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Shift potentials of night flights at the airport Frankfurt*)

by

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Table of contents

Introduction

The preliminary ban of night flights at the airport Frankfurt decreed by the Hessian administrative court, effective as from November 1, 2011, has raised a debate about possibilities to shift planned night flights from the airport Frankfurt. The present paper will go into this question. To this end, at first the notion of airfreight will be critically analyzed and the different segments of airfreight will be discussed. Then, suggestions of how to shift night flights from Frankfurt will be developed. Up to now, public perception has always seen airfreight as linked to particularly urgent shipment of freight. For instance, in April 2010, Markus Pauly, commercial manager of the hub Frankfurt, lectured at the IHK[1] economic forum of the city of Frankfurt on the particular need of express transport of belly freight. The present study, however, will show that in the freight segment of general cargo house-to-house delivery takes an average of six days, so that you cannot really talk about any pronounced urgency in this segment.

The production of air traffic services

The production of air traffic services is characterized by the following specific features:

- **Fragmentation** of suppliers. Almost every state worldwide entertains a governmental airline (flag carrier) to underline its sovereignty (Dienel 1998). This results in a broad supply of airlines with mostly only a small capacity in the airfreight market. In the European Union, the process of privatization and concentration of the flag carriers into few big firms is advancing only slowly. The Belgian airline Sabena disappeared from the market. The Dutch KLM merged with Air France, the majority of which is still owned by the state. In the European Union, the big airlines like Lufthansa, Air France-KLM, Iberia, and British Airways are no longer government-owned.

- **Governmental subsidies**. Many states subsidize their national carriers since they want to see this sign of their national autonomy being preserved. Both open and hidden subsidies are common practice in the majority of the states, which in Europe became particularly obvious in the wake of September 11, 2001. Contributions to Swiss Air and Alitalia in 2004 further highlight this fact. Besides, in the USA, the airlines under competition protection (US-chapter 11) are to be taken into account. State subsidies result in a distorted competition of services, the prevention of economically necessary eliminations from the market, and in the development of global excess capacities. So, in 2001, the airlines associated in IATA reached only a weight load factor of 67.8% for freight-only aircrafts (IATA 2002, p. 17).

- **Bilateral air traffic agreements**. Governmental regulations and traffic rights in international traffic lead to restricted market access. Air traffic agreements are made only bilaterally,

[1] IHK = Industrie- und Handelskammer, the German chamber of industry and commerce

between two respective states. This leads to uneconomic commuting traffic with mostly unbalanced utilization of the two relations ("unpaired traffic"). An improvement of the weight load factor by means of flights with a stopover in third countries is prevented by the bilateral agreements. The airlines have to help themselves out by flying under traffic rights of cooperating airlines.

- **Restricted market access**. Although the air traffic markets in the USA and the EU have already been partly liberalized, barriers to market access continue to exist – like landing rights of third countries, national restrictions in the owner structure of the airlines[2], and prerogatives of (former) flag carriers with respect to granting starting and landing rights (slots) and to establishing handling terminals in the airports. So, for instance, British Airways holds 46% of the time slots in the airport London Heathrow.

With respect to the freight transported, IATA statistics distinguish domestic traffics and trans-boundary, international traffics. While in Europe with its comparatively short domestic distances domestic traffics only play a role for peripheral source or target areas, they are of high importance in countries with large extensions, like the USA, Russia, China, India, Brazil, and Australia. So, the traffic within North-America has five times the volume of intra-European traffic, the predominant part of which, moreover, is transported as airfreight per truck (Conway 2003). In the USA, domestic traffic is above all performed by the networks of the parcel service providers (UPS, FedEx). Therefore, the airport Memphis of FedEx ranks highest among the freight airports worldwide. According to IATA statistics, the ratio of airfreight transported internationally and transported domestically, measured in tons transported (**traffic volume**), is about 60:40. In the IATA statistics, freight and postal consignments are treated separately. The share of postal consignments in international freight traffics, measured in tons transported, amounts to about 1%. Further important variables in the IATA statistics measuring the **traffic performance** are ton-kilometres offered or transported regarding freight (F-TKO or F-TKT) or regarding freight and postal consignments (FP-TKO and FP-TKT) as well as total ton-kilometres offered or transported, including the weight of passengers and luggage (TKO and TKT). The weight load factor is calculated as percentage from the ratio of ton-kilometres offered to ton-kilometres paid (IATA 2001, p. 207). For an evaluation of the economic situation of the airlines, data on weight load factor and yield are relevant. Yield is defined as the average profit per sold service unit. Service units may relate to weight (actual weight or chargeable weight) or also to ton-kilometres offered (TKO) or ton-kilometres transported (TKT). In the analyses of MergeGlobal, moreover, intercontinental flights are distinguished from flights in a region (a continent or a delivery region like Asia-Pacific) (Clancy and Hoppin 2004). The following figure 1 depicts the delivery flows among the continents:

[2] According to the German 'Luftverkehrsnachweissicherungsgesetz' (law on ensuring air traffic evidence), Lufthansa is obliged to publish every three months an owner structure, subdivided according to nationalities, so as to prove that the enterprise is under German or European control, respectively, as it is required by bilateral air traffic agreements and EC-guidelines.

Figure 1: Airfreight-related transport performance among delivery regions in 2004, in billion F-TKT. The figures in the circles signify transports within the region (source: Clancy and Hoppin 2005).

Europa	Europe
Lateinamerika	Latin-America
Afrika	Africa
Mittlerer Osten	Middle East
Asien/Pazifik	Asia/Pacific
Nordamerika	North-America

The airfreight volume of the carriers is to be distinguished from the freight statistics of the airports. There, freight and postal consignments arriving by planes and departing by planes are recorded, so that transit freight is counted doubly. Besides, arrivals and departures of road feeder freight (see below) are counted as airfreight and are hence doubly recorded as transit freight.

Airfreight is – apart from charter traffics – mainly transported via the global **networks** of planned scheduled flights set up by the airlines. Alliances of airlines allow to combine the capacities of the individual lines and hence to increase accessibility and to more densely mesh the network. So, for instance, Lufthansa Cargo together with Singapore Airlines Cargo, Japan Airline Cargo and SAS Cargo founded the alliance **WOW**. With 43 cargo aircrafts and 760 passenger aircrafts, WOW accesses 523 target airports worldwide, with a homogeneous concept:

- one contractual partner and contact over the whole transport distance,
- complete information about the status of freight shipment,
- equal quality standards with all four partners.

Similarly, Air France Cargo leads the alliance **SkyTeam** Cargo with AeroMexico Cargo, Alitalia, CSA, Delta, and Korean Air. Airfreight forwarders, however, criticize that the alliances still lack a concerted presence and that it is still the individual carriers which have to be contacted (Karp 2004).

Air traffic can be differentiated with respect to the types of aircraft used (depending on the respective goods transported). The airlines with a priority on passenger transport convey additional freight as extra load in their passenger aircrafts. The freight is transported in the lower deck, together with the passengers' luggage, in containers especially adapted to the shape of the body (unit load devices), while passengers are transported in the main deck. Airfreight is hence a **couple product** of passenger transport.

Somewhat imprecisely, the lower deck is also called "belly". As freight is transported in the belly of the airplanes, this type of aircraft is also called **belly aircraft**, and accordingly, airlines with only belly aircrafts at their disposal are called belly carriers (for belly freight, see Alram 2011). According to type of aircraft and with an assumed passenger load factor of 100% and corresponding volume of luggage, the loading capacity of belly aircrafts ranges from 1 t in smaller planes up to 15 t in a B747-400 with a

cargo space of 72 m^3. The disadvantage of belly aircrafts is that dangerous or bulky goods cannot be transported in the lower deck.
Belly freight capacity allows the carriers to make use in their capacity offer of the dense network of passenger connections in the regular service of airline alliances. In that way, also destinations with low traffic volume, for which otherwise a charter flight would be necessary, are accessible for airfreight. Economic use of freight-only aircrafts in regular service is only possible for destinations with a high volume of airfreight. **Freight-only aircrafts** are exclusively used by airlines for which airfreight is an autonomous business field (e.g. LH Cargo). The volume of useful load in freight-only aircrafts is 15 t in a Boeing B737, 122 t in a Boeing B747, and 250 t in an Antonov AN225. Due to volume limitations, however, these volumes of useful load are not always reached in practice. The following table shows the four size categories into which, according to Boeing data, cargo aircrafts are subdivided and names some aircraft types in these categories.

Table 1: Classification of cargo aircrafts into four size categories

small **below 30 t**	**Medium standard body** **30 to 50 t**	**Medium wide body** **40 to 65 t**	**Large** **more than 65 t**
Boeing 727 Boeing 737 DC-9/MD80 BAe 146	Boeing 757 Boeing 707 DC-8	Boeing 767 A300/A310 DC-10-10 L-1011	Boeing 747 MD-11 DC-10-30 A380 AN 225

Regarding the use of belly aircrafts or freight-only aircrafts for global freight transport, there are IATA statistics for 2002 (IATA 2003, p. 25f), which lead to the following table 2:

Table 2: Share of freight-only aircrafts in 2002

	Domestic	**International**
total freight in million t	12.6	18.8
of it transported in freight-only aircrafts, in million t	7.8	9.7
share of freight-only aircrafts in %	62	52

This table shows that in domestic traffic, freight-only aircrafts are used for 62% of the tonnage transported, in international traffic for only 52%.

IATA statistics also allow to represent the capacity used in belly aircrafts and in freight-only aircrafts for individual airlines. In 2001, for instance, LH Cargo transported the total volume of 1.058 million tons of cargo – 55.7% of it in freight-only aircrafts and 44.3% in belly aircrafts (IATA 2002, p. 109). Table 3 below shows a classification of freight-only aircrafts worldwide according to loading capacity and their use in international traffic.

Table 3: Number of cargo aircrafts worldwide according to loading capacity and use in international traffic (source: Clancy and Hoppin 2004)

Loading capacity in tons	Number of freight aircrafts worldwide	of them used in international traffic
> 80	287	268
60-80	232	96
40-60	487	487
25-40	153	27

A minor share of the global freight capacities is offered by **combi-aircrafts**, which do not only transport freight in the lower deck but also in a separate cargo space in the rear part of the main deck. Furthermore, Boeing B737 QC ("Quick Change") offers the possibility to reset its interior within about 45 minutes from the passenger version to the freight version by removing the seats.

The question whether air transport is more cost-effective by means of belly aircrafts or freight aircrafts is assessed controversially. The consulting firm MergeGlobal, specialized in airfreight, sees freight aircrafts as the more expensive solution (Clancy and Hoppin 2004). An argument in favour of this view is the fact that there are excess capacities in the passenger sector, which makes discounts in the belly sector probable. Moreover, the couple product belly freight can be calculated with a partial-cost approach. For Lufthansa, Pauly (2010) states that only 5% of its profits are obtained by belly freight.

If it is true that freight aircrafts are the more expensive solution, the existence of freight aircraft carriers can only be explained by the following arguments:

- The capacity of belly freight offered for certain routes is insufficient.
- With pure cargo lines, a decoupling of air freight from the schedules of the passenger carriers and a separate design and optimization of cargo logistics is possible. For instance the parcel service providers UPS and FedEx make use of this possibility by means of own cargo fleets. The time rhythm of belly freight, in contrast, is linked to the schedules of the passenger carriers. At the airport Frankfurt, e.g., there is a wave of departures towards North-America in the morning and one towards Asia in the evening.

IATA statistics on airfreight traffic (IATA 2001) only reflect the airfreight volume of IATA carriers. Companies providing custom-tailored special airfreight services with chartered cargo aircrafts – e.g. individual flights with full capacity utilization for large-scale senders[3] – are not registered.

[3] "wet leasing" including crew, insurance, maintenance

Air cargo business fields

The notion of airfreight refers to different fields with different business models and forwarding times. They are represented in table 4 below:

Table 4: Airfreight business fields

	Forwarding time in Europe, house-to-house	**Forwarding time worldwide, with intercontinental flight, house-to-house**	**Main sites**
Express freight parcels of up to 30 kg integrators	2 – 3 days	2 – 5 days	Cologne/Bonn: UPS, FedEx Halle/Leipzig: DHL
General cargo by 80% parcels of up to 30 kg, but also big and heavy goods	of minimal relevance	6 days on average	hub in Frankfurt
Special freight living animals, perishable goods, refrigerated goods	special delivery chains, largely for import logistics	special delivery chains, largely for import logistics	hub in Frankfurt
Charter flights loads of up to 100 t	project business	examples: petroleum equipment, humanitarian aid	Cargolux, Luxemburg any airport with 3km runway not depending on hub structure
Charter flights loads of up to 5 tons of freight, airfreight taxi	6 – 12 hours		start from landing fields with 800m runway not depending on hub structure

The different airfreight business fields will now be discussed in detail.

Express freight

Express freight is the transport segment specialized in small standardized packed items in parcel form weighing maximally 30 kg. Standardization allows the use of mechanized procedures to forward and sort these shipping items. These mechanized processes are supported by an accompanying information technology which, by means of scanners, identifies the bar codes applied on the parcels and accordingly guides the parcels through the sorting facilities.

In this segment, supplied by the parcel services FedEx, UPS, and DHL, forwarding times amount to 2 – 3 days in Europe and 2 – 5 days worldwide. Forwarding times in Europe are relatively high as compared to those worldwide since the market for parcels in Europe is still nationally fragmented. This is a difference to the USA, where a homogeneous market for parcels exists, with Memphis having

developed into the globally largest parcel hub. The relatively short forwarding times of express freight in comparison to general cargo are essentially due to the fact that preceding/subsequent truck transport, transshipment at the airport, and performance of the flights themselves are all in the hands of a parcel service provider as one single actor, who is therefore also denoted as "integrator". In contrast to general cargo, transshipment of parcels at the hub can be performed very quickly. So, for instance, UPS transships 150'000 parcels per night at the hub Cologne/Bonn. At 11 p.m., the airplanes arrive and, after a resorting of the parcels, leave the airport again at 2 a.m.

The main hubs of the parcel services are not located at the airport Frankfurt but at the airports Cologne/Bonn and Leipzig. For a discussion of shift possibilities for night flights at Frankfurt airport, the segment of express freight may hence remain unconsidered for the time being. Nevertheless, the preliminary ban of night flights in Frankfurt led to reactions of the parcel service FedEx. According to an interview with the author, FedEx had a flight from Frankfurt to Paris after 11 p.m., which had to be advanced to 11 p.m. This meant that collection times for shipments from the Eastern German 'Bundesländer' to the EU had to be advanced by 30 – 60 minutes. A UPS comment was unfortunately not available.

General cargo

The freight segment of general cargo is differentiated from that of express freight. In terms of volume, general cargo is similar to express freight. 80% of all shipping items have the form of parcels weighing less than 30 kg (Frye 2011, p. 63). But general cargo also includes big and heavy items. In contrast to express freight, however, preceding/subsequent truck transport, transshipment at the airport, and air transport are not all in the hands of one actor (see figure 2 below). Instead, they are performed by independent actors who have to be coordinated. This organizational model hence means a higher need of coordination, and forwarding times from house to house amount to an average of six days.

Figure 2: Comparison of process models of integrators and general cargo

Integrator	integrator
Luftfrachtspediteur	airfreight forwarder
Airline	airline
Spedition	forwarding agency
Handling-Agent	handling agent
Versender	sender
Bodentransport	ground transport
Lagerumschlag	stock turnover
Lufttransport	air transport
Empfänger	receiver

In particular, there is no comprehensive IT-system, so that data have to pass numerous complicated interfaces. Even within one company different IT-systems may exist. So, for instance, the affiliated companies Austrian Airlines and Swiss have IT-systems differing from that of the parent company LH Cargo. So far, the production of airfreight services in the segment of general cargo has been standardized relatively little and is dependent on many ad-hoc decisions. Some forwarders cooperate with up to 200 airlines, and vice versa airlines cooperate with up to 600 forwarders. This means a multitude and great variety of interfaces, which hardly enable a transparent information flow down the line and lead to complex transport flows (Gottlieb 2000). The air cargo market is fragmented into a great number of small-scale suppliers. 'Deutsche Verkehrszeitung' compiled a list of 188 airfreight forwarders with a turnover of short of 1 billion Euro in 2005 (DVZ of September 2, 2006). The top 20 of the airfreight forwarding agencies covered only 53% of the respective market. The fragmentation of the whole airfreight volume among a multitude of forwarding agencies is also reflected by the fact that LH Cargo handles only 40% of its volume with the 8 biggest airfreight forwarding agencies (Putzner 2003).

While generally in the logistics industry material flows are controlled via bar codes and checked down the line, this is not the case with general cargo – which indicates a low degree of standardization. In the recent airfreight day 2011 in Zurich, this still persisting low degree of standardization and the lack of solutions down the line were deplored, too (Deutsche Logistik Zeitung of November 3, 2011).

The following problems at the interfaces of the transport chain can be identified:

- short-term changes of customer wishes due to internal shifts of scheduled dates
- changes of the size of shipping items, i.e., packaging dimensions do not correspond with those notified
- insufficient cargo space due to seasonal fluctuations
- seasonal flight plans, i.e., individual regions are only approached during specific periods
- partly, airfreight has to be forwarded over longer distances per truck since the respective airlines have no starting and landing rights for certain airports
- airlines make short-term changes in booking, with the consequence that shipments with the same destination may be transported via different hubs of the airlines and hence have different forwarding times
- long waiting times at the customs clearance of the receiver airport, where the concept of defence against imports conflicts with the set-up of international supply chains

- insufficient organization of subsequent forwarding, in which the executing airline has no primary interest due to the strict division of labour between airline and forwarding agency (Maruhn 2002)

It is one characteristic feature of general cargo that cargo accrues from numerous sources and goes to numerous sinks worldwide, with a rather low volume per relation. Therefore, direct flights for one relation are completely uneconomic since the weight load factor is too low. General cargo can therefore only be air-transported between two concentration junctions. On intercontinental routes, general cargo requires concentration of small volumes with the help of one hub per continent. Important hubs in Europe (mega-hubs) are Paris with Air France as carrier, London with British Airways as carrier, and Frankfurt with Lufthansa as carrier. At the hub Frankfurt, the cargo for intercontinental connections is concentrated. 60% of the outgoing freight for intercontinental transport arrives in Frankfurt as belly freight in passenger aircrafts from European destinations (Frye 2011, p. 55). The remaining 40% are delivered to Frankfurt per truck from all over Germany and from Northern and Eastern Europe. Within Europe, airfreight is not transported as belly freight in passenger aircrafts from one destination to the other but only delivered to hubs.[4] Instead, respective transports are (with few exceptions) executed by trucks. This is due to the fact that truck transports are quite able to compete with air transports with respect to costs and forwarding times. Since general cargo is not transported by aircrafts within Europe, air transport of general cargo occurs in Europe only in intercontinental flights or in intra-European belly flights preceding or following an intercontinental flight.

Frankfurt has a very strong function as a hub since a great number of intercontinental destinations can be reached from Frankfurt and moreover the freight for intercontinental connections is delivered to Frankfurt from a great number of sources as belly freight in intra-European passenger flights. Additionally, cargo is delivered to the hub Frankfurt by truck.

It is less the flight times between two airports but rather the forwarding times from house to house that are crucial for an integration of airfreight into international logistics. Since 1972, an almost constant average value of six days for forwarding a general cargo shipment from house to house has been described in the respective literature (Schaaf 2001, Bridges 2000). The value was even mentioned by the former chairman of the board of LH Cargo, Jean Jansen, in his contribution to the airfreight day in Frankfurt in 2001 (Jansen 2001). The average forwarding time of six days from house to house seems rather high at first sight. To understand this forwarding time, one has to get a clear idea of the structure of the whole delivery chain from sender to receiver. The following figure 3 assumes an intercontinental connection between the hubs Frankfurt and New York as an example.

Figure 3: Structure of an intercontinental delivery chain for general cargo

Umschlag Flughafen transshipment airport

[4] Cf. figure 1, in which the amount of 1.3 billion F-TKT shows the low share in intra-European transports

Hub New York	hub New York
Intercontflug mit 100 t	intercontinental flight with 100 t
Hub Frankfurt	hub Frankfurt
Verteilflüge	distribution flights
Sammelflüge	collection flights
Rom	Rome
Warschau	Warsaw
Bodenverkehre	ground traffics
Speditionsterminals	forwarding terminals
Lokale Verteilverkehre	local distribution traffics
Lokale Sammelverkehre	local collection traffics
Empfänger	receiver
Versender	sender

It is assumed that freight is delivered to the hub Frankfurt by delivery flights from Rome, Paris, and Warsaw. In the mirror-inverted way, at the hub New York the freight is forwarded as transfer freight with the flights to Austin, Denver, and Chicago. Transshipment at the two hubs alone takes an average time of 24 hours each (Frye 2011, p. 61). Once the air delivery routes are defined, there are additional transshipment activities at the airports and ground-bound delivery traffics of airfreight forwarding agencies to or from the respective airports. These forwarding routes have their starting points or target points at the transshipment terminals of the forwarding agencies, which may be located in smaller cities. Transshipment in the terminals requires additional time. From these transshipment terminals, local collection and distribution traffics provide the contact to senders or receivers. According to Erwin Maruhn (2002), the subsequent forwarding from the airports occurs in a rather sluggish way, so that optimization potential is identifiable in the delivery chain there. The high time share for subsequent forwarding is also confirmed in the study of Kraus (2001). The following figure 4 shows that 57% of the total delivery time is needed for subsequent forwarding.

Time used		
Preceding transport: 26 %	**Main transport: 17 %**	**Subsequent transport: 57** %
Sender	Airport Airport	Receiver
10-20 %	**60-80** %	**10-20** %
Investments		

Figure 4: Time shares in the airfreight delivery chain according to Kraus (2001)

Figure 3 illustrates the complex structure of the intercontinental delivery chain from sender to receiver. Many autonomous actors, each with an own IT-system, have to be coordinated in the chain to produce a joint service. A comprehensive transcontinental IT-solution is still far from being reached by the airfreight industry.

For intercontinental connections, the average forwarding time of six days from house to house is not bad, as the alternative is a six-weeks transport by ship between the continents. An **average value** of six days means that a part of the shipments is more than six days under way, but another part also less than six days. The average value does not mean either that in the example of figure 3 of an intercontinental connection Frankfurt – New York the house-to-house delivery time from the extended Frankfurt area to the extended New York area necessarily takes six days. Instead, both destinations may be connected in shorter time. But the share of the freight between these destinations in the 100 t load of a freight aircraft flying from Frankfurt to New York is very low so that the start of an aircraft with loading capacity of about 100 t in the night in Frankfurt cannot be justified by the argument of a short transport time from Frankfurt to New York.

High time shares in the delivery chain are not only used in transshipment of transfer freight at the airport Frankfurt – the Fraunhofer Institut research unit for material flows at the Frankfurt airport gives a respective mean value of 24 hours (Frye 2011, p. 61). Long processing times also occur when freight is delivered by truck to the airport Frankfurt. Airfreight forwarding agencies book the planned freight in advance at the airlines for certain flight numbers on the schedule. When the freight delivered by truck reaches the airport Frankfurt, many process steps are necessary until the freight is stored there, sorted according to flight numbers, customs and safety procedures are performed, airfreight consignment notes are produced, and the freight is loaded onto pallets and can be loaded into freight aircrafts. The following figure 5 indicates the required process steps.

Figure 5: Process steps at the airport in the context of preceding and subsequent truck transport

Airport 1	airport 1
Interkontflug	intercontinental flight
Airport 2	airport 2
Beladen	loading
Ladeplan	loading plan
Paletten wiegen	weighing of pallets
Palettenaufbau	loading of pallets
Begleitpapiere	consignment notes
Zoll-Lager	customs warehouse
Zoll	customs
Sicherheit	safety
Einlagern	storing
LKW-Vorlauf	preceding truck transport
Entladen	unloading
Palettenabbau	unloading of pallets
Zoll-Lager	customs warehouse
Zoll	customs
LKW-Nachlauf	subsequent truck transport

Versender	sender
Empfänger	receiver

With the great number of steps, a processing time in the airport of 12 hours can be assumed until the freight is got ready for dispatch and is loaded onto pallets. Transshipment of the freight is done at two sites in the area of the airport Frankfurt: Cargo City North and Cargo City South. Cargo City North is mainly used by LH Cargo. With transfer freight between aircrafts of Lufthansa and of other airlines, a flow of cargo items between both sites takes place. Because of lower rent costs outside the airport Frankfurt, however, there are still handling agents and forwarding agencies that have been able to hold their ground in locations outside (Remmert 2003). Thus, a part of the freight is transported out of the airport Frankfurt to be loaded onto airfreight pallets by handling agents in **Kelsterbach**. These pallets are then transported back to the airport Frankfurt. Such procedures require additional time shares in the overall process chain. The following figure 6 shows a prepared pallet which is loaded into a freight aircraft.

Figure 6: Loading of a prepared airfreight pallet (source: Main Echo of October 28, 2011)

Traffics of freight delivery to the hub Frankfurt by truck are set up all over Germany and Northern and Eastern Europe. The delivery traffics are partly also performed as road feeder service. Road feeder service denotes the transport of freight by truck from one airport to another one, with this freight having been made ready for dispatch at the start airport already. Frye's study estimates that a good half of the freight delivered by truck to the airport Frankfurt is delivered as road feeder service (Frye 2011, p. 55). The following figure 7 shows the process steps with road feeder service (RFS).

Figure 7: Process steps with road feeder services

Verlader	loader
LKW Vorlauf	preceding truck transport
Airport 1 Konsolidierung Luftfracht	airport 1 consolidation airfreight
RFS	RFS
Airport 2	airport 2
Luftfrachtbrief	airfreight consignment note
Flugzeug	aircraft
Airport 3	airport 3
Airport 4 Dekonsolidierung Luftfracht	airport 4 deconsolidation airfreight
LKW Nachlauf	subsequent truck transport
Empfänger	receiver

Delivery as road feeder service has the advantage that the steps to get the shipment ready for dispatch as airfreight (including customs clearance, making out of the airfreight consignment note, and

safety controls) can already take place at the precedent airport. At the airport Frankfurt, freight of road feeder service can then more quickly be taken over and transshipped as transfer freight. Favourable rates are another factor strongly attracting freight from all over the mentioned area to the airport Frankfurt, at the cost of other airports (cf. the following figure 8). So, for instance, freight is delivered by truck from Hamburg and Hannover to Frankfurt.

Figure 8: Inflow of truck-transported freight to the airport Frankfurt.

The airfreight accruing from Germany and all over Northern and Eastern Europe is collected at the site Hahn by the carrier Air France operating from Paris. It is prepared into airfreight pallets in a handling facility at the airport Hahn and then sent as road feeder service to the airport Paris to be loaded into intercontinental freight aircrafts there. This example illustrates the many process steps and the high amount of time needed to get airfreight shipments from their senders in Germany and Northern and Eastern Europe to Paris.

Figure 9: Preparing pallets in Hahn for Air France intercontinental flights from Paris

Special freight

Besides the two segments of express freight and general cargo, special freight is of relevance. Under this notion, various segments are subsumed: living animals, perishable goods, refrigerated goods, and precious goods, for which respective different process chains are set up. With precious goods – e.g. money – protection against theft is of priority. The segment of refrigerated goods, requiring an uninterrupted chain of cooled unit load devices and cooled storage rooms, is used for transports by the pharmaceutical industry (Air Cargo World 2011). The segment of perishable goods is of high importance at the airport Frankfurt. In its website, **Perishable Center Frankfurt** reports an annual throughput of 130'000 t, which corresponds to about 5% of the total volume of airfreight transshipped in Frankfurt. The respective goods are, above all, flowers, vegetables, freshwater fishes, and sea food, which are mainly imported from Africa. The warehouses of Perishable Center Frankfurt serve as external customs border for imports from non-EU countries. From Perishable Center Frankfurt, goods are either distributed further by truck or transported in unit load devices as belly freight within Europe. Transport of these goods via intercontinental flights to America or Asia, on the other hand, seems unreasonable, since these continents have other sources of perishable goods than Africa, and transshipment of imports from Africa via Frankfurt would raise transport costs to a prohibitive level. Flowers, for instance, are procured by the USA from Central America. It can thus be stated that the category of perishable goods is irrelevant for intercontinental flights from Frankfurt to Asia or America. The need of night flights for intercontinental connections can hence not be justified by the necessity to transport perishable goods.

Charter traffics

The freight categories of express freight, general cargo, and special freight are handled via regular connections. A different type of airfreight transport is provided by the charter business. Freight aircrafts which take loads of about 100 t play an important role in the project business, for instance for the transport of oil drilling equipment or of relief supplies. Besides, individual flights with fully utilized capacity are carried out for large-scale senders. The start of a charter aircraft can be performed from any airport with about 3 km runway and is independent of a given hub function. A charter freight aircraft could, for instance, start from the airport Hannover or the airport Rostock. The company CargoLux located in Luxemburg is a major supplier of charter machines with high loading capacity. Another category of the charter airfreight business is the transport of small quantities ranging from 1 t up to 5 t, which can be transported between two traffic landing fields in Europe by airfreight taxis. Depending on the distance of sender and receiver from the next traffic landing field, house-to-house delivery times within Europe are very short, amounting to 6 – 12 hours. Respective services are provided by the company ProAir in Stuttgart.

The airport Hahn as an alternative airport for Frankfurt

Since with its freight transshipment for Air France Hahn has already competences in airfreight handling, and three further transshipment halls still have free capacities for airfreight transshipment, it seems reasonable to explore the potential of shifting general cargo flights during the night from the airport Frankfurt to Hahn, all the more so since truck traffic from the airport Frankfurt to Hahn takes scarcely the time of 2 hours, which appears tolerable in view of the long durations characterizing the process chain of general cargo.

There are manifold relations between the airports Frankfurt and Hahn. Up to 2009, Fraport was shareholder of the airport Hahn. It is not known why Fraport returned its share. Furthermore, Fraport Cargo Services GmbH (FCS), the handling agency of Fraport, is also represented in Hahn by a field agency. The option of Hahn as an alternative capacity for Frankfurt was also examined in the study of AirLog GmbH of 2004, ordered by the 'Regional dialogue forum airport Frankfurt' to implement the aimed-at night flight ban.

As can be read in an article of 'Logistikzeitung' of March 27, 2010, the airport Hahn had suggested cooperation in the field of cargo to the airport Frankfurt in 2010 in case of a night flight ban. The article is shown in figure 10 below. Loaded airfreight pallets could be transported by truck from the airport Frankfurt to Hahn. Furthermore, truck inflows to Frankfurt could be diverted to Hahn so that the part of them assigned for night flights remains in Hahn.

Figure 10: 'Logistik -Zeitung' of March 27, 2010

Hahn suggests freight cooperation to Frankfurt

Hunsrück airport did better than expected in 2009

by Heiner Siegmund

Since Fraport AG has withdrawn from the airport Frankfurt-Hahn, losses are reducing there. Now Hahn CEO Jörg Schumacher offers cooperation to the former majority shareholder, so that freight traffic prepared to move in case of a night flight ban at Rhein-Main is kept in the extended region.

Freight transshipment at the airport Frankfurt-Hahn decreased in the past calendar year by 3% – to 174'640 t. "With this result, we did better than the other international traffic airports in Germany", Schumacher evaluates the result. For comparison: According to the German Federal Statistical Office, Frankfurt, Munich, Hamburg, etc. had to cope with a decrease of cargo tonnage by an average of 6.1% in the crisis year 2009.

...

Freight transshipment of the airport Hahn amounted to just under 175'000 t last year. That means 3% less than in 2008.

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