AVIATION TRENDS

STATISTICS, ANALYSIS AND INFORMATION FROM THE SWEDISH TRANSPORT AGENCY 2009

SWEDISH TRANSPORT AGENCY

FACTS

- 28.1 million passengers in scheduled and charter traffic at Swedish airports, an increase of 3.4 per cent.
- 21.3 million passengers in international traffic, an increase of 5.2 per cent,
- 6.7 million passengers in domestic traffic, a decrease of 2.2 per cent
- Number of passengers per flight was 74.2. The average amount of passengers on domestic flights was 50.1, and the corresponding number for international traffic was 87.6 per flight.
- Air-freight to and from Swedish airports during 2008 amounted to just over 185,300 tonnes, a decrease of 13.4 per cent compared with 2007. International freight dropped by 13.5 per cent to 180,700 tonnes. Domestic freight which accounted for 2.5 per cent of the total freight volume, declined by about 9 per cent.
- There were 392,910 landings which was almost unchanged as compared with 2007. The number of landings in scheduled and charter traffic was 256,604, corresponding to an increase of 2.1 per cent compared with 2007.
- Stockholm-Arlanda handled 18.1 million passengers, an increase of 1.3 per cent compared with 2007.
- In absolute numbers, the increase was greatest at Stockholm-Skavsta with 485,000 more passengers during 2008.
- During 2008, scheduled and non-scheduled commercial traffic was carried out from 41 airports in Sweden.

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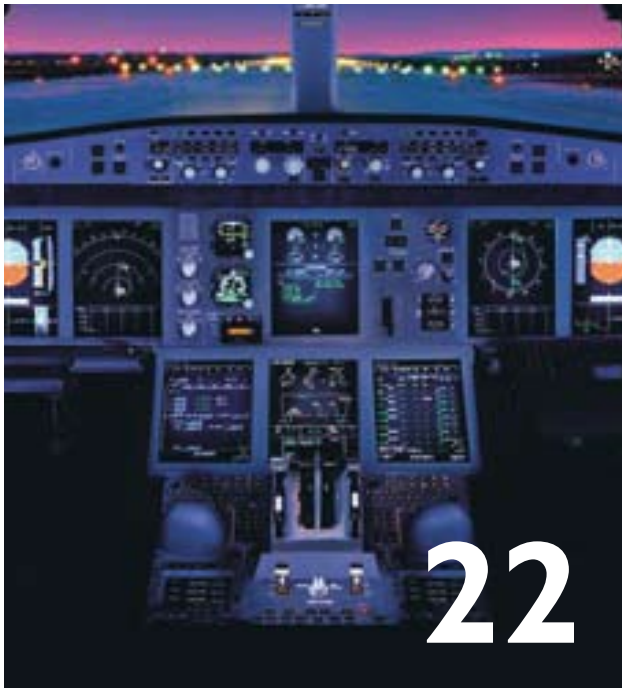
FOREWORD

During 2008 the air transport market was affected by the financial crisis and the downturn of the global economy. Air carriers and aircraft manufacturers were compelled to adjust their activities and make substantial savings in order to meet the decreasing air traffic demand. Sweden is in the forefront of flight safety and its standards meet the level of safety standards of other comparable countries.

Aviation trends describes the air transport market in Sweden and its development during 2008. This report gives interested parties an overall picture of different topics that marked the year 2008.

As of 1 January 2009 the former Swedish Civil Aviation Authority is part of the Swedish Transport Agency. The Agency is not only responsible for aviation but also has overall responsibility with regard to rail, maritime and road transports. Aviation issues are now being managed by the Civil Aviation Department, one of the departments in the Transport Agency. One of the main tasks of the Agency is to provide for a high level of safety through information, regulation, approval and oversight.

Lena Byström Möller
Director, Civil Aviation Department



CONTENT

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THE HISTORY OF DOMESTIC AVIATION IN SWEDEN

Domestic air transport entered relatively recently into Sweden's transport system compared with trains and buses. On the whole, air transport accounted for a rather minor part of the total transport sector until the 1980s. The largest increase took place during that decade (mainly within the domestic area) but the 1990s were characterised by an upheaval within Swedish domestic aviation and for the first time there was a downward trend, largely connected with the economic stagnation in the early 1990s.

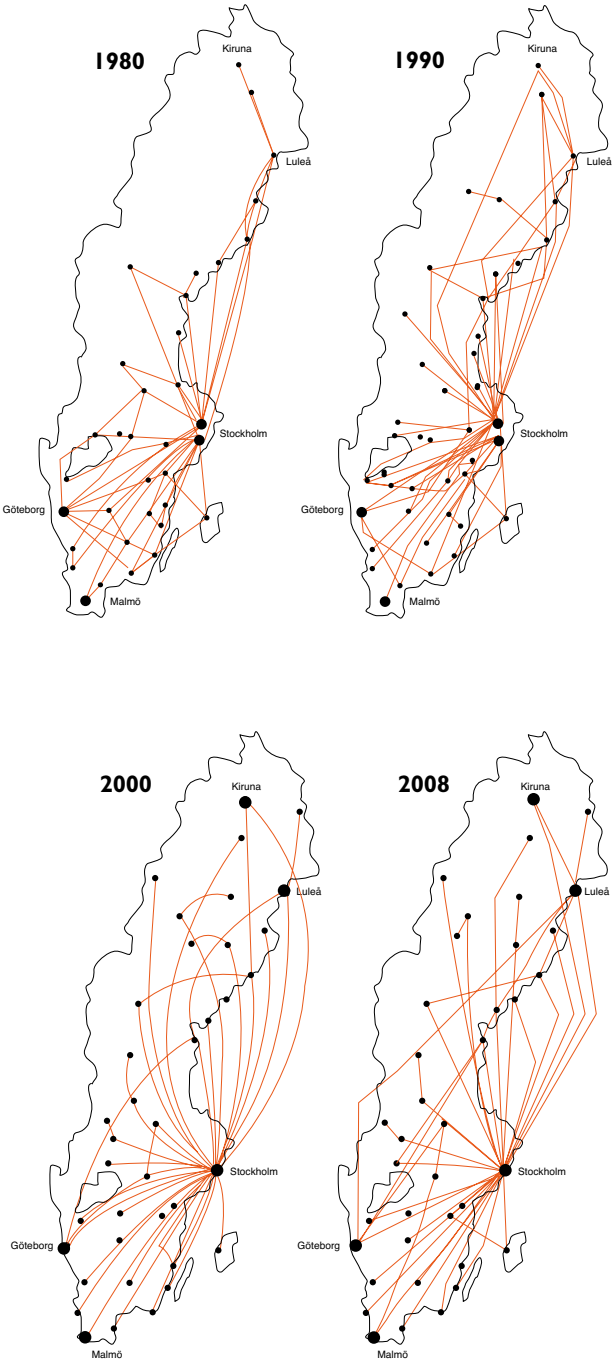
THE BEGINNING OF DOMESTIC AVIATION

Domestic air transport in Sweden began in the early 1900s via aerial newspaper and mail services, similar to the development of air transport in most other countries. In the 1930s AB Aerotransport (ABA)[1] started domestic passenger transport on the routes Stockholm–Visby, Göteborg–Malmö and Stockholm–Malmö. When Stockholm-Bromma Airport was established it became possible for ABA to develop Sweden's domestic air transport system; however, during WW II it was at a standstill.

The early 1950s saw a build-up of passenger air traffic from the very low activity in the years after the war. Passenger transport was initially a complement to the transport of newspapers and mail, and it was not until the late 1950s that passenger travel became dominant, both in significance and volume.

During the 1950s domestic air transport expanded with new destinations, such as Kronobergshed, Kalmar, Ronneby, Jönköping, Sundsvall-Härnösand, Nordmaling (Umeå), and Luleå. Linjeflyg transported 24,800 passengers in 1957, growing to 189,558 over the following year. The 1960s saw more new destinations: Ängelholm, Kristianstad, Borlänge, Umeå and Skellefteå. In the mid-60s Linjeflyg served 15 Swedish destinations from Stockholm-Bromma; SAS served four: Malmö, Göteborg, Luleå and Kiruna.

Domestic network development



[1] AB Aerotransport (ABA) was founded in 1924 and was the first government-owned airline that had a certificate for scheduled air services within Europe and domestically. ABA was reorganized in 1948 and integrated with SILA (Swedish Intercontinental Air Services), a privately owned company supplying intercontinental air services. The new airline was the basis for the establishing of SAS, and the operator certificate was transferred to SAS.

From the 1950s to the end of the 1970s Swedish domestic aviation was characterised by a constant increase in the number of passengers flown, and new routes being opened. Nevertheless, despite the positive development, air transport only accounted for a small part of the country's total transport sector, and was for many years considered a businessman's mode of transport.

AIR TRANSPORT BECOMES POPULAR

The breakthrough for domestic aviation came in the 1980s, when Jan Carlzon, appointed MD of Linjeflyg in 1978, introduced a market orientated strategy for the airline. With its motto "The whole of Sweden at half the price" Linjeflyg began a venture to bring new passenger categories to the domestic air transport system: pensioners, families with children and young people; groups which had previously accounted for only a fraction of the total domestic volume. As part of this strategy, Linjeflyg introduced a pricing policy of favourable prices and discounts in order to attract these new travellers. One example was the so-called "One hundred crowns ticket",[2] aimed specifically at young people to make them regard air transport as a natural mode of travel. In addition to the price policy Linjeflyg also extensively increased the number of flights in its network.

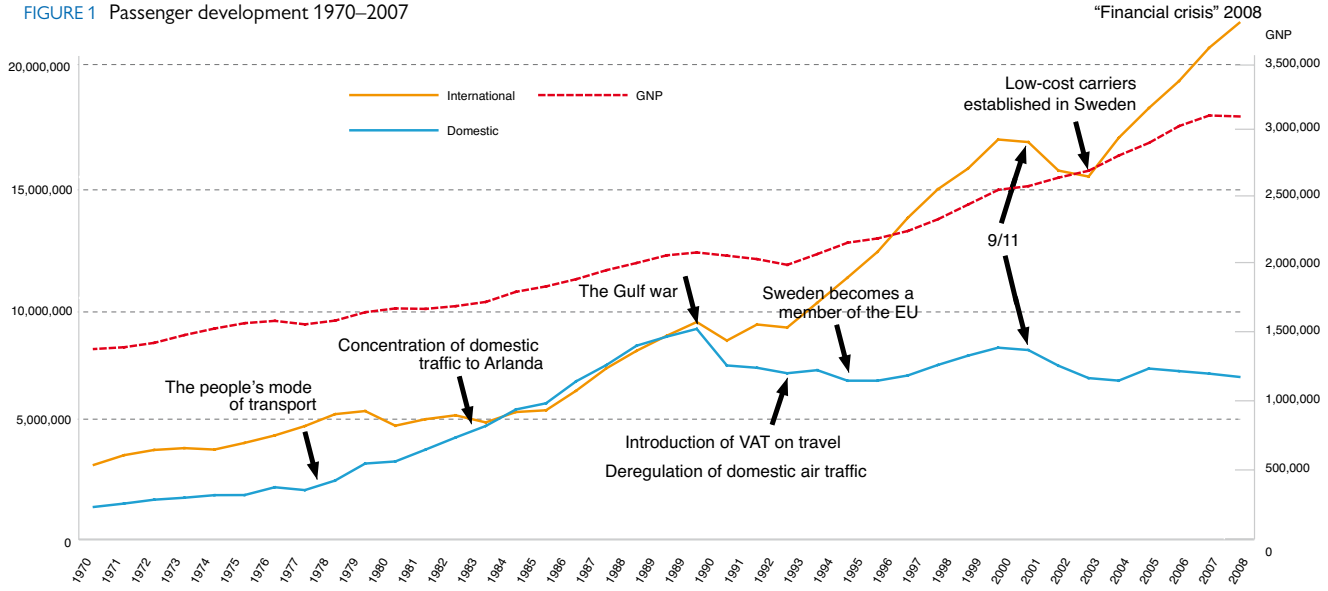
This new deal resulted in a pronounced increase in domestic passengers – already in the first year Linjeflyg expanded by 44 per cent; the special deal for young people alone had recruited about 125,000 new passengers.[3] The "new" domestic air transport system had been transformed from a "business" to a "people's" mode of transport. During the latter part of the 1980s domestic air transport expanded by 8.7 per cent annually,[4] which meant that, for the first time, aviation took up the fight against the car and the train.

In addition to a new price strategy and a deliberate marketing effort aimed at the public at large, the centralization of domestic aviation in 1983 to Stockholm-Arlanda was a defining factor in the explosive development of domestic aviation in the 1980s. The concentration of domestic air transport at Arlanda was, together with Linjeflyg's new strategy, the most important prerequisite for the development of domestic aviation. With Arlanda as the hub, domestic airlines developed a well-functioning hub-and-spoke system. For SAS and Linjeflyg in particular, this concentration gave favourable coordination and efficiency benefits in respect of personnel as well as aircraft fleets. Together with the regional airlines, a far-reaching coordination took place of such aspects as marketing, price policies, timetables and ground handling, in order to facilitate domestic as well as international air travel. A significant change resulting from the concentration at Arlanda was the reduction in transverse connections between regions in Sweden, which decreased drastically during the 1980s.

ECONOMIC DEVELOPMENT IN THE 1980s

When studying the expansion of domestic aviation in the 1980s it is impossible to ignore economic development during that period. Following the recession in the 1970s, Swedish industry and the economy began to stabilize, partly due to the devaluation of the Swedish currency in 1982 and partly as a result of a general global trade boom. Swedish society was thus characterized by a substantial upward economic trend, increased incomes and purchasing power,

FIGURE 1 Passenger development 1970–2007



[2] The introduction of the "100-crowns ticket" was a strategic move to make young people regard flying as a natural mode of transport. [3] Carlzon, Jan, Riv pyramiderna! Bonniers, Stockholm 1985, pp 37-41. [4] Airport statistics 1985-1990, LFV Norrköping. On the Stockholm–Göteborg route the number of passengers doubled between 1984 and 1989, from half a million to one million passengers.

unemployment reduced to an all-time low, and huge profits for Swedish industry.

The expansion of aviation during the 1980s was in many respects dependent on the economic situation described above. Domestic aviation came to play an increasingly important role in the traffic services; the period 1965–1990 shows an average annual growth of 10.3 per cent. 750,000 passengers were transported in 1965; yet by 1988 the number was more than 8.5 million.[5]

The variables explaining the increase in air traffic during the 1980s are primarily increased incomes and more business journeys. Among the most important reasons for this were the relocation of public offices from Stockholm to regional centres such as Umeå, Sundsvall-Härnösand, Borlänge-Falun, Karlstad, Örebro, Linköping, Norrköping, Jönköping, Växjö, and others.

THE DECLINE IN THE EARLY 1990S

The peak in domestic aviation came in 1990 when 8.6 million passengers were flown. The subsequent years showed a downward trend for the first time; between 1990 and 1991 domestic aviation dropped by 2.1 million passengers,[6] or 13 per cent. Between 1991 and 1996 the numbers fell every year except for 1994. Apart from the downward economic trend the Swedish Parliament introduced a 12 per cent VAT rate on travel, exacerbating the negative trend in domestic air travel.

The downward trend ended in 1996, when for the first time in five years there was an increase, albeit small, in domestic air traffic: 0.4 per cent. In 1997 and 1998 however, there was a large increase in passengers: 10.5 per cent. The upward trend continued until the year 2000, when there was a significant reduction, similar to 1990–1991. The situation stabilized in 2005.

DEREGULATION OF DOMESTIC AVIATION

One of the most important institutional changes in the national aviation sector was the deregulation of domestic aviation in 1992. Until then the market was characterized by SAS and Linjeflyg enjoying a unique position with a domestic market share of more than 95 per cent. The dominance of these two airlines was based on:

- A monopoly position in the domestic market. SAS became duty bound and was given sole rights to uphold certain routes: Stockholm–Kiruna, Stockholm–Luleå, Stockholm–Göteborg, and Stockholm–Malmö; the remaining routes were given to Linjeflyg as sole rights. By combining price regulation and establishment control, the government granted exclusive rights for domestic air services to SAS/Linjeflyg. This meant that SAS/Linjeflyg would serve routes (albeit operated by Swedair) that were weak from a business economics viewpoint. The government applied cross subsidisation in the domestic aviation sector to the tune of about SEK 30 million annually.
- SAS controlled, via Linjeflyg and Swedair, both pricing and scheduling.
- SAS/Linjeflyg was a body to which proposed applications for air operation certificates were referred for consideration, thereby being given the opportunity to influence whether new operators were to be granted access to the market.

- Prices and capacity level were determined in consultations between the Swedish Civil Aviation Administration and the Swedish Ministry of Transport and Communications, as it was known then.

In the beginning of the 1990s a wave of liberalisation swept through Europe, especially within civil aviation. The liberalisation had started in England during the 1980s and was accelerated by intensification of European co-operation (the Rome Treaty). The aviation market thus became at par with other sectors.[7]

At the national level in Sweden the establishing of Transwede Airways speeded up the liberalisation of domestic aviation. Transwede applied for an air operator certificate in early 1989 to serve several domestic destinations, thereby challenging the prevailing system. Similar applications came from Malmö Aviation and Nordic East Airways, as well as from smaller regional airlines. Deregulation of domestic aviation in Sweden took place in two steps. In its bill 1990/91:87 the government suggested a partial deregulation where future competition would be allowed between SAS and Linjeflyg. This meant that the government rejected the view of the competition committee (SOU 1990:58), which had suggested that only those routes with an annual volume of 300,000 passengers should be subject to competition. The government's reason for its proposition was the lack of capacity at Stockholm-Arlanda Airport, which would make total deregulation more difficult; however, the basis of this reasoning would change drastically. Firstly, domestic air traffic dropped by 20 per cent between 1990 and 1991 which meant that the lack of capacity at Stockholm-Arlanda Airport was no longer a valid argument; secondly, SAS acquired Linjeflyg in 1992, thereby obtaining total market dominance (in principle). The merger between SAS and Linjeflyg speeded up the deregulation process and the government decided to deregulate domestic aviation as from 1 April 1992. This resulted in the following changes for the Swedish air transport market:

- The sole right and right of precedence for SAS/Linjeflyg came to an end.
- The air transport market became open to all Swedish airlines meeting the safety standards.
- Price and timetable regulation were repealed.
- The government may have granted exemption from open competition for reasons of regional politics.[8]

DEVELOPMENT AFTER DEREGULATION

There are several events marking Swedish domestic aviation after deregulation. Firstly, the demand for domestic air travel has in general fallen since 1992, despite deregulation and increased competition; in fact, during the period 1990–2007 the reduction equalled two million passengers.

Development after 1992 is also characterized by Sweden creating one of Europe's most liberalised domestic markets. A sudden result of deregulation was stimulation of the establishment of new airlines despite the considerable drop in demand in the early 1990s. Competition was striking on the densest routes, with resultant lower prices.

Deregulation has also produced overcapacity, market upheavals in the form of bankruptcies, acquisitions and mergers, and for most of the thinner routes, it has produced higher ticket prices instead.

SAS' market dominance has become stronger after deregulation, partly with the acquisition of Linjeflyg in 1992 and partly via the co-operation agreement with Skyways in 1995. Together, SAS/Skyways today carry 65.6 per cent of the domestic passengers in Sweden.

In general ticket prices have increased since deregulation; however, on certain routes such as Stockholm–Göteborg, Malmö–Stockholm, Umeå–Stockholm, and Luleå–Stockholm, ticket prices have fallen thanks to low-cost carriers. On routes served by only one operator there has generally been a steady increase in ticket prices. When air travel organisers started serving a number of destinations from Stockholm-Bromma at the beginning of the new century, ticket prices dropped somewhat.

Other circumstances that have influenced the downturn and stagnation of domestic air travel are: the introduction in 1992 of VAT on passenger transport, new safety requirements, improved alternative modes of transport, such as motorways, high-speed trains and a train connection to Stockholm-Arlanda Airport. The absence of more operators, in particular low-cost carriers, has also contributed to the stagnation. Finally, an increased environmental awareness has affected the development.

[5] Airport statistics 1965 and 1990, SCAA (LFV). [6] During the period 1990–1996 the number of domestic passengers dropped by 25 per cent. "Airport statistics", 1991–1997, SCAA (LFV), Norrköping. [7] Art. 51.1 The Rome treaty provides that free movement for transport services shall be regulated by the rules in the section for transport (art. 70). Art. 74 specifies that member states shall reach the treaty target within the framework of a common transport policy. [8] Bill 1991/91:100, app. 7, p. 104.

Table 1 Domestic passengers – percentage change

Airport and difference, passengers in thousands

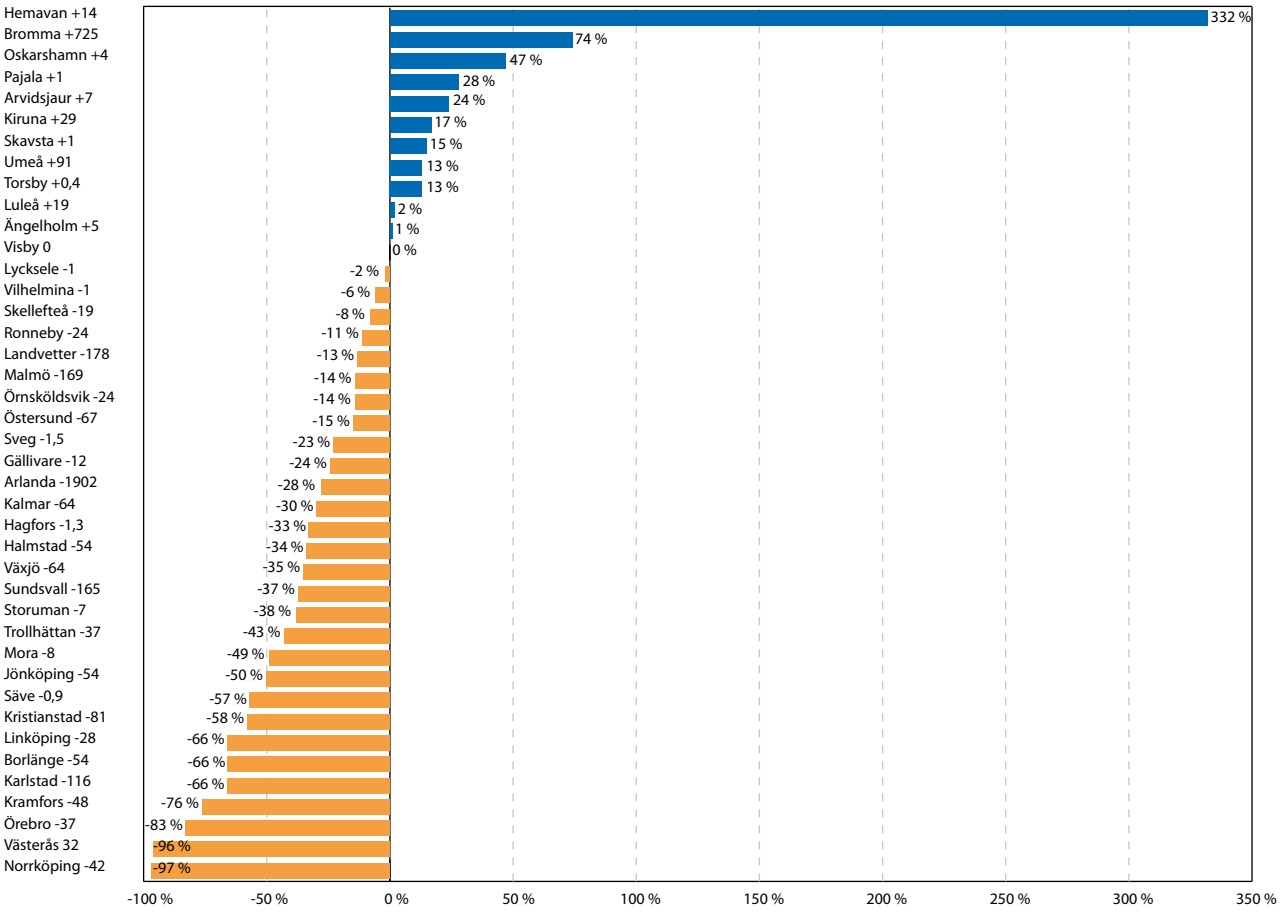


TABLE 2 Development of the domestic air transport market

Year		Events
1944		Privately owned SILA (the current parent company of SAS) is granted the right to operate scheduled air transport; before this the Government-owned company AB Aerotransport (ABA) had a monopoly.
1946		SAS is formed by ABA and its corresponding Danish and Norwegian companies (DDL and DNL, respectively).
1948		ABA and SILA merge.
1957		Linjeflyg is formed as a daughter company to SAS and given the routes not desired by SAS.
1963		A political road traffic decision, involving a slow deregulation of the haulage industry; it went on until 1987.
1967		A political air traffic decision (follow-up of a decision from 1963, which was of only minor importance to air traffic).
1975		Swedair is formed (fusion between a private and a Government-owned company; the Government had 50 per cent, ABA 25 per cent, Linjeflyg 25 per cent).
1979		A political road traffic decision.
1981		Malmö Aviation is formed (flying school and air taxi).
1982		A political air traffic decision (follow-up of a decision from 1979, which was of only minor importance to air traffic).
1985		Transwede is formed, initially to serve the charter market.
1988		A political traffic decision (SAS and Linjeflyg still to have a favourable position).
1989		Linjeflyg acquires the Government's share in Swedair and makes it a subsidiary company.
		A competition committee was appointed to review the protected sectors in particular, i.e. in the transport sector, priority to domestic aviation. Proposal: Open competition on routes carrying more than 300,000 passengers annually, i.e. the 8 to 10 densest routes.
1990		SAS sells its share in Linjeflyg to Bilspedition.
1992	1 Jan	Riksdag decision: Competition between SAS and Linjeflyg only (lack of capacity at Stockholm-Arlanda Airport).
	11 Feb	SAS bids for 51 per cent of Linjeflyg.
	29 Apr	• Bill 91/92:100 which carried the intention to deregulate;
		• SAS's acquisition of Linjeflyg;
		• A 20 per cent drop in domestic passengers between 1990 and 1991 which reduced the pressure at Stockholm-Arlanda Airport.
	1 July	The domestic aviation market is deregulated.
		Transwede starts scheduled air transport in the summer.
		Malmö Aviation starts scheduled air transport between Stockholm-Bromma Airport and Malmö Airport.
		Skyways is formed via a merger between Salair and Avia and becomes Sweden's biggest regional airline.
1993		The concession conditions for SAS are changed, leading to a situation where the airlines can themselves set the ticket prices, but with an obligation to apply to the LFV/Luftfartsverket.
1995		SAS signs a co-operation agreement with Skyways in June.
		Nordic European starts scheduled air transport between Östersund and Stockholm in November.
1996	1 Sep	Norwegian operator Braathens takes over half of Transwede's scheduled air traffic.
1997	1 Apr	Complete cabotage , i.e. foreign carriers can start domestic traffic in Sweden.
		Braathens acquires the remaining part of Transwede's scheduled operations in December.
1998		SAS acquires 25 per cent of Skyways.
		Braathens acquires Malmö Aviation in September.
1999		Konkurrensverket (the Swedish Competition Authority) decides on a penalty of SEK 100 million for SAS because the carrier has abused its dominating position by its application of EuroBonus in the domestic market. The authority also decides to forbid SAS to apply EuroBonus on those routes where there is competition from other carriers. SAS appeals the decision.
2001		Gotlandsflyg AB, an air travel organization, starts serving the Stockholm-Bromma Airport–Visby Airport route.
	Oct	The Swedish Market Court decides that SAS must pay a fine of SEK 50 million because it has abused its dominant position, and that SAS should cease to apply the bonus programme on routes where there is competition.
2003		Low-cost carrier Swe Fly starts serving Kalmar and Ronneby.
2004		Low-cost carrier Nordic Airlink (later FlyNordic) starts domestic operations in January. FlyMe starts domestic operations in March.
2005		The Swedish Civil Aviation Authority is formed by separating the authority departments from LFV/Luftfartsverket. SAS introduces a new concept: "The new domestic ticket at SEK 450".
2007		FlyMe goes into liquidation. Sterling enters the Swedish domestic market.
2008		Sterling goes into liquidation on 29 October.
2009	Jan	The Competition Authority cancels a previous decision from 2001, which was aimed at stopping SAS's bonus programme on competing domestic routes. The Authority may, however, reinstate the 2001 decision if SAS is found to misuse its dominating position to reintroduce the Eurobonus programme on domestic routes.
	Feb	SAS decides to reorganize; the existing split between SAS Denmark, SAS Norway, and SAS Sweden is cancelled.

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DOMESTIC TRAVEL IN SWEDEN

It is a well known fact that the major volume of domestic air travel is found in southern Sweden, but what is the overall picture if we introduce the population factor? Is domestic air travel a mode of transportation in sparsely populated areas today, or do we only find travellers on routes between metropolitan areas, where the major airports are situated? In this article we map Swedish domestic aviation against the background of ongoing discussions about its future.

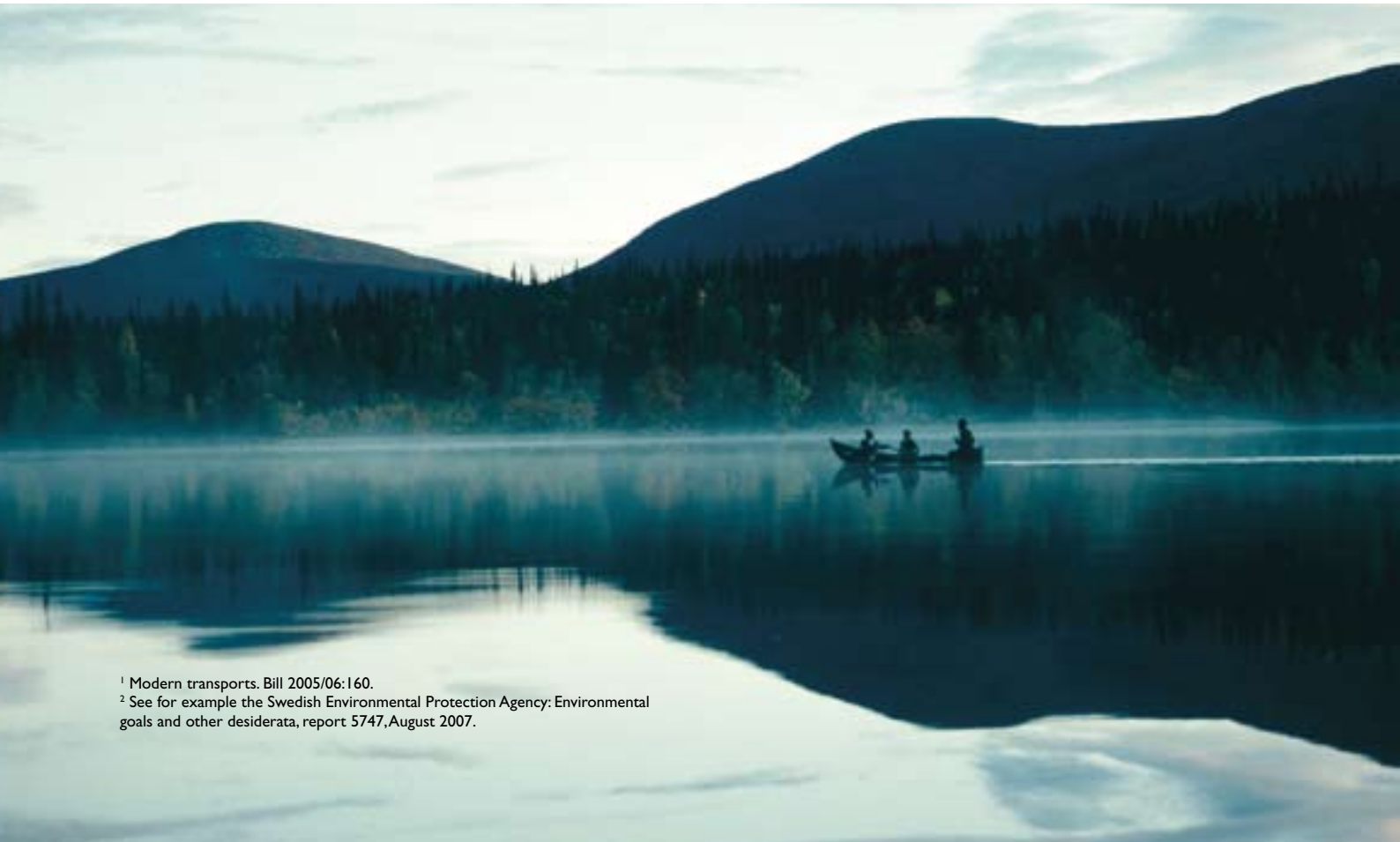
TRANSPORT POLITICS AND DEBATES

Politics is often a case of balancing different interests. Sometimes there are synergies between them, but more often they are conflicting, and politicians are forced to balance improvements within one political area against deterioration within another, as a consequence of the same action. In its transport bill Modern Transports,[1] the Government takes the view that the transport system should aim at counteracting the drawbacks created by long distances, domestically as well as internationally. At the same time a conflict could arise between the regional development politics, of which transport politics is a part, and certain environmental goals.[2]

The domestic air transport sector has come into focus in the present discussions on the environment. Even if the opinions regarding the future of domestic air transport vary between different interest groups, most of them are in agreement that we can see a development where train travel is taking over from air travel over short distances. Certain operators are even of the opinion that the government should regulate which routes should be served by air, and that air transport should above all be used in regions where other modes of transport would mean a substantial time loss, for example in the northern regions of Sweden. At the same time, train capacity is limited and cannot satisfy the demand for transport on the densest domestic routes.

AIR TRAVEL BETWEEN THE SWEDISH METROPOLITAN AREAS

Domestic air travel in Sweden is almost invariably concentrated to and from Stockholm, that serves both as a final destination and departure point for onward travel, domestic or international. In 2007, a total of 6.9 million domestic pas-

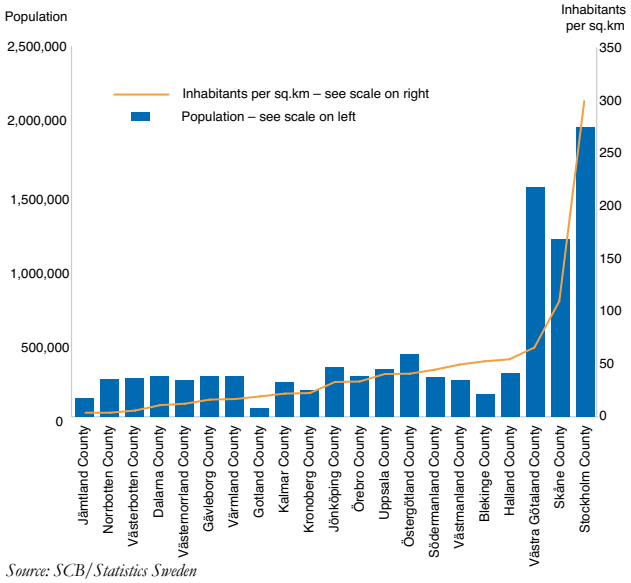


[1] Modern transports. Bill 2005/06:160.
[2] See for example the Swedish Environmental Protection Agency: Environmental goals and other desiderata, report 5747, August 2007.

sengers travelled by air, with 6.7 million of them arriving or departing from Stockholm (Bromma Airport or Arlanda Airport). The two densest domestic routes, Stockholm–Göteborg and Stockholm–Malmö, carried 2.3 million passengers, i.e. about 35 per cent of all domestic air travel.

The background to these volumes is the structure of the population; more than half live in three districts in southern Sweden: Stockholm, southwest Sweden (Västra Götaland) with Göteborg as a hub, and Scania (Skåne) in southernmost Sweden with Malmö as a hub. Figure 1 shows the population and density in 2006. From the table it is obvious that the three districts mentioned have the most people and the highest density.

FIGURE 1 Population and density 2006



Source: SCB/Statistics Sweden

AIR TRIPS PER INHABITANT

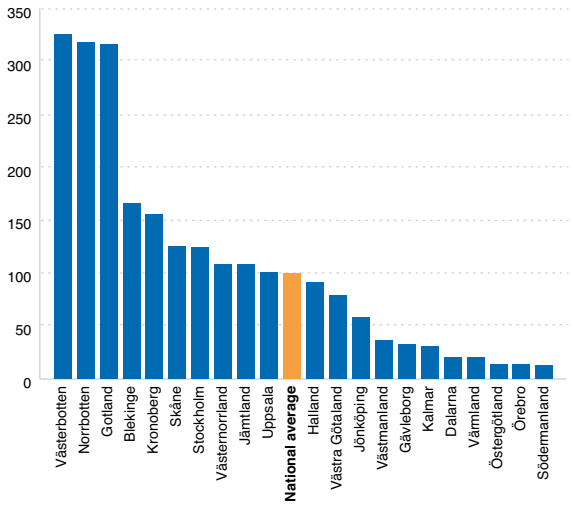
The table above shows that the densest domestic air routes are found in southern and central Sweden. In order to map regional travel tendencies, it is necessary to study air travel in relation to population in the respective region.

Figure 2 shows the order of preference for domestic flights per inhabitant in the Swedish districts. It is based on a survey of travel habits made by SIKA (the Swedish Institute for Transport and Communications Analysis) and the transport authorities during 2005 and 2006.[3] The respondents were asked questions about their travel habits, including flights. The answers are then related to the number of inhabitants per district, and the districts are then placed in order of preference.[4] The national average is set at 100.

The graph clearly shows that domestic air travel is largest in those districts furthest away from Stockholm and the district of Gotland (an island in the Baltic). This is due to the fact that there are fewer alternative modes of transport in these regions compared with others, and that the travel time to Stockholm would be much longer with other modes of travel than by air from these districts. A trip from Arvidsjaur to Stockholm using bus and train takes 13–14 hours, compared with two hours by air.

The number of journeys per inhabitant in the districts where the densest domestic air routes are found, i.e. Stockholm, Västra Götaland and Skåne, are very close to the national average. These regions have a much more developed rail infrastructure, and the time gained by using air travel instead of train travel is considerably less than when travelling from the northernmost parts of Sweden. As an example, the train journey from central Göteborg to the centre of Stockholm takes an average of four hours[5] compared with a flight time to Stockholm-Arlanda Airport of about one hour; however, check-in time, security procedures, and travel to and from the airports must be added to this time, which reduces the time gained by air travel on this route.

FIGURE 2 Domestic air journeys per inhabitant and district; national average index = 100

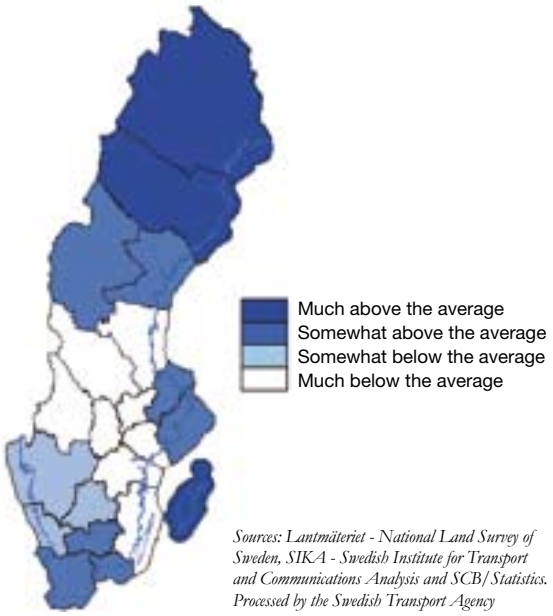


Sources: SIKA and SCB/Statistics 2006. Calculations from the Swedish Transport Agency

[3] Travel habits are delat with in more detail in the investigation on national travel habits. [4] Estimates by the Swedish Transport Agency. [5] Travel time depends on choice of departure.

The smallest amount of domestic air travel is undertaken by those living in the districts closest to Stockholm. There are few air connections, and an air journey would in practice take longer than travelling by train. Figure 3 shows (graphically) the air travel habits within Sweden.

FIGURE 3 Domestic air journeys per inhabitant in Swedish districts in relation to the national average



Sources: Lantmäteriet - National Land Survey of Sweden, SIKA - Swedish Institute for Transport and Communications Analysis and SCB/Statistics. Processed by the Swedish Transport Agency

THE FUTURE OF DOMESTIC AVIATION

In the ongoing environmental discussion, the question of the future of domestic aviation in Sweden has arisen. Certain participants have even advanced the opinion that there should be no domestic air traffic at all south of Sundsvall. The fact that 35 per cent of today's domestic travel takes place between the metropolitan areas is sometimes brought up as a sign that air travel is used more by those living in areas where there is a larger selection of modes of transport than by those living in areas where the alternatives are scarcer. In order to map the regional distribution of air travel, Figure 3 shows the number of air trips in relation to the population in the Swedish districts. It also shows that domestic air travel is used more by people living in districts far away from Stockholm, or with limited geographical access, although not so far (e.g. Gotland) compared with those living in areas closer to Stockholm. It conveys the picture that today, domestic air connections are more important to the population in remote areas, than to the metropolitan population, a picture which will most probably be reinforced over the next few years, given the present political direction.

Concurrently with the infrastructure development in northern Sweden which will reduce train journey time, trains could become an alternative mode of travel to and from the northern areas of the country. The Botnia railway, extending to Umeå, will be inaugurated soon which means that the journey from Stockholm to Umeå will be reduced to about six hours. Consequently the time gained may result in a reduction in air travel from the northern coastal areas of Sweden in the future.

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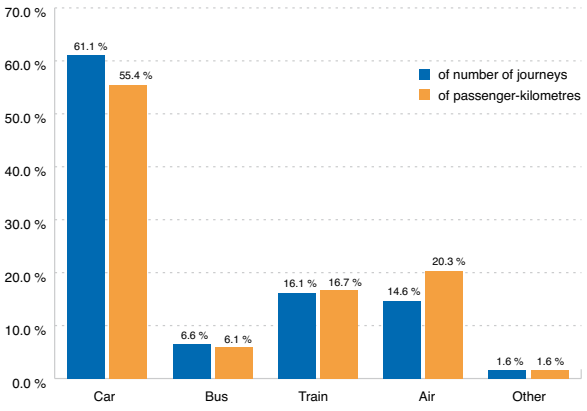
THE NATIONAL SURVEY OF TRAVEL HABITS
Domestic travel over distances > 300 km

Between the autumns of 2005 and 2006, Statistics Sweden performed a survey of national travel habits in response to a request from the transport authorities and the Swedish Institute for Transport and Communications Analysis (SIKA). The survey was carried out every day, involving a total of 27,000 telephone interviews and covering all modes of travel. In respect of air travel, the long-distance journeys were of most interest, especially those of 300 km or more, and it is the result of this part of the survey which is presented here (unless otherwise indicated).

During the period in question, there were 28.8 million domestic one-way trips covering distances of 300 km or more. Air travel accounted for 4.2 million trips, or close to 15 per cent. 14.1 billion (14,100,000,000) passenger-kilometres were accumulated (20 per cent by air), indicating that journeys by air were on average longer than journeys by other modes of transport.

Below is a report on what characterises personal air travel in comparison with other modes of transport.

FIGURE 1 Percentage of number of journeys, passenger-kilometres (respectively) per mode of transport



DISTRIBUTION OF MODES OF TRANSPORT

The car dominates long-distance travel in Sweden, accounting for 60 per cent of all journeys. Train travel is somewhat more common than air travel, but conversely, in terms of passenger-kilometres, these are considerably higher for air than train travel; however, the car is in the lead here, with 55 per cent of passenger-kilometres travelled.

TRIP LENGTHS

Trains and buses have a proportionately even share of the journeys in the different categories of trip length, although in the case of air and car travel, there is a difference. The car's share decreases as the journeys become longer, but for air travel, the opposite is true. When it comes to journeys longer than 800 km, aviation accounts for 49 per cent.

FIGURE 2 Number of journeys distributed by mode of transport and trip length

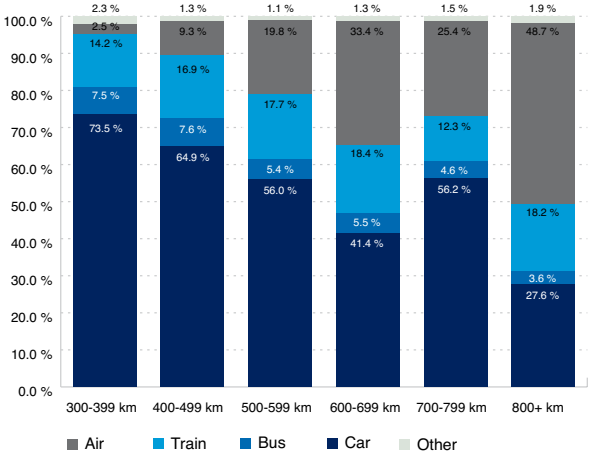


FIGURE 3 Average trip length, km

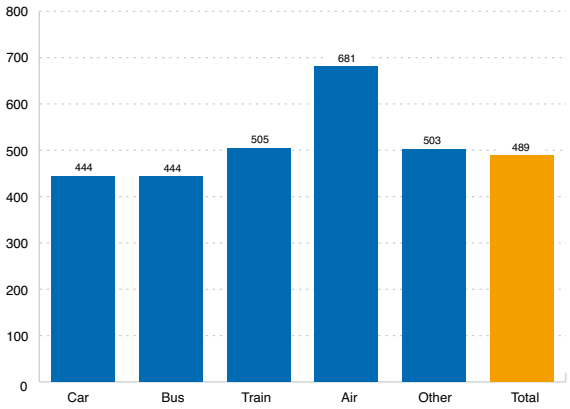


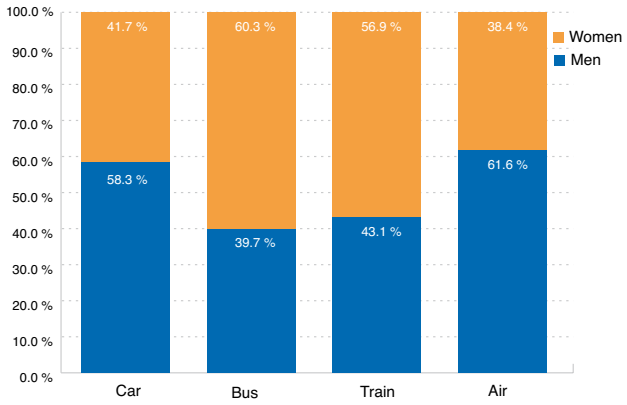
Figure 3 shows the average trip lengths for the different modes of transport. As can be seen, air transport carries people over much longer distances than the average (200 km longer). Cars and buses are slightly below the average, with rail just above.

GENDER DISTRIBUTION

Men account for most of the longer journeys, 55 per cent versus 45 per cent for women. Figure 4 shows the distribution of males to females (respectively) who use the different modes of transport for long-distance domestic travel.

Men dominate travel by car and air, while women dominate bus and train travel. The largest imbalance is seen in air travel, where about six out of ten journeys are made by men; and bus travel, where six out of ten journeys are made by women.

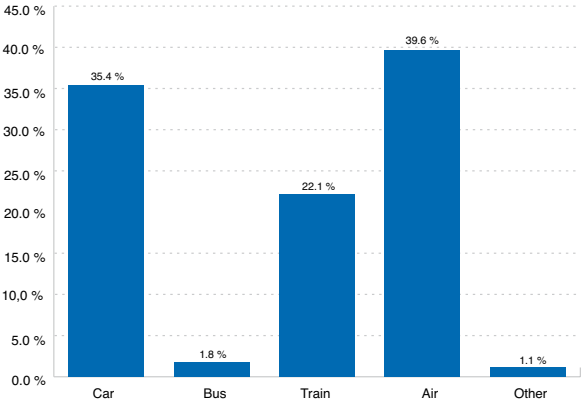
FIGURE 4 Mode of transport versus gender



REASONS FOR TRAVEL

Most domestic journeys (58 per cent) are made to visit friends and relatives, or for other spare time activities. 18 per cent are business trips; the remaining 24 per cent are for other purposes, such as commuting to and from work. Figures 5 and 6 show how business trips and visiting friends and relatives, respectively, are distributed over the different modes of transport.

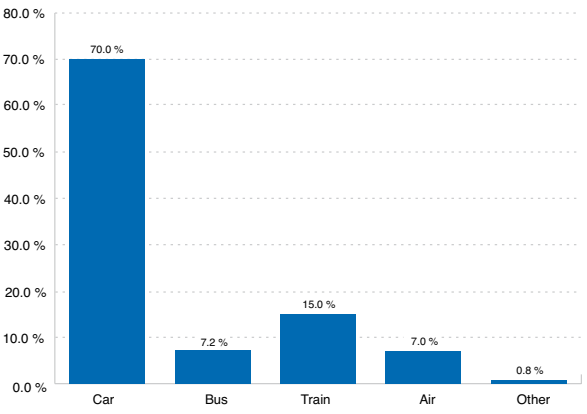
FIGURE 5 Mode of transport – business trips



Air travel dominates domestic business travel over distances longer than 300 km, followed by the car. Trains have a much smaller share, and not surprisingly, business travel by bus is rather unusual.

The distribution of journeys to visit friends and relatives or to pursue other spare time activities looks quite different, see Figure 6. The car completely dominates these journeys. Air travel accounts for only 7 per cent.

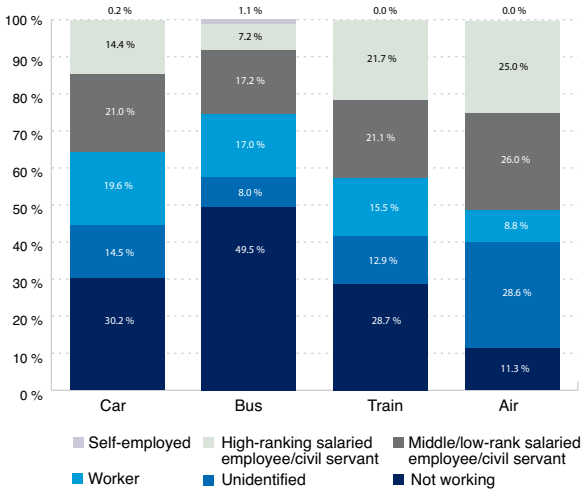
FIGURE 6 Mode of transport, visiting friends and relatives/other spare-time activity



SOCIOECONOMIC GROUP AND AVERAGE INCOME

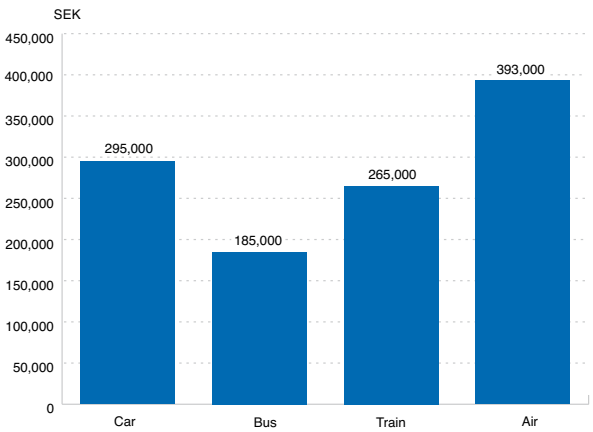
Figure 7 shows the socioeconomic structure for the different modes of transport.

FIGURE 7 Mode of transport – socioeconomic group



Air travel is dominated by salaried employees/civil servants, accounting for 50 per cent of all domestic journeys. For the train the corresponding figure is 43 per cent, with 34 per cent for the car. Bus travel is dominated by the "not working" group, accounting for almost half of all bus journeys. The socioeconomic structure among the different modes of transport is naturally reflected in the income levels of the users. Figure 8 shows the average individual income for the different transport users.

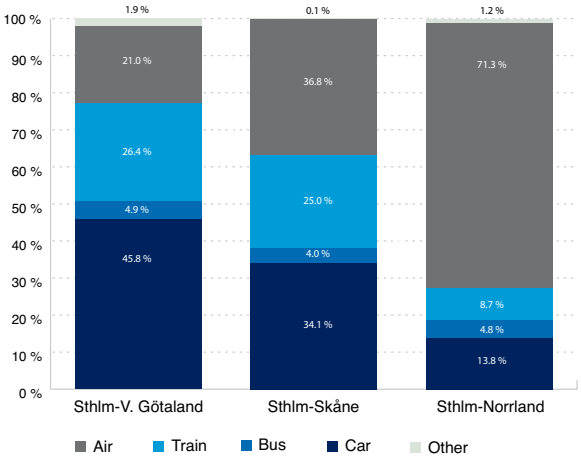
FIGURE 8 Average annual income



DISTRIBUTION OF MODES OF TRANSPORT FROM THE STOCKHOLM DISTRICT

The next figure shows the distribution of modes of transport from the Stockholm district to the districts of Västra Götaland, Skåne, and Norr-/Västerbotten (Norrland), respectively.

FIGURE 9 Mode of transport – from the Stockholm district



As shown by the figure, air travel is the preferred mode of transport to the northern parts of the country and also to Skåne in the south. For trips to Västra Götaland, the car is preferred, followed by the train; with air travel third.

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FOCUS ON DOMESTIC TICKET PRICES

The price trend in a market provides information concerning what is happening (in financial terms) in that particular market. For example, increased costs normally lead to higher prices, while the establishing of new operators normally has the opposite effect. The price trend in the air transport market is therefore an important part of the Swedish Civil Aviation Authority's market surveillance. Between 1996 and 2003, Statistics Sweden published an index covering business as well as private travel within Sweden, but after 2003 they only published a private travel index. This was the reason why in 2007 the authority started to collect data for a total price index of its own, in which the whole domestic market is reflected; the time has come to publish this index for the first time.

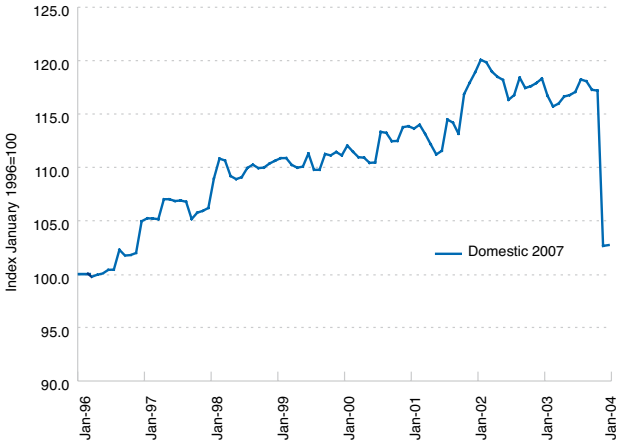
The need to analyze the price trend in the air transport market has grown in pace with the liberalization of this market, and questions regarding competition and price comparison have become increasingly important. At the same time as the need for price surveillance has increased, the pricing system has become more complex, with more operators, an increasing number of ticket categories, increased sales via the internet and prices that vary substantially over time. To make it possible to report on the price trend in an impartial way, the standards of design of statistical data have had to be raised. To improve available price statistics, the authority has started to collect air ticket prices for all domestic routes in Sweden; see the fact box on next page for further information on how the index is calculated. This collecting can be seen as a continuation of the price index for private and business travel published earlier by Statistics Sweden.

THE PRICE TREND SINCE 1996

In the early 1990s the Swedish aviation market was liberalised and ever since there has been competition on a number of routes between two or more operators. In the early and mid 90s there were primarily three operators in the domestic market: SAS, Transwede and Malmö Aviation. In 1996–1997 Braathens (Norwegian) acquired Transwede and in 1998 they also acquired Malmö Aviation, so by the late 1990s there were only two airlines left (in principle), something which raised the question of how many operators there was room for in the Swedish domestic market. The situation changed, however, in 2004 when two new low-cost carriers, Fly Nordic and FlyMe, entered the scene; however, FlyMe went into liquidation in March 2007 and not long after, Sterling took over many of the routes previously operated by FlyMe.

The market development is reflected in the price trend in the market. Since the surveillance started in 1996, ticket prices have shown a steady increase. Towards the end of 2003, just before FlyMe and Fly Nordic entered the market, prices fell sharply. This steep fall is most probably partly due to the increased competition in the domestic market.

FIGURE 1 Statistics Sweden price index, fixed prices, 1996–2003



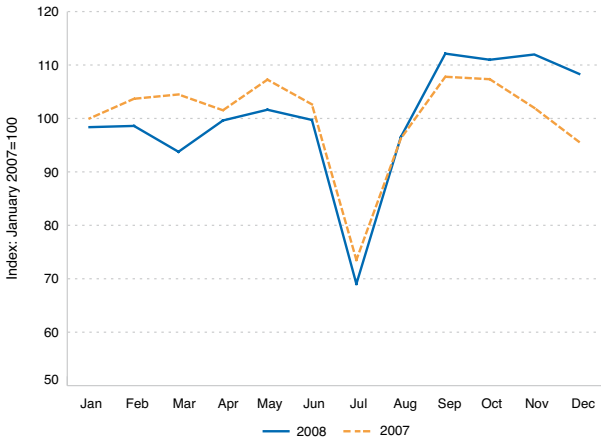
No total price index for the Swedish domestic market is available for the period 2004–2007.

THE PRICE TREND SINCE 2007

The authority's index is applicable from January 2007. FlyMe is not represented in this index, which has the effect that possible price increases caused by the company's prices disappearing from the market cannot be seen in the index. On the other hand the responses of the other companies to FlyMe's exit are reflected.

According to the authority's index, Swedish domestic prices increased somewhat during the first five months of 2007. Prices were lowest during the summer month of July, when the number of business passengers is low. It remains to be confirmed whether this is a seasonal pattern that occurs in the years to come.

FIGURE 2 The Swedish Civil Aviation Authority's domestic ticket price index, fixed prices, 2008



The authority will continue the collection of price data and the publishing of the statistics every quarter in this publication.

FACTS

How the authority's index is created

The total price index is based on the actual prices on all domestic air routes in Sweden. The index is arrived at by the airlines reporting their average prices, together with the number of paying passengers, to the authority. The prices are weighted by the number of passengers.

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THE MARKET AFTER DEREGULATION

For almost 40 years, SAS and Linjeflyg (as it was then known) had a virtual monopoly in respect of domestic air transport in Sweden. There were a number of regional operators serving the market, but SAS/Linjeflyg dictated the conditions. In the early 1990s the deregulation of domestic aviation started, consequently changing the domestic market and leading up to the appearance of the innovative air travel organisations we have today. Low-cost carriers are coming and going, but SAS remains today with Skyways as a partner.

Civil aviation can be divided basically into two different categories, flying as a mercantile business for remuneration or hire (i.e. commercial air transport/aerial work, etc.) or at the other end of the spectrum, precluding financial implication (i.e. training, leisure, private and sports flying, etc.). For commercial air transport it is necessary to obtain an air operator certificate (AOC) in accordance with EASA regulations and another licence based on which aircraft type the airline uses (there are two licences, the dividing line being a maximum take-off weight of 10 tonnes or a passenger capacity of 20 seats). At the time of writing there are 61 commercial operators, 19 of which operate "large" aircraft types and 42 using the smaller types.

Despite a reduction in passenger numbers since 1990, the number of airlines has not fallen significantly in fact, not only has there been an increase in the number of airlines entering the market, but also in the number exiting the market.

TABLE 1 Classification of domestic airlines. The table shows the number of passengers, destinations, and turnover for 2008

	Airline	Owner structure	No. of passengers	No. of destinations served in Sweden[1]	Airplane type
Airlines with domestic and int. route networks	SAS Sverige AB	100 % SAS Group	3,100,000	12	B-737/600/800 MD-81/82
Airlines with domestic route networks	Skyways	75 % Salenia 25 % SAS	690,000	16	F-50
Niche airlines	Malmö Aviation City Airlines	100 % Braathens Aviation 100 % Investment AB Janus	1,100,000 29,000	4 2	AVRO RJ-100 ERJ-135/145
Low-cost carriers	Norwegian Sterling[4]	100 % Norwegian Air Shuttle	709,000 247,000	4 3	B-737/800, MD-83/83 B-737/500/700/800
Regional airlines	Barents AirLink Direktflyg Golden Air Nextjet	Privately owned 100 % Salenia 100 % Thun-koncernen Privately owned	3,700 37,700 196,600[3] 52,600	3 8 2 15	Jetstream J32 Jetstream J32 SAAB 2000/340 SAAB 340 Beechcraft 1900 ATP Jetstream 61
Tour organisations	Gotlandsflyg Kullaflyg AB Sundsvallsflyg AB Blekingeflyg AB Kalmarflyg AB Flysmaland AB Östersundsflyg HögaKustenflyg AB	100 % Sverigeflyg Holding AB 92 % Sverigeflyg Holding AB 78 % Sverigeflyg Holding AB 75 % Sverigeflyg Holding AB 63 % Sverigeflyg Holding AB 52 % Sverigeflyg Holding AB 88 % Sverigeflyg Holding AB 86 % Local business 14 % Kalmarplanet		3 2 2 2 2 2 2 2	F-50[2] SAAB 340[2] SAAB 2000[2]
Other airlines	Avitrans Transwede Airways Air Express[5]	100 % Sverigeflyg Holding AB 100 % Braathens Aviation 100 % Salenia	339,000		SAAB 340 AVRO RJ-100 F-100, SAAB 2000

[1] Scheduled services only. Several airlines and tour organisations carry out seasonal traffic. [2] Tour organisations operate with these aeroplanes on lease from Skyways, Golden Air and Avitrans. [3] The statistics include passengers for those tour organisations who lease aeroplanes from Golden Air. Passenger statistics for tour organisations are missing, since the statistics cover those airlines which serve the route. [4] Sterling goes into liquidation on 29 October. [5] MC Airlines aquired Air Express in May 2009.

Today we see a new type of airline in the form of air travel organisations, and those that do not carry their own traffic, but function more as suppliers of capacity rather than traditional airlines. The Swedish aviation market is completely different today from that of 10–15 years ago.

THE STRUCTURE OF SWEDISH AIRLINES

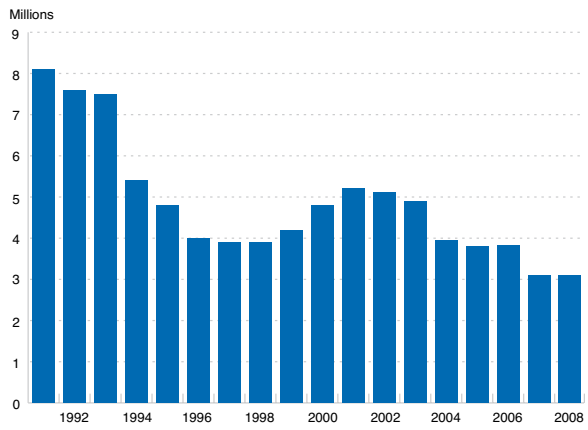
Before deregulation in 1992, the air transport market consisted of a number of operators that could be divided into two categories. The first one was SAS/Linjeflyg and Swedair, which enjoyed a dominating position in the market. The second consisted of regional airlines serving domestic routes between those destinations which SAS/Linjeflyg and Swedair chose not to serve. Their operations were dependent on access to SAS/Linjeflyg's route network.

When Transwede, together with Malmö Aviation and Nordic European (NEA) applied for an AOC to carry out domestic operations with heavy jet airliners, this triggered the deregulation of domestic aviation. Only Malmö Aviation currently remains in the market; Transwede was acquired by Braathens of Norway which, in turn, left the Swedish market, and NEA went into liquidation in 1998.

The current structure of the Swedish domestic airlines is characterised by pluralism, with different types of airline. Table 1 above shows their classification.

One of the airlines currently offering both a domestic and an international route network is SAS, whose domestic network covers 14 destinations; before deregulation that figure was 5. When SAS acquired Linjeflyg the number of domestic routes increased. During 1993 SAS executed a reorganisation programme resulting in a reduction of domestic operations by 14 per cent and a productivity drop of 20 per cent compared with the previous year. Several routes were abandoned between 1993 and 1995.

FIGURE 1 Number of passengers – SAS domestic operations, 1990–2008



Source: Travelutions AB

From 1992 to 2001, SAS experienced a sharp drop in private domestic air travel while business travel increased. The drop was, to a very large extent, explained by the introduction of VAT on domestic travel, something which affected private travel profoundly. Business travel also experienced a drop after 2001, thereby breaking the positive trend with a high yield for SAS domestic operations. The drop in business travellers can be attributed to the increasing competition from other airlines and the introduction of high speed trains. In the early 2000s low cost operator Goodjet started serving Göteborg and Malmö from Stockholm-Arlanda Airport, which increased price awareness among business travellers too.

The second category in the table depicts airlines aiming at the national scene, and very occasionally, at other countries close to the home market. Skyways belongs to this category and is the major domestic operator. The company was formed in 1992 when Salair and Avia merged, resulting in Skyways, which today serves 21 domestic destinations and is the single largest operator on the routes procured by the National Public Transport Agency. In 1992 a general interline agreement was established where the traffic of all operators was to be coordinated. SAS acquired 25 per cent of Skyways in 1998.

Skyways' aim has been, and still is, to serve the regional airports with Stockholm-Arlanda Airport as a hub. The operation is aimed at the business traveller, but in a similar way to other airlines, has offered new products in order to attract private travellers. In conjunction with the aviation crisis in the 1990s they acquired many other regionals, such as Airborne of Sweden, Flying Enterprise, Highland Air, Holmström Air, and Air Express.

Skyways functions largely as a feeder airline to SAS and plays a role similar to that of Linjeflyg before 1992. Finally, their position as the dominating regional airline during the latter part of the 1990s and onwards was dependent on SAS's decision to shut down Swedair, and later, SAS Commuter. It was not until this occurred that a market was created for Skyways to fill.

The third group consists of operators whose business is concentrated on a geographical area or a certain niche. Both Malmö Aviation and City Airlines fit into this category, as their operations are primarily directed from Stockholm-Bromma Airport and Göteborg-Landvetter Airport respectively. Malmö Aviation has been active at Stockholm-Bromma since the start of operations and has made that airport one of the few that shows an increase in the number of passengers during the current decade. The airline also broke the trend of a worsening economy with a profit of SEK 62 million in 2006.

City Airlines (in co-operation with SAS) has a definite niche, with the Västgöta region being its home market (using Göteborg Landvetter Airport as a hub). Unlike Malmö Aviation, domestic flights are only a small part of City Airlines operation; at the moment their domestic routes are Landvetter-Luleå and during the summer season, Landvetter-Visby.

The fourth group consists of low cost carriers serving domestic routes. The trend is that many of these carriers do not stay long on the domestic scene, in fact, since the year 2000 there have been five carriers.

The fifth category consists of regional commuter airlines using smaller aircraft (average 20 seats) to serve certain destinations. The number of passengers is relatively limited. Common to most of these airlines is that they are in a position of dependence on their environment, and in particular on the bigger operators, i.e. SAS.

The regional airlines made their breakthrough in the 1980s when domestic aviation was concentrated at Stockholm-Arlanda, and regional aviation was integrated with both the domestic and international route networks. In the early 1980s there were eight regional airlines, Swedair being the biggest. Their combined market share was 7 per cent of all domestic journeys (300,000 passengers). During the 1980s and 1990s business travel was the most important segment for the regionals (about 80 per cent). In addition to the flights to Stockholm, the regional airlines also carried cross traffic between regions. When the slump started in the beginning of the 1990s these airlines were the hardest hit because of the drop in business travel on their routes; also the competition from rail and road contributed to the decreased demand. Late 2008 there were four regional airlines in the domestic market.

The sixth group in the table consists of air travel organizations who maintain air services via agreements with airlines. These organizations sell tickets, but do not constitute airlines in the traditional sense. This mode of operation was developed in 2001 when Gotlandsflyg challenged Skyways on the Visby–Bromma route. Gotlandsflyg's success resulted in the formation of Sverigeflyg AB, with a view to developing the concept in the rest of Sweden. Since 2001 the number of air

Photo: Ludvig Larson

travel organisations has risen to 7, all with close regional ties in the form of 50 per cent local ownership, the remaining 50 per cent owned by Sverigeflyg Holding AB. All of them serve Stockholm-Bromma Airport, except Höga Kustenflyg which flies to Stockholm-Arlanda Airport.

The last group consists of airlines supplying other airlines with aircraft and crews by wet lease. As a rule these airlines do not have any traffic of their own and only focus on leasing out capacity. Exceptions are Skyways and Golden Air, both of which operate their own routes and also lease out aircraft and crews. The major share of the market for the airlines in this group consists of air travel organisations.

SUMMARY

Despite the sharp drop in domestic air travel during the first half of the 1990s and in the early years of the new century, the number of operators in the Swedish air transport market has increased. Overcapacity as a consequence of increased competition between airlines, as well as other modes of transport, has caused a number of airlines to abandon the market. Nevertheless, new operators are turning up to start domestic air services.

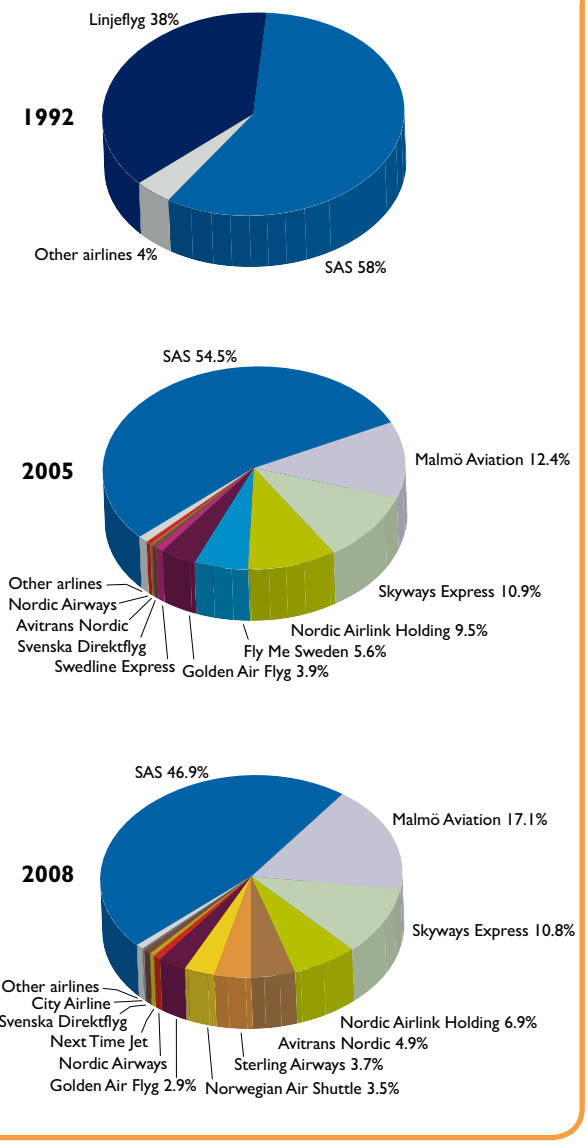
There are rapid changes within two categories of air operators: regionals and air travel organisations. The number of regional airlines has declined over the past 10–15 years through acquisitions or bankruptcies. Today there are only three independent regional airlines. The Salenia group dominates the regional market via their owner influence in Skyways, Direktflyg and Air Express. As a consequence of acquisitions and focussing on Arlanda, the cross traffic between regions has declined and the regionals now aim at commuter traffic to Stockholm-Arlanda or Stockholm-Bromma. Direktflyg is an exception to this, its route network to a large extent running between the regions.

Another distinct development in Sweden's airline structure is the emergence of air travel organizations. Since Gotlandsflyget's start-up, the number of local and regional initiatives has increased. Gotlandsflyg AB has proven to be a successful concept, capturing market shares and forcing prices down on the Visby–Bromma route. On the Sundsvall–Bromma route Sundsvallsflyg shows a passenger increase of 9 per cent for 2007, for a total of 59,000 passengers. The air travel organisations also make transparent the possibility of seasonal traffic to strengthen local tourism, for example Gotland/Visby in the summer and Dalecarlia/Sälen in the winter. Could this concept make domestic aviation take off, or is it a threat to a network route system, thereby contributing to the fragmentation of domestic aviation?

Finally, despite the removal of the institutional market obstacles, deregulation has not brought about the change that was perhaps hoped for. Before deregulation, SAS/Linjeflyg dominated the market with 96 per cent of domestic air transport. Today SAS still has a large share, currently with Skyways as partner and minority owner.

FACTS

MARKET SHARES



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FLYING IS DANGEROUS – THAT'S WHY IT'S SO SAFE!

Flying is dangerous – that's why it's so safe. In order to attain a better grasp of the meaning of this aviation associated paradox, it is necessary to delve into the historical aspect. The development of aviation is littered with incidents and accidents; however, lessons learned have generated new experiences and knowledge, which consequently have led to an increase in safety. It is thanks to continuing improvements that aviation has become the safest mode of transportation available today.

Aviation accidents have occurred ever since the days of the Wright Brothers, when aircraft were relatively simple machines. In the aftermath of an accident, they were repaired (if possible) and returned to the skies shortly thereafter, without the cause(s) of the accident ever really having been identified. As aviation has developed over the years, and with it the pressure for safer operation, each accident has been carefully investigated by experts with an aim of gaining new insight and knowledge regarding the cause(s). This experience has been used to improve safety through legislation and preventative measures for the entire aviation industry.

After the Second World War, the aviation industry experienced a major increase in research and development. This led to the establishment of a new specialised agency within the United Nations, the International Civil Aviation Organization (ICAO) and creation of the Chicago Convention.

This Convention (reinforced by 18 annexes), containing standards and recommended practices, made it possible for aviation nations of the world to find a common methodology and philosophy regarding safety and practices.

Annex 13 has become a universal standard in terms of accident/incident investigation, and outlines how to make the use of the results and recommendations from investigation boards more effective and appropriate.

During the compilation of Swedish legislation (Luftfartslagen 1957) for civil aviation, (effective 1961) applicable parts of the ICAO standards for investigation were introduced. This was the first time in Swedish legislative history that the division of responsibilities was clearly defined as regards the conduct of an accident investigation. At the time, the advantages of a separate investigative body had already been considered, but the shared investigative responsibility (i.e. between a so-called Government Commission and the Swedish Civil Aviation Authority) was maintained until 1978.

During an investigation conducted by the Swedish government in 1974, the argument for a separate investigative body was based on a concept and necessity for objectivity. This ultimately led to the establishment of the Swedish Accident Investigation Board (SHK) in 1978.

Development within the major aviation nations strived towards attaining the independent investigative body (sepa-

rated from the regulator) that is currently a recognised EU directive.

In order to illustrate clearly how the current high level of safety has been reached (by gathering and absorbing knowledge and insight from previous errors) we will take a closer look at three fatal accidents (which affected Swedish domestic aviation), that occurred at Ängelholm (1964), Stockholm (1977) and Oskarshamn (1989).

ÄNGELHOLM 1964

At 19:46 on the evening of November 20th, a Convair Metropolitan aircraft departed Stockholm-Bromma Airport with 39 passengers and 4 crewmembers on board. Their destination was Ängelholm Airport which at the time was an active air force base. The flight was uneventful until the crew had commenced an NDB (Non Directional Beacon) approach to runway 14. It was dark and the weather at the time was marginal with rain, a low cloud base and visibility of 1.5–2 km. During the final approach, approximately 2 km from the runway threshold, the aircraft descended below the minimum altitude and collided with the ground. It skidded roughly 100 metres and came to a stop upside down. 31 of the occupants were fatally injured, while 12 sustained serious injuries.

The accident was investigated by a specially appointed government commission, that subsequently failed to arrive at a definitive conclusion to its cause; however, the probable reasons why the aircraft did not follow the prescribed procedure was a combination of inadequate knowledge regarding position of the particular military approach lights (that were illuminated) and a communication misunderstanding between military air traffic control and the pilots. Additionally, the radio beacons were not positioned in accordance with civil airport regulations.

The commission concluded in its report that there were differences between civil and military air traffic control procedures, as well as in ground based equipment. The matter of approach lights at military airports was of great concern to the investigators, as several airports at the time of the accident were used for scheduled domestic civil operations and equipped with two different types of approach light systems. This would have been totally unacceptable had today's flight safety standards been applied. Obviously the goal was to install a uniform system at all airports where scheduled civil traffic operated, but due to financial constraints, this would not take place until several years later.

The investigation's conclusion regarding a misunderstanding in the radio communication resulted in supplementary training for military air traffic control officers in respect of civil rules and regulations, operational procedures and radio phraseology. Eventually the training of civil and military air traffic control officers was fully co-ordinated.

It was also concluded that the work of the investigative commission would have been simplified had the aircraft been equipped with a Flight Data Recorder (FDR) and a Cockpit Voice Recorder (CVR). (These are often called black boxes, although the actual colour is in fact orange or red.) At the time of the accident there was no requirement for these pieces of equipment to be installed in the type of aircraft involved in the accident; although later they became mandatory also for smaller airliners.

This requirement has contributed considerably to improved flight safety as it has allowed for a more precise and effective analysis of the sequence of events and communication issues involved in accidents and serious incidents. This has in turn aided the investigators when drawing their conclusions.

KÄLVESTA 1977

At 06:10 on January 15th, a Vickers Viscount departed Malmö-Sturup Airport for a scheduled domestic flight to Stockholm-Bromma Airport with intermediate landings at Kristianstad, Växjö and Jönköping. On the last leg between Jönköping and Bromma, there were 3 crewmembers and 19 passengers on board. The weather en route was marginal with cloud tops at approximately 9500 feet; at Bromma (and in the approach sector for runway 12) it was reported as mist with scattered clouds at about 700 feet and a visibility of 5 km. The wind was south-easterly (approximately 10 knots) and temperature at ground level was 0 degrees Celsius with a relative humidity of 90 per cent. There was a risk of ice accumulation on the aircraft, especially at altitudes between 1500 and 6000 feet.

The flight from Jönköping, including the approach into Bromma was quite normal and under guidance of the Instrument Landing System (ILS) on final approach to runway 12 when the accident occurred. The course of events was dramatic, with the aircraft suddenly going into an almost vertical descent from 1300 feet, and impacting the ground in the car park of a residential area. All those onboard were killed, but there were no casualties on the ground. A number of cars were damaged and buildings in the vicinity suffered minor fire damage.

The specially appointed commission which investigated the accident concluded it was caused by ice accumulation on the horizontal stabilizer, resulting in air flow deterioration and subsequent stall (that occurred at wing flap extension). The ice accumulation was due to an abnormally low tempe-

rature in the de-icing system; the reason being partially due to insufficient information in the aircraft's authority-approved operations manual.

The recommendations in the report referring to the operations manual were handled by the UK and the Swedish aviation authorities, resulting in a revision of the text. Additionally, the investigation obtained new knowledge regarding ice accretion on aircraft and consequently, the authority recommended further investigation to seek a deeper understanding of all aspects of ice formation, particularly for the benefit of operational staff such as pilots, meteorologists and air traffic control personnel. The commission also requested that operational procedures be addressed and established concerning what the crew must take into consideration during an approach to land in known icing conditions and to increase the awareness of risks associated with stabilizer icing.

OSKARSHAMN 1989

During the morning of May 8th, a commuter aircraft was on a scheduled domestic flight from Stockholm-Arlanda Airport to Oskarshamn Airport. The aircraft – a Beech 99 – was carrying 2 pilots and 14 passengers. The flight had proceeded normally and the weather at Oskarshamn was fine with good visibility and some scattered cumulus clouds. An approach to runway 19 commenced and the air traffic control officer in the control tower maintained visual contact with the aircraft throughout the final segment of the approach. A couple of minutes before landing, a routine update of the latest wind conditions was transmitted to the captain who acknowledged them. Seconds before the aircraft reached the runway, the control tower officer saw the aircraft enter a nose high attitude, stall, abruptly make a dive to the left and subsequently hit the ground nose first at a steep angle, approximately 150 metres short of the runway. All 16 people onboard were killed instantly.

The Swedish Accident Investigation Board (SHK), which conducted the investigation, concluded in its report that the probable cause of the accident was the pilots inability to effectively compensate for the sharp and sudden nose pitch-up tendency, which was caused by the extension of wing flaps at a time when the engines were operating at a high power setting. A contributory factor was that the aircraft had been incorrectly loaded, resulting in a centre of gravity aft of the stipulated limit, rendering the aircraft extremely tail heavy. The Board also questioned crew composition and training, and was of the opinion that the Civil Aviation Authority should regulate these matters better.

The extensive investigation acquired new knowledge regarding the flight characteristics of this aircraft type when operating with a centre of gravity at, or outside of, the specified limits.

The SHK claimed that the flight crew might have avoided ending up in the situation (leading to the accident) had they been given better and more comprehensive training, especially in respect of weight and balance calculations. When the preliminary report was published, the authority took immediate action towards assuring accuracy of these calculations

The SHK also recommended that the authority should establish more stringent regulations for type conversion training for commercial pilots.

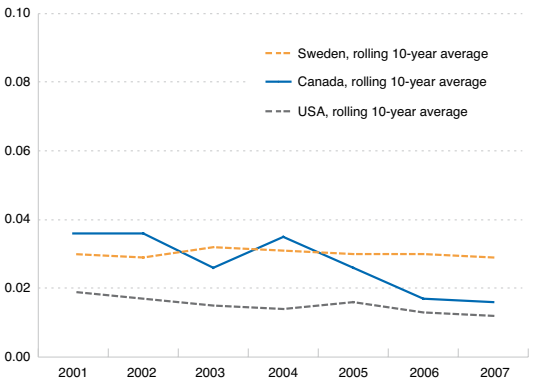
One of the foundations of improved flight safety is to learn from accidents and incidents, the majority of which are not caused by one single component, but rather by a sequence of events. The main object of an investigation is to determine this sequence and the cause(s) of the accidents

and incidents, as well as to discuss factors which could have prevented the events from occurring.

Thanks to comprehensive investigations, the above-mentioned three tragic accidents have had a strong impact on the proactive work relating to flight safety in Sweden. Airport facilities and the air traffic control services have improved, and measures have been taken in order to increase the understanding and improvement of procedures regarding operations in icing conditions. Additionally, our knowledge regarding flight characteristics when operating incorrectly loaded aircraft has increased, and the requirements in respect of pilot training when transitioning from one aircraft type to another are more stringent.

Looking at the statistics, the mean value for a 10 year period and the development over time – Sweden holds a favourable position in comparison with other aviation nations in terms of safety. The graph below shows the Swedish, Canadian and US accident statistics. The Swedish mean value for a ten year period covering accidents with fatal outcomes 1998–2007, indicates 0.029/100,000 flight hours. This is on a par with other well developed aviation nations.

FIGURE 1 Comparison of accident statistics



Sources: Transport Canada/Civil Aviation, US Department of Transportation, Federal Aviation Administration, Swedish Transport Agency.

FACTS

Routines for the current work concerning safety

The analysis section within what is now the Swedish Transport Agency is responsible for processing and analysing aviation safety reports (ASR) pertaining to Swedish operations, that are submitted to the agency. These reports include events ranging from minor incidents to serious accidents. The events which must be reported, and who is responsible for reporting them, is stipulated in the Swedish Aviation legislation and the Rules and Regulations for Aviation (LFS 2007:68). These rules are based on a European Union Directive dating from 2002 (42/2002) regarding reporting of events, therefore a uniform and harmonised legislation exists within the EU. The Analysis Section receives approximately 4,000 ASRs per year.

Each reported event is handled by a flight safety analyst who conducts an analysis and classifies it in terms of seriousness and draws conclusion with respect to what proactive safety measures are suitable for implementation. In cases where the event might call for a deeper and/or additional investigation, the report is also distributed further within the Swedish Accident Investigation Board (SHK). Some of the flight safety analysts within the section have operational experience, such as pilots with a background in commercial aviation operations and air traffic controllers. There is also human factors and statistics expertise available, as well as legal.

Each of the submitted reports is routinely coded in accordance with a specific system and the information is subsequently stored in a database, where statistical information can be made accessible. Flight safety related trends can be diagnosed and analysed from these statistics, that also form the basis for decisive and timely measures in specific target areas; for example the agency has seen evidence of a disturbingly sharp rise in the number of airspace infringements over the past few years; consequently they have initiated an investigation charged with the task of identifying the cause(s) and to propose suitable measures in order to improve the situation.

The Analysis Section is also in charge of the handling of accidents. In cases where the SHK is conducting the investigation, the section follows the investigation and administers contact between the Transport Agency's Aviation Department and SHK; additionally they ensure that recommendations (stipulated by the SHK and included in the investigative report) are implemented and subsequently reported back to the SHK for administrative and follow-up purposes. In cases of accidents or incidents which are not investigated by the SHK, the Analysis Section assumes responsibility for the handling and dealing of the entire case including the identification of proactive safety measures, i.e. revisions of regulations, oversight and supervision, and any other suitable means of assuring a high level of safety within the domains and responsibility given to the Swedish Transport Agency.

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SWEDISH INTERNATIONAL AIR SERVICES HAVE CHANGED

The development of Swedish international air services is closely linked to SAS. Up to deregulation, the basis for Scandinavian aviation politics was for SAS to have a monopoly in the Scandinavian air transport market. The argument for this was the remote location of the Scandinavian countries, and the fact that each individual country had a limited market basis for international air services.

When deregulation was implemented in the U.S., conditions changed drastically for SAS and the other European airlines. Those U.S. airlines that were consolidated and consequently grew stronger in the domestic market could utilize this market position in their competition with European airlines which were limited to just a few destinations in the U.S., therefore not having the same access to the whole of the U.S. market.

Another decisive factor was the collapse of the so-called pooling agreements which had been there to regulate capacity, prices, service levels, etc. between the airlines. When the system broke down, a period of structural change began in many parts of Europe, gradually resulting in the major alliances of today and consequently resulting in the deregulation of both the domestic market and air traffic within the EU during the 1990s.

For SAS these changes meant that the competitors gained access to its home market since the Scandinavian countries could no longer guarantee a favoured position to SAS. Its approach to dealing with the new competitive situation was sweeping cost reductions and a new business strategy with lower ticket prices and more direct routes, especially from Stockholm-Arlanda Airport (Figure 1). The SAS market share has declined since deregulation, but stabilized over the past few years (Figure 2). During the period 2005–2008 Sterling accounts for the major change in international market share, stepping up from sixth place to fourth.

FIGURE 1 Number of international direct routes flown by SAS from Copenhagen Airport, Stockholm-Arlanda Airport and Oslo-Gardemoen Airport 1981–2008

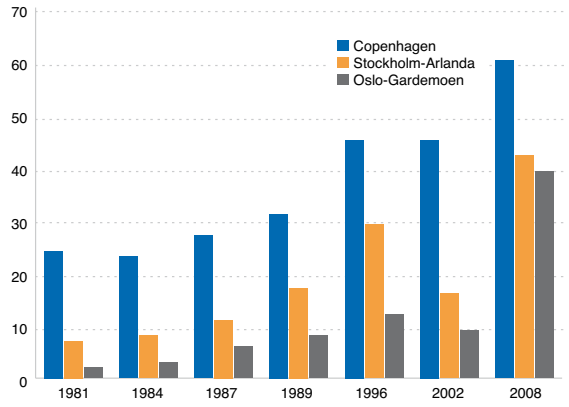
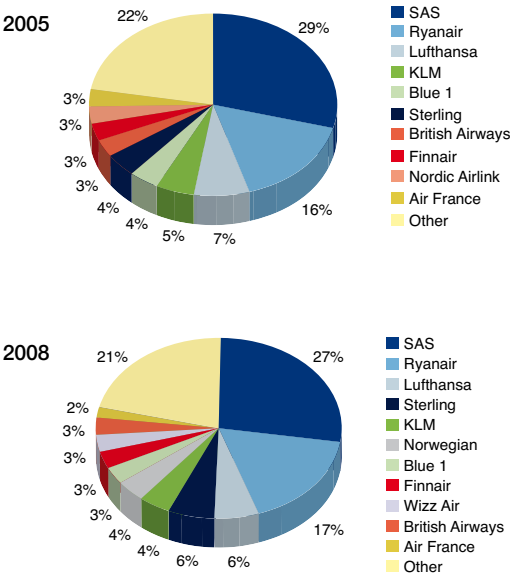


FIGURE 2 Market shares – scheduled international traffic 2005–2008



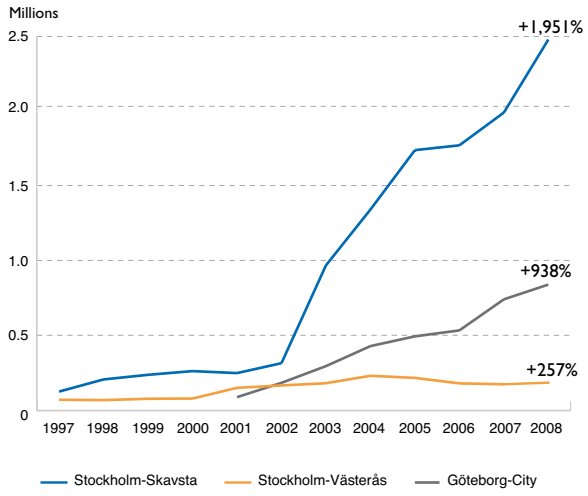
LOW COST CARRIERS IN SWEDEN

Ryanair established itself at Stockholm-Skavsta Airport in 1998 and marked the start of low cost carrier (LCC) operations in Sweden. Some Swedish airlines have also tried the low cost concept for their international services; Göteborg-based Goodjet was the first, operating routes to Paris, Nice and Alicante in 2002. It was, however, a short-lived venture, as the company went bankrupt the following year. Other Swedish LCCs operating for short periods were Swe Fly and FlyMe; both of them left the market with large financial debts.

LCC operations in Sweden are carried out at several airports and at three of them (Stockholm-Västerås, Stockholm-Skavsta, and Göteborg-City) they have brought about a significant increase in the number of passengers (Figure 3); consequently they have achieved virtually total dominance there.

In addition to the three above mentioned airports there is also significant LCC traffic at Stockholm-Arlanda, Malmö Airport and Göteborg-Landvetter. Additionally there are also a few routes from other regions, e.g. Växjö, from where Ryanair operates a route to Düsseldorf.

FIGURE 3 LCC passenger development at Stockholm-Skavsta Airport, Stockholm-Västerås Airport and Göteborg City Airport, 1997–2008



SAS ALSO AFFECTED

Ryanair's entry into the Swedish market had two significant effects on SAS and other airlines with networks. Firstly, they had to change their price strategy and lower the prices (although primarily within Europe). SAS and Malmö Aviation also started up their own LCCs, Snowflake and Snålskjutsen respectively; however, both were incorporated into their respective parent companies after a few years. Secondly, the increasing market share captured by the LCCs forced SAS to modify its route structure from Stockholm-Arlanda; at the end of the 1980s they had 20 direct routes from that airport, yet in 2008 there were more than 60. A similar development has also taken place in Oslo. On the other hand, SAS and other airlines with networks have reduced the number of direct flights from Göteborg-Landvetter Airport despite the competition from LCCs operating direct flights from Göteborg-City Airport.

In the future it can be expected that the competition to attract LCCs will heighten between Swedish airports. Another possible scenario is that the major airports will become more accessible to the LCCs. An interesting joker in this context is the plans nurtured by Uppsala Air to convert the old air force base at Uppsala for LCC operational use.

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FROM MALLORCA TO HO CHI MINH CITY

When the low-cost carriers (LCC) became firmly established in the air transport market there were fears that this would bring an end to charter travel; however, even though competition is currently fierce between charter operators and LCCs, and especially so over medium distances, the predictions of charter company demise have not come true. In fact, the charter operators in Sweden have experienced a stable and positive trend in recent years. Below is an account of the charter market in Sweden and some of the reasons why it has started to grow again, despite stiffening competition and the lively discussions concerning the environment.

Following a period with declining passenger numbers, charter travel capacity in Sweden has increased in recent years. In 2007 there were 3,204,000 charter travellers, up more than 5 per cent from 2006. When looking at the figures over a longer period, however, it is obvious that the tough market situation after 9/11 has affected charter travel. 2001 was a record year with about 4.3 million charter passengers, one million up from the previous year. Following the drop in the years after 2001, it looks as if the charter flight travellers are returning to the market.

MORE DESTINATIONS TO CHOOSE FROM

Swedish air charter (now commonly referred to as 'charter') was born in the 1950s, but the phenomenon dates back to the 1840s when Thomas Cook arranged a train journey for a temperance society. By hiring a whole train he managed to lower the ticket price below that of a regular ticket, and this became the beginning of an extremely successful business concept. Much later, during the 1950s and 1960s, the foundations were laid to some of today's Swedish charter operators: Vingresor and Fritidsresor.

The first major charter destinations were Mallorca and Tenerife; these still enjoy a strong position in the Swedish charter market. In 2008, 150,000 Swedes travelled by charter to Mallorca and about 100,000 to Tenerife. Other early destinations, however, such as the French Riviera, have all but disappeared from the charter catalogues, since they are seen as expensive today. Air services to this area have been taken over by the scheduled airlines.

Since they started, the charter companies have successively introduced new destinations to attract additional and other types of passenger.[1] In the late 1960s to early 1970s more exotic destinations such as the Gambia and Sri Lanka were offered to the charter tourists. When Thailand became available it soon became the most popular long distance destination for Swedish charter travellers. After the Asian tsunami in 2004 there was a sharp drop in charter flights to Thailand, later followed by an equally sharp rise.

Several new distant destinations were found in the United Arab Emirates, notably Sharjah, which grew very popular between 2005 and 2008. In the past few years countries such as Vietnam, Indonesia and China have found their way into the travel brochures, even though the passenger numbers from Sweden are still very small to these countries. Many destinations in Eastern Europe have also been introduced and become popular over the past decade, e.g. Turkey, Bulgaria and Croatia. As an example there are more Swedish charter tourists going to Antalya in Turkey than to Mallorca.

The greater choice of destinations has made it possible for the charter operators to lure other travellers than the traditional "sun tourists". Additionally, the content of the trips has been modified to suit more adventurous and seasoned travellers.

TABLE 1 The ten most popular charter destinations from Sweden in 2008

Destination airports by size
1. Antalya
2. Las Palmas
3. Palma de Mallorca
4. Khania
5. Larnaca
6. Tenerife
7. Phuket
8. Hurghada
9. Rhodos - Paradisi
10. Burgas

[1] Establishing long-haul routes is one way for the charter companies to avoid competition from LCCs which are mainly active on medium-haul routes.

CHARTER JOURNEYS CHANGE

Traditionally a charter package holiday has been a flight to enjoy the sun and beaches, an all-inclusive tour with accommodation, airport and hotel transfers and Swedish tour leaders on site. The charter companies however, have started to offer a higher degree of flexibility and have introduced the possibility for travellers to piece together their own itineraries. The wider choice of destinations reflects this transformation, but the products have also been diversified in other aspects. Beside the major charter companies which offer a wide range of destinations and types of travel, specialised operators have been established, often aiming at one, or just a few, destinations or types of trip.

Many of the larger Swedish charter companies also offer circular or special theme tours with a more active content than the traditional charter vacation. The destinations are often less well known, such as Laos, Cambodia or Albania, or they have a distinctive theme. A few examples of theme tours are gastronomic and wine tasting, and those with a historic touch. Many companies also offer active experiences such as golfing, yoga or skiing, metropolis tours, fly-drive combinations, create your own trip with scheduled airlines, and more.

NEW TYPES OF DEPARTURE AIRPORT

In order to differentiate their product from those of the scheduled airlines and the low cost carriers, the charter operators have increasingly begun to offer flights from smaller airports where the option to travel by scheduled air transport is rarely available. The strategy is that the traveller in the countryside should not have to spend extra time and money to travel to Stockholm-Arlanda Airport or Gothenburg Landvetter Airport for example, something which has up to now been a requisite to reach certain charter destinations. Instead, charter departures from the major airports have decreased.

The increase in charter passengers has been largest at airports that do not normally have much charter traffic (< 20,000 charter passengers/year), such as Skellefteå, Kiruna, and Borlänge. The development is startling; from 2005 the number of charter passengers from these airports has increased by 87 per cent. The trend towards an increased number of charter passengers can, in principle, be attributed to the increase at airports which previously had no, or very little, charter traffic.

Several charter organisations are consciously concentrating on offering charter trips from new departure airports directly to the most popular destinations, thereby attracting new customers. These companies put their money on safe bets when choosing destinations such as Las Palmas, Antalya, and Mallorca from the new departure airports. An additional incentive is that the charter companies also offer one or a few departures from the regional airports every season to more distant destinations. It has thus become possible to fly direct from Norrköping and Luleå to Thailand for example.

There are signs that the regionalisation of the charter market will continue. Charter trips are being offered from an increasing number of airports, and during 2008, travel organizers advertised that they were planning to offer direct charters from Linköping and Visby in 2009.

THE FUTURE OF AIR CHARTER

Despite increased competition, above all from low-cost carriers, the charter companies have attracted more customers over the past few years, i.e. by offering a greater choice of destinations and types of trip, and a better spread of departure airports in Sweden. In the same way as the rest of the air transport industry, the charter companies will be affected over the coming years by increased oil prices, the economic downturn and intense discussions on environmental issues. So far the charter companies have survived by introducing new products; the present situation might speed up that development. Today, there are several charter organisations that offer a small selection of train charters, something which may become a way ahead for these companies if the difficulties that the aviation system is facing persist.

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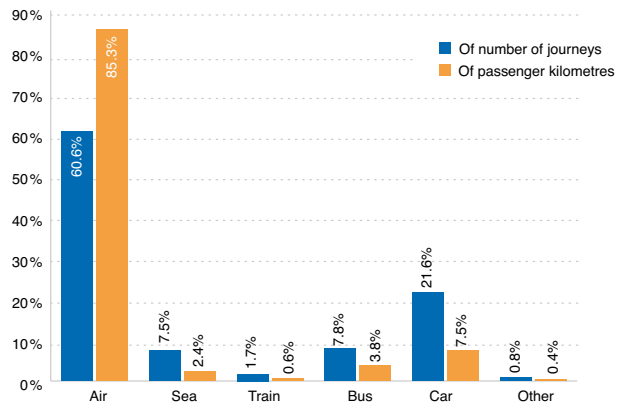
THE NATIONAL SURVEY OF TRAVEL HABITS
International travel over distances > 300 km

Statistics Sweden, at the request of the transport authorities and the Swedish Institute for Transport and Communications Analysis, carried out a survey on national travel habits, called Res0506. The survey took place every day from the autumn of 2005 until the autumn of 2006, involving a total of 27,000 telephone interviews and covering all modes of travel. In the part dealing with air travel, it is above all the long-distance journeys that are of interest, especially those of 300 km or more. The results presented here apply to international flights (the results for long-distance domestic flights were presented in a previous article).

During the period of the survey there were 15.9 million international one-way trips covering 300 km or more. Air travel accounted for 9.6 million trips, or close to 61 per cent. 33.2 billion (33,200,000,000) passenger kilometres were undertaken,[1] of which 85 per cent were by air. Below is a report on what characterises international air travel in comparison with other modes of transport.

FIGURE 1 Percentages of number of journeys and passenger kilometres, respectively, per mode of transport



DISTRIBUTION OF MODES OF TRANSPORT

As mentioned, air travel is the preferred mode of transport for Swedes for international travel. The car comes next, while train travel is rather unusual for these journeys.

TRIP LENGTHS

Car travel is the preferred choice for journeys of up to 1000 km, and then air travel takes over. As the journeys become longer, air travel dominates completely, for obvious reasons.

FIGURE 2 Number of journeys distributed between mode of transport and trip length

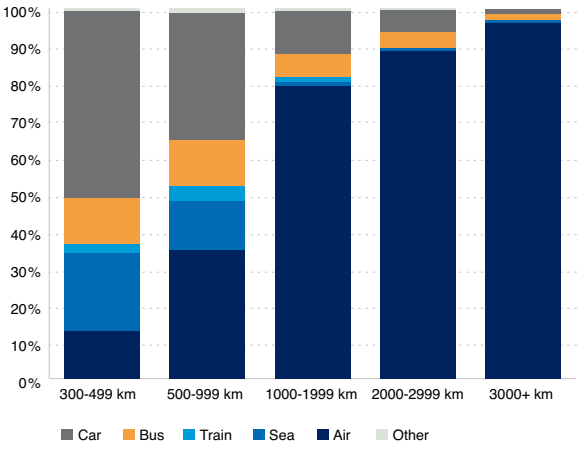
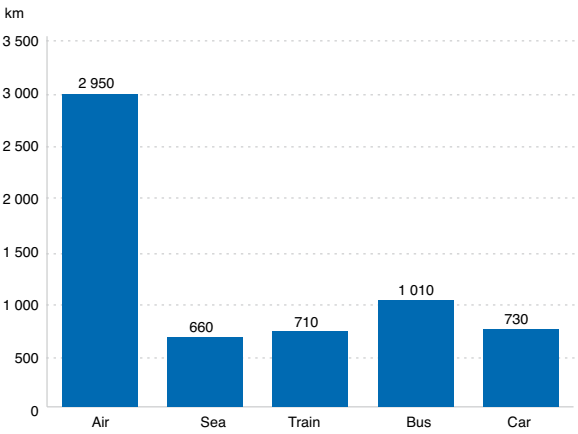


FIGURE 3 Average trip distance, km



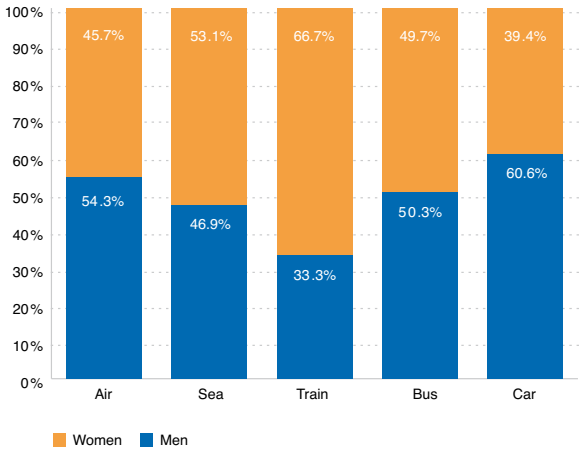
[1] Transport work is measured in passenger kilometers, i.e. the number of people who have travelled in a vehicle multiplied by the number of kilometers travelled by each individual.

As can be seen, air transport dominates on very long distances, with air travel accounting for about 25 per cent of all travel to the neighbouring Nordic countries. The corresponding figure for train travel is about 5 per cent. With the exception of Finland, to which country sea transport is preferred, the car dominates.

GENDER DISTRIBUTION

Men account for most of the international journeys – 55 per cent. Figure 4 below shows that there are rather large differences in the distribution of men versus women for the different modes of transport.

FIGURE 4 Mode of transport vs gender



Men dominate travel by car (60 per cent) and air (54 per cent) while women dominate travel by train (67 per cent) and sea (53 per cent). For bus trips the distribution is 50/50.

REASONS FOR TRAVEL

19 per cent of international journeys are business trips; 12 per cent are made to visit friends and relatives, and 60 per cent are for other leisure activity, e.g. holidays. As can be seen in Figures 5 and 6, air travel is by far the most common mode of transport for international business trips, but also the most common for "other leisure activity".

Air travel dominates domestic business travel over distances longer than 300 km, followed by the car. Rail has a much smaller share, and business travel by bus is rather unusual.

The distribution of journeys to visit friends and relatives or to pursue other leisure activities looks quite different, see Figure 6. The car completely dominates these journeys. Air travel accounts for only seven per cent.

FIGURE 5 Mode of transport – business journeys

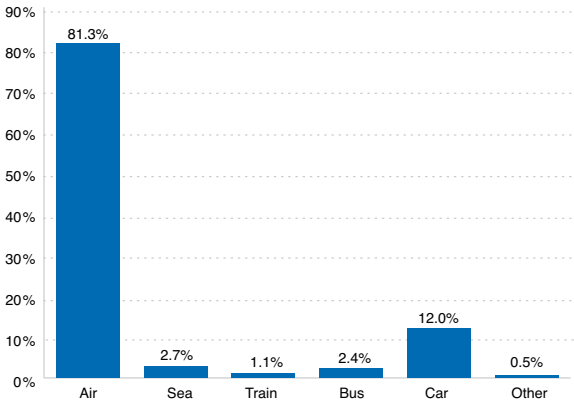
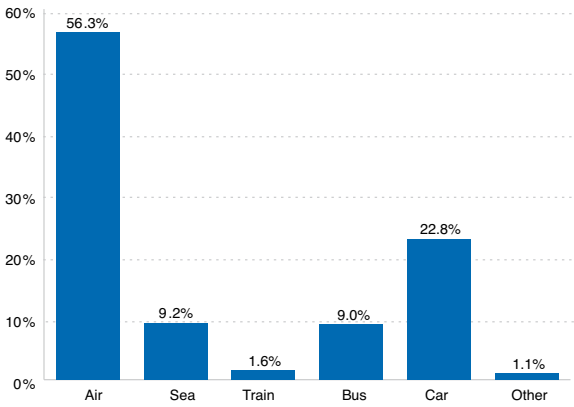


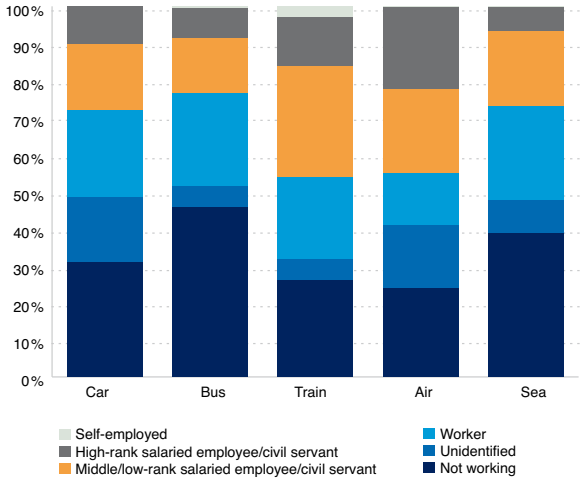
FIGURE 6 Mode of transport – visiting friends and relatives/ other leisure activity



SOCIOECONOMIC GROUPS AND AVERAGE INCOME

Compared with the other modes of travel, air has the largest share of high-ranking salaried employees/civil servants, and the lowest share of "not working" and "workers". Bus and sea travel has a rather large share of "not working" among their travellers.

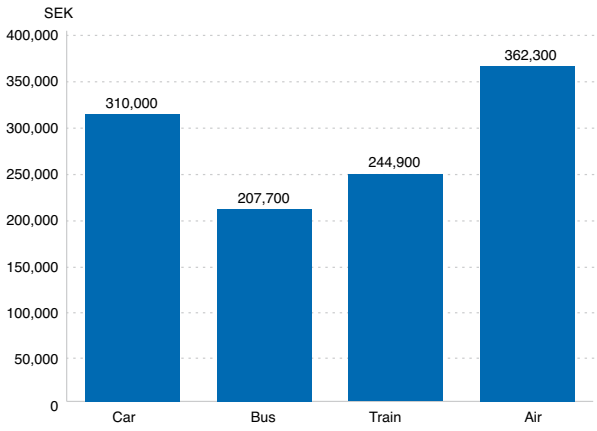
FIGURE 7 Mode of transport – socioeconomic group



The socioeconomic structure among the different modes of transport is naturally reflected in the income levels of the users.

Figure 8 shows the average individual income for the different transport users. Not unexpectedly the air traveller has the highest average income.

FIGURE 8 Average annual income



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SWEDISH AIR TRANSPORT CHARGES

During 2008, navigation and other charges for air traffic have increased. It is primarily the route charges that have increased, but the fees for security checks of passengers and baggage have also been raised. As civil aviation also has been subject to other economic pressures, such as rising fuel costs, excess capacity and a slump in the economy, the charges have taken on greater importance for aviation as a whole, and in particular for the airlines.

The Swedish Civil Aviation Administration (LFV) and the Swedish Transport Agency charge the operators for various services. LFV is a government-owned company, which means, among other things, that its costs are financed through fees; the same applies to the civil aviation department within the Transport Agency.

LFV charges primarily for airport and air traffic management services, such as departure fees, passenger fees, noise fees, emission fees and Terminal Navigation Charge (TNC).

The Transport Agency charges for licensing, examinations, inspections, airworthiness, etc. To finance other activities within the civil aviation field, there is an Authority Charge. The Agency also manages the charge levelling system for passenger and baggage security checks, where the airline is charged for departing passengers and the airport receives compensation for its costs for these activities.

Eurocontrol charges the operator the collectively set route charges. When the operator has paid, the monies are distributed amongst the member countries in accordance with the prescribed procedure.

Table 1 shows the current charges/fees, and an historic development of charges which have been added during the last few years. The latter are primarily environment-related.

AUTHORITY CHARGES

A fee to cover infrastructure, etc. is charged for each departing passenger. The fee amounted to SEK 7.50 (approx. 0.8 euro) in 2008; it has since been raised to SEK 8.50.

FEES FOR SECURITY CHECKS OF PASSENGERS AND BAGGAGE

Since 2005 the fees for security checks of passengers and baggage have been distributed via a levelling system, which means that the fee is the same at all airports regardless of

FIGURE 1 Development of authority, airport and security charges

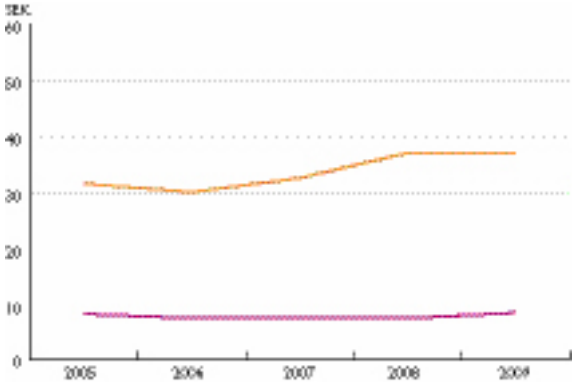


TABLE 1 Types of charges and fees at Swedish airports

1990	1993	1998	2004	2008
Departure fee	Noise fee	Emission fee	Airport security	Airport and security charges
Passenger fee	Departure fee	Noise fee	Emission fee	Levelling security charge
Security fee	Passenger fee	Departure fee	Noise fee	Emission fee
TNC	Security fee	Passenger fee	Departure fee	Noise fee
Route charges	TNC	Security fee	Passenger fee	Departure fee
	Route charges	TNC	Security fee	TNC
		Route charges	TNC	Passenger fee
			Route charges	Route charges

size. This is achieved by distributing the total costs over the total number of departing passengers who are subject to the checks.

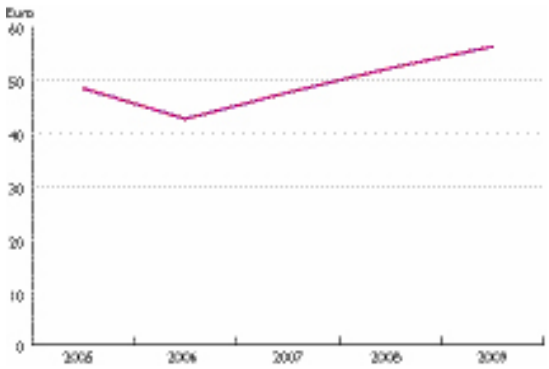
The ban, introduced in 2006, on fluids onboard aircraft made the security costs skyrocket, which had a great impact on the costs for 2007. It resulted in an increased fee for the security checks. They went up from SEK 30.00 to 32.50, and then, in January 2008, to 37.00 per passenger. The cost increase in absolute terms was SEK 92 million.

Because of the increasing costs for security, a review of the fees was started in 2008 in respect of the charge balancing system. Identified weaknesses in the present system are, above all, the fact that there are no clear incentives for the airports to keep costs down, since the costs are distributed over all airports and charged to operators departing from Swedish airports. If a new system is designed, one of the goals is to create incentives that reward those airports that can provide efficient security at low cost.

ROUTE CHARGES

Route charges are based on aircraft mass, route length and a flat rate. The flat rate is determined for each charge zone to recover the costs for air traffic management services. The Swedish charge zone is identical to the Swedish Flight Information Region, and the upper region. The route charge for 2009 is 56.12 euros per service unit, an increase of 8 per cent compared with 2008. The charge was raised because of increased salary and social/pension costs for air traffic controllers, among other things. There is work ongoing today to harmonise the Swedish airspace with the Danish airspace in order to render the work more effective and obtain better cost efficiency.

FIGURE 2 Development of route charges



AIRPORT CHARGES AND INCREASED COSTS OF AND CHARGES FOR AIR TRAFFIC MANAGEMENT SERVICES

Airport charges/fees have for several years been the subject of debate in the aviation sector, and various aviation organisations, such as the International Air Transport Association (IATA) and the Association of European Airlines (AEA) have protested against the increasing airport and air traffic control charges to the national governments, the European Commission and others. The airlines are of the opinion that the charges and fees have been raised too much without allowing them the opportunity to comment or monitor the procedure. The airport owners have instead maintained that the costs are, above all, related to the increased security procedures, and to building infrastructure.

Each airport owner, whether government-, local authority- or privately owned, is in principle free to set his own fees. Sweden has, however, certain international commit-

ments which affect an airport owner's possibilities to freely set the charges. Among other things, the International Civil Aviation Organisation (ICAO), a UN body, has published recommendations on principles for setting fees and charges for international aviation. These principles imply primarily that the fees and charges must not be discriminatory, and that they shall be based on the airports' costs. The principles further imply that an airport must not abuse its dominating position, which often can be regarded as a natural monopoly. Finally, they imply that changes of the fees and charges shall be communicated to the users – Swedish and international – via market consultations. Airport owners will then give relevant economic information to the users, such as what type of service the charge is for, how the charge has been calculated, the connection to airport staffing, capacity requirements, investment costs, and quality of service.

NEW EU DIRECTIVE

EU directive 2009/12/EG on airport fees and charges was published on 11 March 2009. The Commission proposed it in January 2007, after which it was processed by the Council and the European Parliament, which later could agree on a compromise text in the first reading.

The directive contains certain overall principles for the setting of fees and charges at airports within the EU, and rules on how to set them. The fees/charges must not discriminate between the airport users (air transport companies) and they must be transparent.

The directive applies to airports with more than 5 million passengers annually, or, if a member state does not have such an airport, on the largest airport in that state. For Sweden, this means only Stockholm-Arlanda at present. The directive shall be implemented no later than 15 March 2011.

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SLOTS – TIME WINDOWS

If you have passed Stockholm-Arlanda Airport by car on the E4 motorway, you may have observed a queue of aircraft, like a string of pearls, about to land. Perhaps you have also heard that there are air traffic controllers monitoring and separating height and distance between aircraft to avoid accidents. That is correct, but there are also other planning tools available in order to utilize, as efficiently as possible, the capacity of the airports and the airlines. One such tool is the so called slot allocation system; in this case the slot is a 'time window' allocated to a certain aircraft and airport.

Several decades ago, only a few airports were capacity-limited in respect of departures and arrivals. In Sweden, Stockholm-Arlanda Airport started to experience problems in the mid-1980s, and, as air travel increased, more airports began having problems in managing their traffic. In addition, the public's demand for fast and safe air transport increased, and the airlines came under pressure to fly at times that suited the travellers.

It may appear a simple thing to remedy the situation by expanding existing airports and runway systems, or even by building a completely new airport; however, to do this is complicated, expensive and time-consuming. It is also surrounded by many restrictions, media interest and feelings that are not always positive.

WHAT HAPPENED?

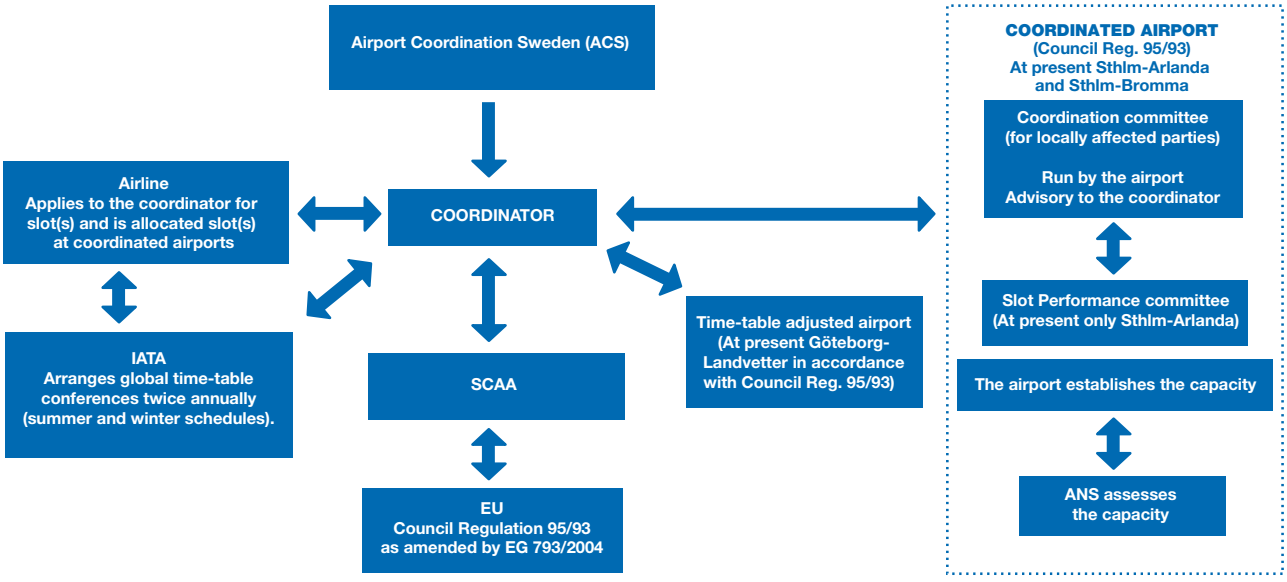
A consequence of the expansion of air transport was the emergence of periods during the day when an airport could not offer departures and arrivals to all operators at the desired times, because the overall capacity of the airport could not meet the increased demand. In other words, there was competition between the operators for the available capacity of the airport. Other problems also arose, such as "who will have priority" and "which rules shall apply"?

The operators themselves tackled the problem by establishing guidelines on how to resolve the situation. They designed a system based on the allocation of slots for arriving and departing aircraft at the airport in question, and the allocation was done by the operators themselves.

REGULATION WITHIN THE EUROPEAN COMMUNITY

Within the EU, the imbalance has been subject to a regulation which was drafted in connection with the deregulation of the air transport market in Europe. This action has led

FIGURE 1 The Swedish slot coordination system



(in principle) to free market access and free pricing. Additionally, an important feature is that the application of the regulation ensures an effective utilisation of available capacity and the promotion of competition.

The regulation is found in EEC Council Regulation (EEC) No. 95/93 laying down common rules for the allocation of arrival and departure times at airports within the community, popularly called the 'slot decree'. The Regulation was changed by a later amendment, Regulation (EC) No 793/2004 of the European Parliament and of the Council. The rules are primarily based on the guidelines supplied by the aviation community, Worldwide Scheduling Guidelines (WSG), published by the International Air Transport Association (IATA).

HOW IS THIS IMPLEMENTED IN SWEDEN?

According to the Regulation, slot allocation should be independent, impartial, non-discriminating, and transparent. In Sweden this has been achieved by establishing a cooperative economic association, Airport Coordination Sweden (ACS), which is charged with running the day-to-day allocation of slots. ACS carries out slot coordination for Stockholm-Arlanda Airport and Stockholm-Bromma Airport, and time-table adjustment for Göteborg-Landvetter Airport.

In Sweden, Stockholm-Arlanda and Stockholm-Bromma are co-ordinated, while Göteborg-Landvetter is time-table adjusted. The reason for making an airport co-ordinated or time-table adjusted is that it has a capacity shortage. Attention to the shortage is called by the operators or the European Commission. The Swedish Transport Agency is the competent authority for these matters.

"Co-ordinated" in this context means an airport where air operators have to be allocated an arrival or departure time to be able to take off or land. There are some exceptions, such as state flights, emergency landings and humanitarian flights.

"Time-table adjusted" means an airport where there is a capacity shortage at certain times of the day, week or year, where the overload can most often be remedied by voluntary cooperation between operators, and where a "time-table adjuster" has been appointed to facilitate activities for airlines or others who operate (or intend to operate) at the airport.

THE CO-ORDINATOR

The co-ordinator's mission is to collect and process the operators' requirements for slot times during upcoming periods and to distribute these relative to the capacity of the airport. The work is continuous, but there are time spans to consider, as the planning year is divided into two traffic cycles: summer, starting at the end of March; and winter, starting at the end of October.

The planning begins with operators submitting their wishes for slot times to the co-ordinator; the last date for this being mid-October (summer slots) or mid-May (winter slots). The co-ordinator then compiles the resultant total "requirement list" which is sent to the operators; this is done in the beginning of November (summer slots) or the beginning of June (winter slots).

The next fixing point is the international slot conference, which takes place in November (summer slots) and mid-June (winter slots) and that allocates slot times for co-ordinated airports of applicable countries, and considers operators' needs.

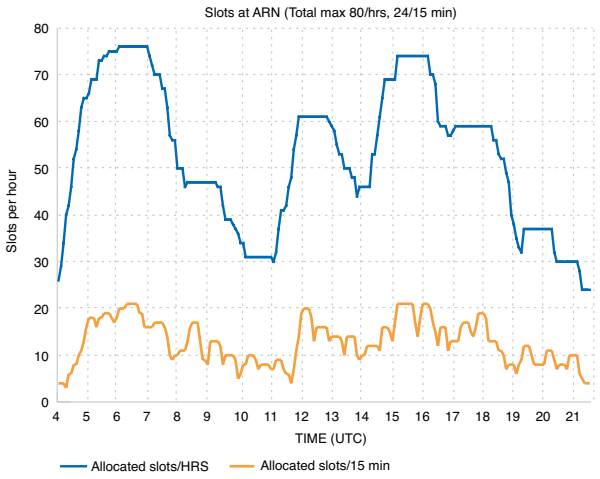
At the end of January (summer slots) and the end of August (winter slots), i.e. two months before the respective traffic period starts, the operators will return those slot times from their allocation which they do not intend using. The slot times thus returned will then be allocated to operators whose earlier requirements were not satisfied.

CO-ORDINATION COMMITTEE

Each co-ordinated airport sets up a committee to discuss slot times, etc. with operators and other interested parties. The co-ordinator presents the result of the planning activities during these meetings (Stockholm-Arlanda Airport's takes place in March and October).

Figure 2 shows the plan for the summer of 2008 for Stockholm-Arlanda Airport. Times are given in UTC.

FIGURE 2 Slot plan – summer 2008

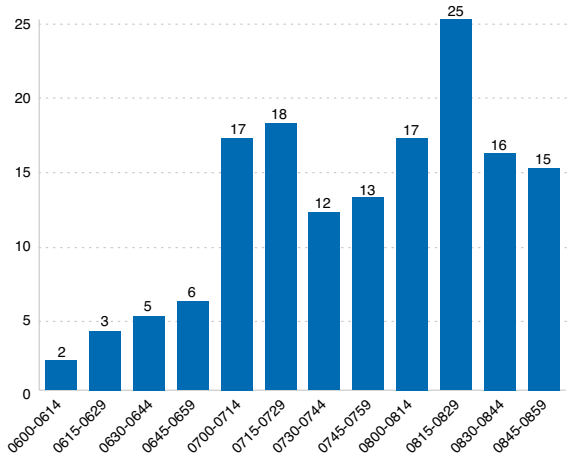


THE SITUATION AT STOCKHOLM-ARLANDA AIRPORT...

The number of companies operating at Stockholm-Arlanda is rather stable, consisting mainly of commercial passenger and cargo operators. The slot allocation principles are such that those airlines already established at the airport and continuing their traffic, may keep their slot times ("grandfather's rights"). New operators which want to get in and compete will share the remaining slot times. There are changes throughout the year, but they are neither far-reaching nor drastic. Stockholm-Arlanda has the possibility of increasing its capacity and, based on the operators' requirements, they are working on this with a long-term perspective in mind.

Arlanda's capacity to manage air traffic is currently set at 80 movements per hour. Limiting factors are air traffic control, and, to a lesser extent, the number of runways, capacity in the terminals, ramp capacity and the availability of ground services. An example of the real situation during peak traffic at Stockholm-Arlanda is shown in Figure 3, showing the number of arrivals and departures occurring during a particular day in 2007. A pattern of concentrated movements, in particular during the morning hours, has been a stable feature for many years.

FIGURE 3 Number of movements per 15 minutes between 06:00 and 08:59 hrs on 18 October 2007



...AND AT STOCKHOLM-BROMMA AIRPORT

Stockholm-Bromma's situation is slightly different. The conditions for air traffic at Bromma are restricted by special regulations, agreements and conditions which limit capacity. In addition the scheduled traffic has to share the capacity with state flights and general aviation.

Stockholm-Bromma currently has a new land-use agreement with the city of Stockholm, something which gives the airport new, long-term opportunities. Terminals and ramp space, however, remain articles in short supply; general aviation has more needs and there are more state flights in the pipeline. Additionally there are the limited physical possibilities of expanding the airport. All in all, it may become difficult for the airport to please everybody.

CHANGES AT STOCKHOLM-ARLANDA AIRPORT

By comparing operator movements during peak periods at Stockholm-Arlanda in two different years, it can be seen in Figures 4 and 5 that the number of active operators is slightly higher in 2007 than it was in 2003. Also, the dominating operators have reduced their total share of slots which have then been taken over by other operators. In the report referred to below, the intermediate years are also shown.

FIGURE 4 Operators which used more than one slot on 18 October 2007 from 06:00 to 08:59 hrs. An additional 15 operators have made one movement each.

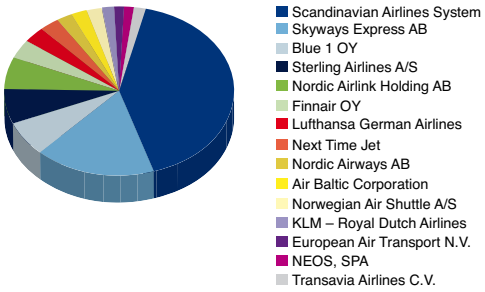
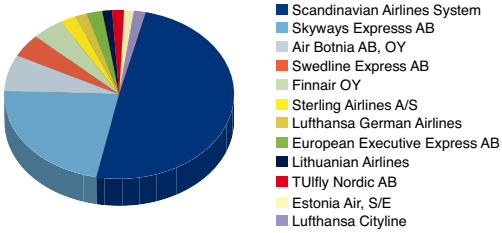


FIGURE 5 Operators which used more than one slot on 17 October 2003 from 06:00 to 08:59 hrs. An additional 19 operators have made one movement each.



THE FUTURE

Operators have formed different perspectives of future capacity requirements at Stockholm-Arlanda. Some say that it could become difficult to obtain new slots and want an increase in capacity at the airport; however, they also mention that a coming recession, higher fuel prices, larger aircraft, more stringent environmental requirements, etc., may reduce the need for more slots. Others say that their service is sufficiently well established that they can make do with the existing slots. The charter operators are of the opinion that slot allocation is not a big problem since their movements are normally scheduled outside of the peak periods.

THE REPORT FROM THE AUTHORITY

In a recent report the Swedish Transport Agency analysed the application of slot allocation in Sweden. The report shows that Stockholm-Arlanda and Stockholm-Bromma will need to continue slot coordination. Göteborg-Landvetter is time-table adjusted and not considered as having any lack of capacity at present, so slot coordination is not required for the moment.

WHAT DO OUR NEIGHBOURING NORDIC COUNTRIES DO?

Norway, Finland and Denmark have, on the whole, designs for slot allocation similar to Sweden. Norway has two co-ordinated and two time-table adjusted airports. Finland has one co-ordinated airport. Denmark has two co-ordinated airports; Iceland one. Denmark looks after Iceland's needs.

CURRENT WORK IN THE EU WITH THE 'SLOT DECREE'

According to the revised Regulation, the European Commission will, within two years, inform the European Parliament and the Council about the application of the Regulation. Such information has been given, pointing out certain problem areas indicated by the aviation community. These areas are:

- Independence of co-ordinators
- Transparency of slot allocation
- Rules for newcomers
- Local rules and guidelines at airports
- Sub trading with slots
- Agreement between slot times and flight plans.

The Commission is currently awaiting a revision of the Regulation and has advised that it will concentrate on ensuring the satisfactory execution of the problem areas that have been identified; however, the Commission may also consider a partial amendment of the Regulation rules, should this prove necessary. A transfer to a trading system for slots at European airports is at present an open item.

Photo: Tommy Safström

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AVIATION'S ENVIRONMENTAL CHALLENGE

2007 was the year when *climate change* hit the headlines and became the natural topic for discussions at coffee breaks as well as in the corridors of power. The tabloids carried headlines such as "The track to doom" and "The climate threatens us", and new expressions like climate food emerged in everyday life. It seemed to work well by prefixing words with climate, that gave a new dimension to the most common topics of conversion; climate threat, climate alarm, climate smart, climate anxiety, climate neutral and climate compensation to name a few examples. 2007 was also the year when aviation was singled out as the worst climate villain of them all. The media promoted headlines such as "Impose taxes on dirty air transport" and "Aviation's effect on the climate must be kept within bounds".

THE PAST CLIMATE YEAR

During 2007, attention was focused on climatic problems from a variety of sectors. The UN climate panel (IPCC) published a new report, outlining the latest climate research that generated a lot of media coverage. This report concluded (among other things) that the noticeable increase in temperature since the mid-1900s was more than likely caused by our emission of greenhouse gases, although many of the effects caused by climate changes could be minimised, delayed or even avoided by reducing these emissions.

Global warming over the next 100 years is estimated to increase the mean temperature between 1.8 and 4 degrees Celsius (compared with 1989–1999); however, reducing emissions by around 50–85 per cent until the year 2050 (compared with those in 2000) the mean temperature increase could be limited to between 2 and 2.4 degrees C (a level often mentioned by politicians in Sweden and the EU as an acceptable maximum) according to all the experts. Action taken and investment in new technology over the next 20–30 years will be of great importance in trying to achieve this, according to the IPCC.

To emphasise the significance of the IPCC report, and to highlight efforts made by former U.S. vice president Al Gore in spreading a clear and concise message about climate threats, they were both awarded the 2007 Nobel Peace Prize.

Several reports and analyses on the effects of climate changes on our society (and how we can reduce our greenhouse gas emissions by reducing our dependence on oil) originated in Sweden. The Commission against oil dependence published its report in June 2007, and another committee (on climate and vulnerability) published its analysis (SOU 2007:60) in October of the same year. As part of the work of evaluating national environmental targets, a new strategy[1] was launched promoting more efficient uses of energy and efficient transport systems. This strategy includes methods of control and suitable actions to ensure that Sweden meets the national and EU emission reduction targets (i.e carbon dioxide).

As far as aviation is concerned, airlines are subject to an emission trading system and the carbon dioxide fee (charged by government owned airports) will be expanded to include all Swedish airports with a local air quality problem.

THE WAKE-UP CALL

As mentioned above, 2007 was the year when aviation became a target for climate debates (initiated by the media) on reducing its impact on the environment. Aviation is the sector with the projected fastest growth, and which is forecast to double its greenhouse gas emissions within the next 20 years, unless something is done. Swedes fly to Thailand (et al.) more than ever; a climatic sin which leaves many travellers with a bad conscience – although very few refrain from travelling there.

The media's targeting and labelling of aviation as a climate villain, has also been reflected in how people perceive the contribution of airlines to the problem. The Swedish Civil Aviation Administration ordered a survey[2] (covering a number of years), showing that in 2007 there were striking changes in the public's attitude towards aviation and the environment. When questioned on which mode of transport they thought impacted environment the most, the majority responded with "road traffic", followed by "air", "rail" and "sea" transport. The interesting thing however; is that between 2006 to 2007 something happened to significantly reduce the gap dividing those who thought road traffic was the worst, and those who thought it was air traffic. In 2006, 69 per cent thought that road traffic impacted the environment

[1] The strategy for a more efficient use of energy and transports. Basic data for the Council's on environmental goals extended evaluation of the environment quality targets. November 2007. Available on www.transportstyrelsen.se

[2] SIFO Research International, Aviation and the environment, May 25, 2007, ordered by the Swedish Civil Aviation Administration (LFV) and the Gullers Group. Number of telephone interviews carried out in 2003, 2006, and 2007: 1000. Respondents above 15 years of age, throughout the country.

the most, while 22 per cent said the same about aviation. In 2007, the corresponding figures for road traffic and aviation were 58 per cent and 37 per cent respectively. This meant the group who thought aviation impacted the environment the most had grown by 70 per cent between 2006 and 2007.

The survey also showed that 85 per cent of the respondents were willing to pay an extra 50 Swedish kronor for an air journey within Europe in order to compensate for the carbon dioxide emissions produced during the flight. However, reality shows that very few passengers would actually pay if such a supplement was voluntary.

SOME FIGURES

Most curves point upwards for the time being, in particular passenger traffic and emissions to the atmosphere, but conversely the number of aircraft landings are actually decreasing in Sweden (more so in domestic traffic than internationally).

The fact that passenger traffic is increasing at a time when the number of movements is declining, indicates that airlines have become better in filling their aircraft with passengers (consequently improving the cabin load factor), using larger aircraft, or even making longer flights. The truth is probably a mixture of these factors.

Emissions increase in line with higher aircraft weights and additional passenger capacity (thus requiring higher fuel consumption). Generally speaking, larger aircraft use more fuel, so obviously the longer the flight, the more fuel consumed; however, irrespective of this, the overall amount of emissions per passenger has decreased, and is expected to continue declining.

Swedish domestic aviation shows a decline on all fronts, in fact, according to official statistics from the Climate convention and Kyoto protocol, carbon dioxide (CO_2) emissions from domestic aviation in Sweden fell by approximately 1.5 per cent between 1990 and 2005. This sector is included in Sweden's commitment to the Kyoto protocol; however, international aviation is not, therefore increasing its emissions by 45 per cent in Sweden during the same period.

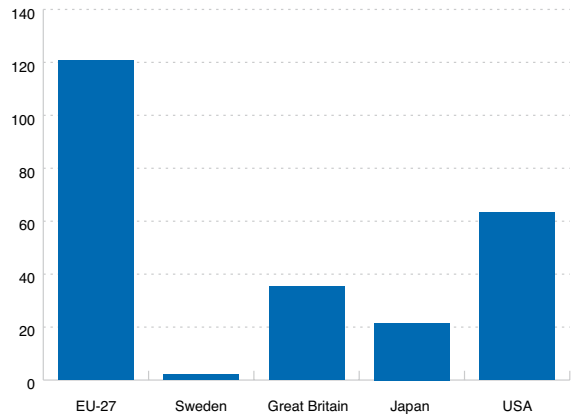
One easily gets impression from the media that aviation is the worst mode of transport when it comes to a negative influence on climate, and aviation's contribution should definitely not be belittled. It is, however, important to know the starting point when discussing emissions, in particular in respect of carbon dioxide, from various modes of transport. Looking at the Swedish domestic situation in 2005, road

transport accounted for 93.6 per cent of all CO_2 emissions produced by the transportation sector; aviation for 3.4 per cent, sea transport for 2.7 per cent and rail for 0.3 per cent. If international air and sea traffic are added, their respective percentages increase.

An interesting (and surprising) fact is that emissions from international shipping do not appear in the debate, yet emissions from Swedish international shipping increased by almost 200 per cent between 1990 and 2005! At the other end of the scale, motoring increased its emissions by 11 per cent during the same period.

Looking at Swedish aviation's (domestic and international combined) share of total emissions, this amounts to 3.8 per cent; this reflects reasonably well when compared with the EU, where aviation accounts for 3.4 per cent of total greenhouse gas emissions.

FIGURE 1 Comparison between EU and other countries relating to greenhouse gas emissions from international aviation



Source: UNFCCC

AVIATION'S EFFECT ON THE CLIMATE IN ADDITION TO CARBON DIOXIDE EMISSIONS

Carbon dioxide has the same effect on the climate regardless of the source of emission; be it a paper pulp plant, a car, or an aircraft. What differentiates aircraft emissions from those of other sources, is they are released at higher altitudes, where there are other substances affecting the climate, in ways they would not, if released closer to the surface. For instance, nitrogen oxides (NO_X) contribute (in different ways) to the formation of ozone in the troposphere, yet to the breaking down of ozone at very high altitudes in the stratosphere. There are also other factors such as various particles, water vapour, the production of condensation trails and, quite possibly, high altitude cirrus clouds that should be taken into consideration when discussing aviation's total effect on the climate.

TIME FOR ACTION

As previously mentioned, international aviation is not included in the Kyoto protocol, as it was decided at the time that international aviation and shipping emissions should be handled by UN organisations (ICAO and IMO respectively). Progress within these organisations has been very slow, however, and pressure has increased on ICAO (above all) to be more active in producing a solution to the best way of handling aviation's climate effects. The EU Commission suggested incorporating air traffic to/from (and within) EU countries into the existing system of emission rights trading; consequently, the EU Parliament and Council initially voted to incorporate aviation into the trading system, although opinions on how it should be accomplished differ between them.

Since aviation is a worldwide enterprise, the outcome of its climatic effect needs to be discussed as part of a global agenda. The EU has been a guardian of this, designing a system for emission rights trading which has shown to work well[3] and, in the long run, could be expanded to include international aviation. Irrespective of this, a system that only encompasses air traffic to/from (and within) the EU is not sufficient, so Sweden and the EU hope that all international aviation will be included in the next set of global climate rules that will follow after the expiration of the Kyoto protocol in 2012.

THE INDUSTRY STARTS TO TAKE RESPONSIBILITY

In the wake of media debates on aviation's effect on the climate, the aviation industry has also started to take a serious part in the game. The Swedish Civil Aviation Administration, several airlines and travel agencies have begun to offer customers the chance of compensating for emissions caused by their air travel.

ICAO has also fallen in line with the world's pressure on aviation to accept its responsibility in reducing its effect on climate. In its most recent resolution (September 2007), their general council confirmed it will continue to play a leading role in the work on aviation's climate problems; additionally it decided to appoint a group of high level representatives

[3] A basic requirement is, however, that the total emission ceiling is gradually lowered so that a real reduction of emissions definitely takes place.

from a number of states, to develop an aggressive action programme for international aviation in this regard.

The Swedish Aviation Interests Association has an environmental committee which produced a report in 2007 listing ten points to improve the adaptation of air transport to improve the climate. They advocated (amongst other things): efficient financial instruments, the incorporation of aviation into the EU's emission trading system, political decisions in Sweden and the EU leading to a more efficient use of European airspace, and the need for business aviation to take steps to reduce its effect on the environment and climate.

It is a positive sign that business aviation has recognized that there are environmental problems, and is no longer hiding behind the worn argument "we are so small compared with other modes of transport". Environmental and climate problems are critical for aviation, the environment no longer has to be in conflict with economy, there are talks of possibilities for some, necessities for others and huge costs in the end if they do not adapt to the changing conditions that alterations in the climate will demand.

AVIATION HAS A DEFINITE ROLE IN THE COMMUNITY

It is not easy to reduce aviation's climatic effects by replacing existing fuels with more environmentally friendly alternatives, although it is easier to apply this approach to motoring, for example. Aviation depends on fossil fuels (and is likely to continue to do so for the foreseeable future) and people will always want to use air transport as they do today. Having said this, a stand has to be taken on whether to accept aviation's dependency on fossil fuels and the consequent climate effects in order to satisfy the need of air transport by allowing these emissions. This will produce an all-embracing action plan for the whole transport sector, where real reductions of emissions are required by the other sectors. If this is not feasible, the end solution will be to reduce the overall amount of air travel.

Forthcoming technical solutions such as modified routes, improved airframes and aerodynamics, etc. have the potential to reduce the climatic effects by 10–15 per cent; however, this is not sufficient to cover the expected increase in air traffic in the coming decades. Incorporating aviation into the EU's emission trading system may be a good solution in managing their NO_x emissions, although one must accept the real reduction in emissions will not take place solely within the air transport sector, but also within those sectors where it is more cost effective to make reductions.

Banning aviation in Sweden is not a realistic alternative, although there may be routes where it could be possible (even economically feasible) to replace air transport with another mode of transport. Having said that, we must take into account that Sweden is a very 'elongated' country, and the only realistic possibility of getting from one end to the other in one day, is by air. Another factor to be taken into account is the mode of transport chosen as a replacement for air. If rail travel is going to be competitive, compared with the roads (chosen by most travellers as a replacement) then rail capacity has to be substantially increased to make the train a more attractive alternative.

Photo: Jim Anderson

Heléne Jansson, Roy Kannerstål, Thomas Kuntze, Annika Wallengren

THE ROLE OF CIVIL AVIATION IN SWEDISH NATIONAL CONTINGENCY PLANNING

Historically, Swedish national contingency planning has focused on managing threats when faced by a war situation. When the political security situation changed, the work of contingency planning was given a new, wider aim and direction. Today, a number of operators at different public levels work together to build resources in order to meet a threat scenario where there is little risk of war, but where other circumstances have been added.

For a long time, the risk of war was considered the major threat against the Swedish nation. The Swedish Transport Agency and air transport operators were for example tasked with the planning of how these would be able to continue their different activities in a war situation.

The major specification of requirements for a functioning air transport system was formulated by the Swedish defence forces. This stipulated that in the case of war mobilization, thousands of military personnel would gather at airports all over the country for transportation to their respective defensive locations. There would also be a potential need to evacuate people from directly threatened areas to safer places.

SWEDEN'S PREPARATIONS FOR WAR

The task of the authorities included the arranging of capacity to transport 3,000 stretcher patients per day, which was solved by purchasing a large number of stretcher kits which were meant to be installed in aircraft normally operated by SAS and Linjeflyg, in the case of a crisis.

The co-operating participants in the air transport system would be airports, air operators and maintenance facilities. Using legislation that regulates the obligation for manufacturers and businesses to participate in the authorities' crisis planning, these companies or organizations were subsequently designated K-enterprises (meaning that they would be of crucial importance in a war effort).

Ramps and runways were extended at several airports, and hangars were built at airports which were assigned to receive workshops transferred from Stockholm-Arlanda Airport.

Since a war would mean problems with spare parts and components, these were stocked and used on a daily basis, but replenished as needed, which kept the stocks current.

Aviation fuel was stockpiled by locating a large number of fuel tanks at and around airports. An organization to manage fuel rationing was established by the authority in order to handle fuel allocation.

There were exercises and training sessions every year for all involved, often in co-operation with the defence forces.

There was widespread co-operation between the Swedish Transport Agency, central and regional authorities and the industry. In addition to the exercises and training mentioned above, there were annual two-day regional meetings.

The Transport Agency received grants on an annual basis to maintain and develop the crisis management function. These grants were only used to increase the ability to function in a war situation; however, certain measures naturally involved the strengthening of capabilities in peacetime, thereby increasing the society's crisis management capacity.

When the political security situation changed, and the risk of Sweden becoming involved in a war within the subsequent few years was considered very small, the aim and direction of crisis work was changed, consequently the system of K-enterprises was abandoned and the grants were reassigned to improve crisis management capabilities in peacetime.

THE CURRENT TASK FOR THE SWEDISH TRANSPORT AGENCY

In the risk and vulnerability analysis of the air transport sector it has been found that air traffic control towers and centres are vulnerable resources. The Swedish Civil Contingencies Agency allocated funds during the period 2006–2008 to mitigate the vulnerability of prioritised facilities.

ALTERNATIVE AIR TRAFFIC CONTROL TOWERS AS PART OF CONTINGENCY PLANNING

When the funds were granted, the metropolitan areas and the island of Gotland were selected as targets for the effort, and consequently it was planned to supply the airports of Stockholm-Arlanda, Göteborg-Landvetter, Malmö and Visby with standby facilities for their air traffic control towers. The project has been managed as follows at Stockholm-Arlanda:

- A technical group has compiled basic data and equipment for the alternative tower, and is tasked with connecting electricity supply and telecommunication cables to it.

- Another group has developed technical and operation manuals and training procedures for these areas.
- A third group has worked on the security proofing of the mobile tower.

The alternative tower at Malmö Airport was ready in the summer of 2008 and will be operational as soon as the required documentation is completed.

REDUNDANCY BETWEEN THE AIR TRAFFIC CONTROL CENTRES

To reduce vulnerability if one control centre is knocked out, a project has been initiated to create redundancy between the centres. The Swedish Civil Aviation Administration finances most of the project, but the Swedish Civil Contingencies Agency contributes.

AVIATION FUEL TANKS

The Swedish Transport Agency is responsible for a number of fuel tanks that were installed in the 1980s and 1990s as a preparedness measure, but as the defence policy has been changed, these tanks will be dug up and destroyed (this also applies to other items no longer adequate or required). This work will be financed by the Swedish Civil Contingencies Agency.

OPERATIONS CENTRES

A number of operations centres have been prepared at various airports to be used in connection with a crisis. The Swedish Transport Agency is responsible for maintaining relevant aviation personnel current in their positions within these centres. Funds are allocated via the Swedish Civil Contingencies Agency.

CO-OPERATION WITH OTHER AUTHORITIES

COLLABORATION AREA 'TRANSPORTATION'

The Transportation collaboration area consists of the:

- Swedish Rail Administration
- Swedish Energy Agency
- Swedish Transport Agency
- Swedish Maritime Administration
- Swedish Road Administration

which have one representative each in the management group. Representatives from the Swedish Defence Forces, the Ministry of Enterprise, Energy and Communications, the reference group from the local authorities and the county administrative boards are also called to their meetings.

Since 2005, a working group in the field of critical infrastructure has been identifying vulnerabilities and assessing the ability to manage disruptions and threats to the infrastructure of society. The work has resulted in an analytic model based on a pilot study of oil company Preem's two refineries in Lysekil and Göteborg respectively, and the oil depot in Göteborg. The object is to apply this model to other vital transport nodes, and also to determine the basis for a common risk and vulnerability analysis within the area of collaboration.

Within the CBRN area (chemical, biological, radiological and nuclear matters) the co-operation group has concentrated on mapping and strengthening the CBRN capabilities of the various transport authorities. One working group has, together with a defence training organisation, developed a training package for CBRN experts. The training has produced enough experts to supply all the transport authorities in times of crisis.

The Transportation collaboration area has carried out three large-scale studies so far, using three different scena-

rios (snow chaos in Göteborg in 2004, pandemic in Stockholm in 2005 and terror attack including a CBRN event in the Öresund region in 2006). These revealed the following weaknesses in contingency planning: the roles of the authorities; legal matters such as laws and law-making; co-ordinated crisis management; key jobs and common situational awareness. A conference is being planned where the authorities within the collaboration area will, together with industry, discuss how to work together with these factors in a crisis.

COLLABORATION AREA 'PROTECTION, RESCUE AND CARE'

The Protection, Rescue and Care collaboration area comprises the Swedish Civil Aviation Authority, the Coast Guard, the National Police Board, the Swedish Maritime Administration, the National Board of Health and Welfare and representatives of local authorities and county administrative boards.

To improve planning and ensure the taking of appropriate action in the future, the collaboration area has come to a common conclusion on the shortcomings, vulnerabilities and risks which exist within the affected authorities and organizations in respect of the common activities. The study was accomplished using risk and vulnerability analyses carried out by the authorities along with analyses of investigations, reports and results from different working groups. In addition, the collaboration area has carried out various alternative studies, e.g. the Öresund region, where representatives from co-operating authorities in the region gathered to discuss how to improve co-ordination in a crisis situation. The shortcomings, vulnerabilities, risks and experiences have been collated and now form the basis for the common action and co-operation requirements that are present in the collaboration area's planning for 2009–2011. The experience gained has also been communicated to the research in the area.

An investigation was completed on "co-ordinated helicopter support during work under stressful circumstances" which is one of the analyses forming the basis for an ongoing study looking to make the public sector's use of helicopters more efficient.

Another project is the ongoing work to produce a plan for a pandemic situation in the aviation sector. This is designed in accordance with the International Civil Aviation Organization's (ICAO) guidelines.

The collaboration area has carried out basic staff training with excellent results. The ambition is to make this training a model for future, joint public staff training.

The Swedish Transport Agency has also received grants to continue the work on co-ordinating airborne rescue resources from several authorities via seminars and exercises.

The Aeronautical Rescue Co-ordination Centre (ARCC) has, together with the Maritime Rescue Co-ordination Centre (MRCC) carried out a practical exercise in their joint redundant facility, and made an analysis of shortcomings and suggested improvements to the facility.

The task for the authorities is to co-ordinate crisis management work. However, when all is said and done, the responsibility to protect one's own activity/facility rests with each and every operator in the field. For the years to come, the efforts of the Swedish Transport Agency will increasingly aim at offering training and exercises utilising existing resources.

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Interview: Eva-Mari Löfqvist

SNAM – A UNIQUE NATIONAL RESOURCE

In recent years there have been two occasions when there was a need for large scale evacuation of Swedes by air from disaster areas in foreign countries, the first as a result of the Asian Tsunami tragedy of 2004 and more recently during the Lebanese crisis of 2006. In both cases the Swedish National Ambulance flight unit (SNAM) was used.

SNAM traces its origin from the transport system developed within the civil defence organisation, of which SAS and Linjeflyg belonged as K-enterprises (meaning that they would be crucial in a war effort).

Aircraft normally used in scheduled traffic would be converted to medical evacuation (Medevac) configuration to transport injured persons in a war situation. The conventional passenger seats would be removed and replaced by military stretcher kits.

INCREASED NEED FOR ADVANCED MEDEVAC SERVICES

When the threat scenario changed and the security concept expanded during the 20th century, a requirement to improve the Medevac system capability in peacetime accidents was identified. An example of the need for a specific type of air ambulance transport was the 1998 fire in a Göteborg discotheque, when it was imperative to transport a large number of people with burns to hospitals in all the Nordic countries.

As a consequence of this tragedy, the SNAM project was initiated by the Swedish Civil Aviation Authority on 1st July 2001, and financed via the Swedish Emergency Management Agency. The SNAM system has been verified in the Barents Sea Rescue exercise off northern Norway; since when three more such exercises have taken place.

The joint efforts in expanding the SNAM system have led to a point where Sweden has a valuable asset in the form of a Boeing 737-800 aircraft equipped with advanced Medevac capability, which can be used to transport injured and sick people from major accidents, disasters or terrorist attacks. One of SNAM's objectives is to add another aircraft to the system.

A FLYING HOSPITAL IN SIX HOURS

Further to a purchasing procedure, the Swedish Transport Agency came to an agreement with SAS according to which SAS will convert their Boeing 737-800 aircraft to a Medevac configuration, consisting of 6 intensive care places, 6 stretcher bays and around 20 passenger-seats for slight injuries and dependants while there is a request for a SNAM operation. This conversion can be accomplished in less than 6 hours!

The Medevac team consists of the standard flight crew, 8 medical doctors, 11 nurses, a SNAM representative, a medical technician, a flight engineer and a so-called turnround co-ordinator. The concept is unique, in that it does not require the aircraft to be modified in advance, thereby providing a larger selection of available aircraft and increased preparedness.

As far as medical treatment goes, the Medevac team consists of volunteers in combination with recruitment, which avoids a costly standby system for medical personnel. A new law concerning Medevac services abroad was introduced on 1st September 2008 that makes it possible for county councils to provide medical treatment abroad when a major accident or disaster involving Swedish nationals has occurred.

HOW SNAM WORKS

DECISION-MAKING PROCEDURE

When a major accident or disaster has occurred necessitating large scale Medevac efforts, SNAM can be activated after inquiries are made to the Swedish Transport Agency, asking if it is possible to use the system. The Agency has personnel on call around the clock all year round to receive such inquiries and obtain the basic data required for a decision. The Agency will initiate and lead the operations.

The appropriate possibilities and limitations regarding such operations are checked by the SNAM members. If it is possible to go ahead, the contribution is desired and there is financing available, the Agency may, in consultation with the Swedish civil contingencies agency, the National Board of Health and Welfare, and the others, decide to initiate the Medevac contribution.

EQUIPMENT IN THE AIRCRAFT

After a decision by the Agency to initiate the SNAM operation, it takes about six hours to modify the aircraft to an advanced Medevac configuration. The work is performed at Stockholm-Arlanda Airport and includes removing most of the passenger seats, and replacing them with stretcher kits. Six of the treatment positions are designated for intensive care, where mobile Micu stretchers are used which can be lifted in and out of the aircraft easily. These are equipped with batteries which make it possible for the patient to remain on the same stretcher between local and distant hospitals, where ongoing treatment will continue. There are also six stretchers for those with less serious injuries along with seating for relatives.

While the reconfiguration of the aircraft is in progress, medical personnel make their way to Arlanda from various locations in Sweden, and the Västerbotten County Council assumes responsibility for ensuring that members of the medical team have the appropriate skills and competence required for the particular mission.

OPERATIONS CENTRE AT STOCKHOLM-ARLANDA AIRPORT

The Swedish Transport Agency, assisted by representatives from SAS and the Västerbotten County Council, controls the operations centre at Arlanda.

MEDEVAC TEAM

The onboard team will have had substantial experience in their respective areas of work, and normally work at various hospitals in Sweden. Their experience is also supplemented by training in their particular roles in the aircraft and familiarity with the equipment.

THE TSUNAMI IN SOUTHEAST ASIA AND THE LEBANON CRISIS

SNAM staff have been used to evacuate Swedish citizens on two occasions during the development phase of SNAM.

Experience from the 2004 tsunami in South East Asia proved that it was possible to evacuate people from Thailand even before the completion of the SNAM project. The mission was executed without the intensive care stretchers (which were under construction at that time) so existing stretchers were used; however, they were not certified for use in Boeing 737-800 aircraft. The evacuation was therefore accomplished using an MD-80 aircraft from SAS, complete with SNAM medical personnel onboard. The experience showed that SNAM-trained staff could be deployed at short notice.

During the Lebanon crisis, the team was complemented by SNAM medical personnel, and, in the period 19th–25th July 2006, almost 7,500 Swedish citizens were evacuated by 53 aircraft, chartered by the Swedish Foreign Office. SNAM medical teams manned 24 of these; in addition there were 10 aircraft from the Skåne region, each equipped with medical personnel and those returning from the Swedish Rescue Services Agency support team. More than 8,400 persons were evacuated from a Lebanon at war, with most of the flights flying to Sweden via Cyprus, Syria, and Turkey. The Swedish foreign minister at the time pointed out that Sweden received many very positive remarks from the international community.

Since this article was first published, SNAM has been activated on one more occasion, namely in connection with the evacuation of EU citizens from Mumbai in November, 2008.

Helge Brändström, medical expert within SNAM, and chief surgeon of anaesthetics and intensive care at the Västerbotten county council.

SNAM EXPERIENCE

In the words of Helge Brändström (see photo above), "the primary benefit of the SNAM system is that it can be used in different configurations, depending on varying scenarios and degrees of injury. The medical staff members, who are trained and equipped for missions with the SNAM aircraft, can also be used for air transport of slightly injured persons or for large-scale evacuations".

Experience from the tsunami and the Lebanon evacuation showed the benefits of having competent medical personnel with good knowledge of aviation medicine and well prepared drug and equipment lists. The knowledge of "aviation" medicine is crucial in order to decide which patients can fly or not, and which risks are associated with an aircraft environment.

Examples of situations when special consideration must be given is in the case of patients with head injuries, or injuries to the chest, preventing the lungs from functioning correctly, consequently causing breathing problems.

If we had not gained that kind of knowledge prior to the tsunami evacuation, we may have made mistakes, as well as having felt more uncomfortable in our roles.

This knowledge of "aviation" medicine is also important for large scale evacuation by air in a crisis situation such as Lebanon for example. Part of the SNAM personnel training involves the identification of conditions that could worsen during a flight, one example being epilepsy, where the lower oxygen content in the cabin, as well as the noise from the engines, creates an increased risk of spasms.

Another consideration gained from the tsunami and Lebanon evacuation experience showed the advantage of wearing uniforms or attire that distinguished SNAM staff, coupled with an ID badge depicting their respective country of origin.

Helge Brändström confirmed the above by stating "wearing identical clothes and an ID badge, the personnel involved are easier to find in large crowds and they attain a certain formal status. This facilitates our work during different types of evacuation".

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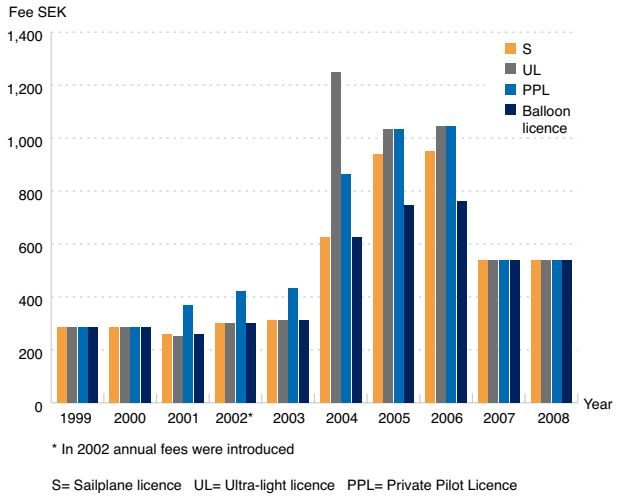
FEES FOR GENERAL AVIATION

The conditions for general aviation have changed considerably over the years, and regulations have gone from being national, with overall requirements, to being common, harmonised European regulations, demanding more follow-up by the appropriate civil aviation authority. At the same time new types of ultra light aircraft (UL) have entered the scene and many of these have different characteristics to older aircraft. One example is lower operating costs per flight hour, so not only UL pilots use these aircraft, many PPL holders do as well.

OTHER REASONING BEHIND NEW FEES

The development of non-commercial pilot licence fees are shown in Figure 1 below:

FIGURE 1 Licence fees



The new regulations demanded increased follow-up on the part of the authority, so when it came to the handling of licenses, this resulted in the creation of working and reference groups, consisting of appropriate parties which charged fees for licensing and airworthiness activities, with an objective of outlining the fees for 2004 (the same format was used to establish the fees for 2005).

The intention was to make fees more transparent, highlighting the authority's own costs as well as the attendant costs incurred by accident/incident investigations, and the authority's costs for increased workload created by the new groups. Financing of the latter used to consist of funds transferred from the fees paid by commercial operators, who had always accepted this; however, in the early 2000s this acceptance ceased, as they came to the conclusion that all concerned parties must finance their own costs.

Comprehensive analyses were made (in conjunction with presentation of the new licensing fees) of how much time was spent on the handling of licenses, and how this affected the costs that had to be recovered. These handling charges were added to actual costs incurred when renewing a license, which were considered payable by all pilots collectively:

- Charges for special handling for pilots with medical conditions where, in some cases, external experts had to be consulted;
- Costs for the systems and their maintenance, as well as designing new forms;
- Costs for telephone time/telephone service/counselling.

The cost incurred for additional work (delegated by the authority, but performed by the new groups) was added, as was the Swedish Accident Inquiry Board annual cost for licenses.

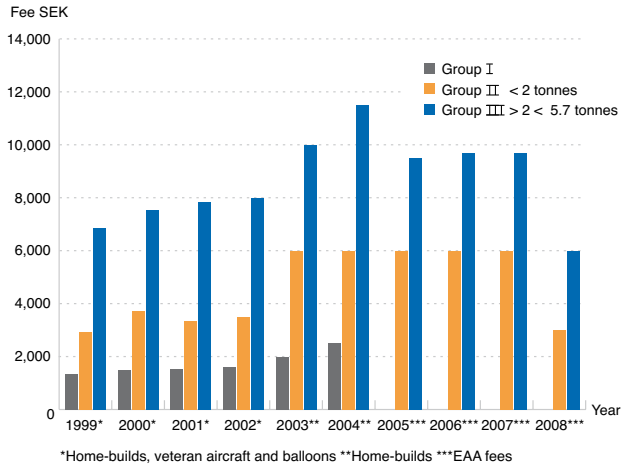
In 2004, the UL license annual fee increased against the background of many accidents with this aircraft category. This led to UL pilots carrying a larger share of the accident inquiry board costs, compared to other pilots. This situation was resolved with the introduction of new fees in 2005, equalizing the costs for UL and PPL pilots.

During 2007 and 2008, a review was carried out in respect of the Agency's direct fees, that encompassed several of the Agency's product areas, and aimed at recovering the costs for each product area. As for the licensing fees, these were reviewed in 2007, resulting in a reduction of the fees to a level which covers the Agency's true costs for the work. Attendant costs are no longer added to the licensing fees.

CERTIFICATES OF AIRWORTHINESS (C OF A) WITHOUT EXPIRY DATE

The changes in airworthiness fees over the past ten years are shown in Figure 2.

FIGURE 2 Airworthiness fees



The airworthiness fees for aircraft less than 2 tonnes, i.e. that group of aircraft mainly used within general aviation, were raised in 2003 by SEK 2500 per year and remained constant until 2007. The reason for the increased fees was to reflect the Agency's costs for the follow-up, and to show transparency.

On 28th September 2008, new regulations relating to renewal of airworthiness certificates were imposed, requiring airworthiness certificates to be issued without an expiry date.

A national Airworthiness Review Certificate (ARC) authenticating renewal of an aircraft's airworthiness and valid for 1 year, will be issued by Certified Air Maintenance Organisations (CAMO) to the C of A. Since the Agency no longer issues this annual certificate, the fees have been adapted to reflect this situation by lowering them in 2008, although the Agency's costs for its share of the follow-up work are still included.

STATISTICS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POLITICAL GLOBE
LEGEND
National Capitals
Other Cities
Statute Miles
UNITED STATES
MEXICO
GULF OF MEXICO
ATLANTIC OCEAN
PACIFIC OCEAN
Seattle
Portland
San Francisco
Los Angeles
Phoenix
Houston
New Orleans
Havana
Puerto Vallarta
Mexico City
Honolulu
Hawaii
Bermuda
CUBA
JAMAICA
HAITI
BELIZE
HONDURAS
GUATEMALA
EL SALVADOR
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GALAPAGOS ISLANDS
PERU
Equator

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PASSENGER DEVELOPMENT 2008

Just over 28 million passengers travelled to/from airports in Sweden during 2008. Compared with 2007 this is an increase of 3.4 per cent, equalling about 900,000 passengers. International traffic increased by 5.2 per cent, to about 21 million passengers; domestic traffic decreased by 2.2 per cent and amounted to just under 7 million passengers. The increase rate in international traffic is the lowest since 2004; domestic traffic shows a downward trend.

One of the major events in 2008 was the bankruptcy of Sterling Airlines which served international as well as domestic routes; Malmö Airport and Stockholm-Arlanda were hit the hardest. Norwegian took over some of Sterling's destinations, and both SAS and Malmö Aviation increased their capacity on their routes to Malmö and Göteborg.

24 out of 41 Swedish airports showed an increase in traffic during 2008; in 2007 there were 29 showing an increase. Among the larger airports, Stockholm-Skavsta had an increase of 24 per cent which took it past the two-million passenger mark. Malmö Airport dropped by about 6 per cent, Göteborg-Landvetter by about 1 per cent; Stockholm-Arlanda increased by about 1 per cent. The drop at Malmö is partly explained by Sterling's bankruptcy. Stockholm-Arlanda's marginal increase is roughly on a par with the other Nordic capital airports; Helsinki is in the lead with just above 2 per cent, Oslo shows 1.6 and Copenhagen 0.6 per cent.

Among the smaller airports – Mora, Torsby, Norrköping – showed large increases during 2008. Mora has benefitted from the tourist traffic from the south to the Sälen mountain resort area. Norrköping has established scheduled services to Helsinki and Munich; this, together with more charter services, has produced the largest increase, expressed in percentages, of all Swedish airports during 2008.

When looking at the densest domestic routes to and from Stockholm, only 3 out of 10 routes show an increase during 2008. The most positive development was shown on the routes Stockholm–Luleå (9.7 per cent), Stockholm–Skellefteå (4.2) and Stockholm–Umeå (1.3). The worst result was that of the Stockholm–Sundsvall route (minus 12.8 per cent).

Among the countries served internationally from Sweden in 2008, Germany received the largest number of passengers, 1.3 million, which equals an increase by almost 8 per cent over 2007. This increase is partly a result of added capacity and destinations by low-cost carriers, partly by Frankfurt serving as a major transfer airport for international traffic due to the far-reaching cooperation between SAS and Lufthansa. Italy, one of the countries with high passenger figures from Sweden, had the largest relative increase, 12.6 per cent. Two other countries with traditionally high passenger figures, Greece and Finland, experienced large drops during 2008.

LANDINGS, SEATS AVAILABLE AND CABIN LOAD FACTORS

The number of landings (passenger traffic) was almost 231,000 during 2008, an increase by about 3 per cent over 2007. The number of domestic landings dropped by 1 per cent while international landings increased by 7.5 per cent.

The number of available seats was more than 41 million during 2008 – about 2.8 million more than in 2007. Available seats can be regarded as a measure of the total supply available from the airlines. International supply increased by 10 per cent while domestic supply dropped marginally, remaining practically constant.

The cabin load factor, which is a measure of how many of the available seats are occupied by paying passengers (expressed in percentages), was average about 68 per cent in 2008, 2.9 percentage points lower than in 2007. International traffic showed 69.5 per cent cabin load factor while domestic traffic showed 64.7 per cent.

TICKET PRICES

Statistics Sweden checks air ticket prices in Sweden every month. Ticket price is one component in the larger and more well-known Consumer Price Index and therefore targets "private" passengers only. According to Statistics Sweden the price level in 2008 for charter tickets has been lower compared with 2007 during all months but December. Scheduled ticket prices have not shown the same favourable development as charter prices, but have been higher than in 2007 during the summer and autumn.

As far as ticket price development is concerned the Swedish Transport Agency makes its own calculations based on information from the airlines. Domestic ticket prices were lower until August compared with the same period in 2007; during the rest of the year the prices increased rather sharply and climbed above the 2007 level.

SWEDISH AIRPORTS

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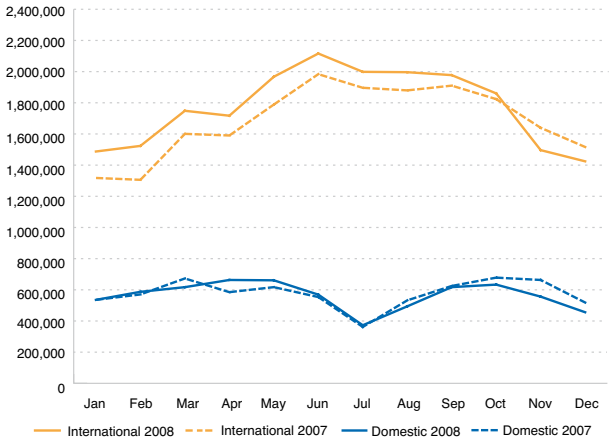
Traffic development 2008

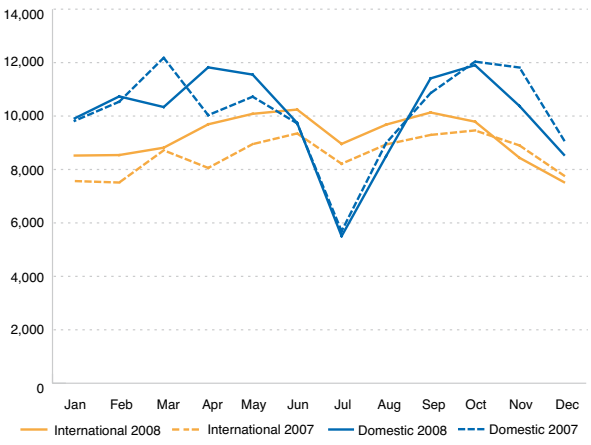
Number of arriving and departing passengers at Swedish airports with scheduled and non-scheduled traffic in 2007 and 2008.

Airport	2008	2007	Change	Change, %
Arvidsjaur	57,381	50,381	7,000	13.9%
Borlänge	36,620	33,841	2,779	8.2%
Gällivare	38,942	51,637	-12,695	-24.6%
Göteborg-City	842,120	743,809	98,311	13.2%
Göteborg-Landvetter	4,300,113	4,353,304	-53,191	-1.2%
Hagfors	2,744	2,455	289	11.8%
Halmstad	113,501	114,864	-1,363	-1.2%
Hemavan	17,666	19,034	-1,368	-7.2%
Jönköping	76,611	107,059	-30,448	-28.4%
Kalmar	177,734	174,107	3,627	2.1%
Karlstad	118,762	119,482	-720	-0.6%
Kiruna	207,431	191,857	15,574	8.1%
Kramfors	14,787	26,153	-11,366	-43.5%
Kristianstad	58,654	65,639	-6,985	-10.6%
Linköping	82,523	72,011	10,512	14.6%
Luleå	995,300	930,169	65,131	7.0%
Lycksele	25,564	26,929	-1,365	-5.1%
Malmö Airport	1,747,483	1,867,737	-120,254	-6.4%
Mora	8,390	5,918	2,472	41.8%
Norrköping	113,246	87,518	25,728	29.4%
Oskarshamn	13,338	12,421	917	7.4%
Pajala	2,749	2,456	293	11.9%
Ronneby	206,932	219,852	-12,920	-5.9%
Skellefteå	241,848	235,782	6,066	2.6%
Stockholm-Skavsta	2,479,646	1,994,512	485,134	24.3%
Stockholm-Västerås	186,612	178,741	7,871	4.4%
Stockholm-Arlanda	18,106,877	17,878,124	228,753	1.3%
Stockholm-Bromma	1,852,715	1,802,584	50,131	2.8%
Storuman	10,577	12 501	-1,924	-15.4%
Sundsvall-Härnösand	303,636	336,333	-32,697	-9.7%
Sveg	5,332	4,629	703	15.2%
Torsby	3,377	2,457	920	37.4%
Trollhättan-Vänersborg	55,049	61,762	-6,713	-10.9%
Umeå	823,159	811,363	11,796	1.5%
Vilhelmina	16,039	16,293	-254	-1.6%
Visby	324,347	317,558	6,789	2.1%
Växjö-Kronoberg	179,799	169,512	10,287	6.1%
Åre-Östersund	383,504	374,426	9,078	2.4%
Ängelholm	391,780	394,930	-3,150	-0.8%
Örebro	69,950	84,453	-14,503	-17.2%
Örnsköldsvik	144,975	132,557	12,418	9.4%

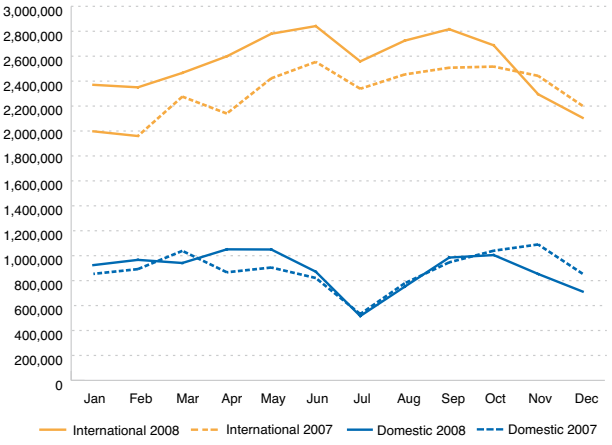
Number of scheduled and non-scheduled passengers at Swedish airports in 2007 and 2008



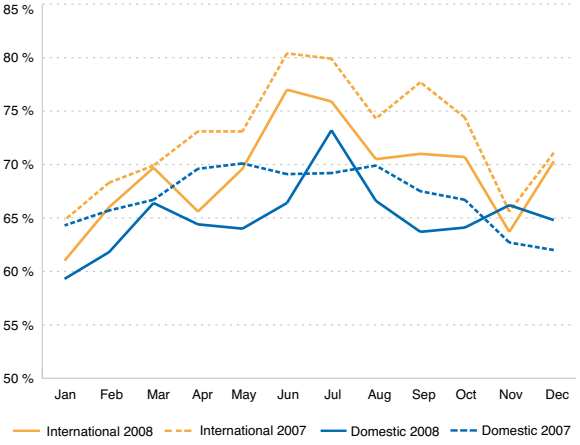
Number of scheduled and non-scheduled landings (only passenger flights) at Swedish airports in 2007 and 2008



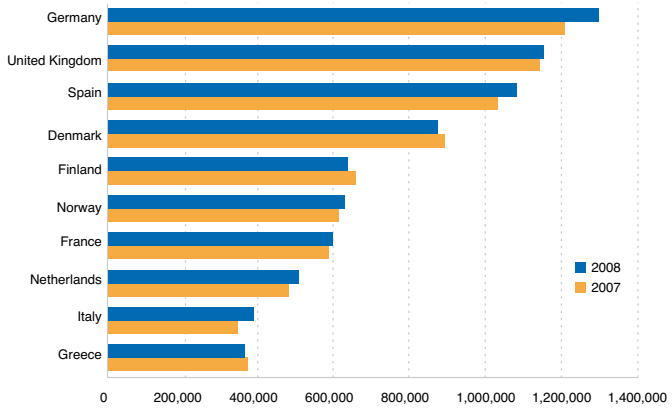
Number of available seats in scheduled and non-scheduled traffic at Swedish airports in 2007 and 2008



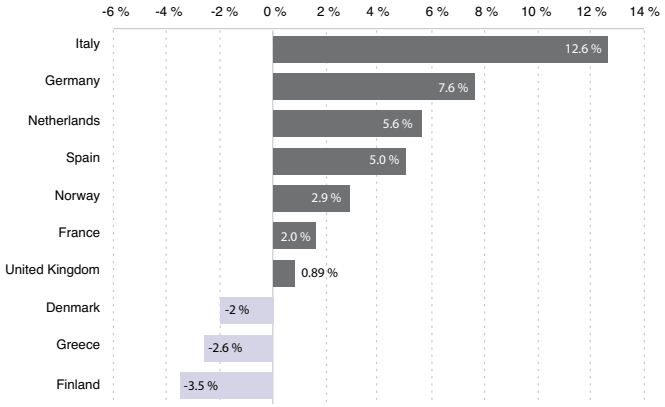
Development of passenger load factor in scheduled and non-scheduled traffic in 2007 and 2008



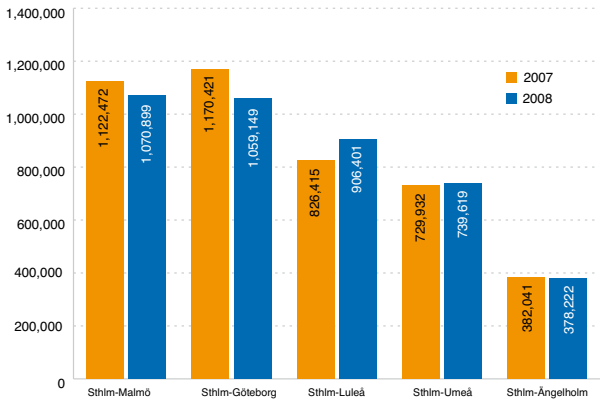
Number of departing passengers from swedish airports, top ten countries (first destination) in 2007 and 2008



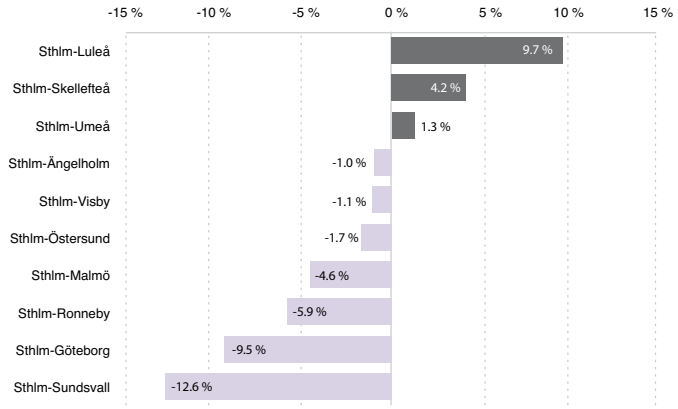
Relative change in the number of passengers travelling to the top ten countries 2008



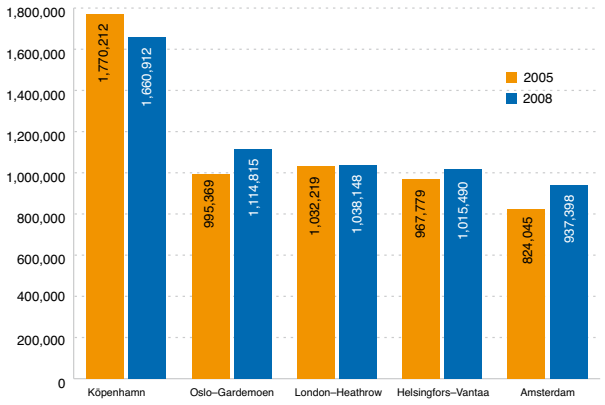
Number of passengers on the five major domestic routes in 2007 and 2008



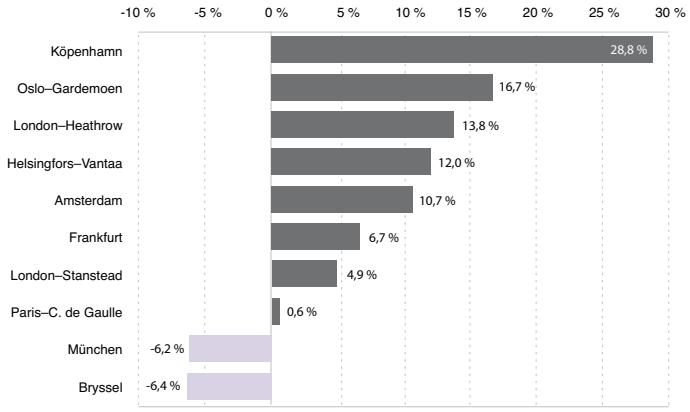
Relative change in the number of passengers at the ten major domestic city-pairs in 2008



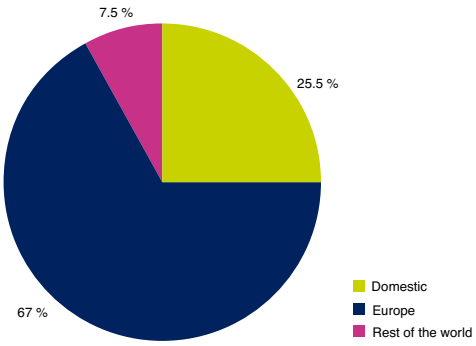
Number of passengers at the five major international routes in 2007 and 2008



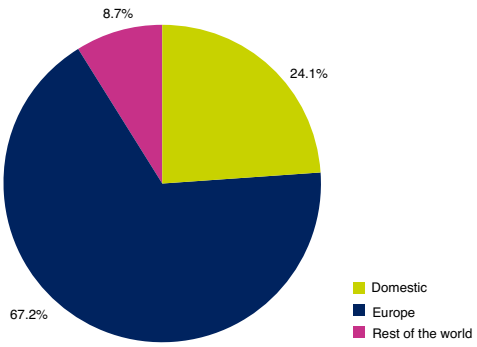
Relative change 2007–2008 in the number of passengers on the ten major destinations



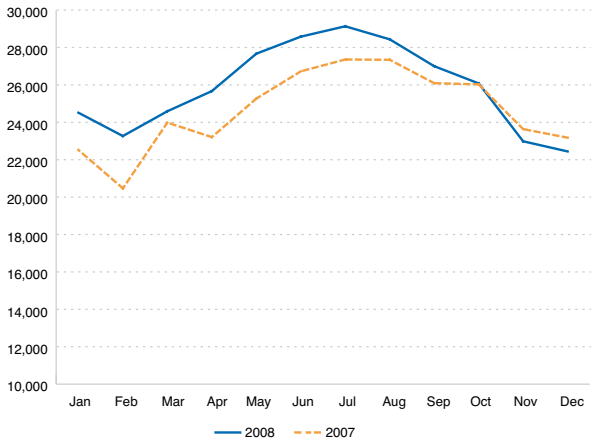
Passengers divided by region during 2007 (first destination)



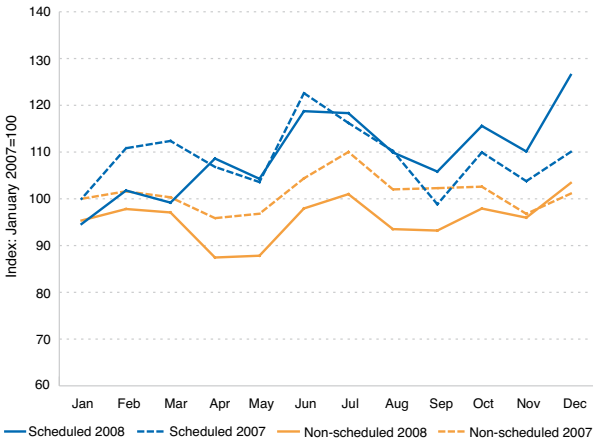
Passengers divided by region during 2008 (first destination)



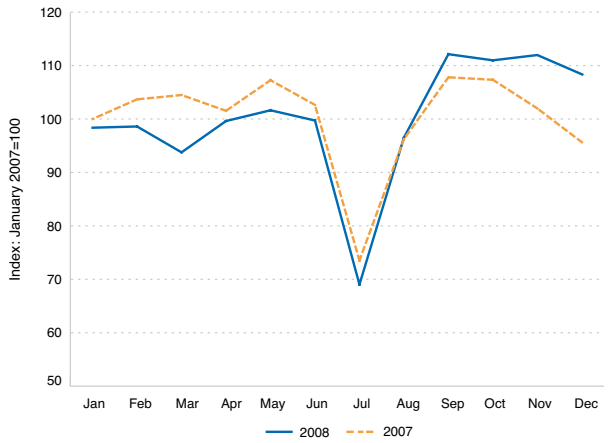
Number of overflights in controlled airspace in 2007 and 2008



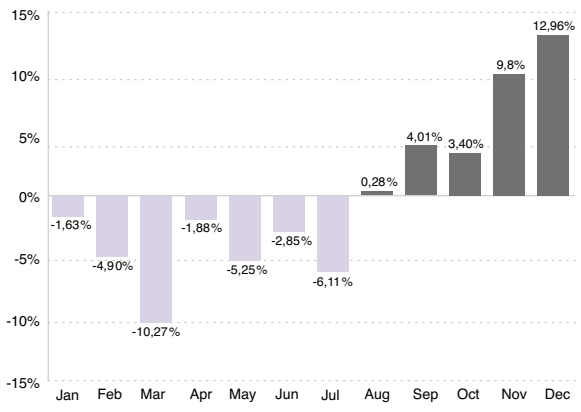
Passenger price index for international flights in 2007 and 2008 according to Statistic Sweden, fixed price level

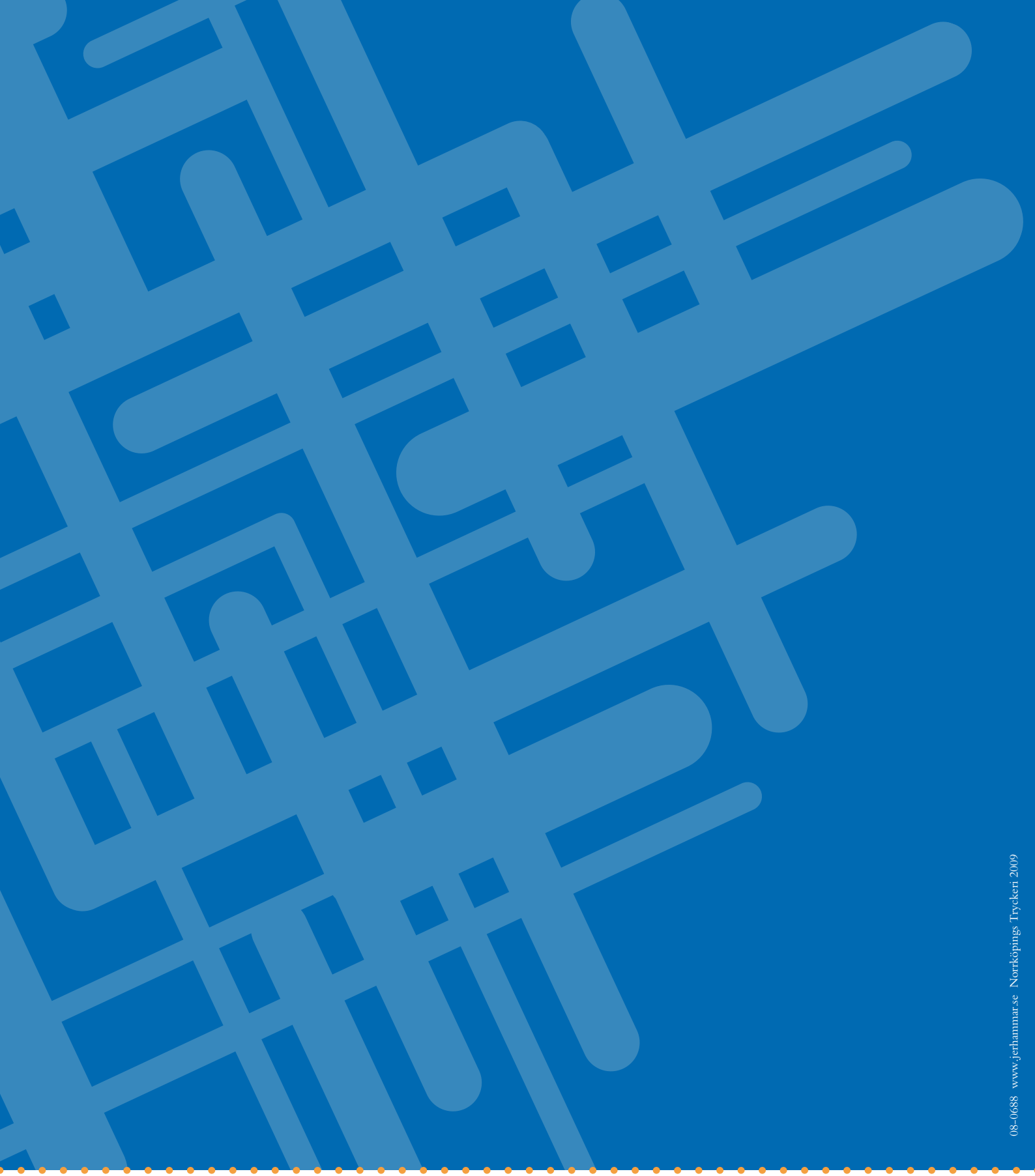


The actual development of ticket price for domestic passenger traffic in 2007 and 2008, fixed price level



Actual ticket price changes for domestic traffic per month in 2008 (compared with the same month previous year), fixed price level





08–0688 www.jethanmar.se Norrköpings Tryckeri 2009

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