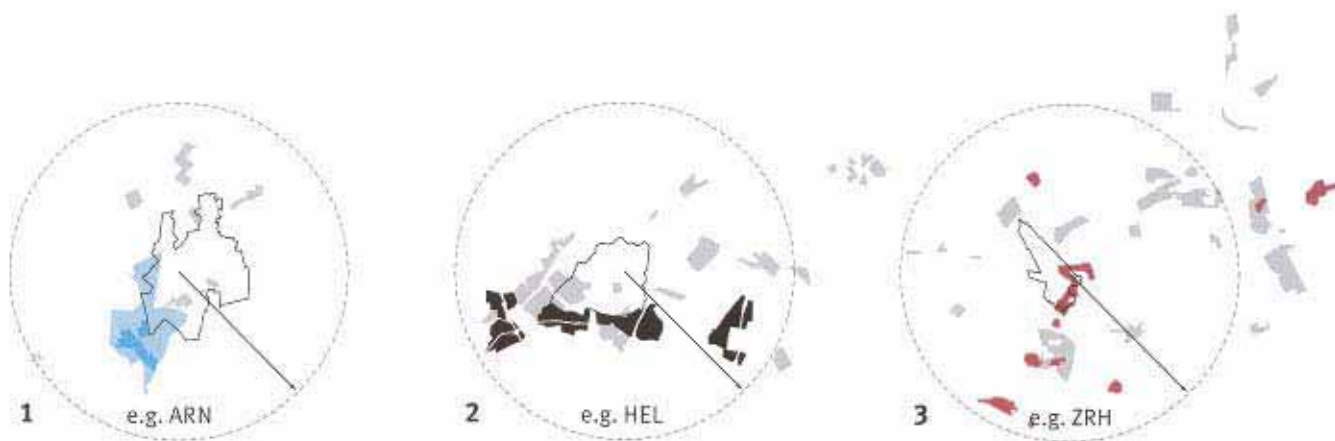
DIFFERING AIRPORT CITY INITIATIVES: (1) CO-OPERATION, (2) INDIVIDUAL INITIATIVES, (3) REGIONAL CENTRES

expected. Insecurities about investment opportunities are unattractive. With the airport's inclination to 'do it yourself' instead of 'do it together', and with competing initiatives of surrounding municipalities, individual marketing is inefficient, and common marketing almost impossible.
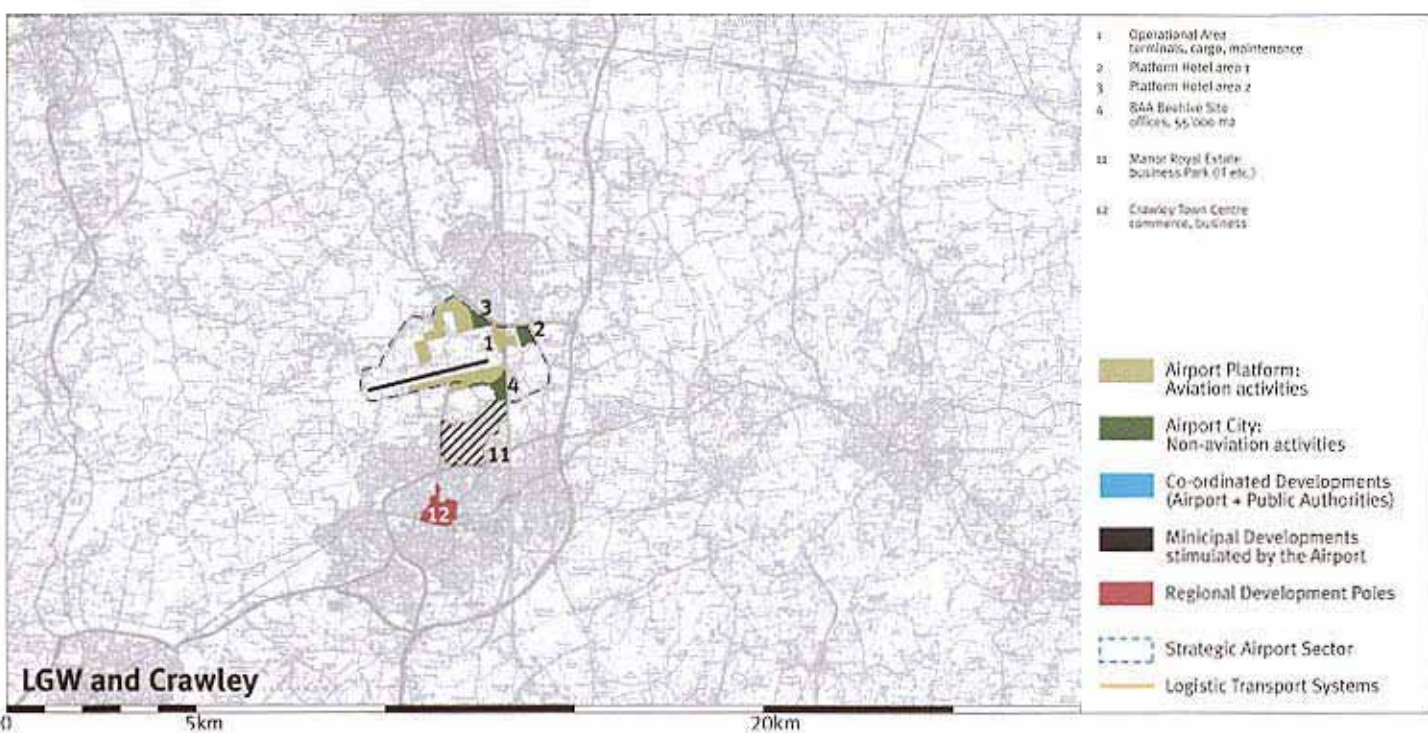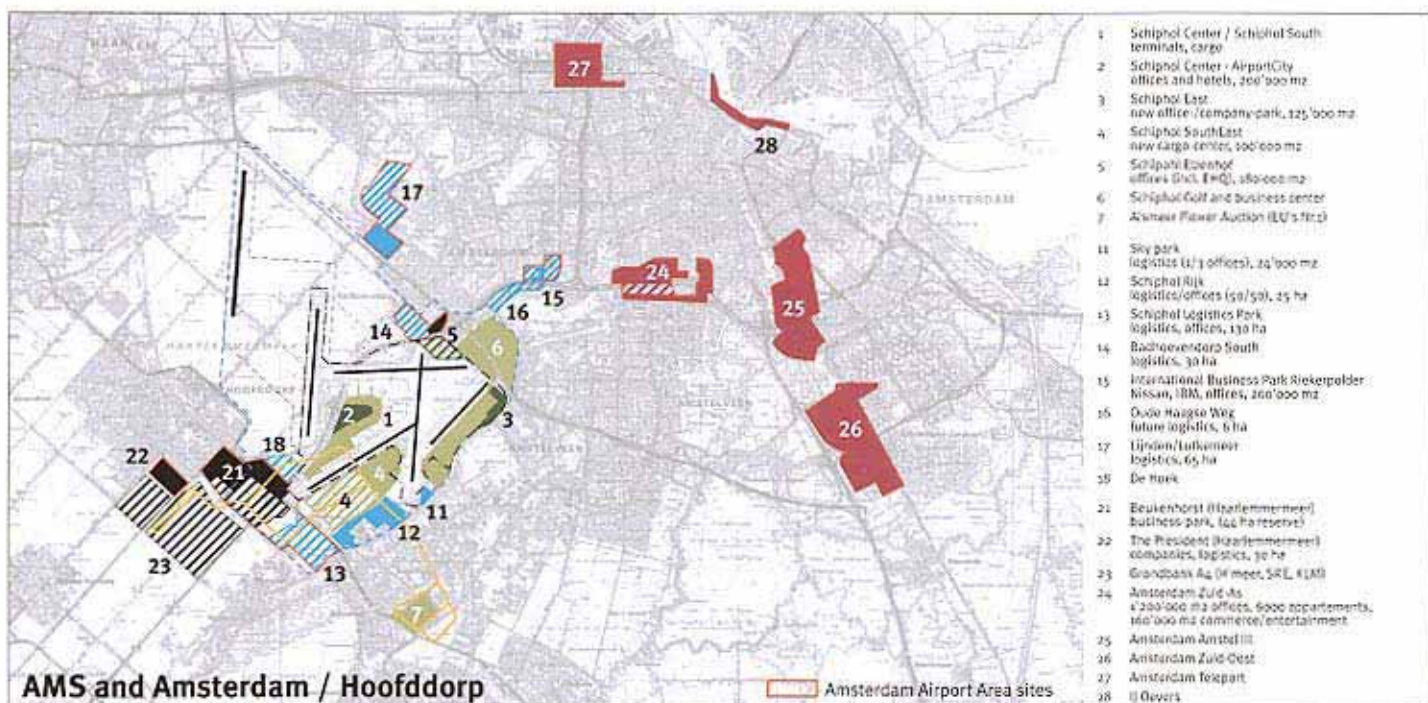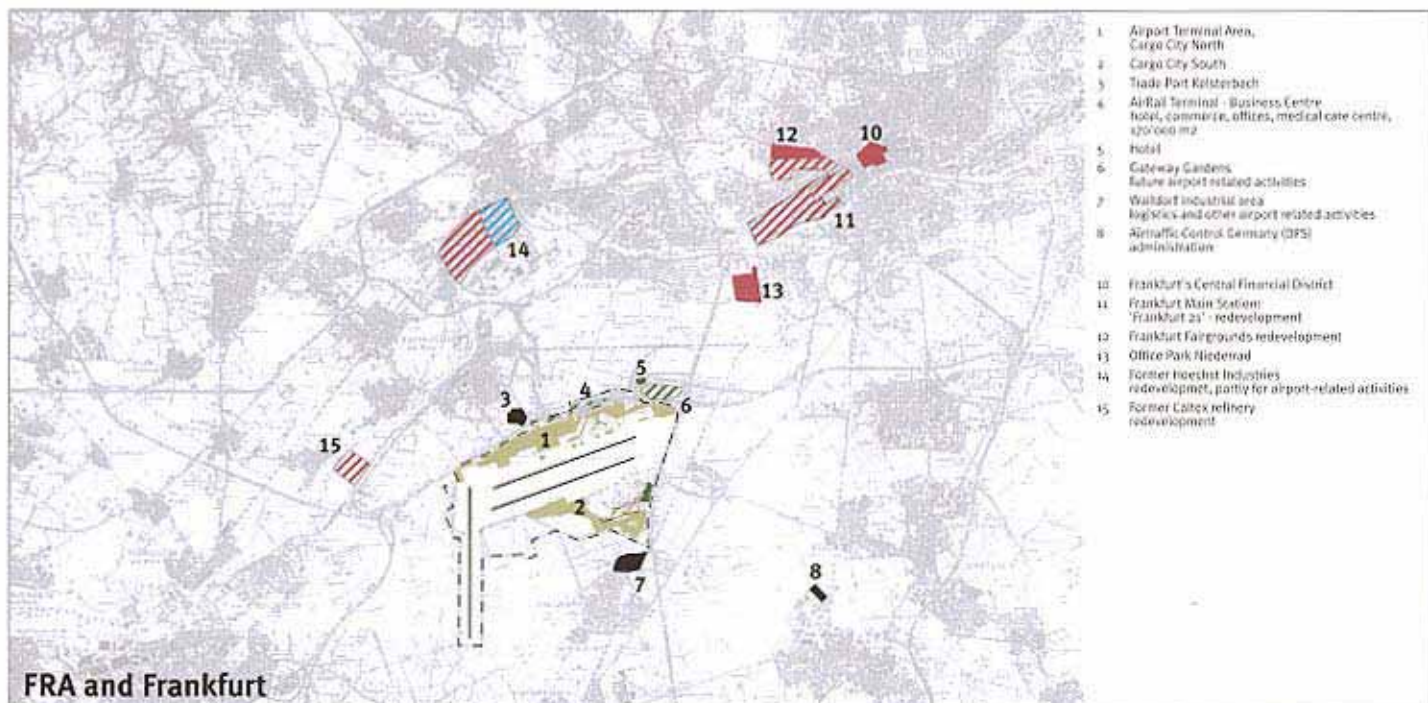
- Fragmented, spontaneous initiatives make it impossible to create a critical mass that is necessary to promote the airport area for a airport-related activities on a market where European regions are competing. An unclear profile with respect to market demand, and the lack of transparency on development opportunities, are obstacles.
- The importance of accessibility for the over-all investment climate is often forgotten. Transport bottlenecks and a lack of adequate development sites can become a serious handicap. No co-ordination with infrastructures is very expensive in the long-term.
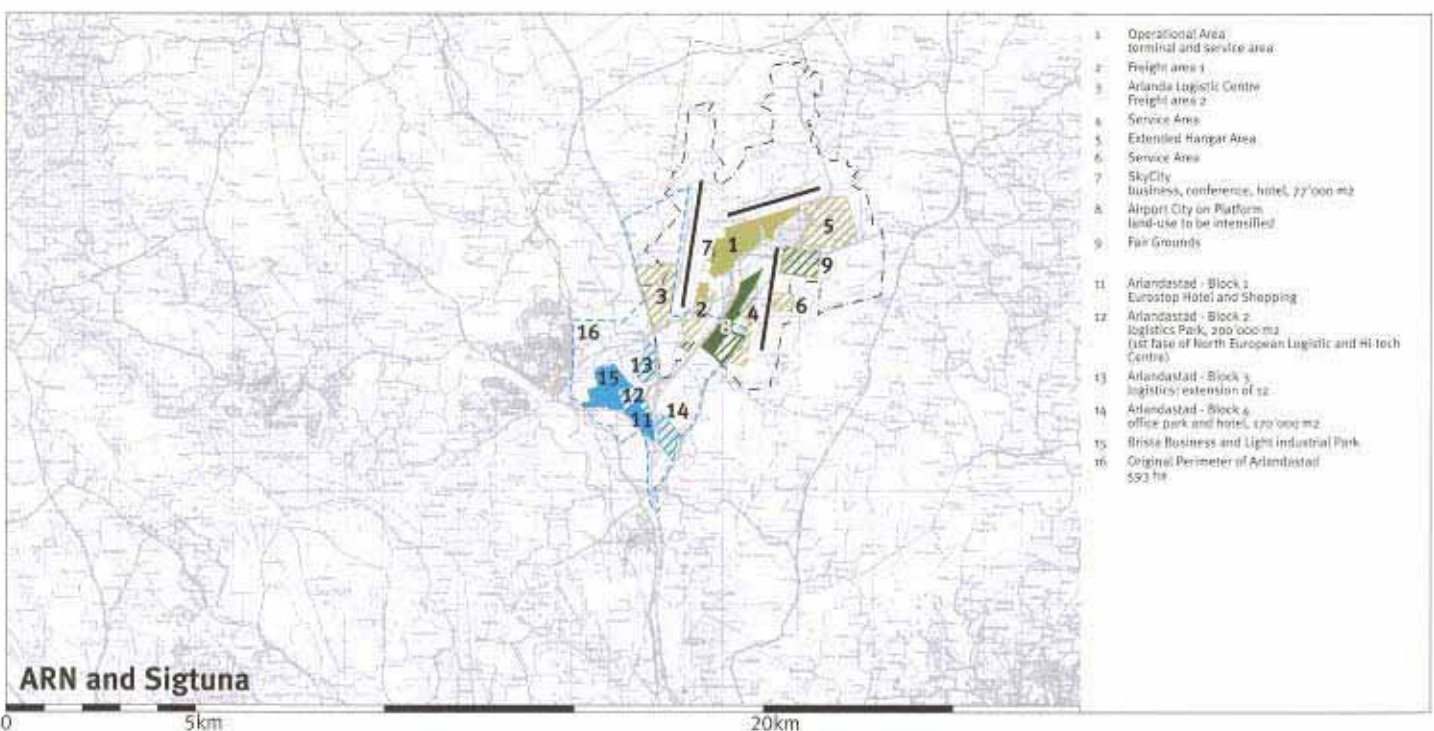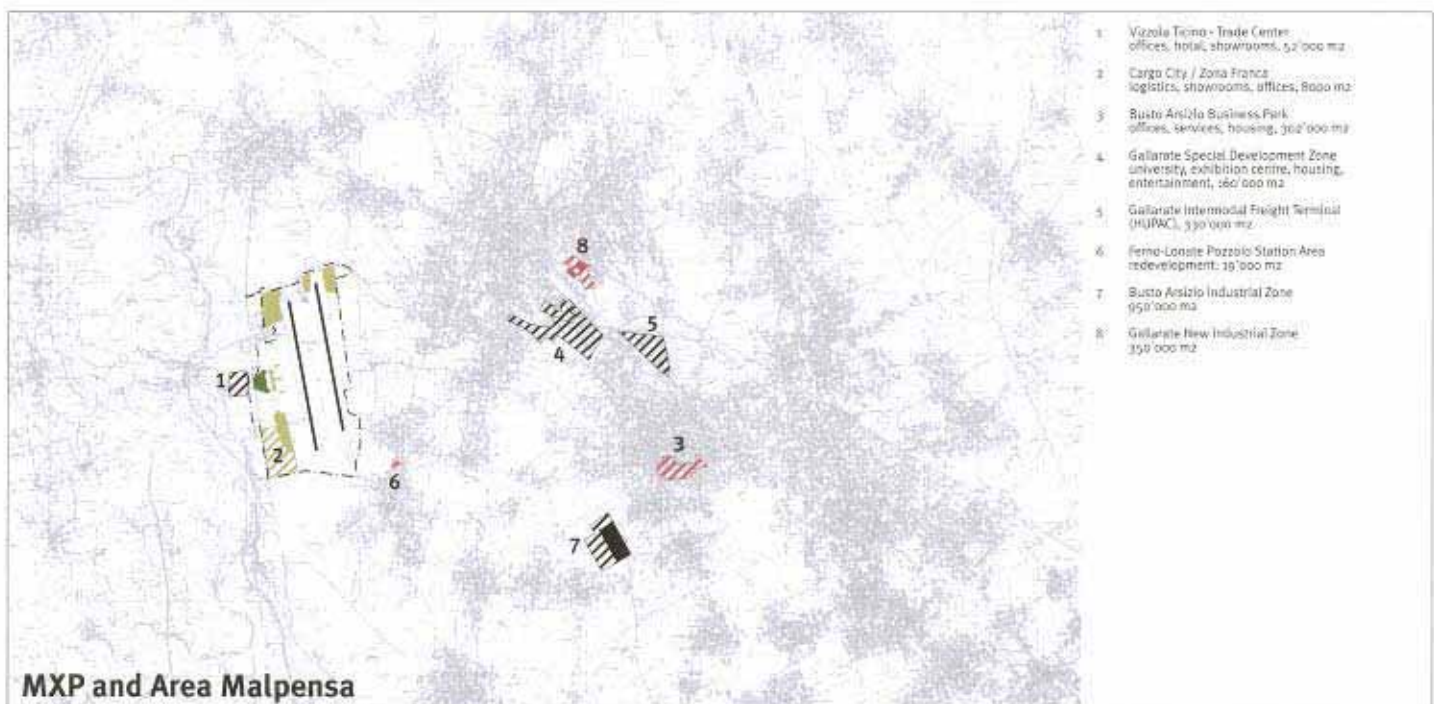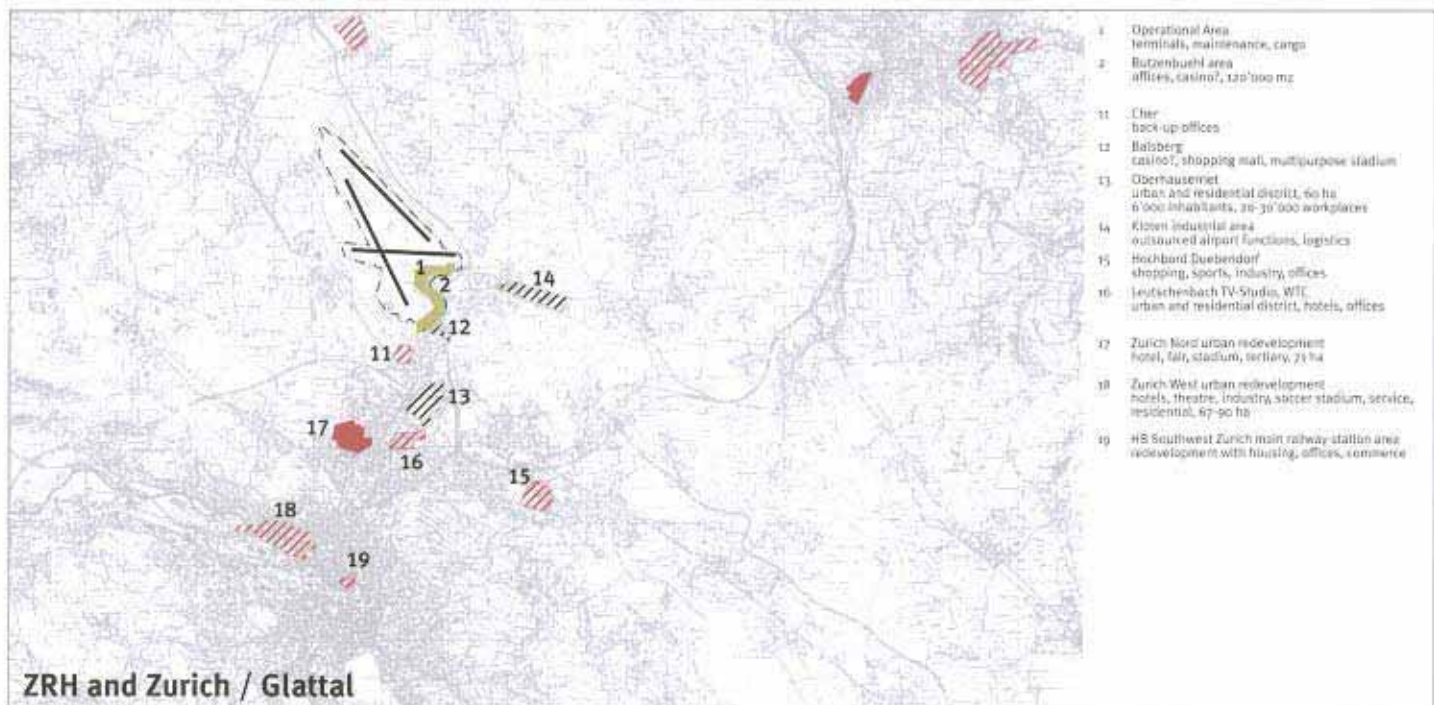
together to optimally exploit the (economic) added-value of growing air traffic alongside a still attractive surrounding. Otherwise, one risks to create and foster a considerably lower-quality spin-off in a characterless environment.
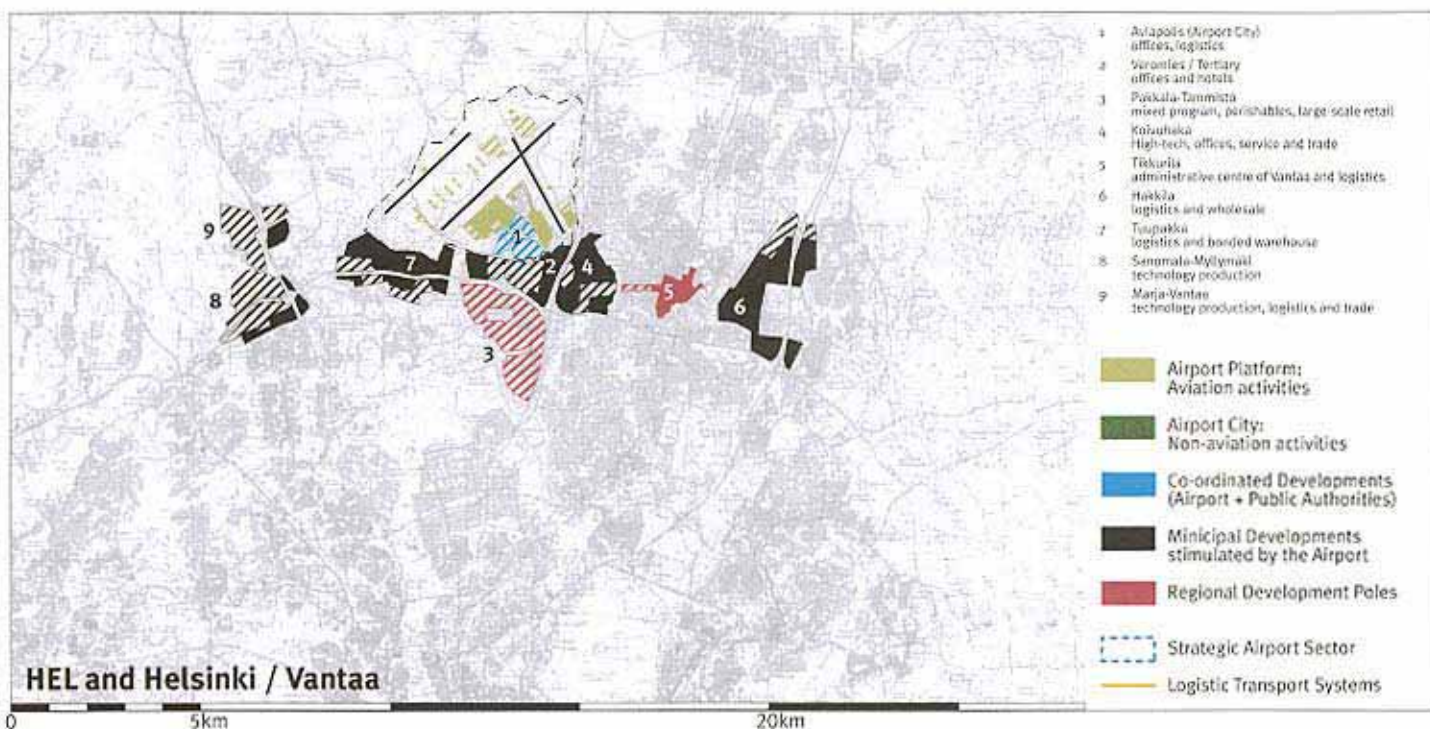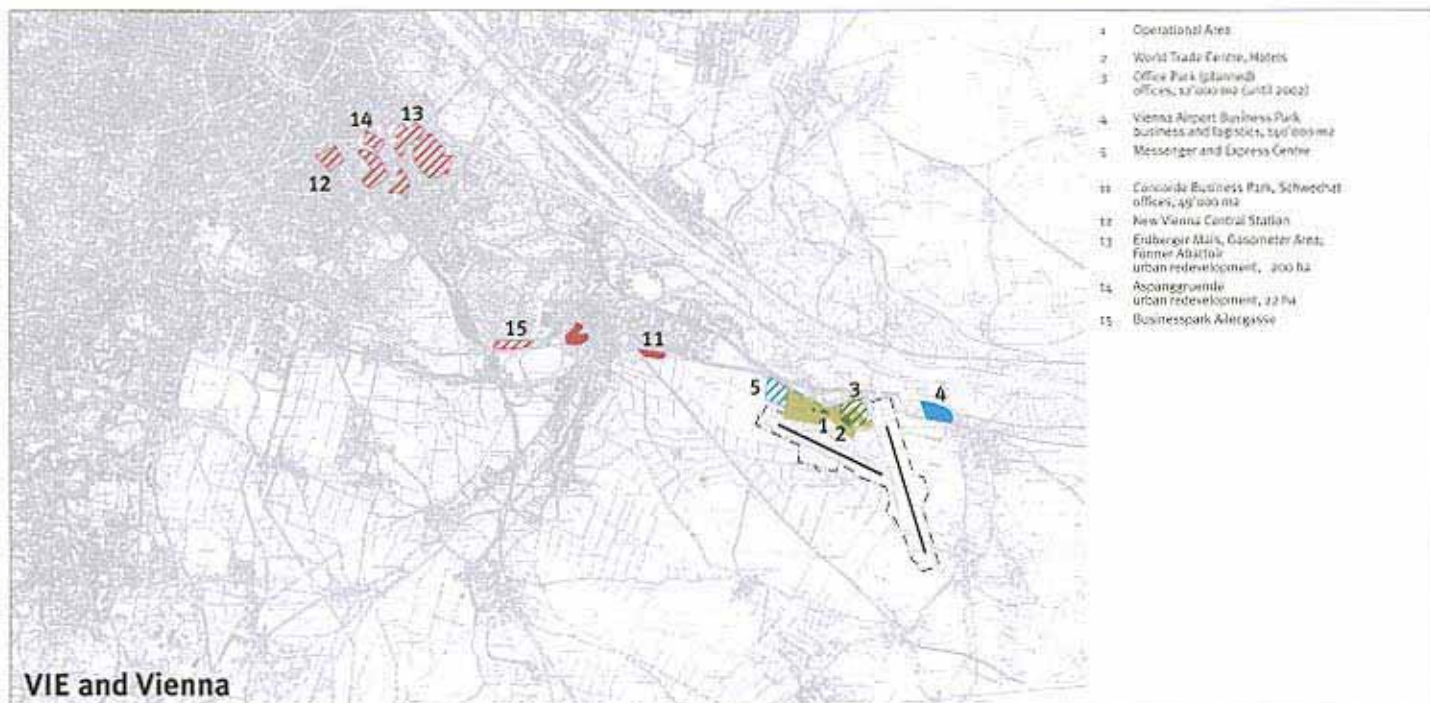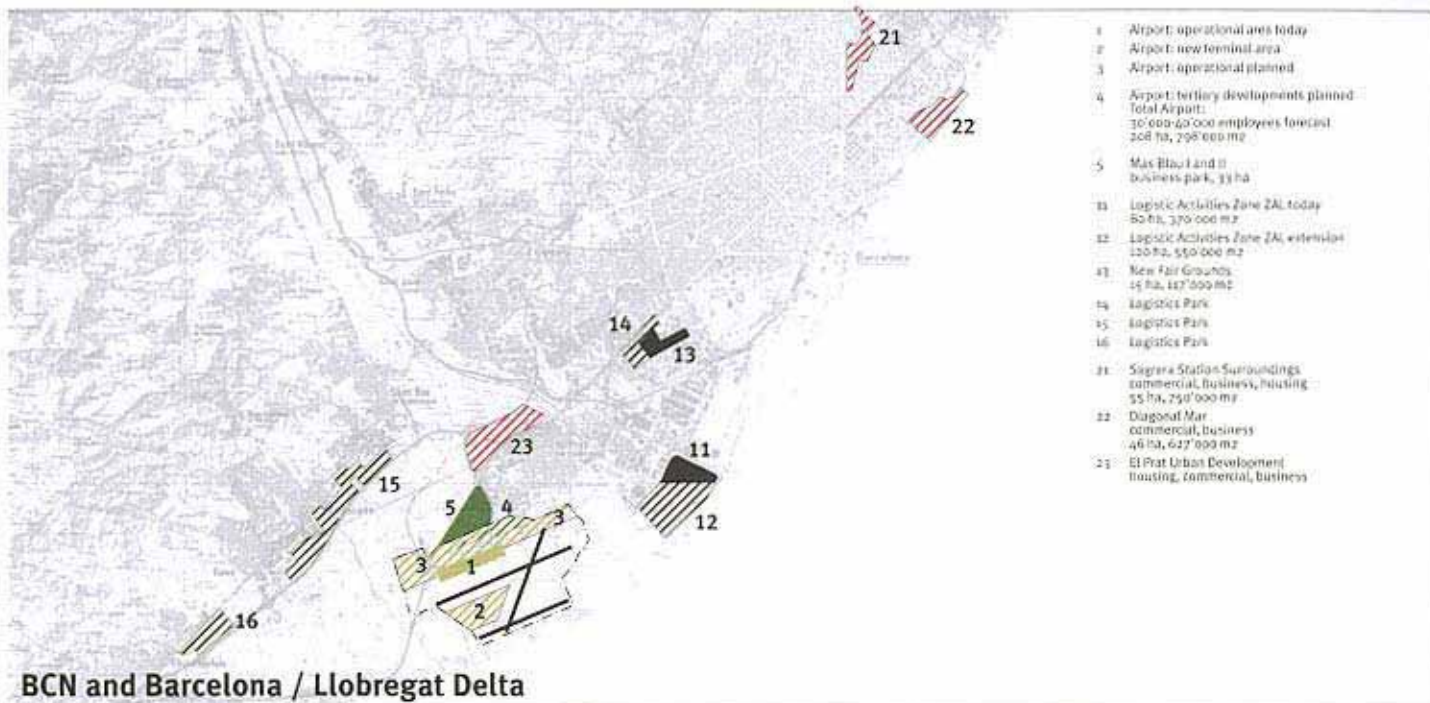
Some regions have successfully started up collaboration in selectivity, co-ordinated marketing or even development co-operation. Their experience shows that close partnerships and clarity between local and regional authorities and the airport form a basis, on which the growth of an airport can have a positive impact on the regional economy as well as on the efficiency and performance of the airport itself. Strategic co-operation within Public Private Partnerships (guided growth) starts to replace spontaneous development initiatives and uncontrolled growth.

Selective programming
With site reservations for specifically airport-related activities like logistics, and with the establishment

FRA and Frankfurt

1. Airport Terminal Area, Cargo City North
2. Cargo City South
3. Trade Park Kelsterbach
4. AiRail Terminal - Business Centre hotel, commerce, offices, medical care centre, 170'000 m2
5. Hotel
6. Gateway Gardens future airport related activities
7. Walldorf Industrial area logistics and other airport related activities
8. Airtraffic Control Germany (DFS) administration

10. Frankfurt's Central Financial District
11. Frankfurt Main Station 'Frankfurt 21' - redevelopment
12. Frankfurt Fairgrounds redevelopment
13. Office Park Niederrad
14. Former Hoechst Industries redevelopment, partly for airport-related activities
15. Former Caltex refinery redevelopment

AMS and Amsterdam / Hoofddorp

1. Schiphol Center / Schiphol South terminals, cargo
2. Schiphol Center - AirportCity offices and hotels, 200'000 m2
3. Schiphol East new office-/company-park, 125'000 m2
4. Schiphol SouthEast new cargo center, 100'000 m2
5. Schiphol Eixenhof offices (incl. EHQ), 180'000 m2
6. Schiphol Golf and business center
7. Aalsmeer Flower Auction (EU's first)

11. Sky park logistics (1/3 offices), 24'000 m2
12. Schiphol Rijk logistics/offices (50/50), 25 ha
13. Schiphol Logistics Park logistics, offices, 130 ha
14. Badhoevedorp South logistics, 30 ha
15. International Business Park Riekerpolder Nissan, IBM, offices, 200'000 m2
16. Oude Haagse Weg future logistics, 6 ha
17. Lijnden/Lutkemeer logistics, 65 ha
18. De Hoek

21. Beukenhorst (Haarlemmermeer) business park, (144 ha reserve)
22. The President (Haarlemmermeer) companies, logistics, 30 ha
23. Grondbank A4 (H'meer, SRE, KLM)
24. Amsterdam Zuid-As 2'200'000 m2 offices, 6000 appartements, 160'000 m2 commerce/entertainment
25. Amsterdam Amstel III
26. Amsterdam Zuid-Oost
27. Amsterdam Teleport
28. IJ Oevers

Amsterdam Airport Area sites

LGW and Crawley

1. Operational Area terminals, cargo, maintenance
2. Platform Hotel area 1
3. Platform Hotel area 2
4. BAA Beehive Site offices, 55'000 m2

11. Manor Royal Estate business park (IT etc.)
12. Crawley Town Centre commerce, business

Airport Platform: Aviation activities

Airport City: Non-aviation activities

Co-ordinated Developments (Airport + Public Authorities)

Minicipal Developments stimulated by the Airport

Regional Development Poles

Strategic Airport Sector

Logistic Transport Systems

0   5km   20km

ZRH and Zurich / Glattal

1 Operational Area
terminals, maintenance, cargo

2 Butzenbuehl area
offices, casino?, 120'000 m2

11 Cher
back-up offices

12 Balsberg
casino?, shopping mall, multipurpose stadium

13 Oberhauserriet
urban and residential district, 60 ha
6'000 inhabitants, 20-30'000 workplaces

14 Kloten industrial area
outsourced airport functions, logistics

15 Hochbord Duebendorf
shopping, sports, industry, offices

16 Leutschenbach TV-Studio, WTC
urban and residential district, hotels, offices

17 Zurich Nord urban redevelopment
hotel, fair, stadium, tertiary, 71 ha

18 Zurich West urban redevelopment
hotels, theatre, industry, soccer stadium, service,
residential, 67-90 ha

19 HB Southwest Zurich main railway station area
redevelopment with housing, offices, commerce

MXP and Area Malpensa

1 Vizzola Ticino - Trade Center
offices, hotel, showrooms, 52'000 m2

2 Cargo City / Zona Franca
logistics, showrooms, offices, 8000 m2

3 Busto Arsizio Business Park
offices, services, housing, 362'000 m2

4 Gallarate Special Development Zone
university, exhibition centre, housing,
entertainment, 160'000 m2

5 Gallarate Intermodal Freight Terminal
(HUPAC), 330'000 m2

6 Ferno-Lonate Pozzolo Station Area
redevelopment: 19'000 m2

7 Busto Arsizio Industrial Zone
950'000 m2

8 Gallarate New Industrial Zone
350'000 m2

ARN and Sigtuna

1 Operational Area
terminal and service area

2 Freight area 1

3 Arlanda Logistic Centre
Freight area 2

4 Service Area

5 Extended Hangar Area

6 Service Area

7 SkyCity
business, conference, hotel, 77'000 m2

8 Airport City on Platform
land-use to be intensified

9 Fair Grounds

11 Arlandastad - Block 1
Eurostop Hotel and Shopping

12 Arlandastad - Block 2
logistics Park, 200'000 m2
(1st fase of North European Logistic and Hi-tech
Centre)

13 Arlandastad - Block 3
logistics: extension of 12

14 Arlandastad - Block 4
office park and hotel, 170'000 m2

15 Brista Business and Light industrial Park

16 Original Perimeter of Arlandastad
593 ha

0   5km   20km

BCN and Barcelona / Llobregat Delta

1 Airport: operational area today
2 Airport: new terminal area
3 Airport: operational planned
4 Airport: tertiary developments planned
   Total Airport:
   30'000-60'000 employees forecast
   208 ha, 298'000 m2
5 Mas Blau I and II
   business park, 33 ha
11 Logistic Activities Zone ZAL today
   60 ha, 370'000 m2
12 Logistic Activities Zone ZAL extension
   120 ha, 550'000 m2
13 New Fair Grounds
   15 ha, 127'000 m2
14 Logistics Park
15 Logistics Park
16 Logistics Park
21 Sagrera Station Surroundings
   commercial, business, housing
   55 ha, 750'000 m2
22 Diagonal Mar
   commercial, business
   46 ha, 617'000 m2
23 El Prat Urban Development
   housing, commercial, business

VIE and Vienna

1 Operational Area
2 World Trade Centre, Hotels
3 Office Park (planned)
   offices, 37'000 m2 (until 2002)
4 Vienna Airport Business Park
   business and logistics, 140'000 m2
5 Messenger and Express Centre
11 Concorde Business Park, Schwechat
   offices, 49'000 m2
12 New Vienna Central Station
13 Erdberger Mais, Gasometer Area,
   Former Abattoir
   urban redevelopment, 200 ha
14 Aspangrуende
   urban redevelopment, 22 ha
15 Businesspark Alterlgasse

HEL and Helsinki / Vantaa

1 Aviapolis (Airport City)
   offices, logistics
2 Veromies / Tertiary
   offices and hotels
3 Pakkala-Tammista
   mixed program, perishables, large-scale retail
4 Koivuhaka
   High-tech, offices, service and trade
5 Tikkurila
   administrative centre of Vantaa and logistics
6 Hakkila
   logistics and wholesale
7 Tuupakka
   logistics and bonded warehouse
8 Sanomala-Myllymaki
   technology production
9 Marja-Vantaa
   technology production, logistics and trade

Airport Platform:
Aviation activities

Airport City:
Non-aviation activities

Co-ordinated Developments
(Airport + Public Authorities)

Municipal Developments
stimulated by the Airport

Regional Development Poles

Strategic Airport Sector

Logistic Transport Systems

0   5km   20km

of strategic sectors around airports for different types of businesses, as can be seen in AMS (SADC), ARN (Arlandastad), BCN (Delta Plan), and to a certain extent also in HEL, sites are given a clear label. They are no longer just any business sites: a strict selectivity applies to the functions allowed, which is also based on a valuation of the site's integration into transport networks. Selectivity, or selective programming, and branding, the attribution of a clear label, are mutually dependent concepts: reserving sites for a specific kind of activity will bring a market advantage.

The example of Arlandastad in Stockholm shows clearly that selectivity and branding can be indispensable even in boom-times: after ten years of vain attempts to attract IT, high-tech and logistic businesses, the area only hosted a major peripheral shopping center. Recently, after having been specified more clearly (mostly logistics) and launched anew in 1999, development starts to move.

Selective programming has, where it has been done, contributed to attracting high value real estate development without frustrating the main function operation than sites around airports.

By replacing individual marketing initiatives, first models of common marketing and of co-ordinated development are to help tackle discrepancies in site-development.

Where marketing for an airport region includes the complete range of sites that can be offered, the function of marketing is not only to represent the airport region as a whole, but also to provide an overview over all plans, and to inform about schedules for the sites and type of activity. Clarity for potential investors on 'when where how much?' is a crucial prerequisite for successful development of Airport City and its relation to other regional development poles.

- Amsterdam, which probably underwent the most radical changes on its metropolitan area with the boom along its southern periphery, has launched several initiatives to co-ordinate and market the different development poles of its urban area: Triport, AAA-area, Amsterdam Zuid-As.
- In Helsinki, the Helsinki Metropolitan Development Corporation has been set up to work out marketing

FROM PURE BRAND TO DEVELOPMENT CO-OPERATION

of the airport, and it could be the key in establishing a regional balance: which activities are to settle around the airport and how is the Airport-City complementary to and broadening the range and offer of urban functions in the metropolitan region? Nevertheless, even though in today's boom-time selectivity and branding would be easiest to implement and most effective in international competition, almost all development sites in all regions participate in the general euphoria and compete with each other within the regions.

Marketing initiatives and development co-operation
Airport regions show clear discrepancies in site development opportunities. Sites on or around airports can often be developed much faster than sites - especially redevelopment locations - elsewhere in the metropolitan area. And airports, used to such projects, offer cheaper, smoother and less complex development handling. More central city sites usually require much higher pre-investments and more complex development co-

strategies and represents the Metropolitan area abroad (e.g. in Cannes). In principle, its name is misleading, as it has nothing to do with actual development.

But Marketing is not Development, it is only a stepping stone to development: a clear distinction has to be made between marketing organisations and development forums. With marketing alone it is not possible to overcome discrepancies between sites, and to control potential bottlenecks. To handle a specific planning context, development corporations are needed. However, a regional development company is not easy to establish. Almost automatically it requires the co-operation of all levels and involved entities. Regional authorities alone usually have no experience with such an instrument, with the exception of Amsterdam maybe (SADC); and as development is not part of their traditional tasks, it is rather improbable that municipalities and the airport cede this function directly to the region.

Development within noise contours?

The city of Vantaa, airport municipality in Helsinki, may be a single exception with its way of seeing its airport's noise contours: "it is our major problem and our major asset". The noise contour means that a large area - close to 25% of the municipality's territory - is uncontested by other functions and can be reserved and promoted for logistic and industrial uses, to become the Logistic Zone of Helsinki. Much more frequently, conflicts in the airport region arise due to the noise immissions on the airport area: particularly opportunities for housing development for the increasing numbers of airport employees nearby the airport are severely impaired.

Collaboration is needed to compensate for the nuisances and limitations of land-use exerted on the territory by the airport's noise impact. Compensation with development within noise contours again requires selectivity; otherwise, there may not be enough adequate land available. Especially logistic and industrial activities, but also business and recreational functions can be located within noise-contours (depending on respective noise protection

CDG - Sud de l'aeroport
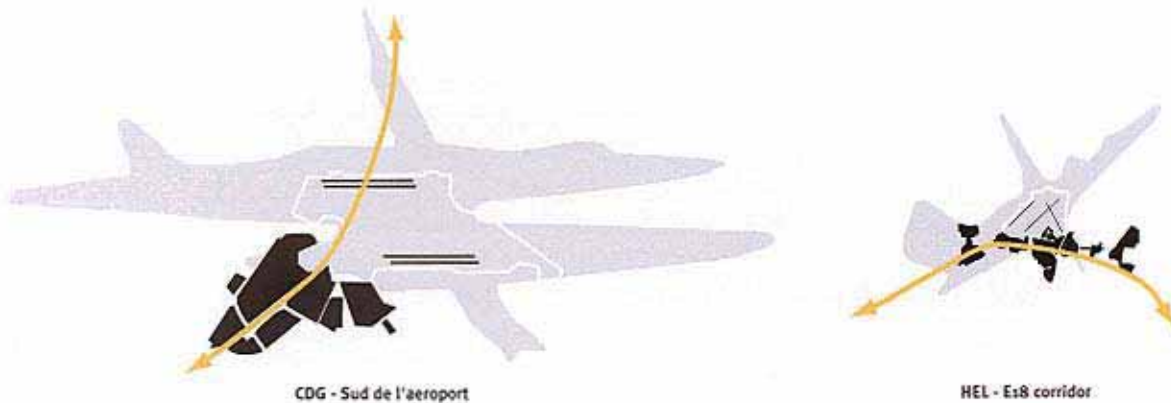
HEL - E18 corridor

TUNING ALLOCATION ECONOMIC DEVELOPMENT WITH NOISE CONTOURS

legislation), provided the highway and rail corridors are also in the same area; Arlandastad at ARN and the E18 corridor at HEL are working this way, and around Schiphol airport explicit strategies of this kind are also worked out. Tax-revenues, employment opportunities, and good integration into public transport networks are then possible compensations for the noise immissions and other environmental nuisances. In HEL and ARN, this is rather easy, as in both cases only one municipality is really affected, while around airports where several municipalities compete for compensation it is a challenge to satisfy them all.

Compensation may become a major element in the attempt to balance the expansion of air traffic with optimal exploitation of the economic potential of an airport.

The city of Vantaa actively exploits its noise contours with economic development within them. In Paris CDG, however, infrastructures and noise contours do not match: the noise contours cover suburbs to the East and the West, while the major high-tech developments, industries and exhibition centres are set up along the bundles of transport infrastructures running North-South.

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MXP VIE
BCN

conclusion

Airports are here to stay. Airport expansion comes along with potential benefits, and major nuisances, not only in its immediate surroundings, but throughout the region. Battles are fought about noise impacts and further concessions of local authorities concerning their land-use plans. In the struggle to find elements that can provide with added value for both sides in this tense situation, economic developments and traffic network patterns that are stimulated by the airport's presence offer top opportunities.

To maximise the beneficial effects, four major tasks have to be considered:
- the integration of land-use and mobility at the airport and in the airport region,
- an efficient interconnection of the different means of transport in the airport station,
- provision of access quality to the entire Airport City comparable to the standards for other urban areas,
- a potential Airport City development within the restrictions imposed by noise on local land-use.

movements in the region, the effect of increasing passenger and commuter traffic from and to the airport on landside traffic is rather small (in AMS traffic induced by the airport amounts to only 12% approximately). But together they have a cumulative effect, creating heavy congestion particularly in the airport area, which cannot be tackled with current policies.
To overcome these threats and guarantee accessibility in the future, hard-core arrangements are needed, not only to improve public and road infrastructure, but also to co-ordinate land-use and transportation strategies in the airport region, and to avoid respective imbalances.

Fully integrated concepts (will) become more and more relevant. Network integration is a prerequisite for development. Accessibility is not only vital for the airport, but a guarantee for the overall investment climate and attractiveness of an area. If bottlenecks appear, business companies are the first to leave. Concepts to improve the accessibility and the position of the airport in transportation networks are to be developed alongside strategies to stimulate

Airport City planning is an unusual planning task. **It is a step** away from purely 'technical airport planning' to include aspects of an urban planning process. **It is as ambitious** - if not more daring - as Central Station redevelopment.

Co-ordination of land-use and transportation strategies in the airport region
It is evident that the potential for economic growth around an airport not only depends on the capacity of the airside facilities, but is also directly related to the quality of landside accessibility of the airport. And vice versa: the quality of access depends on the monitoring and control of the growth of the developments around airports.

Many regions face serious bottlenecks in accessibility in the years to come, as land-use strategies - or less co-ordinated development initiatives - have been hurrying ahead of initiatives to improve transportation networks (bottleneck nr.1 in Amsterdam and Zurich). The enclosure of the airport within the metropolitan area urges to co-ordinate accessibility and urban development. The uncontrolled exploitation of the development potential around an airport - directly on its vital access infrastructures - is conflicting with the primary aim to keep the airport itself accessible. Measured against the natural growth of traffic

and co-ordinate the economic and commercial development at the airport and in its surroundings. Only then the growth of the Airport City can take place while sustaining the primary function of the airport.

Co-ordination of Airport Interchange and Aiport City
Landside accessibility is a battle for a few % of extra public transportation customers, fought for with heavy investments in new infrastructure in the airport region.
Almost all current regional initiatives focus on adding new or improving existing public transportation services to the airport, as well as restricting car access (e.g. with parking fees). As yet missed out are the effects of (1.) developing the Interchange Node, (2.) building on top of the Interchange Node and (3.) demanding top access quality for the Airport City, which are efficient tools to influence the modal split in airport access. They are the new additional tasks in landside accessibility.

1. Interchanging at the airport is as yet difficult. The different means of public transportation are often not yet well connected. An interchange node asks for a different logic than point-to-point access to the terminals. Better connections between the different means of transport would make more services possible, raising the amount of people using train and bus. If 30% of the long distance train passengers at the airport station are not air passengers - as expected at Frankfurt or Schiphol airports -, higher frequencies on local/regional services are feasible.

2. Too often, Airport Cities are still developed where there is room, not where connections are. Building an office centre (e.g. the airport administration) directly on top of the Airport Interchange, instead of elsewhere on the airport territory, will make 5% of the employees leave their car at home - as Frankfurt airport calculated. In comparison, Marjaline, which is to connect Helsinki airport, is expected to lead to a 3% increase of the share of public transportation, Frankfurt's 'Regionaltangente West' to a 1.1% increase. Of course, these new rail lines are above all key-projects to improve the regional networks, and the beneficial effect on airport accessibility is a welcome side-effect.

integration of land-use and mobility, and the creation of an attractive environment at the airport for employees, visitors and others, as well as urban accessibility, are tasks that are to be tackled with urban planning instruments rather than with airport/airside planning. As should be standard in any normal city planning, integration of land-use and mobility stands at the core of the task.

But airport planning - and thus planning an Airport City - is not a normal planning task!

- It is particularly difficult since everything is on the move. An airport is subject to a continuous transformation to allow for further expansion, the improvement of the airside product (e.g. terminal concept) and of the quality of the Airport City (e.g. open space). Functions switch place on its territory: a terminal instead of a freight centre, the airport administration instead of maintenance, a business centre instead of a parking lot.
- Partnerships and responsibilities to develop an Airport City together are not yet clearly defined. Currently, the airport operator claims two tasks: the public responsibility of the airport operator and the private interests of an enterprise and real

It is particularly difficult since everything is on the move. **It is highly specific,** as a double agenda is to be satisfied: the making of an Airport City without interfering with the airport's space for manoeuvre.

3. Landside accessibility is decisive for the quality of the airport as a working environment. There is an important deficit concerning access for other users of the airport than passengers: employees, clients and visitors. They cause more traffic movements than passengers, but have a much lower modal split! If connections between landside access and terminals are optimised, it is risky not to do the same for connections between landside access and the workplaces and destinations of employees and visitors. Their share in landside traffic is likely to grow faster than that of passengers, as an increasing share of air passengers are transfer passengers.

An unusual planning task

There is an extreme development dynamic on the platform and in its immediate surroundings. The quality of what happens does often not come up to the requirements. Common instruments - 'technical airport plans' - are not adequate for handling the complex organisation of the airports' landside. The

estate developer. But Airport City has not been taken out as a patent by the airport operator.
- In a city, expansions and transformations are neither as fast nor as big nor as radical. At the core of an Airport City there is an airport with all its nuisances and its security requirements. There needs to be space for manoeuvre: in a city, where traffic networks are more or less stable, this is not necessary in the same way.

An airport is not simply an airport anymore. But - it's not just a city, either.

3

PART **3**

airport sh

All over the world, the growth of Airport Cities and the increasing use of the airport as a landside Interchange are issues that have to be faced by airports and their airport regions. But not every situation is equally adequate for such developments. 'Why and how an Airport City is realised', for example, or 'Why no Airport City is developed' are equally important questions.

The nine European airports and airport regions show very different development stages and patterns of Airport City and Airport Interchange. To understand the individual features of every situation, the prevailing conditions have to be considered: economic and political in terms of the necessity for an Airport City, and environmental and social in terms of its feasibility. Opportunities for Interchange functions and Airport Cities depend, on the one hand, on the requirements of airport operability, on the business orientation of the airport operator, and on the quality and capacity of airport access. On the other hand, they depend on the airport's position and role in the metropolitan region, different policies of the involved authorities and the protection of the environment.

The 'Short Stories' are not written on a fix pattern, but highlight particularly interesting features and the respective experiences made in the different regions. They are to provide a general understanding of the benefits and possible dilemmas of Airport City and Airport Interchange development, and outline interests and strategies of public authorities and airport operators, as well as instruments available to them.

The nine Short Stories are based on interviews and discussions in the specific regions during summer 2000. Nevertheless, the ideas and opinions expressed in these texts are those of the authors.

'Big' airport versus 'small' territory

Malpensa airport is not - as is usually assumed - a new airport planned from scratch out in the green. It is the result of several radical expansion phases of a former military airport situated at the western border of the metropolitan area of Milan, some 50 km off the city centre.

Two things explain most of the characteristics of the new Malpensa-airport and the difficulties concerning its integration into local and regional developments: the airport's size, and the fragmentation of the surrounding territory.

Malpensa is forecasted to handle 21 million passengers in the year 2000. In only one and a half years, the airport has undergone a spectacular leap in scale: before the renewed Malpensa airport opened in October 1998, it transported less than 6 million passengers! This success was unexpected. Neither the airport development plan 'Malpensa 2000' of 1985 (predicting 8-9 million passengers), nor the 'Piano territoriale d'Area Malpensa' of 1999 (predicting 12-15 passengers in 2005) foresaw such a radical growth. As a consequence, the context of planning - which had been very constructive during the preparation of 'Malpensa 2000' - has become more controversial since the airport's opening in 1998.

Unlike most European airports which are situated either within the main city or on the territory of only one neighbouring municipality, Malpensa airport lies on the territory of 7 municipalities, the smallest of which governs only 430 inhabitants. The municipalities are completely unprepared to deal with an airport development of this scale and of this speed. The discrepancy between airport development and the local development strategies further increases due to a persistent lack of co-operation between the local authorities concerning their respective land-use strategies.

1. Piano territoriale d'Area Malpensa
In 1999, the 'Piano territoriale d'Area Malpensa' was produced in order to build up a framework for co-ordinated action between the region and local municipalities concerning the spatial and economic integration of Malpensa in the territory. This is a strategic plan for the 'Malpensa Area' - a limited sector of 17 municipalities which are directly affected by the development of MXP airport.

Since this part of the metropolitan area of Milan suffered a decline (80s and 90s) in its traditional manufacturing industries

(textile, mechanical engineering), many of the municipalities were left with large brownfield sites within their cities. Independently, they launched major operations for renewal, creating an abundant offer of development sites in the region.
The task of the 'Piano d'Area Malpensa' was, therefore, above all:
"- to provide an inventory of all the projects and initiatives of the authorities and institutions involved within the Malpensa Area to form a complete overview of all ongoing planning
- to challenge the development potential of the existing plans and the capacity of transportation networks within the area with regard to the expected effects of the expansion of Malpensa airport
- to propose specific projects - in the fields of mobility, environment, economic development and airport impact, to achieve the integration of Malpensa and co-ordinated development of the 'Malpensa Area'." [1]

The co-ordination between the different actors happened through the formation of a Committee, chaired by the province of Varese. Besides the concerned municipalities (including the major conurbation of Busto-Arsizio and Gallarate), it included the region, the 3 provinces (Milano, Varese and Novara), the airport authority SEA and the consortium of the (regional) 'Parco del Ticino' (park of the river Ticino).
The 'Piano d'Area' is no plan as such. It is rather the start of a process of collaboration and a proposal for regional development, fully dependent on future possibilities to implement and monitor this process.

2. The initiatives of the airport
Both Milanese airports are run by the SEA, a publicly owned enterprise, with the city of Milan (84.6%) and the province of Milan (14.5%) as major shareholders. Geographically, however, the airport lies within the province of Varese. But neither the shareholders nor the province of Varese have authority concerning airport development within the airport perimeter. This is in the jurisdiction of the Italian national government.
Until 1998, the Lombardy region, the so-called 'heart of the Italian economy', in which Milan lies, did not dispose of an adequate international airport. The 1985 airport development plan 'Malpensa 2000' was to provide the framework for a northern Italian hub for Alitalia, with three core-projects:

190 Million consumers
▲ NEDC

▲ SEDC
190 Million consumers
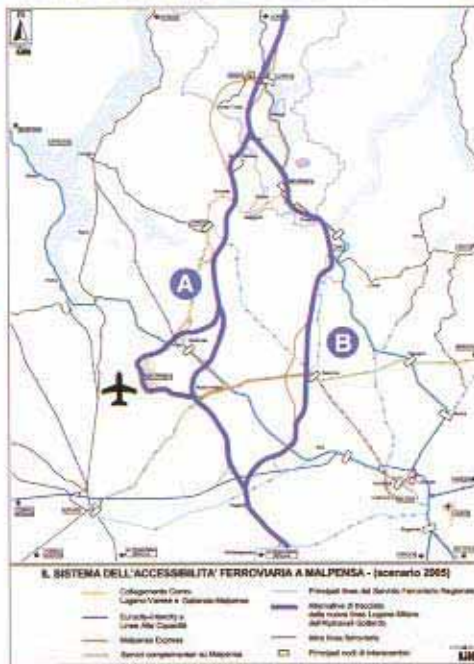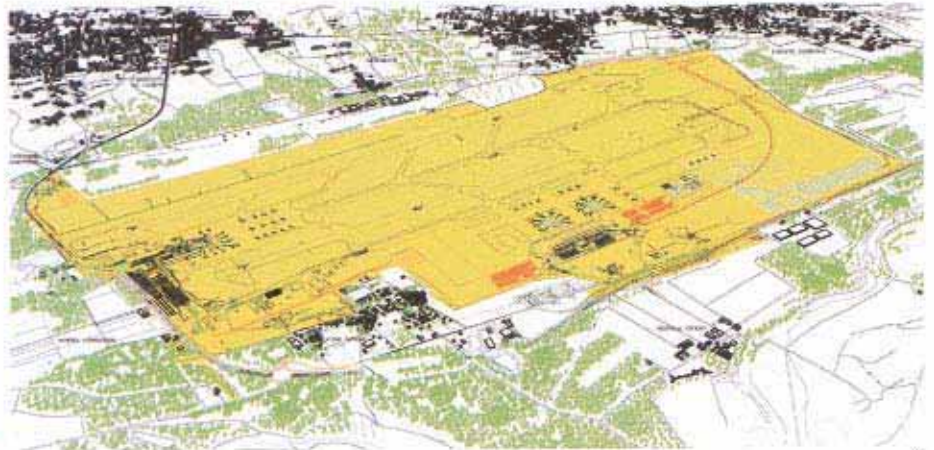
① On the territory of 7 municipalities
② Perimeter of the 'Piano d'Area Malpensa'
③ Regional and national rail are not yet connected
④ Two business parks will be built behind the main
   terminal (at the lower right)
⑤ Integration into Alp-Transit is an open issue
⑥ MXP: on a narrow strip of land between
   Parco del Ticino (left) and the runways (right)
⑦ A new Southern European Distribution Centre?

IL SISTEMA DELL'ACCESSIBILITA' FERROVIARIA A MALPENSA - (scenario 2005)

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1- Redesigning the airport: 'Malpensa 2000' foresaw the construction of a new main terminal to the west of the two existing runways. Currently, the two terminals operate separately for different types of air-traffic (terminal 2: charter and full freighter only, terminal 1: regular/scheduled flights). The northern terminal 2 is proposed to serve as a future satellite terminal which would require a passenger-shuttle and a baggage-link. Both a people mover or a second station for the 'Malpensa Express' train are possible options.

2-Malpensa Express: in 1999 the new airport was connected to Milano Nord (Cadorna) Station with a point to point train service (every 30 minutes). It is operated by the regional railways Ferrovie Nord Milano FNM.

Due to the 'Parco del Ticino', only a narrow strip of land was left for terminals and landside accessibility. This led to an extra-ordinarily compact and vertical organisation of the terminal and parking, as well as to direct connections with the railway station (4 floor-terminal, and multilevel car parks built above the railway station).

3-Cargo City: The 'Malpensa 2000' masterplan foresaw a Cargo City capable of handling 200'000 tons of air-cargo per year, with a future capacity of 1 million tons. With this initiative, Malpensa not only intended to become a new European hub airport in terms of passenger traffic, but also the Southern European Distribution Centre for freight, to balance the dominance of northern Europe. A special logistics branch, the Malpensa Logistica Europa SpA, was formed next to SEA, to make sure Malpensa will reach this status.

The Cargo City is also a response by the airport operator to fit the economic profile of the region. Its potential for international air-cargo has, until recently, remained unused (e.g. textile/clothing production). In its first phase, the focus will be on freight handling, in multi-storey cargo facilities. Later, logistic activities will be added and in the third phase it will be expanded into a distribution centre (with the option of a rail terminal), on a total surface of 100 ha.

3. The goals of the Piano d'Area
... concerning landside accessibility

The metropolitan structure of Milan is very spread out but very densely urbanised. The historic, radial connections to Milan centre are heavily congested (the axes Como-Monza-Milano, Varese and Domodossola-Bustio-Milano), while tangential connections are underdeveloped. A new tangential railway link and the so-called 'pedemontano lombardo', a highway running at the foot of the Lombardy hills and bypassing Milan to the north, is to provide with some relief.

The 'Piano d'Area' has stressed "the necessity to develop a rail-infrastructure, which is not solely airport-oriented (as is the 'Malpensa Express'), but would establish a better integration of the whole area and the airport into rail-networks". As the two networks of the regional railway company FNM and the national company FS are not yet connected, other services are not yet possible. The integration between the FNM and the FS networks is therefore at the top of Lombardy region's agenda: a few metres of rail will provide the missing links at Novara, Busto Arsizio, Gallarate, Varese and Milano CS. This will allow trains from MXP to run in all directions: to Switzerland, to Venice (via Milano or the northern bypass), and south-bound to Novara, Torino and Genova, and to increase the accessibility of the natural catchment area of the airport.

The 'Piano d'Area' concludes that a more efficient local network has to be established to cope with the growth in traffic due the radical airport expansion. Accessibility to the new airport for its 16'000 employees still relies mainly on car-use. At Malpensa, not enough local public transportation services to the surrounding cities have been set up. Neither did the SEA launch any initiative on its own, except for a Malpensa-Linate shuttle that serves SEA employees still living around Linate airport. Particular attention will have to be given to the connections between the local and regional/national public transportation networks, enhancing the formation of regional interchange nodes in the Malpensa Area. It seems unlikely that Malpensa airport will become one of these interchange nodes: it is too remote with regard to the urban centres in this part of the metropolitan area of Milan. Gallarate is now the major interchange. The preconditions for connecting (inter)national with local/regional trains at Malpensa would, however, change if it were directly connected to the international Simplone rail line, a link that would bypass Gallarate.

...concerning Airport City development

Due to the recent economic decline, the Malpensa area needs re-development rather than new development. In addition, major areas which have been designated for new housing have become inappropriate for this type of development due to the growing noise impact. The municipalities around Malpensa are left with an excessively large stock of new development plans and brownfield sites (former industrial sites). Their struggle to re-programme these areas is hindered by a lack of structures for local collaboration, and by insecurities about the future growth of Malpensa airport.
At the airport, two initiatives have been launched to profit form the airport expansion: the airport authority is planning a business park (150'000 m2) just outside the terminals, while the smallest of the 7 airport municipalities, Vizzola Ticino, is planning a trade centre of some 55'000 m2 just opposite the airport's business park.

The 'Piano d'Area' proposes to distribute as much as possible of the potential spin-off of the airport over the wider surroundings of the airport. Development on new sites on and around the airport is to be minimised, while re-use of the former industrial areas available within the limits of the surrounding cities - like Gallarate and Busto-Arsizio - is to be stimulated to the maximum. The sites near the airport are to be reserved for a limited amount of specifically airport-related functions: the Cargo City, as well as hotel and conference facilities. The 'Piano d'Area' promotes "a co-ordinated and controlled growth of complementary, multifunctional development poles".
Such a diffusion of the economic impact of Malpensa airport will require rethinking of the accessibility of the Malpensa area. The potential axes of urban development, Malpensa-Saronno, Malpensa-Gallarate and Malpensa-Magenta, have yet to be equipped with adequate means of public transportation.

4. The challenge: a comprehensive regional strategy

The principal challenge at Malpensa airport is the integration of a large-scale infrastructure, a 20 million passenger airport, into a fragmented, small-scale local context - the Lombardy region contains no less than 1570 municipalities. Despite the spectacular growth of air traffic at Malpensa

and its declared goal to reach the status of a hub airport, the impact of Malpensa airport on the local economy was minimal until now. The Milan-governed airport is still seen as an element alien to the local context, causing increasing nuisance due to its rapid growth. To get some relief, a group of municipalities is proposing an additional runway oriented in a different direction, to replace some of the more problematic approach routes in terms of noise.

Another challenge is the lack of suitable instruments to promote the whole of the 'Area Malpensa' as a multimodal logistic platform. The potential of this region for air and rail cargo is obvious: the Cargo City with Malpensa as the air cargo hub for Alitalia, the logistic terminals (rail-road) of Hupac and a specific 'integrated logistic development pole'¹ between Busto-Arsizio and Gallarate.
But competition between the various local authorities to develop a major road-rail interchange frustrates the common promotion (by local and regional authorities and private parties) of north-west Milan as logistic platform in a way that would be comparable to what Barcelona has achieved with its 'Deltaplan'.

The third challenge is that the 'Piano d'Area' has not yet led to co-ordinated land-use strategies in the 'Area Malpensa' with regard to air traffic-related business. The different sites within the 'Area Malpensa' still lack a clear profile (a start has been made with the 'Piano d'Area') and schedule of when which site could be developed. Only very recently have there been attempts to evaluate the possibility of setting up strategic co-operation within a development company (public private partnership).

The development plan for the 'Area Malpensa' can be located somewhere between spatial planning and programming. It has updated the general regional structure plan for this area. It has not been explicit in formulating regional development goals or common and co-ordinated action: it sets out the sum of existing local plans, suggesting eventual adjustments and proposing their integration. But the individual plans - each in itself a reasonable plan - remain punctual interventions in the region. Strong planning competence at the local level has made integrated development in the Malpensa Area very difficult, until today.
The earlier Committee has now been dissolved and transformed into two bodies without planning or programming authority: a 'Consultancy Malpensa 2000', representing all interest groups, which could launch development initiatives but which suffers from a large number of representatives (making it inefficient), and a 'Technical Commission', which is to monitor and guide the updating and fine-tuning of the plan.

Yet the implementation of the goals set out within the 'Piano d'Area' will not only depend on the willingness of the local authorities to co-operate, but also on the participation of the airport. The airport operator SEA has neither been keen to inform local and regional public authorities about its plans, nor has it tried to get involved in initiatives beyond its own territory. It commissions its own economic impact studies, and is primarily concerned with the development of its own sites, the Business Centre and the Cargo City.

5. Outlook: an airport system
One other factor seems to influence the current hesitation around further development of the 'Area Malpensa'. Everyone seems to be waiting for clarification on the future of Malpensa airport. It has been established as the new northern Italian hub, but no decision has been made as to how much it is to grow. This will depend largely on a decision to develop an airport system from the four airports in the Lombardy region (Malpensa, Linate, Bergamo, Brescia) or eventually even an airport system for the whole of northern Italy, with Venice, Bologna, Bergamo and Malpensa, to be able to serve one of the most prosperous economic regions of Europe more directly than a central hub would do.
Consequently, the integration of Malpensa airport into the (inter)national north to south train corridors - the two Alp-transit lines (Simplone and Gotthard) - remains an open issue. Malpensa's geographical position would allow for a deviation of the nearest Simplone-branch via Malpensa, bringing Intercity and international trains to Malpensa. On the other hand, a direct connection to the Gotthard-line is currently being investigated. The Lombardy region must express its preferences between two principal alternatives for the Gotthard connection: an alignment via the current corridor at Como, or a new link at Varese, which would allow for eventual integration with Malpensa. The choice is particularly difficult since neither alternative has clear cost/benefit advantages. For southern Switzerland, however, a fast link to Malpensa airport (via Varese) is a very attractive alternative over the rather remote Zurich airport.

Conclusion: Malpensa Area - an example for an integrated project approach?
The 'Piano d'Area Malpensa' was a promising start. It encompasses an appropriate territory to deal with and co-ordinate airport development with all other aspects of spatial planning; a tool with which to form strong, new alliances between all involved parties.
But until now, the area defined as the 'Area di Malpensa' has mainly served analytical purposes. The small municipalities around MXP airport have joined together into a 'co-operative group of municipalities', but have nearly exclusively dealt with issues concerning the environmental impact of the airport. They have not yet set up a framework for concerted planning to integrate the airport into the region, a task that has actually been assigned to them by the Lombardy regional government. This, however, would be necessary to increase their capacity for action and co-ordination with the airport operator and the established local economic actors (including intermodal logistic operators).

In May 2000, another, very experienced player appeared on the map of the Area Malpensa: the Malpensa Real Estate BV, a 60% subsidiary of Schiphol Real Estate. It was set up with the aim of developing real estate at Malpensa⁵. This announced a future trend in the development of land around airports, which demands extra attention from the local and regional authorities, and requires new forms of public private partnership.

1 'Malpensa 2000 Project', the new airport masterplan of 1985, to be completed by 2000
2 'Piano territoriale d'area Malpensa', Regione Lombardia, April 1999
3 idem
4 idem
5 Malpensa Real Estate BV: SRE 60%, Grontmij (a Dutch developer) 40%

ARLANDA.
en.unik mötesplats

'A unique meeting place': the official slogan of CAA Arlanda

Regional planning in Sweden is mainly about issuing guidelines for the co-ordination of development in urbanised areas around major cities. Lying at the scarcely populated edge of Stockholm County, some 40 km outside the city, Arlanda Airport has not been identified as subject to such co-ordination. Regional Planning has considered the airport only in terms of airport capacity and function, as well as environmental impact (in particular land-use restrictions due to noise), but not in terms of the creation of an Airport City.

Sigtuna, the municipality in which the airport is located, is therefore very much on its own in dealing with Arlanda Airport. Since 1987, airports are, in principle, part of the normal planning system and thus subject to the municipal land-use authority. Arlanda Airport is probably one of the fastest growing European airports, particularly with respect to capacity expansion: a 3rd runway is under construction now, a 4th runway is planned for around 2010, and a 5th runway is being studied as a long-term option.

1. Arlandastad
Co-ordinating business development in the airport area

In the 1980s, and more so in the early 1990s, the municipality of Sigtuna and the Swedish Civil Aviation Administration (SCAA) launched and promoted a new concept for airport-related business development close to the airport platform: Arlandastad, that is: Arlanda-city. A rather huge area, encompassing a total of 593 ha, was reserved for this purpose in the forested area between the airport and the municipality's new town, Märsta, where it connects to Stockholm's northbound railway lines and the E4 highway junction to Arlanda airport. A total of 300 ha of the area was to house activities like business parks, high-tech businesses, and knowledge-intensive companies. The rest was to be divided into 120 ha for open space, 100 ha for operational activities of the airport, and 80 ha for industrial activities. The western part of Arlandastad consisted of an already built up industrial area, Brista.

The initiative is an early example of co-operation between an Airport Authority and the airport municipality. Sigtuna, over many years, bought most of the land. To promote and control development in the area, Arlandastad Company was set up, belonging to two of Sweden's main

construction firms, PEAB and Skanska. Sigtuna municipality and the SCAA are advisors and members on the board. According to the agreement between the company and Sigtuna and the SCAA, Arlandastad Company has the exclusive right to buy blocks of land on the basis of a city development plan, as soon as there is demand from external investors. Co-operation between the company, the municipality and the airport is very good. Arlandastad Company sees itself as an instrument serving Sigtuna and Arlanda, ensuring an attractive development of Arlandastad with companies profiting from the infrastructure and the airport, and adequate facilities for the workforce. The goal is to create a full-fledged urban society in Arlandastad, which is expected to take some 20 years.

Sigtuna makes tax-income only with housing
For Sigtuna, Arlandastad and the respective co-operation with the SCAA and the development company are important tools for guiding business development in the area. The municipality's interest is to prevent an imbalance between business and housing in the municipality itself and in its surroundings, and to avoid a programme that creates large workforce commuting into the municipality, and businesses that generate a lot of customer based traffic.

In the Swedish tax-system, local taxes can only be raised on the personal income of residents, not on businesses. Sigtuna is therefore not interested in developing Arlandastad 'a tout prix', that is any programme at any cost. The airport municipality is more interested in reserving Arlandastad for specific functions that have a strong inclination to air traffic or are airport-related. These would take advantage of the infrastructure and the airport, and create the least amount of consumer traffic from other parts of the region. Reserving Arlandastad for this type of development guarantees the availability of space in the long-term for further developing these functions, along with airport growth.

The importance of the tax system for business development around airports becomes clear when one compares ARN with the new airport of Munich, MUC. Both airports are equally far away from their main cities. But as in Germany businesses contribute to the municipalities' tax-income, the municipalities around MUC offered major tax incentives and other

support to companies. As a consequence, business developed in an unprecedented way, even though MUC is very poorly integrated into public transportation networks.

In 1999, Sigtuna municipality strongly opposed the large noise contour that the SCAA drew up for ARN. The problem was not that Sigtuna's current residential areas would be strongly affected by the airport's noise; the new parallel set-up of the runways would, notwithstanding the addition of a third and fourth runway in the same direction, reduce noise immissions. But the contour obstructed Sigtuna's plans for more housing, and seemed to be a rather excessive 'safety measure' of the airport administration to guarantee airport expansion. As Sigtuna cannot provide housing for the entire workforce of the airport and Arlandastad, a considerable share of housing demand is diverted to surrounding municipalities.

Arlandastad and the Greater Stockholm Area

The original concept for Arlandastad was to create a high quality business park for knowledge-based businesses and areas for light industrial and logistic activities close to the airport. To date, however, only one block of Arlandastad has been developed, mainly as a regional shopping facility, and comprises a hotel, an outlet factory and a shopping centre. Therefore, the development and marketing concept for Arlandastad has recently been adjusted, and the area has been launched anew.

The original area assigned to Arlandastad was over-dimensioned. Arlandastad was planned during the economic boom in the second part of the 1980s and at that time was even perceived as a threat to the city of Stockholm as a high-tech business location. However, the estimation of the market demand for business premises at a location this far from the centre of the region was unrealistic, a problem that was further enhanced in 1992 by the crash in the Swedish property market. The proximity to Arlanda airport alone was not attractive enough for IT, high-tech and knowledge-based businesses. This type of business, for example like Ericsson, indeed do locate in the Arlanda corridor, the main northbound exit of the region, to have good access to the airport. But they do not need spatial proximity to the airport, and as the Greater Stockholm Area is very centrally organised, they prefer to stay within the northern

urban periphery of the city, in Kista-Sollentuna, a booming high-tech area. In fact, this area is experiencing such strong growth from international high-tech businesses that according to the Regional Plan 2000 an additional stop of Arlanda Express is planned in Häggvik/Kista, to optimally connect this area to the airport.

Arlandastad, and in particular the area between the E4 motorway and the airport, was also perceived as a major threat to the operability of the airport in the long-term. The platform is and has to stay an airport and provide access to the Stockholm region. Flexibility, above all, in the form of opportunities for the construction of extra runways, and space for operational and airport-related activities, needs to be guaranteed. Unclear programming of the developments could generate unwanted traffic, congesting the airport's accesses.

Arlandastad re-launched: towards site-branding

To qualify and be promoted as a 'Regional Centre Area' in the Regional Plan 2000 for Stockholm County, a site must not only have high accessibility from within the region, it must also be part of an already densely populated area, contain regional services and have a substantial hinterland in relation to Stockholm city centre in terms of population and potential economic density. The goal is for a more efficient use of existing urban areas. ARN airport and its scarcely populated surroundings are not considered a Regional Centre Area. With the regional economy doing well, Arlandastad can and has to be reconsidered on the basis of its most specific asset, the airport. To fully take advantage of the airport's presence and capacity for growth, the strategy for developing Arlandastad has shifted from airport-oriented high-tech, knowledge-based businesses to increased airport-relatedness, with a focus on logistics and distribution. A mutual agreement between Sigtuna, Arlandastad and the airport promotes a considerable part of the area as a North European Logistics Centre (NELC) and Arlanda Logistics Centre.

The commitment to logistics is promising:
- as opposed to earlier policies, it attributes a more specific and adequate characterisation to Arlandastad, and promotes reasonably sized segments of the area for specific activities.
- in line with regional guidelines, it benefits the whole region, and

Arlandastad (1986), 600 ha of airport business, had a slow start

Earning taxes on housing, Sigtuna is against extra-large noise-contours

Planstruktur 2030 alternativ P
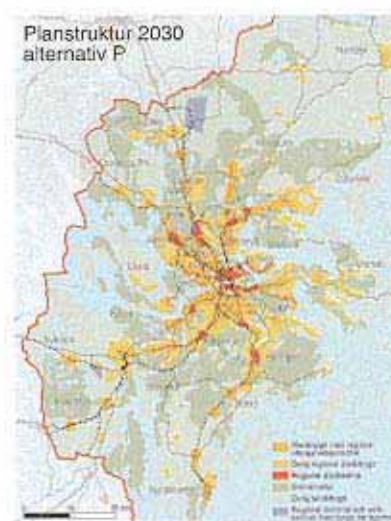
Regional Plan 2030: the airport is no Regional Centre Area

complements the main development poles of the Stockholm region. it optimally contributes to airport operability, while at the same time taking full advantage of the airport's capacity. Lufthansa (the leading airline company of Star Alliance which also includes SAS) has recently chosen Arlanda as its northern European freight hub.

2. The airport's own Airport City initiatives
SkyCity
'At the heart of Arlanda is the Nordic region's most efficient meeting centre, SkyCity, which offers conference facilities, shopping and overnight accommodation at a first-class hotel only 100 m from the gate.'* SkyCity, inaugurated in 1993, is an outstanding example of a first generation terminal-bound Airport City concept, and an important marketing tool for the airport: 'Arlanda Airport - a unique meeting place'*. Its position in the airport is very interesting: it forms the hinge between the northern and the southern air terminal areas. With the recent introduction of the railway connections to ARN, it happens to sit right on top of the Intercity and regional rail terminal (as is the case in FRA's ICE station). Being thus part of the operational area of the airport, it is a kind of Airside Centre, but at the same time serves as station hall, and is publicly accessible from the landside. Its 70'000 m2 of floor area include shopping, business, and conference facilities as well as a hotel and a series of restaurants. These facilities are frequented by an average of some 100'000 visitors per week, of which 75% are also airline passengers. With close to 330'000 passengers at Arlanda every week, every fourth passenger uses the facilities in SkyCity!

SCAA: a new business orientation and an Airport City
The Swedish Civil Airports Administration (SCAA), which operates 19 Swedish airports (amongst them the most important ones), is not state-subsidised. To finance investments, the 19 SCAA operated airports have to come up with their own revenues, and are therefore usually run as commercial businesses. Of the 19 airports operated by the SCAA, however, only 7 are profitable, with Arlanda at the top. These seven have to cross-finance the others. Currently, financial pressure within the SCAA is high, as most of its revenues are channelled into the expansion of ARN (third runway, new terminals).
Airport planning is done at each airport by

its own administration, but in 'large-scale projects' it is done together with the head-office of the SCAA. CAA Arlanda is currently transforming itself from a technical authority, with a focus on infrastructure, into an airport authority with a stronger business orientation. A planning department is being set up to approach not only airside, but also landside planning issues, and to generate additional revenues. Yet, this planning activity is still strictly limited to the airport perimeter, and aviation issues (airside support facilities, logistics, cargo) have priority.

In line with the new company strategy, CAA Arlanda seized the opportunity offered by the 3rd runway and the necessary perimeter expansion to incorporate part of the area between the E4 exit and the airport terminal area (former Arlandastad territory) to promote the Airport City and logistics on its own property. (This strategy is similar to the platform expansion at BCN airport). In the access corridor, hotel and conference functions and some business space, are supposed to complement car rental, parking areas and SAS administration office buildings. This internal Airport City development is uncontested by the surrounding authorities as the demand for hotel and conference facilities on the platform by far exceeds the capacity of the present facilities. In principle, the sites reserved on-platform and in Arlandastad for business and logistics form a commonly promoted Airport Zone, allowing investors to freely choose the most appropriate location. However, the airport still needs all its resources for its expansion, and has as yet not been able to prepare the necessary urban development plans for its logistic and Airport City development sites. The CAA can, within the next couple of years, not offer any areas ready for development, while in Arlandastad the plans are ready for several development sites.

How to connect to the Airport City?
With the current expansion and reorganisation of all airport activities, and the creation of the Airport City inside the airport boundary, a shuttle-service is required to access and link the disperse sites on the vast platform. As it would allow for more remote parking, valuable central areas on the platform can be liberated from a parking function, and the complicated traffic layout in the heart of the airport can be reduced.
A Sigtuna initiative, which is being

discussed with CAA Arlanda and Arlandastad, is to extend this shuttle service, or SkyCab, as it is called, to Arlandastad, and eventually even to Märsta and Sigtuna.
Sigtuna has been able to attract and accommodate a remarkable share of airport-related hotel and conference facilities. Together with the airport, Sigtuna is Sweden's 4th most important hotel and conference centre. The municipality considers the existing bus system linking the airport to Märsta and Sigtuna as insufficient for the current and future demand from visitors and the municipality's airport workforce, and strongly promotes the improvement of the local east-west connections to the airport.

3. No landside Interchange, but a multi-modal Airport Station
Arlanda station is an important national railway station: it is the 4th busiest station in Sweden, after Stockholm, Gothenburg, and Malmoe. Long-distance services and the link to downtown Stockholm are already well catered for:
- opened in 1999, Arlanda Express is a high-speed point-to-point connection to downtown Stockholm, and significantly contributes to the integration of railway and airline modes of transport. Tracks were built and financed by a private consortium. Upon completion, ownership of both tracks and trains was transferred to the State, and in exchange the consortium was given the right to operate the express service until 2040.
- all national and IC trains bound to Northern Sweden call at ARN, including the direct trains between Stockholm and Uppsala. Additional direct connections to other regions of Sweden will make rail traffic grow rapidly in the next years.
- Direct east-west long-distance connections are provided by bus services.

The local buses between Sigtuna and the airport also serve to integrate the airport into the regional rail networks, which today are only indirectly accessible via Märsta station, which is Sigtuna's railway station and final stop of the northern Stockholm commuter trains. In the future, an extension from Märsta station to the airport via a short loop (heavily promoted by Sigtuna, who had already promoted a railway-connection to the airport in the first place) could directly connect the airport to the commuter train network in Stockholm County. However, this extension is still a controversial issue within

Stockholm County Council. In the County's proposal for the new Regional Plan 2000, which is now out for consultation, the extension is included as a medium to long-term option. The SL, the public transport company owned by the County Council, sees a need for the extension only if passenger and employee numbers on the airport platform increase substantially and justify the financial effort.

Three rail stations directly under the airport terminals

To optimise accessibility to the air terminals, three underground stations were built at the airport: two for the Arlanda Express, directly underneath the northern and the southern main terminal areas, and a third station for IC, regional and eventually commuter trains, right under SkyCity. The escalator of the latter surfaces in the apron area and connects via a short bridge to SkyCity's main hall.

Notwithstanding the airport's high accessibility by rail, and the excellent direct bus services between Stockholm and the airport (every five to ten minutes), there is no great demand for using ARN as a landside interchange. The airport area, and in general all of Stockholm County to the north of Stockholm's urban periphery, is very scarcely populated. The local demand for national and international rail connections is low. The people of Sigtuna continue to use the nearer Märsta railway station, which also serves as bus interchange for the airport area, for those commuting to Stockholm.

Thus, the fact that the stations for the different means of transport - local buses, rail, and Arlanda Express - on the airport platform are not closely connected to each other is of no great disadvantage. Instead, landside accessibility provides maximum comfort for public transport passengers. While the three railway stations are right under the terminal areas, access to road-bound means of transport is convenient too (from terminal to bus to taxi to car). The favourite option for the SkyCab people-mover and its stops is to stack them on top of the terminals.

The Maximum Pollution Limit - a tool for improving the modal split

The so-called 'Maximum Pollution Limit' for ARN, which is a limit to the over-all air pollution in the airport area (including both air traffic and ground-

transportation), was and is an important factor for the successful implementation of the extensive range of public transport alternatives at Arlanda airport. Originally, the limit was established as part of the government's planning permission for the 3rd runway, in order to generate less pollution and less noise with newer and better aircraft. Due to the government's coupling of pollution from aircraft with landside transport to and from the airport, however, the airport actually had the choice - and in fact did chose - to reduce landside pollution. Together with Sigtuna and Arlandastad, it promotes public transport and reduces car traffic in the area while pursuing more or less unconstrained growth on the airside. As a consequence, the landside's share of Nitrogen oxide (NOx) emissions at the airport, for example, which was at 66% in 1990, will be reduced to 57% by 2005.

After completion of the 3rd runway, the Maximum Pollution Limit will probably be relaxed to guarantee airport growth. Furthermore, the SCCA wants to have separate rules established for airside and landside Maximum Pollution Limits and is demanding that measurements should not be taken locally, but rather be spread over the whole country, as the airport is of national interest. Yet, the measure, as such, is not contested and will be used to further improve public transport services to the airport and reduce car use.

Conclusion: A detour, to become specific

The fact that Arlandastad has until 1999 not really taken off, has led to the consolidation of the concept for the area. The delay may well turn out to be an advantage for the long-term viability of Arlandastad. It has become far more attractive and well-positioned in the context of economic development of the whole Stockholm region, due to a more precise definition of activities to be accommodated, the fact that Arlandastad today can rely on excellent accessibility by train which until 1998 was not the case, the prospect of an efficient means of transport for the airport platform and Arlandastad together (the SkyCab people-mover), and a clear idea on the growth and business orientation of Arlanda airport with a focus on air freight.

6 Luftfartsverket website www.lfv.se Sept 2000

7 Slogan of Arlanda Airport

SkyCity: an Airport City in the terminal

THE UNDERGROUND STATIONS
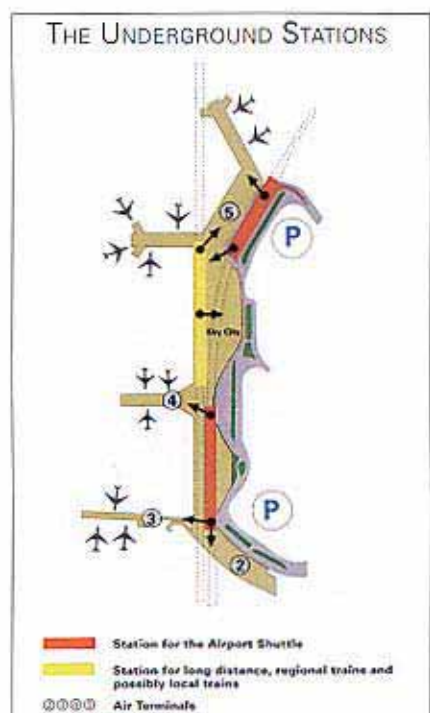
3 stations directly under the terminals
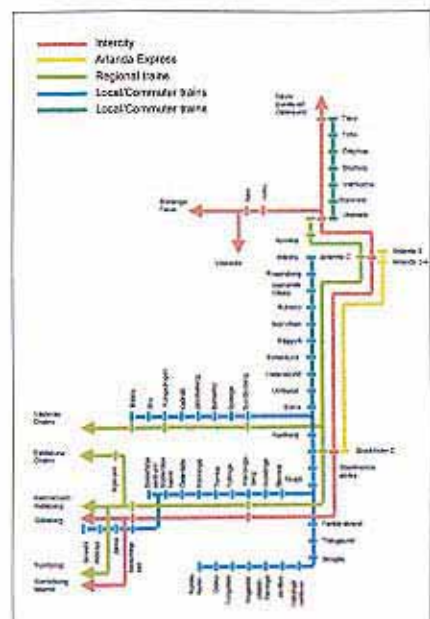
Train traffic to Arlanda
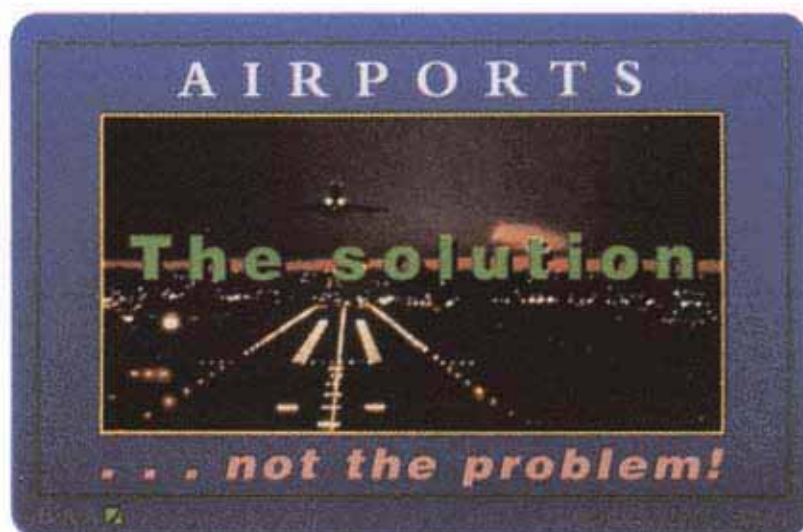
Advertisement of the BAA

A strong regional interchange, but please no Airport City!

London Gatwick airport is a very special case: a one runway airport in an airport system. As a part of the London airport system, with five airports, it is London's second airport. Three of the five airports, Gatwick (LGW), Heathrow (LHR) and Stansted (STN), are owned by BAA, since 1987 a privatised airport operator. LGW is one of the top five airports in terms of passenger numbers in Europe, with more than 30 million pax, even though it has only one runway. This is possible due to high passenger numbers per plane (120: second in Europe after LHR), and very dense slot management (up to 45 movements per hour). Once mainly a charter airport, LGW is now increasingly gaining hub character (international connections). Air cargo is not as strong, but nevertheless significant: in 1999, 283'000 tons of freight were transported through Gatwick.

The distance from the airport to central London is considerable: 35 km, or a 30 minute train ride with Gatwick Express or several other private operators (which typically offer a slower service). Gatwick station is by far the most important multi-modal landside interchange node for West Sussex County and the Mid-Sussex sub-region. But there is no Airport City and there are no major logistics centres around it. Why?

The airport municipality, Crawley, as the local land-use planning authority, has very clear economic policies regarding the accommodation of airport-related

developments, and can, to a certain degree, control development on the platform. The issues 'Airport City' and land-use on and around the airport are well regulated. An Airport City is unwanted.

2. Crawley's economic policies: diversification off-airport, selectivity on-airport

Central Sussex is an economically thriving area, well connected to London, and towns of the region are mainly commuter bases for Croydon and London, but also for Crawley/Gatwick. The Crawley/Gatwick area has the lowest unemployment rate in the UK, virtually 0%. The New Town of Crawley, with a population of 90'000, is the largest employment centre of West Sussex. Sectors like hotels, distribution and catering, transport and communications, and business services, have, to a great extent, replaced manufacturing. Many of these activities are related to the operation of Gatwick Airport, by far the main generator of local employment. As a consequence, the down-turn in the air traffic industry during the early nineties hit the airport area particularly hard. To depend less on the airport, Crawley and the other surrounding municipalities want to diversify their economic structure.

It is a general policy in the UK that regional functions have to be concentrated in town centres instead of at the airport or elsewhere. In town centres, they are easily accessible by public transport and for local residents, and contribute to the centres' regeneration and identity. The Crawley Borough Local Plan 2000 states that 'to retain the shopping viability of the town centre discourages large out-of-town shopping developments'.
To relieve green areas around the airport from development pressure, Crawley aims at optimising the use of its urban territory by redeveloping former industrial sites into business parks. Airport-related and -oriented activities, requiring proximity to the airport, are to be subsumed in these development sites. The large Manor Royal estate, for example, meets the requirements of many high-tech firms or other ancillary activities.

Crawley's land-use control extends onto the airport platform. There, the Borough Plan distinguishes between 'operational areas' (where BAA Gatwick is granted general permission to carry out development for operational, functional, safety or security reasons) and 'non-operational areas'

(where the airport may develop operational, but also airport-related activities, yet needs planning permission from the Borough Council). While such 'non-operational areas' in the western part of the platform are too remote for hotels, conference facilities or offices, those in the eastern part (beyond the railway line) are reserved for structural landscaping towards urban areas (visual and acoustic screening). For BAA's real estate subsidiary Lynton, a private real estate company acquired by BAA in 1988, development opportunities on the platform are thus scarce and strictly controlled. Lynton is currently mainly developing the Beehive area, an off-airport location to the south of the airport, with 50'000 m2 of office space.

The growth of the airport will generate additional jobs. However, Crawley does not want to particularly promote airport-related activities on top of local and regional development demand in the airport area. Instead, the municipality in general tries to dampen land-use demand by the airport in order to avoid a further increase in the (local and regional) imbalance between housing and workplaces, which would exacerbate the pressure on rail and road infrastructure in the airport area.

As an alternative to providing new homes in the Crawley area, West Sussex County Council intends to encourage workers from areas with high unemployment to commute to the airport, and has even considered the possibility of relocating part of the activities of the airport (e.g. catering) to poorer coastal towns. However, these towns are 40 or more kilometres away from the airport, and accessibility to the coastal areas is as yet only convenient by road.

3. Two bottlenecks: housing and surface access

With the airport growing from 30 million to 40 million passengers in the coming years, employment on the platform is expected to rise from 29,000 to 34,000 - and for all these additional employees, new housing will be needed. To avoid increased car use, the housing demand should be satisfied strategically, either close to the corresponding workplaces, or at least close to public transport, to support public transport initiatives. Today, LGW competes with other centres up to 50 km away for employees, and there is not even an efficient and attractive public transport service available.

Already today, the provision of sufficient staff housing in close proximity to the airport is a major problem for Gatwick Airport and Crawley Borough Council. Due to its proximity and good accessibility to Central London, the airport area is particularly attractive for commuters to London. Furthermore, Crawley has built up a reputation for good housing standards and for a pleasant living environment. As a consequence, the imbalance between housing and corresponding workplaces in the area is considerable: housing in the airport area has become unaffordable for many airport staff. Living at some distance, including coastal towns, they are forced to go to work by car. To overcome this disparity, close to 50% of the housing needed in Crawley would have to be subsidised, or at least low cost housing! The area's housing issue is further aggravated by the fact that Crawley's requirements to the development of neighbourhoods (including adequate facilities) can only be met in one area, the strategic gap area separating the airport from Crawley. Currently, this area prevents the airport from developing southern

urban annexes. At the same time, however, it guarantees flexibility for technical and operational expansion of the airport: if there were new capacity assignments to LGW in the forthcoming national Airports Policy, a second, parallel runway to the south of the airport could become necessary. As a consequence, planning permission for housing development in the gap area will not be granted within three years of the adoption of the Crawley Local Plan 2000. This is similar to the ZRH Planning Zone concept.

Today, the Crawley/Gatwick area, the economically strongest part of West Sussex County, is one of the County's worst bottlenecks with respect to road traffic. Private transport became dominant in the UK during the Thatcher era. From 1980 to 1990, car traffic increased by 50%, while public transport declined. The South-East's once dense and vital railway network was, to a great extent, abandoned during the 1960s and services declined during the 1970s and 1980s: many of the South-East's small railway lines, and in particular the east-west lines, were closed. With a few exceptions, only the well frequented north-south radial axes into London were maintained (Gatwick Express was, for a while, the only profitable railway line in the UK). The privatisation of British railway services in the mid 1990s has led to a fragmentation of rail services in West Sussex County and there is increasing customer dissatisfaction over late and cancelled trains. The six current railway operators in the South-East are, in general, not substantially expanding or improving services. Poor public transport services have encouraged increased car use.

With its main instrument, the Structure Plan, West Sussex County Council has had strategic land-use policies (in terms of
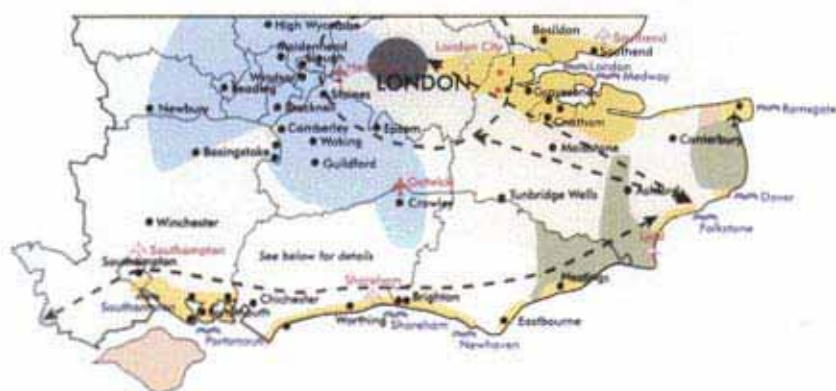
Gatwick inside London's 'economic pressure area' (blue)

Traffic converging in the airport area and in the Central Sussex Towns Cluster

LGW
HEL
ARN
AMS
FRA
ZRH VIE
MXP
BCN

distribution of activities in the region) and transport policies since the 1970s. However, until recently, transport programmes were financed by the central Government on a one year basis, which made it difficult to formulate long term strategies. For 2001-2006, the UK government has now required all Counties to produce a Local Transport Plan in order to tackle transport on a county-wide basis over a 5 year period, to enable infrastructure and particularly public transport to catch up, and to achieve the integration of transport management and infrastructure with land-use demand. Around LGW airport, an estimated 60 million Euro are alone necessary to upgrade local public transport; and a much higher amount is needed still farther afield for taking regional rail services to the airport to a satisfactory level. Against this background, the question of what role the airport can assume in the public transport networks becomes crucial.

4. Interchange and Park&Ride?

Notwithstanding the poor conditions of public transport in the South-East of England, Gatwick has become the most important public transport interchange in West Sussex County, largely because of the bundle of train lines that run into London, including the Gatwick Express. Besides giving access to the airport, Gatwick station also serves as a railway junction and a coach and bus interchange. However, the quality of these networks is reflected in the airport's modal split: while 33% of all air passengers, who mainly travel to and from Central London, use public transport, only 10% of the employees, living in the region or even closer to the airport, go to work by public transport.

The only major initiative of a private

transport provider for the area is the Thameslink 2000 project. However, it is a largely northward oriented initiative, improving rail services to and across the Thames through Central London, and will provide direct services from Gatwick to new Northern destinations. It will improve services in the region to the south but to a limited extent only.

Even though Gatwick has had rail service right from the beginning in the 1930's, and improved the railway station along with the terminal expansions, Gatwick's bus and train stations today form an unappealing Interchange. The idea of a multi-modal landside Interchange has not yet influenced the location of the bus and train stations. To get from bus or car to the railway platforms and vice-versa, commuters need to enter and pass through the air terminal. BAA Gatwick, who also operates the coach station, is now investigating the possibility of moving the bus station to a more prominent and convenient location, the current pick-up area for private cars; this would improve the conditions for bus/rail Interchange.

The question, however, may need to be raised as to how an Interchange can be financed without an Airport City. The investments needed to improve the quality of public transport provision are, in the eyes of BAA Gatwick and Railtrack (the operator of the train station) as well as the other public transport providers (all private), only justified in conjunction with real estate development around the node. The restrictions to land-use development on the airport platform and in its immediate surroundings, including the area around the Interchange, must therefore be considered an obstacle to the realisation of a high-quality landside Interchange.

An unintended by-product of the airport's good northbound public transport links, with adverse effects on the road networks around the airport, is the frequent use of Gatwick as a park&ride station for commuters to London, even though prices in parking areas close to the terminals are high. Commuters to London drive to the airport and then take the train into the city. The airport employees, however, arrive at work by car because local and regional public transport is poor. The promotion of the public transport Interchange function at the airport may require accompanying measures with respect to car use.

5. Airport Transport Forum and Inter-County Collaboration

The zone of influence of the airport is not congruent with territorial boundaries. Gatwick lies right at the border between West Sussex and Surrey Counties, and close to East Sussex and Kent Counties. The airport raises various questions that concern all of these Counties, in particular with respect to regional public transport and road congestion, airport staff housing and the accommodation of the airport's economic spin-off, requiring common and co-ordinated approaches and action.

With regard to traffic issues, BAA is, as a company with extensive experience as a private operator and employer, and as a business enterprise, well aware of the necessity for integrated development strategies in its airport area. In this respect, it is comparable to ZRH in terms of traffic. (This is less evident for state-owned operators, which are being backed by other public authorities in such issues.) Since there were no Government guidelines regarding transport, BAA launched its own initiatives, out of the need to overcome some highly unsatisfactory situations in terms of landside accessibility.
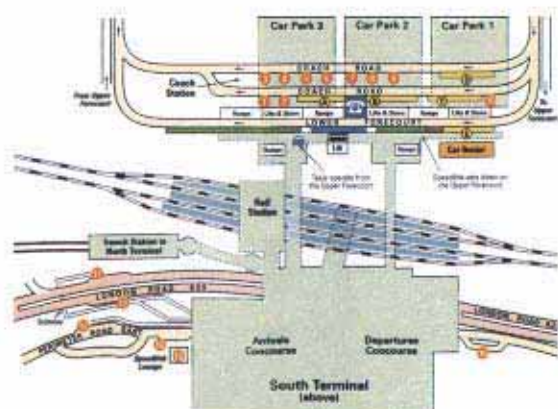
Landside interchanging only via the terminals...

...to the right to the trains, to the left to the buses

Gatwick Airport Transport Forum: across County boundaries

From 1998 to 2000, BAA Gatwick led an Airport Transport Forum (ATF) which included representatives from West Sussex and Surrey County Councils, the adjacent municipalities, transport providers, the Chamber of Commerce, airlines and airport staff. The Forum worked out the area-wide Gatwick Airport Transport Strategy GATS, with the main purpose of promoting public transport across County boundaries in the airport area and to support local authorities in approaching the car issue. It has even become part of the Local Transport Plans of both West Sussex and Surrey Counties, covering all aspects concerning airport-related transport.

Based on the experiences and success of Gatwick's ATF and a similar initiative at LHR, in 1999 the UK Government issued the 'Guidance on Airport Transport Forums and Airport Surface Access Strategies'. It requires all major UK airports to establish an Airport Transport Forum, and to contribute to the Counties' Local Transport Plans.

Gatwick Direct and FastWay Buses

*Within this Forum, but also mainly based on its own initiative, BAA launched local transportation initiatives. Largely due to BAA's funding, the Gatwick Direct, a public bus system running along key corridors in the Crawley/Gatwick/Horley area, with branch services connecting to residential neighbourhoods, has been implemented as a first element of the GATS.
It will connect the major development areas to the airport, but also help to spread the housing issue of airport employees over the whole airport area without increasing car traffic. Furthermore, it serves as a local feeder system into the Airport Interchange for commuters to*

London. Gatwick Direct started operation in spring 2000 and is intended to build the market for FastWay, which will be launched in 2002 as a part of the West Sussex and Surrey County Local Transport Plans. FastWay will be a guided bus system implemented through a public private partnership.

Conclusion: A step towards a permanent airport forum?

The questions of the quality of the Airport Interchange, and the optimisation of its position in public transport networks, are relevant not only locally, but at a much larger scale. With the Gatwick Airport Transport Forum, an interesting platform has been established for approaching inter-county transport issues, not only through discussions, but also through the successful implementation of key projects. Due to the peripheral position of Gatwick Airport in West Sussex County, also aspects like housing or the accommodation of economic growth generated by the airport cannot be solved without co-operation involving adjacent Counties and municipalities. An instrument similar to the Transport Forum, but more strongly integrating land-use and transport, could in the future be very valuable for successfully approaching new issues.

8 Crawley Borough Local Plan 2000',
  Crawley Borough Council, April 2000
9 Department of the Environment, Transport and
  the Regions, July 1999

No Airport City wanted: parking dominates the landside

FastWay: a bus-network initiative of an airport operator

'Three terminals - one airport'

Advertisement of FRA

1. Frankfurt airport promotes intermodality

Since 1999, Frankfurt airport has an own High Speed Train link: the AirRail terminal. It was built by the FAG, the Frankfurt Main airport operator (66%) and the German railways (34%) to strengthen the airport's international position and to divert air traffic to rail. By developing the German HST into a feeder for the airport, short-distance flights can be replaced: a substitution of some 5% of the slot capacity is aimed for (~2 million pax)[10]. The High Speed Train link is also envisaged to enlarge Frankfurt airport's catchment area and make the airport competitive with the other three European hubs on serving a community within 200 km distance; within a 100 km catchment area, FRA serves less people than CDG, LHR or AMS.

The Airport Frankfurt Main AG (FAG) promotes intermodality and advertises itself as a multimodal interchange node: a combination of an air terminal, a regional railway station (since 1972) and the new ICE High Speed Train and Intercity terminal (since 1999). The result is a highly developed access infrastructure: an integrated transport hub - more than just an airport. Frankfurt airport is to "safeguard the international importance of Frankfurt region" by offering international connections.

'Three Terminals – one Airport', the new slogan of Frankfurt Airport, welcomes the High Speed Train station as a fully equipped third terminal with check-in, baggage reclaim, etc. One flaw of the system is, at the moment, that only the two air terminals are linked to each other with a people-mover (the 'sky-line'). The new AirRail terminal has yet to be reached either on foot or by shuttle-bus. Another drawback is that full-fledged integration between air and rail traffic has not yet been achieved: this will require increased co-ordination between the services and timetables of both transport systems. The German Railways DB and Lufthansa, supported by the airport operator, are now preparing the first joint Air-Rail services; a pilot scheme is aiming for the integration of luggage handling for the combined ICE-air-service on the FRA-Stuttgart ICE relation.

2. Dipole: AirRail Terminal and Frankfurt Central Station

With the AirRail terminal, the city of Frankfurt has two long-distance railway stations. So far, Central Station is still the major interchange for (inter)national ICE and IC/EC lines as well as for regional and urban public transportation networks. But the ICE-station in the AirRail Terminal is convenient and allows for easy transfer between different train networks; Frankfurt's Central Station is operating at capacity, and to enter the present terminus station means a considerable time loss. Given the quality of the airport's AirRail terminal, and bottlenecks in Central Station, the problem may arise that different levels of rail transport (HST and regional trains) call at different stations.

In 1998, a 'Dipole Study'[11] was launched by the airport, the city, the railways, and the Rhein-Main Verkehrsverbund (regional Public Transport Executive). It defined the respective roles of the two ICE-stations for the region, in order to avoid the divergence of the different transport services. The study concluded that:

* The high quality of accessibility to the City has to be preserved and the new AirRail terminal accommodated in a way as to make it an 'added value' for the region.
* The main node of the (inter)national High Speed Train connections has to stay at the Central Station.
* To avoid a shift of long-distance traffic to the airport station, the link between the airport and the Central Station has to be improved, and travel times minimised.

The Dipole concept also requires considerable investments at the Central Station, to transform it into an underground through-station and to add extra capacity.

The new AirRail terminal, operative since 1999, will be attractive as landside interchange. The Dipole study expects that only 2/3 of all travellers at the AirRail terminal are going to be air passengers. The other 1/3, some 12'000 travellers per day, will use the AirRail terminal as origin or destination station for a High Speed Train trip.

In addition to the new AirRail ICE terminal, the airport has, since 1972, a highly frequented regional train station (230 daily connections), located between the AirRail terminal and the air terminals. This results in an average modal split of approximately 30% by public transportation (35% passengers and 26% employees).

The project of the 'Regionaltangente West' – a regional tangential railway-line, planned for completion by 2007 - could improve the ratio. It is a response by the Umlandverband Frankfurt (the Frankfurt Conurbation Council) and the regional Public Transport
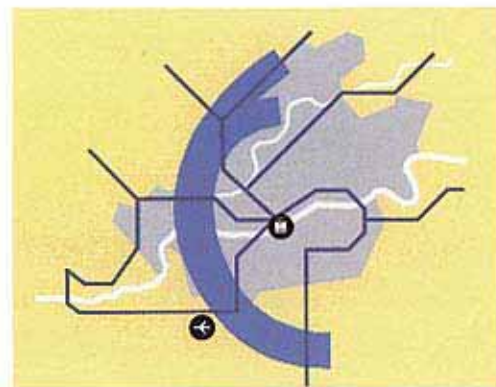
The new AirRail-terminal next
to the regional railway station

The ICE is to substitute flights
within Germany

A new tangential light-rail service for Frankfurt to
link to the airport

Executive to the increasing traffic on tangential routes, which is still mostly car traffic due to a lack of adequate public transportation services. This new line will not only complement the regional public transportation network by making it more able to serve the new focal points of current and future development in the metropolitan area (and help relieve some of the urban S-Bahn segments from capacity constraints). It will also improve access to the airport from the northern, western, and southern parts of the Frankfurt agglomeration, which are only connected via Central Station at the moment (a 15-20 minute time loss). Even if the policy of intermodality at Frankfurt airport seems to focus very much on serving air traffic, the airport station will gain – not least due to the new infrastructure to be built - an important regional interchange function on the long-term, although subordinate to Central Station.

3. A business centre
on top of the interchange

Simultaneously with the construction of the AirRail Terminal, a 660 m long deck was built above the four ICE tracks. The Airport Frankfurt Main AG hopes to have realised an AirRail Centre on top of it by 2004, to provide a service centre of some 170'000 m2 of floor space.

The deck has been a major risk, requiring a pre-investment by FAG (2/3) and the German railways (1/3) into an empty platform, awaiting potential future clients to build on top of it. The risk paid off: FAG and DB have been successful in acquiring clients for their 425 million Euro project, within a record time of less than 1.5 years. In the 8 to 9 storey high complex, 2 hotels will be accommodated, as well as an office-centre,

75'000 m2 of commercial surface, a medical care centre and some 1000 parking spaces. It was a visionary project, unique in its kind, and realised just before the German Railways reached their rather critical financial condition of today, which would no longer allow for such pre-investments anywhere in Germany.

The fact that this small 'Airport City' sits right on top of the AirRail terminal is expected to reduce car-use considerably. Of the 4000-6000 employees of the AirRail Centre, 5% more are expected to leave their car at home than if a similar development were located elsewhere on the airport territory! (This can save 300 car parking spaces). Even though this is equivalent to an overall shift of only 0.2% of the total traffic flows at the airport, it still seems to be a very efficient means to regulate car traffic, seen that - as the Dipole study assumes - the 'Regionaltangente West' will only lead to a 1.1% increase of the public transportation share at the airport!

Airport accessibility by public transportation continues to focus on the optimisation of the air-rail interchange, on the core area around the terminals, making it necessary to concentrate 'urban' functions (shops, restaurants, offices) in this area. The consequence of this air traffic-focussed intermodality is that the rest of the airport activities, spread out along the northern and southern perimeter of the airport territory, are served only with local or internal bus services.

The new 'Regionaltangente West (RTW)' will not be able to improve the situation of a 'single point access'. Unfortunately, cost-benefit evaluations obliged to use the existing regional rail tracks for the 'RTW',

thus limiting it to only one stop at the airport for its 62'000 employees, the existing underground station. This, while it stops three times in Eschborn, a former suburb and now a growing business park. The new rail service would of course have a considerably bigger effect if several stations were possible on the northern strip of the airport territory. But there is no viable alternative in the central part of the airport either above or underground.

In what concerns road access to the airport territory, however, Frankfurt airport is exemplary: FRA was the first airport to be planned (in 1930) in the context of freeway development and was sited at the junction of the A3 and the A5 highways. Today, a secondary road structure guarantees access from Frankfurt City and the rest of the region, avoiding dependency on the heavily used national highway intersection.

4. Frankfurt has reservations about
a new regional centre at the airport

Frankfurt airport is surrounded by the city's forest, a well guarded green belt. Expansion of the airport land is only discussible for operational purposes. On the airport platform itself, nearly all areas are used for aviation activities, such that space for non-aviation activities is very scarce. This is why the artificial building site on top of the AirRail Terminal was erected. But there are major sites, e.g. the former American air base and the related housing area 'Gateway gardens', which will soon fall back to the airport operator. They will be used to expand the operational areas, the new 'Cargo City South', and commercial functions.

Downtown Frankfurt is the top location for international business; the 'banking district' is the region's major international asset. The

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The platform on top of the ICE-station is ready...

...for a 170'00 m2 business, health and entertainment centre

airport is to serve this asset in the first place. As travel times between the city centre and the airport are quite short by road and by train, Frankfurt sees no real need for an additional 'Airport City'. However, building investment and construction at Frankfurt airport is considerable on the landside, even though it is not promoted as an 'Airport City'. FRA accommodates the biggest European airport conference centre (mostly part of Sheraton hotel), offers 170'000 m2 of business and retail space on top of the AirRail terminal, and is planning the construction of the new headquarters for Lufthansa. In comparison, Schiphol airport, which declared itself 'AirportCity', is just as large (200'000m2). A matter of definition?

It seems as if the city of Frankfurt which has spent most of its energy for renewal in its very centre, still needs to get used to the idea of suburban business centres. Sites beyond the city's territory - like Eschborn – are seen as a threat to the inner city, such that even a better integration of these new centres into transport networks is met with suspicion. The city of Frankfurt tries to channel investment into its own enormous redevelopment areas in the inner city: the Messe (fairgrounds), a former railway yard, and Frankfurt 21, the planned restructuring of the Central Station area. Numbers, however, paint a sober picture: Frankfurt airport's future office capacity only amounts to 5% of the 3.5 million m2 of office capacity of downtown Frankfurt, and in this view it seems no major development pole, or competitor to downtown Frankfurt, after all.

Despite this reservation on Frankfurt's part, the airport and its surroundings are continuously developing on the line towards airport-related activities, like logistics, distribution (e.g. the new Cargo

City South) or high-tech production. The office park in Frankfurt-Niederrad (15'000 jobs), halfway to Frankfurt City, has been in operation since the 1960s, and more recently the 'Tradeport', a logistic park just east of the platform, has been opened up. There are also similar developments in the municipalities next to the airport and on larger ex-industrial sites, such as the former Caltex refinery (5 km to the west of the airport) or the former Hoechst-production plant (5 km to the north of the platform). The latter is an initiative of the airport operator together with Hoechst to provide extra land for real estate development.

Possibly due to the reservation on Frankfurt's part, these initiatives remain loose initiatives, and there is no common land-pool or marketing instruments to co-ordinate and promote airport-related activities. There seems no need to reserve certain areas very near to the airport for the creation of a new 'Airport City'. The spin-off of this major hub affects a much wider area than the immediate surroundings of the airport, making it difficult to verify how much airport-related activities have 'invisibly' been accommodated on other industrial sites or within mixed land uses.

5. The UVF – a metropolitan authority that governs both land-use and transportation planning!

The Umlandverband Frankfurt UVF is not only involved in traffic issues. It is the common land-use planning authority for 43 municipalities in the Frankfurt region, including the city of Frankfurt. The member municipalities had to transfer their former planning authority concerning land-use and strategic transportation to the UVF. However, they retain the right to control site-planning and urban planning

themselves. As such, real estate development at the airport - lying inside Frankfurt territory - has to be approved by the city of Frankfurt. The UVF was founded in 1975, mainly for the co-ordination of city-versus-hinterland issues, at a moment of increasing tensions between Frankfurt and its surroundings. It was, at that time, established to prevent the city from incorporating several surrounding municipalities. Similar legal structures exist in other German regions (in approximately 10 cases). But while most of them are not involved in land-use planning, the UVF issues the biggest land-use plan in Germany. Economic promotion for this wider area is done by a separate organisation, but managed in very close co-operation with UVF.

Land reserves for economic development were derived in a supply-oriented way and laid down in a plan until the year 2015. The UVF has no specific strategy for allocating air traffic spin-off. It does not attribute airport-related businesses to specific sites in the region. The UVF is a pure planning entity, and it has no financial means at its disposal, e.g. for the provision of a land-pool. Yet, as a land-use planning authority, these issues could be part of the UVF's task.

Thus, the situation around Frankfurt is very special, as the UVF is a regional authority with both land-use and transport control. It could become an ideal instrument to tackle the integration of airport development and Airport Interchange with the metropolitan transportation infrastructure. To appropriately deal with these new issues, the UVF will be reorganised: land-use planning shall be done at a regional scale. The planning area will also be enlarged from 43 to 75 member municipalities, and the areas south-west of the airport will be included in the future. This takes account of the increasing relevance of airport-related issues within the greater Frankfurt area.

Airport City against the background of Frankfurt's inner city

The UVF: a metropolitan land-use and transport authority

However, the other main regional centres of Wiesbaden, Darmstadt and Mainz are as yet not to be more directly involved in airport issues.

6. Airport capacity expansion dominates the 'mediation' on airport development

Frankfurt airport is eager to expand its capacity with a fourth runway. In order to find solutions with other interest groups, and to avoid conflicts and legal action, a 'mediation group' [12] was set up to advise on the further development of the airport. This was seen as an efficient process of collaboration to evaluate runway alternatives and compensation for airport capacity expansion. This 'mediation group' has agreed on a package of five actions which are binding for the participants: optimising the existing railway system, extending airport capacity, a night-flight ban (2300-0500 hours), an anti-noise agreement, and the creation of a regional dialogue forum (concerning problems in relation to airport expansion). There is no definitive decision yet on how to extend runway capacity. Three alternative sites for a fourth runway are now subject to very detailed investigations.

The Frankfurt mediation process ended in February 2000. Apart from the many environmental issues, it has investigated matters of regional economic development in relation to the development of the airport as the largest single provider of jobs in the country, as a customer, and as a decisive factor for the quality of a location.

It also dealt with the social consequences of a restrained versus a promoted airport development. The main aim of the mediation was to assess the effects of airport expansion on the region as a whole, rather than only on the areas directly surrounding the airport.
The first mediation process did not yet yield a common vision with regard to land-use strategies in the airport surroundings which would reach beyond the perimeter of the UVF. The regional dialogue forum has only recently taken this into account. This new group seems to be an adequate forum to advise and develop strategies on all relevant questions concerning airport development.
Despite this comprehensive approach, there is still the danger of a one-dimensional and unnecessarily cramped public discussion focussed only on airport capacity. With the new forum there would be an opportunity to develop integral concepts concerning not only runway-options, but also potential economic development and compensation for nuisances in the municipalities surrounding the airport.

7. Outlook: upcoming Airport-Alliances
In the meantime, Frankfurt Airport is not standing still: in 1999, the airport operator sought co-operation with Schiphol airport, mainly on activities of common interest concerning airport development in other countries, and only partly with respect to FRA airport itself. However, there may also be issues of Airport City development at stake, i.e. real estate developments and shopping concepts, transfer of know-how and IT-services. A common real estate subsidiary is in the making. The prospect of international airport alliances will, inevitably, introduce new elements into the collaboration between airport regions and airport operators.

Conclusion: The AirRail terminal - Interchange and Airport City at once
Besides the 4th runway, the integration of the airport and its AirRail terminal into the High Speed Train network has been in the foreground of the discussion on airport development in Frankfurt. Anticipating the potential interchange function of this new, attractive railway station, Frankfurt launched a study to typecast the region's major railway stations. The role of the airport station was defined in relation to what has to happen at Frankfurt Central Station. In order to create and finance the second most important railway station in Frankfurt, a small 'business city' had to be built on top of the terminal. The success of this operation, the airport's own 'central station development', shows that it makes sense to pre-invest into an efficient integration of landside infrastructures, not least to allow for high-quality urban development at airports.

10 Schiphol aims at shifting 5 million passengers from Air to Rail
11 "The role and accessibility of the Frankfurt Main airport station in relation to the Central Station 21", German railways, FRA airport, regional Public Transport Executive, city of Frankfurt, August 1998
12 The mediation group was composed of the Ministry of Transport, the regional Ministries of Environment, Energy, etc., the Chamber of Commerce, local communities, Lufthansa and others

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'Creating AirportCities' versus 'Amsterdam Airport Schiphol'

Official slogan of the Schiphol Group

Schiphol has been one of the most noted airport developments in Europe - an often cited reference. And public authorities and the airport operator have acquired a lot of experience in dealing with each other.

- Amsterdam Airport Schiphol has developed a strong business orientation and has undergone major organisational changes. Under its new name Schiphol Group, it has developed a look which is likely to become typical for future privatised airports.

- The Dutch love to plan. The development of Schiphol airport forms part of strategic plans at all levels: in national spatial plans it has been given mainport status (fostering air traffic and economic growth), the regional plan sets out a strategic framework for the development of the airport region (co-ordination and stimulation of investment), and the city of Amsterdam and the local municipalities are to provide visions on the further development of their territories.

- A broad set of well-known instruments to co-ordinate airport development and mediate between the different interest groups has been set up, dealing with issues such as airport capacity expansion, noise impact and the promotion of economic growth around the airport. They include:
  • the 'Corus group' to facilitate the evaluation process for the construction of the 5th runway,
  • a 'Bestuursforum' Schiphol and 'SADC' (Schiphol Area Development Company) to co-ordinate spatial and economic development around the airport,
  • the AAA (Amsterdam Airport Area), and
  • the FIO (Foreign Investment Office) to promote the Amsterdam region as a top international business location in Europe.

- Only 20 years after its opening, Schiphol railway station has gained a central position in (inter)national and regional networks between the cities of Amsterdam, Rotterdam, The Hague and Utrecht.

An analysis of the current processes around Schiphol can reveal particular dilemmas and urgencies with respect to Airport City and Airport Interchange development and put a light on the success of instruments which have been developed over the last 15 years.

1. 'Creating AirportCities'[13] versus 'Amsterdam Airport Schiphol'[14]

Since 1999, Schiphol airport has been welcoming its passengers with the slogan: 'Creating AirportCities'. The airport management is trying to anchor Schiphol as "the newest city of the Netherlands"[15] on the map, a place "where you can snack or dine sumptuously, shop in a luxurious shopping centre, meet with your business partners, or sleep for a few hours. And " - as if it were all too obvious - "if you want to fly: we will do everything to make your departure or arrival as pleasant as possible.""[16]

This slogan reflects a major change in the mentality of the **Airport authority**; it has moved away from being only concerned with flight control, to an operator of a major urban territory (2400 ha) and a competitor in the international airport development market. A reorganisation of the airport management became necessary to better respond to the new economic reality: Schiphol relies to some 50% on its non-aviation income (commercial development, parking fees, concessions). As a consequence, Schiphol has created Schiphol Real Estate BV (SRE), a full subsidiary of the Schiphol Group. With SRE, Schiphol has its own land development and real estate development company (land development is usually an element of a municipal authority!). SRE is promoting the transformation of a remote site (Elzenhof) and the former hangars/Fokker industries ('Schiphol Oost') into airport business parks. It is building up a major international business centre (200'000 m2) in the core of the airport, right next to the railway interchange. SRE has become one of the biggest real estate developers in the Netherlands, delivering up to 20'000 m2 of office space per year, on Schiphol land itself.

SRE is not only active on its own land, but has also become involved in real estate development around Schiphol-owned regional airports, and even - and independently from the Schiphol Group as such - at other international airports. A few months ago, SRE set up Malpensa Real Estate BV (where it holds a 60% share) to develop logistic businesses and office parks around Malpensa airport. Schiphol imagines that in the near future it could even get involved in developing its concept - a comprehensive spectrum of activities at the Interchange 'airport' - at other interchange nodes in Europe (e.g. High Speed Train stations).

To the outside world, such a straightforward entrepreneurial thinking might come as a surprise, as a deviation from the norm. But it is more likely that a new norm in airport

An Airport City in the making

management is being synthesised here, at the dawn of airport privatisation.

Even though **the city of Amsterdam** is the major shareholder (21.8%) in the Schiphol Group, its influence has decreased in the last years. The city, busy developing its southern periphery (Zuid-As) just a few kilometres north of the airport, opposes a massive concentration of business activities at the airport. Instead, it proposes a metropolitan concept: it sees the Zuid-As and the airport as one development zone - with the nick-name 'Cash-corridor' -, having the assets of airport, future High Speed Train stations, an (inter)national business location, and abundant housing potential for Amsterdam. Within this development zone, the airport
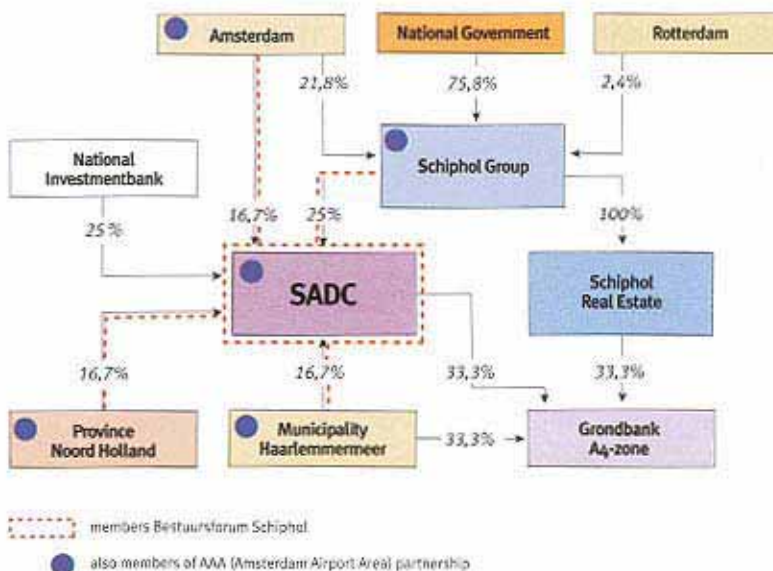
Amsterdam Central Station in the North, not least due to constraints at the latter to integrate separate platforms. Serving the Central Station would also require a 15 minute detour, frustrating the effectiveness of the High Speed Train link.
But the future success of the Zuid-As - the undisputed international business location of the 'Randstad' - is questionable. Major investments into the integration of highway and rail infrastructure (underground) are required to make the ambitious plans come true. Under current circumstances, such levels of pre-investment seem to be less probable than ever before.

The ambitions of the Schiphol Group are up against the ideas of Amsterdam, as well as

Amsterdam's southern periphery in the making: still a huge infra-gap

Amsterdam and Haarlemmermeer, within which SADC would develop, promote and sell land for logistic companies and offices that are related to these logistic companies (cf. Arlandastad Company). The covenant charged the SADC to apply selection criteria to test airport-relatedness of potential clients. Amongst other criteria, a set percentage of the activities of businesses was to serve either air cargo, or air passengers, per day.

The initiative: The initiative for establishing the SADC came from the province of North Holland. Both the province and Schiphol were at that time concerned by the rapid development of business sites, which would exert an enormous pressure on the land surrounding the airport, limiting its flexibility in terms of expansion. They were worried that the municipalities would allow un-coordinated site development and would collapse under the pressure of developers which managed to buy land around the airport. The province and the airport were able to convince Amsterdam and Haarlemmermeer to participate in a common forum of co-ordination and mediation, a role which required an independent organisation (the SADC), and could not be attributed to the regional authority, the province, itself.

Starting-up: Acquiring land was more difficult than expected, as the SADC had no experience and had to compete with other major developers in the area. But over the years it managed to buy considerable amounts of land within the Schiphol Zone and successfully attracted major international firms (a lot of Japanese and American companies setting up new headquarters in Europe).

A period of 'peripheral' existence: With the economic boom of the 90s, and in view of the opportunities for dedicated office development, SADC's importance gradually declined as the partners focussed more and more on their own affairs.

members Bestuursforum Schiphol

also members of AAA (Amsterdam Airport Area) partnership

SADC: joint real estate development around Schiphol

would primarily fulfil a transport, and not a business role.
The Zuid-As has only recently become a desirable concept for the future development of Amsterdam. Until the early 90s, the city tried to counteract the rapid growth of its southern periphery. The redevelopment plan of the IJ-oevers, the northern waterfront around the Central Station, had to prevent the city from becoming the "periphery of its own periphery"[1]. The plan failed since there was not a sufficient market demand and road infrastructure was poor. Instead, the Zuid-As continued to show unrivalled growth (major banks, international headquarters).
The connection of Schiphol airport and Amsterdam to the European High Speed Train network will complete the reorganisation of the urban territory of Amsterdam. The High Speed Train station for Amsterdam will be the Zuid-As station, not

those of the province of North Holland, and have put established partnerships under pressure. The 'AirportCity' concept also brought with it a new question: should it be Schiphol's own responsibility to develop its Airport City, with the airport management "fulfilling the roles of mayor and alderman" (Schiphol Group, 'Creating AirportCities', 1999)?

2. A revival of the SADC!
Ten years ago, the province of North Holland, the municipality of Haarlemmermeer, the city of Amsterdam, Schiphol airport, and the national investment bank (to bring in the money) set up the 'Bestuursforum Schiphol' and the respective land development company SADC (Schiphol Area Development Company) to make better use of the economic growth in the airport region. A land-pool, the 'Schiphol Zone', was established with land from both

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The municipality of Haarlemmermeer - the land-use authority for most of the SADC land - launched its business park Beukenhorst, an opportunistic, but most successful development on the southern edge of the airport perimeter (350'000 m2, with another 250'000 m2 available over the next few years). The municipality was less selective than the SADC with respect to the airport-relatedness of the businesses.

Schiphol airport started to develop sites on its own territory, like 'Schiphol Centrum'[18]. The logical next step was to set up the SRE. To make the situation even more complex, all kinds of special collaborations were made on different sites in the airport's surroundings, with the SADC only partly involved. For instance, 'Schiphol Logistics Park' will be developed by the airport, the airline KLM and the SADC (with only 10%), and the land along the A4 highway just south of the airport will be developed by the SRE, SADC and the municipality of Haarlemmermeer, each with a 33% share.

Revival of the SADC: Over the last few years, economic development has been particularly strong to the south of the airport, and major logistic and office development were realised on the land of the airport itself. The city of Amsterdam felt that office development on and around the airport was all to its disadvantage. It saw its own ambitious plans for the Zuid-As threatened by just as attractive, but cheaper sites at the airport, which also had the advantage of shorter development times. Further economic development to the south of the city could also frustrate the already strained accessibility not only

of the airport, but of Amsterdam in general. With airport privatisation around the corner, the city of Amsterdam - which does not own any land of the airport, as Schiphol lies entirely on Haarlemmermeer territory - announced radical measures. The city was going to exchange a 12% package of its shares in the airport for land on the airport territory, in order to be able to exert more direct influence on the development of commercial programme on-airport. Such a 'pact' between the airport and Amsterdam would have disrespected Haarlemmermeer, making Amsterdam land-owner on its neighbour's territory.

On the other hand, Haarlemmermeer itself found it difficult to manage international business development all alone.

In this situation, the SADC has once more been recognised as the ideal tool for co-ordination. As its original land reserves are nearly used up, the area for which the SADC is responsible in terms of co-ordination and guidance of development, will be expanded. Parts of the Zuid-As will also be included, with the advantage for Amsterdam that these sites are in its own hands. On these new sites, the SADC's activity will, however, be limited to co-ordination and will not involve financial participation. Both Haarlemmermeer and Amsterdam do not want Schiphol airport to become active, via its stake in the SADC, on areas outside the Schiphol zone.

After a period of peripheral existence, the SADC will now have an even greater importance regarding the development of the airport region than before. The airport territory itself will not be included in the

land-pool. This land has remained a bone of contention. In response to this, the airport operator is currently busy specifying its concept of 'Creating AirportCities' in order to distinguish more clearly the segment of activities it is trying to accommodate on its own development sites, thereby responding to and trying to alleviate the concerns of local and regional authorities.

The AAA or Amsterdam Airport Area:
Alongside the development co-operation within the SADC, another 'umbrella' organisation, the AAA, has been set up consisting of the SADC itself, the four partners in the SADC, KLM and the KFN (Office Fund Netherlands). Under the chairmanship of the SADC, the AAA is marketing and promoting all major economic development sites of all member parties in the Amsterdam region. It pools information on real estate development in the Amsterdam airport area for international companies. Its services include a schedule on the availability, development priority and programming of all sites in the area.

3. Schiphol station: dominant network position

During the last 15 years, the Schiphol area has seen a major concentration of development around the airport. The national 'mainport policy' stimulated such growth, defining Schiphol as both an airport and an economic vehicle. While the emphasis has been on maximising the economic benefits, improvements of the accessibility by road and investments into public transportation have been lagging behind. The basic external infrastructural networks (especially motorways) have, in principle, remained the same.

This is dangerous ground, as Schiphol airport lies on a bundle of transport infrastructures which are vital for the accessibility of Amsterdam and the whole region of North Holland from within the Randstad, but which suffer from severe congestion. Consequently, the years to come will show a concentration of initiatives around the airport that are not only urgent to guarantee access to the airport, but also to resolve some of the main bottlenecks in the region (the airport causes only some 10-12% of the road traffic on the A4 highway). Projects include a western highway bypass of the airport, the 'Zuid-tangent' (a regional public transportation service), the integration of the region into the High Speed Train network, and additional regional road infrastructure.

The airport's critical position in terms of road
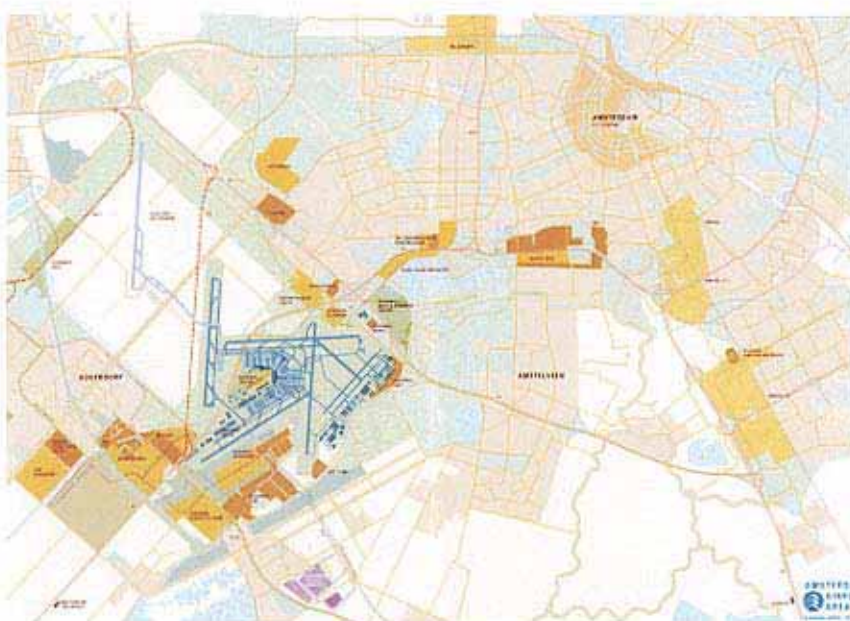
Amsterdam Airport Area: joint marketing and information-pool

Schiphol train station at the core of the airport

access has, at the same time, guaranteed the success of Schiphol's railway station. It has gained a key position in public transportation networks for the northern half of the Randstad ('Ring-City'). It is the country's sixth most used railway station (some 46'000 passengers/day). Schiphol station already fulfils a major interchange function between Intercity trains, regional/local trains and buses in the region. But the station is not yet promoted as such in current regional or national policies. Also, the data required to defend such strategies have not been available until now.
Schiphol is also to become the main High Speed Train station for the Netherlands, where both the TGV Nord (which calls there already) and the German ICE will meet. This connection is crucial to provide extra capacity at the airport: 5 million passengers are expected to switch from continental flights to HST. In preparation for its strategic function, the train station has been extended to 6 tracks (work concluded in 2000). It is very likely that the airport will also assume a park&ride function for the new High Speed Train services.

The Zuid-tangent, a free-lane regional bus-line with a relatively high average speed (42 km/h), which can be upgraded to a fast tram-line, fills in a missing tangential link in the regional public transportation network in the greater Amsterdam area (by 2002 it will serve Haarlem-Hoofddorp-Schiphol, by 2008 also Amsterdam East). This new high-quality service will have four stops on the airport territory and an additional three stops in the southern business parks, improving the integration of what are still rather dispersed (off-)airport sites. Additionally, the future north-south metro-line of Amsterdam (2008), linking the current Central Station to the Zuid-As, could later be extended to Schiphol airport. This would lead to an optimal integration of all SADC sites into the metropolitan public transportation network.
Schiphol airport's own response to the inherent danger of road traffic congestion is Sternet, a bus service offering made-to-measure public transportation for a large part of the 50'000 employees at the airport and passengers from the region. Schiphol collaborates with Amsterdam and the regional bus operator in this dedicated 7 days a week (and soon to be 24 hours a

day) airport service that links all urban centres within some 20 km from the airport to it in a star-shape manner. Sternet also provides with a shuttle service between the remote areas of the vast airport territory and Schiphol's railway station.

4. Re-designing Schiphol airport
The increasing emphasis on the railway station has caused a shift in the organisation of the terminals: the station hall - 'Schiphol Plaza' - has become the core element of the entire one-terminal-complex. The different terminal areas are accessed directly from the station hall. The railway station is also very prominently placed for landside development, and its optimal integration with 'Schiphol Centrum' is part of the AirportCity concept. Consequently, the central areas of the airport platform are also the most valuable business locations, which will lead to a further intensification of land-use.

The recently concluded evaluation of the expansion of airport capacity in the Netherlands has resulted in the decision to accommodate further growth at Schiphol itself. The alternative, to relocate the entire airport to an island some 30 km from the coast, was judged as too expensive and a long term option only.
This means that Schiphol airport must optimise airport capacity at the current location within given noise contours. After the completion of the fifth runway (scheduled for 2003), a new configuration of the runways may be necessary in order to expand capacity. To maintain flexibility for airport expansion on the airport platform itself, an expensive, but space-saving solution has been adopted to extend cargo facilities. Schiphol participates in the development of an 'Underground Logistic System' (ULS), a fully automated rail-shuttle, which will connect the world's biggest flower fair in Aalsmeer via the airport's cargo-cities (South-East and Centrum), to a new cargo rail terminal for high speed cargo shuttle trains in Hoofddorp. In such a way, cargo facilities can be expanded outside the airport territory, where space is less scarce and less critical for further airport expansion.

Conclusion: A laboratory for cross-level collaboration
The Schiphol region has become a melting-pot for made-to-measure forms of collaboration, marketing and airport-related site development. Now that it is clear that the airport has to remain and grow in its present location, public authorities and the airport operator are more willing to seek viable solutions together. One could say that the introduction of the 'AirportCity' concept has diverted some pressure in the discussions on air traffic growth away from noise issues towards other crucial aspects that, if done well, will have beneficial effects for the airport region. There seem to be, however, no recipes which guarantee success. The instruments and partnerships underwent several phases of 'fine-tuning', reacting closely to the state of the economy and resultant opportunities. The SADC evolved from an organisation set up to promote the Schiphol region, to a broader collaboration to relieve distrust and competition.
The challenge, today, is to co-ordinate the urban development of an area which, due to the airport and the resulting concentration of infrastructural transport networks, has become the most dynamic development area in the Netherlands.
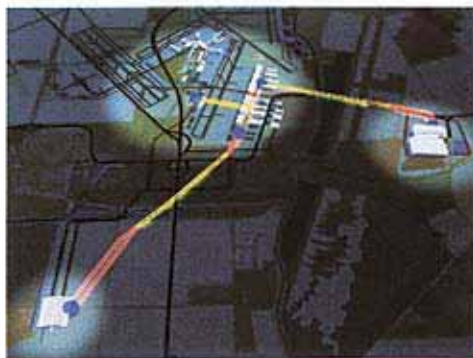
An automated Logistic System allows for remote cargo handling

13 official slogan of the Schiphol Group
14 official name of Schiphol airport, the term suggesting that it is the airport of the city of Amsterdam
15 Schiphol Group, "Welkom in de nieuwste stad van Nederland", advertisement for Schiphol airport, 1999
16 idem
17 Masterplan 'Ruimtelijk Scenario IJ-oevers Amsterdam', 1992
18 Schiphol Centrum: core area of the landside

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'Vantaa, the Airport City'

Vantaa
the **Airport**
City

WELCOME TO FINLAND

Official slogan of the city of Vantaa

Airports are vital for Finland's communication network as the country is very scarcely populated (16 inhabitants / km2) and encompasses a huge territory (337'000 km2). Consequently, Finland has 25 airports, 18 of which carry international traffic. Vantaa accounts for 92% of it. Because of dispersed settlements, the national railway network is low-key and only links the main cities. Instead, buses offer an extensive transportation system, and long-distance coaches/express buses are the primary means of public transport to reach other parts of the country. The bus terminal at Helsinki-Vantaa airport is Finland's second most important bus station after downtown Helsinki! Consequently, there is not enough demand for a national rail link to the airport.

1. 'Vantaa, the Airport City' [19]
Helsinki-Vantaa airport lies within the municipality of Vantaa, some 19 km north of Helsinki's centre and just north of the 3rd highway ring-road, the E18.

According to the (municipal) Masterplan 1992, Vantaa shall, until 2020, attain the status of "an independent city and an integral part of the Helsinki metropolitan area". In this respect, the city of Vantaa has to face three major issues:
1- due to strong economic growth in the E18 corridor and at the airport, there is rapid traffic growth in the northern parts of the metropolitan area of Helsinki.
2- the manoeuvrability and landside accessibility of the airport could in the future be limited by intensive urbanisation in its vicinity.
3- the airport's noise contour today covers some 36% of the municipality's territory; with the new 3rd runway (under construction), this share will be reduced, but will still cover some 25%. Surprisingly, such a major noise carpet is not considered to be a handicap. Vantaa demonstrates a sober pragmatism and sees the noise contour as the main asset for the city of Vantaa to guarantee economic prosperity, as 25% of its territory will remain uncontested for functions like business and recreational developments.

Today, Vantaa calls itself 'Vantaa the Airport City', making the airport the foundation of Vantaa's profile in its competition with other cites. This is a clearly strategic, yet still little realised, view of its territory. It is strategic in that it suggests that the integration of Helsinki-Vantaa airport as part of the city of Vantaa should have priority. The municipality should be viewed as one urban area that includes an airport, rather than two suburbs with a huge gap in-between. It is still little realised, however, as there is no clear programme for action and development. There is a lack of co-operation between the many separate initiatives (on-airport and off-airport) that are supposed to lead to the desired status of 'Vantaa the Airport City', and will make more of it than the pure sum of its parts.

Currently, a potential Airport City features in two complementary initiatives. These are:
-the 'Aviapolis', on-airport, and
-the development of the E18 highway corridor into a 'Logistic Zone'.

2. Aviapolis
'Aviapolis' is a joint initiative of the CAA of Helsinki airport and Vantaa and is being promoted by both parties. It aims to develop a 1 km2 site on-airport to accommodate 400'000 m2 of offices, high-tech, IT and logistic activities, all of which will be fairly airport-related.
The land to build 'Aviapolis' has become available through the expansion of the airport territory to accommodate a third runway. With the reorganisation of the functional processes on its platform, the airport will move some operational activities (maintenance, etc.) from the more southern areas of the perimeter to sites in-between the parallel runways. This will allow the redevelopment of the southern areas for other purposes, creating space for the CAA to develop new strategies to gain extra revenues.

The airport's classification as a 'traffic zone'
Like in Sweden, spatial planning in Finland is almost wholly controlled at the municipal level. Regional planning only sets the main guidelines for municipal planning. Thus, in principle, Vantaa municipality controls the land-use development of the airport. Planning of the airport infrastructure and buildings is, as at most European airports, assigned to the CAA, with permission granted by Vantaa. The airport is a so-called 'traffic zone' and left white (a blank spot) in the municipal Masterplan. This serves to guarantee the necessary flexibility

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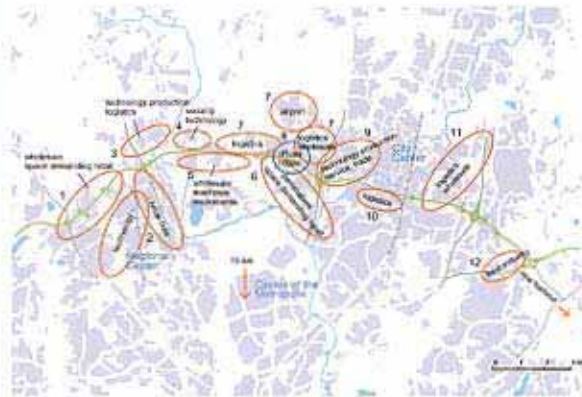
E18 in the Helsinki Metropolitan Area - Cityscape of an Edge City
Pilot project Vantaa Vantaa City Planning unit 17.6.2000

Cluster(s)

④

+20...25 %

⑤

+140...150 %

+35 %

⑥

VANTAAN YLEISKAAVA 1992
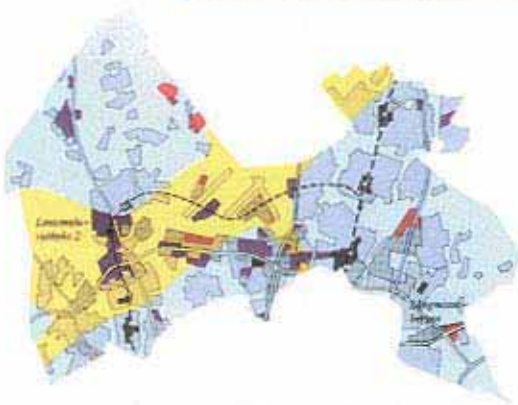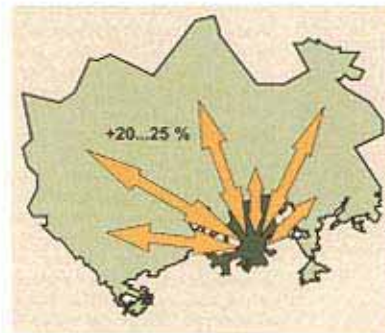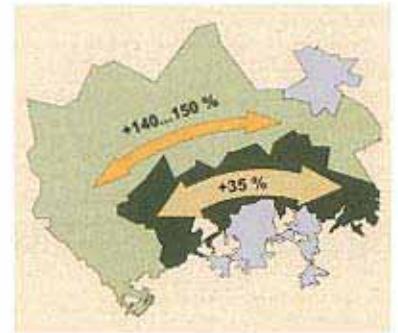
⑦

① Air-traffic is vital for Finland
② A noise-carpet not as a handicap but as a development opportunity
③ A preview of 'Aviapolis': a joint initiative of Vantaa and the CAA
④ The E18 highway corridor: Vantaa defines clusters of activities
⑤ Traffic growth from and to the inner-city 1995-2020
⑥ Growth of cross-town traffic 1995-2020
⑦ Marja railway line between Vantaa, the airport and Helsinki centre

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in planning required by the continuously changing airport infrastructure. However, the determination as 'traffic zone' sets clear limits concerning the activities of the CAA: the airport can build for transport purposes only.

Therefore, the land on which to build 'Aviapolis' had to be rezoned and removed from the 'traffic zone'. It remains inside the airport perimeter, and remains property of the state (and therefore of the CAA), but is now subject to the planning authority of the municipality of Vantaa.

Airport City development - an unknown territory

Regarding the development of Aviapolis, the municipality of Vantaa and the CAA face a 'terra incognita'. The CAA has previously only been concerned with running the airport. Real estate development is a new task, but has become necessary for financing the development of the airport. It is still not clear when 'Aviapolis' can get started. Both Vantaa and the CAA hope to initiate its construction within 2-3 years. Negotiations about the respective responsibilities and the distribution of construction costs and benefits between the developing partners CAA and Vantaa municipality are currently taking place: Vantaa would like to see some of its investment in transport infrastructure on airport territory compensated.

'Aviapolis' is to become the flagship and the trigger for the development of the E18 corridor. In order to set high standards for the image of the future 'Aviapolis', the city of Vantaa has developed a detail plan, an urban plan for a specific area. With this tool the municipality has, according to spatial planning law, the potential to control the quality of future developments in the area. Whether they succeed in reintroducing some Finnish forests into their plan, in order to give 'Aviapolis' a unique and truly Finnish identity, is as yet unsure.

3. E18 corridor

The E18 TEN-highway, connecting Scandinavia with Russia, from Oslo to St. Petersburg, is the backbone of the biggest development area of the Helsinki metropolitan region with an expected 60% economic growth within the next 20 years (and a relatively modest 12% growth in housing). It is to become a 'Logistic Zone' incorporating warehouses, logistics, high-tech industries and commercial developments, as a response by Helsinki to the economic prosperity and trade along this route, triggered by the opening of the Baltic countries. Relocating Helsinki harbour eastwards, to directly connect this asset to the E18, will complete the picture, but is still a controversial move due to its environmental impact.

Large parts of the E18 corridor in Helsinki are still to be urbanised. Further development of these areas is being assessed in the interreg IIC 'E18 Co-operation Project'[20]. Co-operation is sought with other parties to "link a comprehensive urban and regional planning study with pilot projects ... to the development of an internationally competitive route of high standard"[21]. The aim is to develop a strong image for these formerly peripheral areas in order to convey the potential of this development zone to prospective clients and authorities. For this purpose, an urban design study has been launched for the whole corridor.

To support interested clients, Vantaa is setting up a 'Centre of Logistical Expertise' within its business development unit. "The purpose of the Urban Logistics Program is to develop a co-operative logistic network between educational and research institutes, public officials, and enterprises. The first phase is to study the possibilities for a logistic forum and service center, which could engage in local development projects. The objective is to create a hi-tech expert logistic forum. To this effect, further measures are to be undertaken, e.g. the clarification of clusters and their logistic needs."[22]

'Typecasting' defines clusters of activities along the E18 corridor, some of which already exist. Their programmatic relation to highway, port and airport, will increase the competitiveness of the Logistic Zone.

A need for development strategies

The 'Logistic Zone' can be seen as Vantaa's answer to the strongly established IT and high-tech centre of Espoo and the city centre of Helsinki. There is, however, a surplus of potential sites for development in the region. The three cities in the Helsinki Metropolitan Region, Helsinki, Espoo and Vantaa, all offer opportunities for development. The area offered in Vantaa alone is comparable to that of Amsterdam's 'Cash corridor'. The multitude of options in the region stimulates competition between the municipalities but leaves potential investors with insecurities concerning both the success and future character as well as the state of planning of these areas.

If the E18 corridor is to develop beyond a plan for a peripheral industrial polygon (of hundreds of hectares), then there is an urgent need for strengthening a common implementation strategy and for giving rise to a development strategy for all sites. The Helsinki Metropolitan Development Corporation - despite its promising name - is concerned only with marketing the Helsinki segment of the E18 corridor. It does not deal with development and co-ordination. To increase the possibility to be selective and to choose what to promote on its industrial sites, Vantaa tries to acquire land to gain influence. The municipality aims at reducing the 75% of private land-ownership in the corridor.

4. Tangential traffic links

After the boom of the urban peripheries, many European cities are confronted with a new, more polycentric urban structure. Helsinki is no exception. The radial connections to the main city centre of the region remain essential, but journeys between the district centres become more frequent. This is evidenced by the fact that major traffic growth (an additional 150%) is expected on the tangential routes linking Vantaa, Espoo and the eastern parts of Helsinki, especially along the 1st and 3rd ring roads (E18) (the second ring is under construction). The Helsinki Metropolitan Area has traditionally had a very high share of public transportation, accounting for 53% of journeys in 1976, and 40% nowadays. Nevertheless, it is difficult to maintain the modal split at this level. As the share of public transport is lower on the

tangential routes (30% in relation to 51% on the radial routes), where major traffic growth is expected, investment in these routes would be most effective.

'The Helsinki Metropolitan Area Vision 2020'[23] and the 'Transport System Plan 1998'[24] therefore include major improvements of the tangential public transportation corridors and propose to concentrate all major developments along these corridors, creating a network of 'linear' growth areas. The aim is to achieve general integration of transport networks with land-use strategies by 2020. The proposed Marja railway line is one example of an essential regional link. It will connect two radial railway lines running through the eastern and western parts of Vantaa and provide a rail connection to the airport. The future airport railway station will have no interchange function, even though the airport is an important bus interchange between the regional and national bus systems. Instead, the two centres of Vantaa municipality, Tikkurila and Myyrmäki, will remain Vantaa's major interchanges between long-distance trains, regional trains and local trains / local busses (40% of the northbound long-distance trains from Helsinki stop in Tikkurila; in both stations, many rush-hour lines come together). The interchange function at Tikkurila and Myyrmäki is mostly for commuters; air passengers tend to use coaches.

5. Waiting for the Marja-line
The Marja-line, a regional link for 200'000 employees, will connect the district centres and future housing areas of Myyrmäki and Tikkurila.
Planning for the Marja-line has already started, and the general plan is expected to be ready by 2001. In addition to technical plans, land-use alternatives along the railway line will be studied, environmental impacts will be assessed, and cost-benefit calculations will be made in this planning phase.
However, the Marja-line will bypass the major development areas to the south of the airport, the Aviapolis and the 'Logistic Zone' along the E18. According to present plans, there is no link between the Marja-line and the Airport City, and it plays no role in the future development of the E18 corridor and Aviapolis. It would be worthwhile to study if this tangential railway link could run on a more southerly

route, to serve not only the airport, but also the future business and commercial development sites.

In the 'Transport System Plan'[25], construction of the Marja-line is only part of the third investment-package, scheduled for after 2011. It is unclear as to why the Marja-line will not be built before this. Reasons for this delay include:

- CAA Helsinki does not appear overly eager to get the rail-link, as its current emphasis lies on good road access. Marja-line plays only a minor role, in the CAA's current considerations on airport accessibility as well as in its expansion plans for the airport. The connection of the Marja-line to the future terminal areas remains as yet undefined in the CAA's plans, and consequently has as yet no impact on the new terminal concept. Such a standpoint is possible as the CAA is alone responsible for masterplanning within the 'traffic zone' (with only few interjections by Vantaa).
- Vantaa believes that the airport is still too small and that a railway will become necessary only with 12-15 million passengers and 20'000 employees. The municipality, however, is still in favour of an earlier implementation date.

6. Outlook - a forum for development
The Finnish government does not set the airport and harbour developments in Helsinki out as economic core-projects of national importance. The government's prime concern is an economic balance between Finnish regions. Thus, respective strategies for the airport and the harbour in

Helsinki are developed at the local level without top-level guidance. Today, discussions typically focus on the details of specific projects. What is urgently needed in addition to this, are regular, more general forums to approach the integrated development of 'Vantaa the Airport City'.

Conclusion: Specifying a broad ambition
Currently, the city of Vantaa and the Helsinki metropolitan area are reflecting on a redefinition of the metropolitan structure, away from the former centre-subcentre hierarchy. Yet, different planning authorities take care of the different elements in the airport area: housing, industrial sites, road infrastructure and regional public transportation. 'Vantaa the Airport City' would require an approach that specifies land-use and transport planning in a set of key projects. With the upcoming boom of the 'Logistic Zone' of the E18 corridor, a new housing area just south of the airport (Pakkala-Tammisto), and the 'Aviapolis', the area around the airport could be planned and developed more specifically as a new centre area. Such a strategic sector, an airport zone, could help to narrow down and clarify the concept of 'Vantaa, the Airport City', and of Aviapolis.

19 Official slogan of the city of Vantaa (local municipality)
20 Financed by the EU Interreg IIC programme: 'European Road E18 Co-operation Project', January 1999 until December 2001
21 idem
22 City of Vantaa, business development unit
23 'The Helsinki Metropolitan Area Vision 2020' (PKS 2020), Development office of the Helsinki Metropolitan Area (YTV)
24 'Helsinki Metropolitan Area Transport System Plan PLJ 1998', first revision of the 'HMA Transport System 2020 PLJ 1994'
25 idem

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Barcelona Logistic Center.
Airport a Key Enabler.

| **Airport** | **Logistics** | **Logistics** | **Highways** | **Railways** | **Port** |
| The Airport in Europe. Long haul services. Cargo and Logistics area above 40 ha. | **Zone-2** Foreseen expansion of 150 ha. | **Zone-1** Consolidated logistics centre of 55 ha. | Direct connection with the main Spanish and European freeways. | Cargo terminals within a radius of 5 kms. | Leader in the Mediterranean and gateway to Europe. |

Advertisement of the Logistic Platform of Barcelona

A city with the ambition to plan its airport by itself

During the last 15 years, the traditional competition between Madrid and Barcelona was fuelled by the fact that AENA, the Spanish Civil Airports Administration, and Iberia, the state-owned airline, were mainly concerned with the development of Madrid airport, while the development of Barcelona airport was set back. Therefore, the autonomous government of Catalonia region and the city of Barcelona (through its metropolitan planning agency Barcelona Regional (BR)) launched their own initiatives to study the future of the airport. When in 1999 AENA started developing its own strategies for Barcelona airport, it found itself in an unusual, if not unique, situation for Europe; it faced public authorities that had very clear ideas regarding the development of their airport, and on the airport's role in the region. BR had been set up after the Olympics to have an integral planning agency for the whole metropolitan area, an agency which still today is very valuable for the city.

1. AENA and Barcelona Regional: from Technical Airport Planning to Regional and Urban Planning of an Airport

Barcelona Airport is the main airport for the metropolitan area of Barcelona with 4 million inhabitants, and for the Catalonia region with 6 million inhabitants. It has, after its major expansion for the 1992 Olympic games, leapt from handling 10 million passengers per annum to 17.5 million in 1999. Once again, the terminal area has become too small; operational facilities are underdeveloped, and the system as a whole is expected to reach capacity limits by no later than 2005. Furthermore, ancillary activities are as yet non-existent and accessibility by public transport is poor (11% by train, 7% by bus), not least because taxi service is very strong, accounting for up to 45% of landside traffic to the airport.

The planned expansion is to solve all of these bottlenecks at once. An additional, parallel runway will be built. Terminal capacity will be more than doubled, with a new terminal between runways to avoid impairment of runway capacity through taxiing aircraft crossing runways. Operational and cargo facilities will be brought to an appropriate level. Furthermore, the expansion includes the creation of a major railway station and interchange as well as the realisation of a state-of-the-art Airport City within an expanded airport perimeter. Both will be developed completely from scratch: there is neither an Interchange nor an Airport City present at the moment.

Opinions about how to effect these developments differ. AENA aims to optimise the Airport from a technical and operational point of view, while BR is primarily motivated to integrate the airport and the impacts of its expansion into the
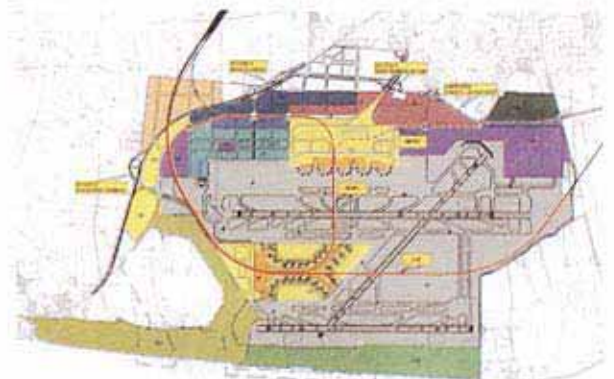
AENA's initial masterplan for the airport expansion

metropolitan area by providing optimal interconnections and a well-integrated logistics and business zone. The comparison of the two approaches allows one to understand the motivations of an airport operator versus those of a regional authority, and to see what profit the common process has yielded to the region.

A satellite concept or a multi-terminal scheme

BR felt that new terminal concepts for Barcelona Airport should no longer be beyond the interest of local and regional public authorities, as opportunities for airport-related landside development are to a great extent dependent on it. BR proposed to keep and expand the main terminal in its present location, and to build satellite terminals in the midfield area. The airport system would thus be very flexible and able to react to airport growth (by adding more satellites) and to changing Airline Alliances. The idea was to directly integrate the main terminal area with the Airport City, and to create an over-all Airport Product.

Due to the relatively close relationship between AENA and Iberia (both are still state-owned), AENA's prime interest is to provide a convenient and dedicated main terminal for Iberia, the home carrier of Barcelona airport, and the partners of its alliance, One World. Altogether, Iberia and One World account for some 60-70% of the air traffic at the airport. Due to the spatial constraints at the existing terminal, AENA considered this only possible with a new terminal for One World between the two parallel runways (terminal capacity: 20-25 million passenger per annum) with the new railway station, while other companies would use the smaller existing terminal (terminal capacity: 16 million passengers per annum).

A regional Interchange or an airport station

Originally, High Speed Trains would have by-passed Barcelona through the Vallès urban periphery to the north, and would have served Barcelona with only one High Speed Train station (Sagrera), in this scheme a terminus. However, the High Speed Train service would enlarge Barcelona airport's catchment area to an Euro-region of 15 million inhabitants, stretching from Valencia and Zaragoza in Spain to Toulouse and Montpellier in France. This was an important additional argument of the Catalan government and of the city of Barcelona to make High Speed Trains pass through the city and thus to fully integrate it into the High Speed Train network, with two or three through-stations: the Airport, Sagrera and maybe Sants.

The local and regional authorities intended not only to make the airport's public transportation node the main access to the airport for air passengers, but also to interconnect public transportation at the airport so well that it could serve as a regional public transport interchange for the Llobregat Delta, and to improve service for air traffic passengers and airport employees from within the region. They aimed at integrating international and regional train services in one station, and placed it to the North of the existing main air terminal, thus not only giving access to the airport terminals but also anchoring the node in the Airport City. This would increase the attractiveness of the Airport City as a regional business location, thus allowing to fully exploit the potential for real estate development around the railway station.

AENA adopted the idea of providing high quality accessibility to the airport by linking it to regional and international train networks. It sees the High Speed Trains

mainly as an opportunity to enlarge the airport's catchment area (attracting traffic from throughout the Euro-region). AENA therefore chose to locate the airport railway station underneath the new main terminal between runways in order to optimise the connection between air and rail services.

On the other hand, AENA sees no need for an interconnection of local and regional lines in the Llobregat Delta as the Delta's public transport networks focus on the metropolitan interchange at Sants station. Nevertheless, the AENA scheme would also allow for using the airport station as a land-side interchange between High Speed Trains, Intercity and regional trains, if that is desired in the future.

The Airport City: annex or over-all concept?

Barcelona airport currently has only 500 employees per million passengers. The goal to increase commercial and business activities on the platform, and to reach international workforce standards - some 1000 employees per million passengers - means that employee numbers will jump from 8'000 today (at 16 million passengers), to 30- 40'000 in the future (at 30-40 million passengers). For the accommodation of these additional employees, some 800'000 m2 of industrial floor space, or an area of about 200 ha, are necessary, in addition to the 150 ha for operational facilities and logistics. A true Airport City is planned to the north of the existing terminal, on land that needs to be expropriated from the airport municipality, El Prat. In exchange for this land, the municipality gets back some stretches of land along the coastline.

BR views the Airport City as a new piece of city in the Barcelona metropolitan area, and conceives and reads it as such. The Airport City is to include the entire range of
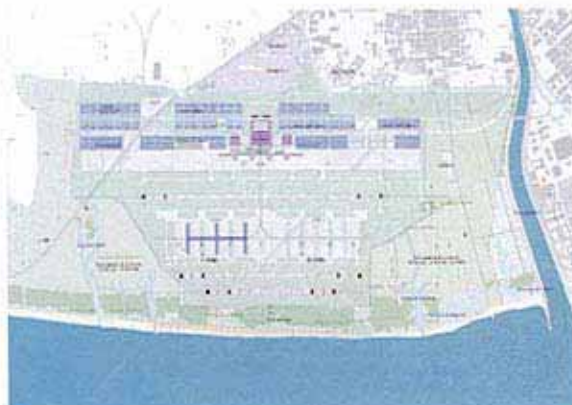
The city's (BR's) own masterplan proposing a northern core area

Barcelona's subway system will integrate also the airport

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functions found at airports: terminals, operational facilities, airport-related businesses, hotels, conference facilities, and public transport. Yet, in addition to this over-all functional integration, BR has set new standards for the latest generation of Airport Cities by giving the rather vast area (some 5 km by 1 km) a high urban access quality. The Airport Interchange (the Airport City's main station) will not be able to satisfy the accessibility requirements of the Airport City, as it is too big of an area. Therefore, in order to give the compact Airport City a similar density of public transport service, as is the standard in any other urban area in Barcelona, a series of six or more subway stations, on elongated branches of one or two of Barcelona's subway lines, were proposed. The elongation of subway lines is also the ideal means to connect the airport platform to the main residential areas of the airport's, and future Airport City's, employees: El Prat and the western districts of the City of Barcelona.

AENA, with its experience and background in technical airport planning, primarily conceived the northern zone within the expanded perimeter as a spatial reserve for the increasing amount of operational activities (cargo, aircraft maintenance, etc.), and as a zone for logistic activities. Integration of such a zone with the major new railway station under the midfield terminal did not seem necessary. Activities like hotels, conferences, and shopping, which do not fit into the industrial zone, could eventually be given space on the scarce land to the rear of the main terminal. This, however, would cause extra pressure on the natural and agricultural spaces of the Delta in that area.

What the confrontation has yielded
In several crucial issues, the strategy of the local and regional authorities to actively plan and design the airport expansion according to their own interests has resulted in adaptations of AENA's rather technical airport expansion plan:
- AENA recognises the importance of creating an Airport City with a diverse range of activities.
- Political consensus among local, regional and state administrations was reached in the summer of 2000 over providing high urban access quality to the airport and the Airport City. This has subsequently also been included in AENA's official airport plans. Several subway stops, part of a new metro line crossing all of Barcelona, will serve the Airport City.
- High Speed Trains will serve the airport, and a regional railway interchange for the Delta, at the airport, is possible.
- AENA has set up a special office in Barcelona to design and develop the airport's masterplan. It does not, however, include regular political and technical participation from local and regional authorities.

2. Barcelona and the major interventions into infrastructure
The city of Barcelona has developed an explicit strategy of 'recentralisation' in the metropolitan area [5]. Instead of growing other centre areas throughout the metropolitan area, the city of Barcelona aims at establishing new nuclei within the city itself, to upgrade run-down districts, and to enhance urban development. The current major infrastructure projects in the city and the region - the airport, High Speed Train, subway-system expansion, regional rail service improvements, gauge adaptations to connect to the rest of Europe - further contribute to fulfilling these aims.

Barcelona will have two or three High Speed Train stations, only one of which, Sants, is currently an important railway station. The other two new stations, Sagrera and the airport - the future main High Speed Train terminals of the region - are used for restructuring and further developing the urban territory. The city of Barcelona gets two new focal points. Sagrera, the future main HST station for the city, is the motor for the redevelopment of its own urban district.
Barcelona Airport, on the other hand, must be seen as part of the development concept for the Llobregat Delta, the Delta Plan. The common goal of local, regional and national interests is to make the Delta - with a potent port, a vital industrial sector, and a fast growing airport, as well as good links to Spanish and European landside transport networks - the main Logistic Platform of the Mediterranean and of southern Europe. For Barcelona airport, this means that the development of its Airport City is integrated into over-all development concepts for the metropolitan area. This is a new way of looking at and conceiving airports.

Thus, Barcelona's Airport City has a clear definition and development guideline to start with. It will be a core element of a highly advanced logistic centre. Within this context, the impressive dimensions of the Airport City are understandable. Expected synergies of the airport with the harbour, e.g. from logistics operators and distributors involved in both air and maritime transport and freight flows, can be easily accommodated and exploited as the same infrastructure can be used to give access to port and airport, and to distribute goods to the hinterland. Yet to also exploit the airport's excellent accessibility by public transport, the Airport City will include an office core.

Today's airport railway link to the left

AENA's adapted masterplan with subway and Airport City

3. El Prat - a local municipality in a context of major initiatives

Unlike other airport municipalities (Vantaa in HEL, Haarlemmermeer in AMS), El Prat does not aim to participate in the economic roulette of airport expansion and spin-off. Instead, all the development strategies of the municipality are geared towards improving the local living conditions. El Prat's centre is to remain the nucleus of a community, and must not become a business district. As the municipality is well enough connected to Barcelona by public transport, it sees no need for a regional interchange in its area.

As part of its strategy aimed at environmental quality, El Prat is very interested in preserving and strengthening the natural areas in the Delta and particularly along its coastline. As a compensation for the airport perimeter expansion onto its territory, the municipality required of AENA some stretches of currently otherwise occupied coastline, for example a golf course and a military site, with the intention of restoring them to natural habitat.

In order to hook up to the Logistic Platform initiative of the Delta Plan, El Prat intends to become a centre-piece in logistical matters. This it aims to do not by building logistic and distribution centres and business parks, but by specialising in educational facilities and institutions related to logistics and transport. Within the metropolitan area, transport management, aerodynamics and avionics can only be studied in El Prat. With respect to the Airport City, the only issue El Prat is really concerned about is the provision of housing for the additional airport platform employees. The number to be accommodated in El Prat is expected to jump from 3'000 to 15'000 when the Airport City raises employee numbers on the

platform to an international standard. El Prat is therefore aiming to provide direct connections between its municipal roads and the Airport City's network, in order to reduce walking and cycling distances.

Like in most other airport regions, El Prat as the airport municipality has the potential to exert a certain control over non-operational activities on the airport platform. However, El Prat hopes that with the adaptations of the 1976 General Metropolitan Plan to the new Airport Plan, the entire Airport City will be tied together in one development plan. Thus, the ensemble as a whole would have to be approved by the municipal council, and a higher over-all urban quality could be achieved.

4. Outlook: privatisation of AENA. Barcelona and Catalunya are expectant

Currently, the Spanish State, the region of Catalunya, and the city of Barcelona are ruled by different political parties (liberal right, centre and socialist respectively). Each one has different ideas with respect to the future of AENA. The State is not yet willing to lose control over airports, and thus favours keeping all Spanish airports under a partially privatised AENA rule. The regional government, the Generalitat de Catalunya, claims the rule of the three Catalan airports, Reus, Girona and Barcelona, to create a Catalan Civil Aviation Authority, and a Catalan airport system. The municipality of Barcelona is convinced by the potential for the airport to become self-financing under a market-oriented management, and therefore would even favour a total privatisation, if this were the only way to achieve the desired development.

Conclusion: The Barcelona case – debating a common solution

Even though ultimately the scheme of AENA will be realised, the debates and dialogues resulting from the proposals of the regional and local authorities have contributed to a more integral approach to airport planning. Since the 1992 Olympics and the related urban upgrading initiatives, Barcelona is very experienced in using infrastructural initiatives for steering urban development. To guarantee and create high accessibility, and to define the role of an area as part of the city and of the metropolitan region, come first. Only then can exploitation start. This allows for very precise programming and specification of development areas.

The great advantage in the case of Barcelona is that all relevant elements regarding the expansion of the airport and its integration into the metropolitan context are developed simultaneously, and are part of the comprehensive Plan for the Llobregat Delta. At airports like AMS or ZRH intentions are similar, but may encounter more difficulties as much of their airport area is already far developed. Accessibility, there, has to be constantly updated to keep up with economic growth.

26 Barcelona New Projects, Oct 1999.
Barcelona Regional/Ajuntament de Barcelona

The future Sagrera HST station in the foreground: a key project for 2004

The Delta Plan: port and airport as a logistic platform

Advertisement of ZRH

A privatised airport in the focus of regional planning

The airport authority of Zurich airport, or Unique Zurich Airport, as it is now called, was privatised in April 2000. The Canton of Zurich, however, still holds a golden share of slightly more than 50% in the airport. The current expansion phase of the airport, which includes a Midfield Dock and an Airside Centre as well as improving services in the railway station hall, is planned to be completed in 2003. For the years beyond 2003, the new masterplanning unit of the airport authority is not only concerned with future airside expansion, but is now investigating additional landside opportunities in the form of an Airport City.

The Canton of Zurich has a well worked out plan for the integration of transport and land-use in the 4 km long corridor between the airport and Zurich Nord/Oerlikon. The airport area and the Zurich Nord redevelopment area are designated as Regional Centre Areas in the spatial development plan of the Canton [1]. In

addition to the regional railway, a light-rail and an extended tramway line are planned to guarantee fine distribution and excellent accessibility throughout the corridor. Urban growth can rely on several established cores (urban or municipal centres) and attractive large development sites.

Airport-generated noise is a major issue in the region. The SIL (Swiss Federal Specifications on Air Traffic Infrastructures [2]), submitted to federal approval in October 2000, fixes the new acceptable noise limits for airport surroundings. They are less restrictive than what was expected, which reduces constraints on air traffic. However, airport flexibility could be prejudiced in the long-term, as considerably more development can take place in the surrounding municipalities. To guarantee space for the expansion of operational facilities, the SIL has designated a strategic sector around the airport, which is significantly wider than the current perimeter.

1. Privatisation 2000

Due to the recent privatisation, there is no clarity yet about how to co-ordinate and co-operate between the airport authorities, municipalities, and Canton. While before privatisation all aspects and responsibilities for airport development were with one entity, the Canton, responsibilities are now split between public departments and the private airport operator. Limits of responsibility need to be consolidated. With regular roundtable meetings, and an airport forum, steps are being taken at a

FLUGHAFEN ZÜRICH
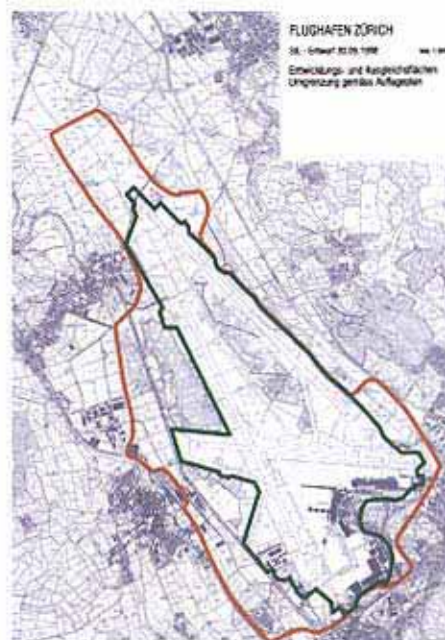
The new perimeter: gaining space for manoeuvre
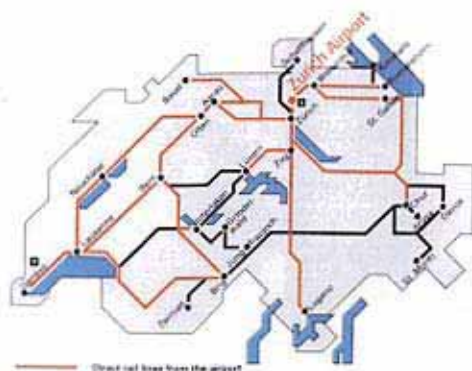
Direct rail links from all over Switzerland

political level towards co-ordinating the different actors involved, and contacts between their representatives are being (re-)established.

The airport area affects a total of 6 municipalities, of which two are directly adjacent to the airport's built areas (Kloten and Opfikon-Glattbrugg), and have almost grown together. There is a lack of co-ordination between these municipalities, and also between them and the airport operator. Their land-use plans show no signs of common strategies, much less of strategies with respect to the airport.

Some of the new strategies of the privatised airport operator require that certain real estate developments on the airport platform, or - in more general terms - for airport-related or -oriented activities anywhere close to the platform, need to be progressed faster than the planning processes of the surrounding municipalities allow. Tensions are arising due to the incompatibilities of airport planning with local and regional planning guidelines that require public transport access as prerequisite for development, and due to different time frames of the respective planning processes.

2. Growing interchange function
One of the most renowned assets of Zurich Airport is its high accessibility by public transport, enhanced by the fact that it is also strongly used as an Interchange for regional networks. The airport has the 5th busiest railway station in Switzerland, both in terms of passengers and of trains serving the station. The modal split for public transport at the airport is high already, with 41% of passengers and 34% of employees arriving by public transport. One of the airport's main problems, however, is bottlenecks in landside networks, and particularly congestion on the highway network to and around the airport. The airport operator is therefore aiming for a better integration of the airport in regional public transport networks and an improved

public transport modal split (51% for passengers, and 43% for employees).

To improve accessibility for its employees and passengers, the airport operator is also aiming to further enhance the airport's importance as a landside Interchange (today, close to 10% of landside traffic to and from the airport is due to interchanging, including 1.5% of park&ride). 'The new facilities will make Zurich Airport a linchpin in the public transport system for northern Zurich and the surrounding region.'[28] A more prominent role in regional networks, with additional direct trains to the Canton's main population areas and more direct connections to cities in Switzerland and abroad, will increase the frequency and quality of service. In this respect, Swissair and the airport authority, the local and regional public transport Consortium ZVV, bus companies, and the Swiss Federal Railway Company SBB, are all closely co-operating.

National and international trains link all of Switzerland's major cities directly to the airport. Some trains even bypass Zurich Central Station, a terminus station, and call exclusively at the airport. They are, however, not diverting traffic away from the Central Station but providing additional direct links from tourist regions and other big cities which generate lots of air traffic. Since 1998, remote check-in and baggage claim is possible in over 130 railway stations throughout Switzerland. To extend its catchment area, the airport is

co-operating with Swissair and the Swiss National Railways to improve links to nearby regions in neighbouring countries. A new northern link to Stuttgart (on the Milan-Stuttgart-line) is planned and trains from Austria are being diverted to call in St. Gallen and at Zurich airport. This is intended to divert air passengers from Munich airport to Zurich.

To exploit the airport's high accessibility during the night when there are no flights (thus avoiding temporary over-capacities in accessibility), the airport intends to attract activities to the Airport City, and mainly to

its core area, that operate throughout the night. With this in mind, the airport has recently requested a casino license for a site just next to the railway Interchange.

Interchange quality
The current airport expansion phase also aims to improve the quality of connections between the different means of public transport in the interchange. The station hall above the underground railway platforms has been redesigned and will be opened vertically to optimally link all means of landside public transport. The new railway terminal is to be the intersection point between all landside access ways to the airport: right above the railway tracks, directly next to the bus and light-rail stations, and between the multi-storey car parks. It will be very compact, and will provide 60 convenient check-in desks and direct luggage claim. 'The new complex will feature a generously proportioned concourse extending between Car Parks B and C. This will bring a sense of clarity and transparency to the facility with its various floors, while the glass ceiling will provide welcome daylight from above. On the plaza level, almost twice the current range of restaurants and shops will be available.'[29] The Interchange will be the airport's second focal point besides the new Airside Centre.

3. Accessibility to the airport area
Accessibility to the airport area will, in addition to the Airport Interchange, be improved with the introduction of several initiatives aimed to achieve a fine network

A landside interchange in the making: already 9% of all rail passengers at the airport are 'interchangers'

distribution throughout the airport area. The initiatives will form part of other regional networks and have a particularly high density of stops in the airport area. This will significantly contribute to improving the modal split by the desired 10%. Convenience for public transport users will be improved by separating public and private transport in the airport area.

The Airport Interchange accommodates two regional railway lines (S2, S16) which circulate between the densely populated areas along the lake of Zurich via Zurich Central Station, to cities to the north-east of

99

the airport. In addition, three nearby railway stations, Opfikon-Glattbrugg (S5), Balsberg and Kloten (both S7), link the airport area to all major population centres of the Canton of Zurich. A shuttle-bus connects these stations to the Airport Interchange.

The fine distribution by public transport in the airport area, and the connection between the regional railway stations, will be significantly improved by 2005 with the realisation of the Glattal light-rail system. The light-rail will have six stops in the airport's main activity zones, with stations only 250 to 500 m apart. The Airport City will thus have a high urban access quality,

The airport in the regional railway network

similar to what will be reached in Barcelona with the extended subway lines. Additional opportunities to improve the accessibility of airport and Airport City can be provided with the light-rail linking the three regional railway stations and the Airport Interchange.

The light-rail system is particularly significant for the airport because it will link all the main development sites between the city of Zurich and the airport platform (the Glattal urban periphery). Travel times between all these locations and the airport will be less than 10 minutes. Originally conceived as a means of tying together the Glattal urban periphery, the light-rail system has become a means of strengthening the development in the corridor between Zurich and the airport.

4. The concept of Regional Centre Areas
The Glattal corridor is considered the hottest spot for development in Switzerland. It contains a bundle of high-quality national, regional and local transport infrastructures, and no less than three important public transport interchanges only ten minutes apart: Zurich Central Station is the Swiss railway hub; the airport is Switzerland's 5th most used station, and Oerlikon is an important regional hub. All of them lie between sites with excellent development potential and have been designated Regional Centre Areas in the Canton's structure plan.

The Centre Area Concept originally encompassed 11 areas throughout the Canton, which together form a vital polycentric structure that allows for an economically and ecologically sound operation of the regional railway. The quality of public transport is perceived as one of the most important elements of the overall regional investment climate. In recent years, the focus has shifted away from the initial eleven to the five best integrated and co-ordinated locations. These are the airport and Zurich Central Station developments, as well as the areas with the highest potential to undergo major transformations through redevelopment: the Zurich Nord, Zurich West and Winterthur industrial districts.
'Due to the only partial predictability of urban development dynamics in the region, sites need to be reserved in the Centre Areas for new uses in order to optimally accommodate them in the future. ... Every Centre Area has to maintain its primary identity, so that they optimally complement each other. ... The necessary planning steps are to be phased in order to avoid unwanted developments and/or the obstruction of development possibilities. The co-ordination of site development will help in the long-term to efficiently accommodate, but also to generate, development impulses.' [1]

Of the five main Centre Areas, the Airport Centre Area is considered to be the one with the highest development deficit. With a surface area of 242 ha and some 2.2 million m2 of built commercial floor area, its development reserves amount to close to 800'000 m2. On a length of only 5 km (same as Barcelona's Airport City), it contains
- two municipal centres, and three major development sites,
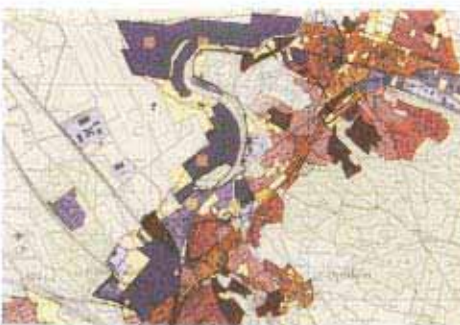- the airport's terminal, freight and hangar areas, and

A new light-rail for a booming northern periphery (the airport at the top)

- high accessibility by rail (4 stations), light-rail (10 stations) and highway (3 exits).
Unlike the other four main Centre Areas in the Canton, it has as yet no specific character or identity, nor any urban coherence. The Centre Area concept has as yet not been incorporated in the airport's strategies and in the plans of the surrounding municipalities, who are not used to joint planning. Co-operation between the municipalities, the airport authority, the region, and transport providers is urgently needed to reach an over-all urban development quality in the Airport Centre Area.

5. An integrated Airport City?
Within the Airport Centre Area, the share of the airport's platform is limited. Developable space on the platform or at least close to its core area (terminals), for airport-related activities, is very scarce. In general, the platform of ZRH airport is very small as compared to other airports, and offers much less space for development. The airport operator has been and is still forced to outsource platform functions to off-platform sites (e.g. catering, Swissair headquarters) or to remote locations on the platform, to free valuable office space in the core of the platform. The only platform area that can be developed in line with the Centre Area concept is the core

The airport area is a regional Centre Area

area Butzenbühl which is to accommodate some 120'000 m2 of office space and eventually a casino. A scheme for this area, called 'Unique Airport City', has been presented in October 2000.

Out of the need to, as a privatised airport operator, relatively fast generate income with activities other than running the airport itself, the airport operator would like to use the new strategic perimeter around the airport, as defined by the Swiss Federal Specifications on Air Traffic Infrastructures SIL from October 2000, as an opportunity for its own Airport City development.
The SIL perimeter, however, was established to allow for the expansion and reorganisation of operational facilities, and as a reserve for the airport's manoeuvrability. Because of this and as there are many developable sites with excellent accessibility in the airport's surroundings, the municipalities and the Canton are opposed to the airport's development plans in the SIL area. For the same reasons, the current relocation of the airport operator's own headquarters from the terminal area to a remote platform location without adequate accessibility, even though it remains within the airport perimeter, might meet with resistance from the public authorities. The discrepancy between the quick real estate demands of the airport operator, and the availability of highly accessible sites in the wider airport area and in the corridor to Zurich, needs to be overcome.

With the Centre Area concept, the Canton has a very clear scheme for an optimally integrated Airport City. Given the high accessibility throughout the airport Centre Area, airport-related activities could be spread over the whole area and even include additional developable sites in the adjacent municipalities. For all these sites, the question and co-ordination of 'where to do what' should have top priority. Within the Airport Centre Area, airport-related activities should be favoured, as the airport itself cannot realise an Airport City without looking beyond its perimeter.

With the high accessibility of the entire corridor to the main city, and the excellent connections between the different Centre Areas, Zurich is a good example of a region where part of the airport-related development programme could be easily transferred even further away to sites beyond the immediate airport surroundings. Simultaneously with the

The Centre Areas of the Canton of Zurich

current airport privatisation, and the operator's intentions to densify the core area of the platform, there are strong initiatives to develop the area around Zurich's Central Railway Station at the other end of the corridor. The project, called Eurogate, consists of 250'000 m2 of commercial and prime business space. It could even be considered a potential location for special kinds of airport-oriented activities: the airport and the Central Station are only nine minutes apart by train. They are, so to speak, 'door-to-door', and one can go from one to the other without getting wet.

6. Key tool: 'Planning Zone Concept' (Planungszone)

Within the Airport Centre Area, but also in the wider surroundings of the airport, the accommodation of the 'wrong' activities in the 'wrong' locations could become a major threat to the manoeuvrability of the airport. The Canton of Zurich has a specific instrument geared to the challenge of how to deal with uncertainties and the need for flexibility in the planning process of the airport, the so-called Planning Zone (Planungszone). If the development of a certain site potentially prejudices the airport's operability in the future, the Canton can, either on its own initiative or in co-operation with the airport, for a limited time (usually some two to four years) block any change of land-use in this area. After this time limit, the area has to be opened again to development, if the airport has not clarified its arguments for other uses, and concretised projects. Currently, there are no such Planning Zones in force, but they may soon become important as the airport works out future airside strategies.

Conclusion: Optimally connected regional Centre Areas

With the Centre Area concept and the importance given to the airport station as an interchange node in local and regional networks, the Canton of Zurich has created a sound basis for the full-fledged integration of the airport into one of the most dynamic areas of the Zurich region. The implementation of this regional concept, however, is still hampered by a lack of collaboration between the local authorities, as well as by entirely new preconditions and interests due to the recent privatisation of the airport operator.
In view of issues like the Airport City and the airport's outstanding national and international accessibility by landside public transport, the Airport Centre Area can be expected to become a valuable basis for co-operation between the airport operator, the municipalities and the Canton, as well as transport providers and investors.

In the middle: the new Airside Centre and midfield terminal. Developable land is scarce on the landside

27 Kantonaler Richtplan, 1994. Kanton Zürich
28 SIL Sachplan Infrastruktur der Luftfahrt, 2000. Bundesamt für Zivilluftfahrt
29 ZRH airport. 5th expansion. Brochure 1999/2000. Flughafen Zürich
30 idem
31 Siedlungsentwicklung, 1998. Raumbeobachtung Kanton Zürich, Heft 20

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A nearly independent Airport

1. Organisation: a private company, autonomous on its territory

Vienna Airport plc has been a fully privatised enterprise since 1992. Ownership is divided between public entities, holding 48.92% (Provinces of Vienna and Lower Austria each with 20%, and the Federal Republic of Austria with 8.92%), and private shareholders holding the rest. For being the most privatised airport of the nine airports compared, Vienna Airport plc has a very low share of non-aviation income: only 28% of its total revenue!

Prerequisites for becoming a business enterprise included commercialisation, a new organisation structure (with several subsidiaries), planning and development control instruments, strategic planning, and a real estate development branch (Vienna Airport Real Estate Development Ltd, a full subsidiary of Vienna Airport plc). Privatisation was introduced together with a Public Private Partnership Concept which clearly defined the roles of the public and private sectors and of the airport management, as follows:

- *the public sector serves as a regulator, but at the same time acts as a strategic and development partner and promoter.*
- *the private sector supports the strategies by providing the financial backing required.*
- *the airport management manages shareholder value, supports the regional economy by providing facilities, logistics and marketing for companies settled at the airport, and is active in regional environmental management in terms of minimising the adverse impacts of air traffic.*

Vienna Airport plc is also involved in strategic planning by federal and provincial authorities. Strategic co-operation with the public sector covers such areas as:

- *rail connections (co-operation with Austrian Federal Railways),*
- *the airport's Business Park development (together with the municipalities), and*
- *the Spatial Development Concept for the Eastern Region of Austria (Provinces of Vienna, Lower Austria and Burgenland).*

Successful environmental management has, among other initiatives, reduced the 66 dB(A) flight noise zone from 34 km2 to 15 km2 between 1980 and 1995.

Vienna Airport plc has autonomy in terms of Airport City planning and design on its property. If the airport's development plans pass environmental impact assessments, the ministry of transport grants Vienna Airport plc the right to buy out current landowners for expansion for operational purposes; however, for purposes like the Vienna Airport Business Park, it must purchase the land like an ordinary developer. The Austrian municipalities don't have any legal competence in land-use planning for airport areas; they are only responsible for the physical planning of the surrounding area (local land-use and zoning plans, and urban development plans).

Small municipalities and green and agricultural buffer zones make the airport remain in a sea of green:

- *To the west, an agricultural buffer zone separates the airport from an industrial and business area (an oil refinery and the Concorde Business Park at the Eastern fringe of the City of Schwechat).*
- *To the north, the A4 motorway (linking Vienna with Budapest) presents a physical barrier between the airport and the wetlands of the river Danube, which are part of the National Park 'Donau-Auen'.*
- *To the east, there is a chain of small villages, the development of which is restricted to the realignment of existing settlement borders. The Regional Concept on Networking of Green Areas (1993) defines this area as a 'key structure'.*
- *To the south, agricultural land limits the airport territory.*

2. Masterplan 2015: new attention to real estate and Airport City

In 1998, Vienna Airport plc presented the 'Masterplan 2015', a Zoning Plan which determined the facilities, equipment and capacities required to support the forecasted volume of traffic. It expanded the airport area from 1'000 ha to 1'500 ha, the main part of which would be required for the construction of a third runway parallel to one of the existing runways.

However, the explicit goal of the 1998 Masterplan was to concentrate business development at the airport, and to transform the airport into a 'multi-modal centre of economic activity' with a mix of 400 enterprises and a workforce of 20-30'000. Therefore, the main focus of the Masterplan was not only on the expansion of the airside facilities, which would happen regardless (even though it is more

VIE
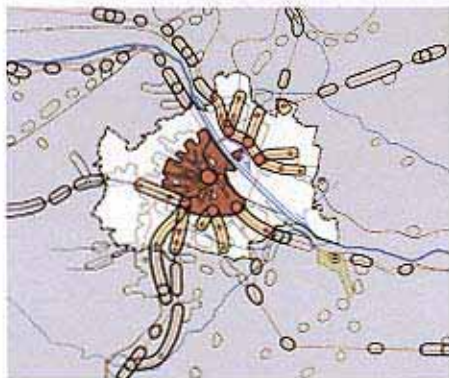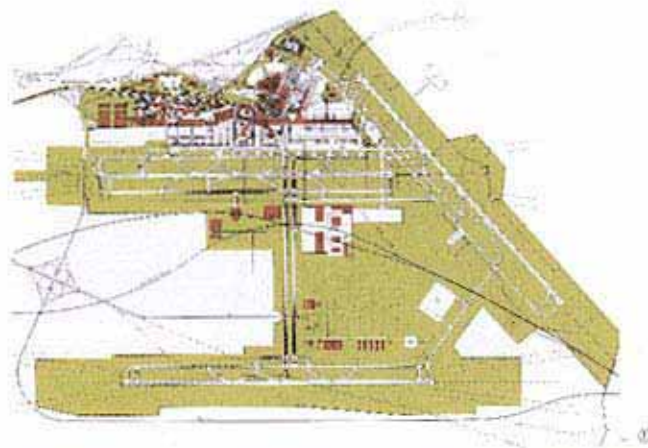
① Masterplan for airport expansion: option E
② The forecourt of the terminals
③ Winning entry for an urban planning competition for VIE's Airport City
④ Vienna Province (white) is embedded in the Province of Lower Austria (gray): the airport is just not part of Vienna's development corridors
⑤ New attention to real estate
⑥ At the threshold to Eastern Europe
⑦ Vienna airport in the regional railway network

HEL
ARN
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FRA
ZRH
MXP VIE
MUC
BCN

expensive: additional runway, terminal buildings, control tower), but rather on landside projects. The Masterplan was no more only an airport expansion plan, but was to serve as an integral development plan, and equally considered
- airside expansion,
- landside development,
- infrastructural and access improvements and
- environmental protection.
It therefore served, and continues to do so, as a comprehensive instrument for the co-ordination of airside and landside planning; airside and landside interventions are phased and developed in parallel. A major component of the Masterplan 2015 involves preparatory work for the implementation of a comprehensive urban design that will guarantee a coherent spatial and visual quality for the airport area. The latter includes over-all area quality management, the minimisation of walking and cycling distances, greening and planting, and traffic guidance.

Based on terms of reference defined by the Masterplan, Vienna Airport plc in 1999 launched a competition for the development of an over-all urban planning and design concept. The jury's criteria, which included operative and economic aspects, efficiency, and design quality, were not comprehensively met by any project. Therefore, two teams were nominated joint first prize winners (Baumschlager-Eberle & Itten-Brechbühl, and Frank/Hayde), and an additional five projects from the 16 finalists were purchased to be incorporated in the future design of the airport.

Based on the results of this competition, the Masterplan is now undergoing a comprehensive revision. This will be

accompanied by an independent 'Mediation Process' initiated by Vienna Airport plc, launched in fall of 2000 and lasting some 18 months. The Mediation Process should help to find a common consensus on current and prospective conflicts in airport and Airport City development. It will help clarify under which conditions VIE can ensure and improve economic performance, jobs and the infrastructure of the Vienna Region in the long term, taking into account the environmental impact on residential areas nearby. The Mediation Group includes representatives from the nearby communities, the 'Platform against a 3rd Runway', a Neighbourhood Committee (mayors from the neighbouring communities), representatives of the Provinces of Vienna and Lower Austria, environment attorneys and Vienna Airport plc.

3. The airport's position and role in the region
Corridor to Vienna
The city and Province of Vienna is an enclave in the Province of Lower Austria. The airport sits on the territory of the latter and is thus no more part of Vienna itself. As a province which in the wider airport area is predominantly rural, Lower Austria is hardly developing strategies that go beyond road- or rail-integration of the airport.
Nevertheless, the airport, which serves as a gateway to the region, is triggering urban development between itself and the City of Vienna. Besides the airport's Office Park, such new development poles include the Concorde Business Park in Schwechat (49'000 m2) and urban re-developments in Vienna like the former gasometer and the abattoir sites, which as yet are equally well or even better accessible by public transport than the airport.

Accordingly, the 1995 City of Vienna Urban Development Plan[22] aimed at making this rail and road corridor (Vienna/Simmering - Schwechat - airport) one of the city's main development axes. But as Vienna in principle cannot plan any further than its boundaries, it limits its focus to its own territory, only indicating possible extensions of the proposed corridors into the Province of Lower Austria.
Thus, the awkward situation arises where urban growth towards the airport is taking place just like in other airport regions (for example Zurich with the Glattal-corridor), but where no regional planning authority is really responsible for outlining the integral relation between the airport and the city, or its strategic position in the region.

In order to fill in this gap, a regional development programme concerning Vienna's airport corridor is being prepared by the 'Planungsgemeinschaft Ost', a joint planning association of the Provinces of Vienna, Lower Austria and Burgenland, to co-ordinate development in the corridor and deal with the airport's wider regional impact.

The Airport City: a specific type of programme
The Office Park at the very core of the airport is the centrepiece of the airport's Masterplan. Initially, an Office Centre will be built to house the now dispersed departments of the airport administration. The Office Centre will promote the Office Park for subsequent development. Businesses like banks, insurance companies, travel agencies and other enterprises with a strong inclination to air traffic will follow. Given its strategic advantage of offering readily accessible air travel with respect to the other development sites in the corridor to Vienna, the airport is particularly promoting the area for businesses that want to set up their headquarters to exploit the advantages of the hinge-position of Vienna between Eastern and Western Europe. This is an airport initiative, but must also be seen in the context of Vienna's position as the currently most eastern capital of the EU and in the EU's Eastern European strategies.
VIE sees itself as the international gateway to Eastern Europe. Until the fall of the iron curtain, VIE's catchment area measured 6 million inhabitants; this has now risen to 14 million. VIE emphasises its proximity to the Eastern European economic markets and its strategically ideal position with respect to Central and Eastern European air traffic developments. The idea is to attract businesses from Eastern Europe so they

are still as close as possible to their home countries, but can fully profit from the capacity, connections and services at VIE.

To make the Office Park an attractive urban environment for the workforce, the business developments will be complemented with leisure facilities, including restaurants and sports centres. There are even ideas to build housing for airport employees. VIE has the best shopping centre in Austria in terms of efficiency/m2 and high growth rates. Therefore, this non-aviation sector has very high priority in VIE's strategic planning (today, non-aviation amounts only to 28% of total revenue), and growth-stimulating initiatives have been launched in this respect: a special VIE shopping website promotes shopping at the airport for travellers.

A business park profiting from the airport
Vienna Airport Business Park is somewhat remote (to the north-east of the airport) but has direct access to the highway. Vienna Airport Business Park Development Company Ltd., a subsidiary of Vienna Airport plc, acts like a normal developer and investor. As the site is not part of the airport territory, the Business Park development has to be submitted for approval by the relevant municipalities. The 127'000 m2 of the Business Park are reserved for activities profiting from proximity to the airport. This includes those that will benefit from the expansion of the Air Cargo Centre at the other end of the airport. This means trade, logistics and distribution (hi-tech and pharmaceutical products), as well as service and communications industries.

4. A threshold to Eastern Europe
Even though the main interest of Vienna Airport plc is with the Airport City, it collaborates with Austrian Federal Railways and the Vienna initiative 'TEN-hub Vienna Region' on improvements regarding access to and interchanging at the airport. In their traffic forecast, which forms the basis of the Masterplan 2015, Vienna Airport plc assumes that by the end of the Masterplan period, distances below 600 km will not be flown anymore, but travelled by train. Today, however, direct long-distance connections are as yet only provided with coaches - to Bratislava and Budapest.

There are plans for integrating the airport into the long-distance Intercity and Eurocity rail networks to Eastern Europe by means of a new rail link to the existing Vienna-Budapest line with junction to Bratislava. Within the context of VIE as the international gateway to Eastern Europe, the integration of Vienna and later of Eastern Europe into the TEN rail (but also road) networks is of major interest. At the beginning, High Speed Trains circulating from a new Vienna Central Station to Western Europe will be accessed via a shuttle-train between the airport and the Central Station. As the airport lies to the east of the city of Vienna, it is optimally located to eventually be integrated in High Speed Train service (ICE) to Eastern Europe via Vienna. This would significantly improve the conditions VIE can offer to potential Eastern European clients for its Airport City and Office Park development: excellent and convenient links by landside transportation.

Interchange at Vienna Central Station
The landside Interchange function of the airport will not be significant. Interchange at regional to international levels will be provided at the new Vienna Central Station, a through station for rapid transit of ICE, IC, EC, regional and 'S-Bahn' trains. The airport is too peripheral in the region for this task.
Public transport serving the airport is strongest between the airport and the city centre, but is still not particularly good. Upgrading the S7 regional railway service (which is bound for the trunk route of Vienna's S-Bahn network) with double tracks for a higher frequency of service (every 15 minutes) and for a significant travel time reduction, is due to be finished in the autumn of 2002. Furthermore, the Airport will be directly linked to the proposed Vienna Central Station by an additional regional railway service. These developments, however, will only improve public transport access for the 50% of the airport's workforce living in Vienna. For the other half, spread in the closer and wider vicinity of the airport, public transport provision will remain inadequate.

Conclusion: An Airport City in a near planning vacuum
With the urban design competition and its airport masterplan, Vienna Airport plc has developed a strong vision for new urban standards in airport development, a response to the categorical shift on the airport's landside away from being a mere parking lot. The future on-airport Office Park is aimed at the opening Eastern European markets, complementing the ambition to establish Vienna airport strategically in a larger European area. Lying beyond buffer zones, not on the territory of the city and province of Vienna, and not in its own province's heart, the airport is positioned in a near planning vacuum and appears only marginally in local and provincial strategies. A 'Mediation Process' has been started to find a consensus on airport and Airport City development, including access and environmental impact, and taking into account residential areas nearby. Furthermore, efforts for a new regional development plan for the airport corridor are underway.

32 Urban Development Plan Vienna/The new Traffic Concept, 1995. Municipal Administration of Vienna - Urban Planning

Glossar and Abbreviations

AMS
Amsterdam Schiphol Airport; Province North Holland

ARN
Stockholm Arlanda Airport; Stockholm County, Sigtuna Municipality

BCN
Barcelona Airport; Barcelona Area Metropolitana

FRA
Frankfurt Airport; Umlandverband Frankfurt

HEL
Helsinki Airport; Helsinki Metropolitan Area, City of Vantaa

LGW
London Gatwick Airport; West Sussex County

MXP
Milano Malpensa Airport; Regione Lombardia

VIE
Vienna Airport; Province and City of Vienna

ZRH
Zurich Airport; Canton of Zurich

Airport Area
Areas adjacent to the airport, the transformation of which is directly related to the airport development

Airport City
Definition see Part 1 Trends (p. 14)

Airport Interchange
Definition see Part 1 Trends (p. 16)

Airport Platform
Territory within the airport perimeter

Airport Product
New notion of airport based on a comprehensive business orientation (airside and landside development)

Airport Region
A region containing an international airport

Airport-oriented activities
Choose the airport or the region to settle because of the function of the airport as a regional and international interface (interchange node) and as a business location.
Profit from the regional and international accessibility of the airport.

Airport-related activities
Activities with a direct functional relation or dependence to air traffic (freight, passengers) and airport operation

Aviation activities
Core-business, operational activities

CAA
Civil Airports Administration

Collaboration
Partnership

core-business
operational or platform-bound activities which have a direct functional relation with the airport, the activities of the 'core-business'

HST
High Speed Trains

Hub
An airport with a substantial share of transfer between intercontinental flights and continental flights/HST. The increasing amount of transfer passengers in these airports and consequent higher aircraft occupancy rates lead to feasibility of additional services and routes to and from this airport. One expects that there will be place for 4-6 hubs in Europe.

IC
InterCity trains

ICE
InterCity Express (German High Speed Trains)

Interchange Node
Interconnection of different means and levels of transport which allows for transfer between them

Metropolis
Conurbation, City region

Municipality
Local government area within a region

Noise Contour
Zone which indicates the noise level generated by air traffic on the ground. It is used to indicate zones within which a certain type of land-use (noise-sensitive) is to be restricted

Non-aviation activities
Non-operational activities, such as airport-related activities and airport-oriented activities complementing aviation activities as ingredients of the Airport City

Off-airport
Beyond the airport perimeter

On-airport
Within the airport perimeter

Pole
Centre or concentration of activity or development

PPP
Public Private Partnership

PT
Public Transport

Regional Hub
An interchange node which acquires a crucial position in regional networks. The same principle that makes an airport a hub (see Hub) also makes an airport railway station a Regional Hub.

SME
Small and Medium-sized Enterprises

Tangential Route
Circular route, ring road

TEN
Trans-European Networks

Territory
Land owned or administered

TGV
Trains à Grande Vitesse (French High Speed Trains)

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	✈	Departures
	✕	Interchange
↑	▦	Airport-City
←	P	Parking
→	CARGO	- City