

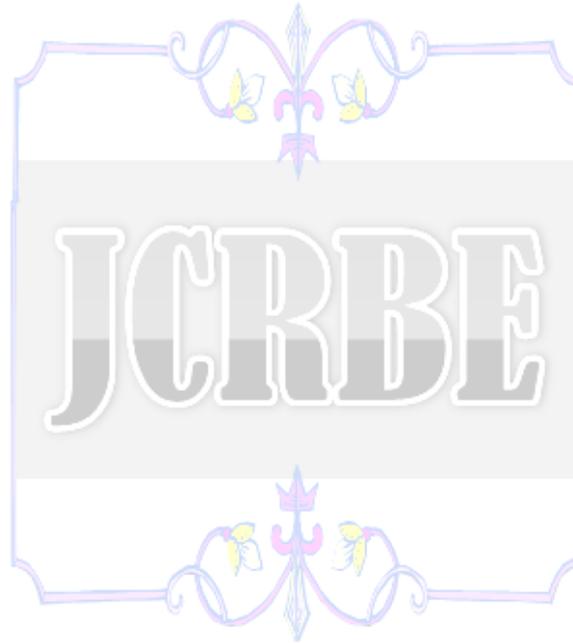
The new airport in Istanbul: Expectations and opportunities

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ABSTRACT

Governmental authorities of Turkey already decided to build a third airport in Istanbul. This paper investigates the needs, expectations and opportunities for Istanbul's new third airport. For this reason, first the city's existing social and economic structure is evaluated. Then, capacities and development possibilities of the existing two airports are examined. Finally, the need for a new airport is defined and the expectations and opportunities for this airport are described.

Keywords: air transport, new airport, airport planning and land use



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ISTANBUL AS BOOMING WORLD CITY AND GLOBAL CONNECTIONS

Istanbul is the largest city of Turkey and Turkey's most important gateway to the world. Istanbul, divided by the Bosphorus as European and Anatolian sides, connects the Sea of Marmara and the Black Sea. The city is also divided by the Golden Horn. The Bosphorus is the only sea route between the Black Sea and the Mediterranean.

The history of Istanbul goes back to 3,000 years ago. Many human cultures were settled along years. Istanbul, the transcontinental city between the Sea of Marmara and the Black Sea, was the capital of Byzantine, Latin, Roman and Ottoman Empires. Because of its geopolitical and strategic location and its position along the Silk Road, it was the junction for great civilizations, center for political, commercial and intellectual activities with its cosmopolitan structure.

Today, with its nearly 15 million population, Istanbul is the most important historical, cultural, commercial and highly populated city of Turkey which attracts millions of tourists and business people each year. As a global city and being a finance center, Istanbul hosts many of the Turkish companies' headquarters and foreign companies' liaison offices. Istanbul hosts Turkey's only securities market, the Istanbul Stock Exchange since 1986. In addition, most of the Banks' headquarters with at least 20% of their branches are located in the city.

Turkey's Gross Domestic Product is 774.2 billion; total exports are 134.9 billion, total imports are 140.7 billion, and total taxes collections are 31.4 million US \$ (Ministry of Development, 2012) Istanbul is the national economic powerhouse of Turkey and generates approximately 25% of Turkey's Gross National Product. More than 40% of Turkey's imports and exports are from Istanbul. City has approximately 23% of all commercial companies in Turkey which pays around 40% of total taxes collected (Ministry of Economy, 2012).

Istanbul is also a touristic city with many remains from ancient civilizations and from their culture. The old and the modern architecture and the museums with thousands of remains, attracts millions of domestic and foreign people.

Regarding the aviation activities, Istanbul with 59.7 million passengers/year (2012), is the major national and international hub of Turkey where Atatürk Airport is the main base for Turkish Airlines (THY), and important transit point for international flights, between Europe, Asia and Africa destinations. The Airport has more than 180 international flights to approximately 100 countries. THY by herself can reach more than 50 destinations in different countries with less than 3.5 hours flights from Istanbul (THY, 2012). Most of the other Turkish Air Carriers also has their headquarters in Istanbul. Sabiha Gökçen Airport is the second airport of Istanbul, on the Anatolian side, and mainly serves to domestic passengers.

EXISTING AIRPORTS; CURRENT CAPACITIES AND TRAFFICS

Since the civil aviation activities and flights in Turkey started at 1920's, Istanbul continued to be the major aviation center of Turkey all the time. Today, approximately 1/3 of Turkey's commercial flights and passenger traffic are generated from the existing two airports of Istanbul (Picture 1).

ATATÜRK AIRPORT

Atatürk Airport is Turkey's premier airport and the major gateway to the World. Airport first opened in 1912 for military purposes. The first civilian flights started in 1924. Concrete runway and passenger terminal was built in 1942. Today, the Airport serves more than 1,000 aircraft and more than 100,000 passengers every day.

Atatürk Airport is located in the European side of the city (Bakırköy) and 20 kilometers away from the city center (Taksim). Airport is owned and operated by General Directorate of State Airports (DHMI), which is a State enterprise. Airport has 3 runways, 2 terminal buildings (connected to each other) and a cargo terminal (Table 1). According to the latest studies of DHMI and other governmental institutions, the Airport has no possibility for additional runway.

Terminal buildings were operated by TAV Airports holding between 2000 to 2005 for 4 years and 10.5 months under the Build-Operate-Transfer (BOT) Model and will be operated by TAV again up to 2021 by leasing agreement for 15.5 years.

SABIHA GOKÇEN AIRPORT

Sabiha Gökçen Airport is a new airport, opened in 2001. It is located in the Pendik-Kurtköy district on the Asian side and 50 kilometers away from the European city center (Taksim). Airport has one runway, one terminal building and cargo terminal. Airport Authority is planning to have second independent parallel runway in few years (Table 1).

Airport is owned and operated by Airports Management and Aviation Industries Co. Ltd. (HEAŞ). Terminal building is operated by Istanbul Sabiha Gökçen Airport Construction Investment and Operating Company (ISG) since 2008 under the BOT Model (up to 2028).

The distance between two airports is approximately 42.5 kilometers.

2010-2012, commercial aircraft and passenger traffic movements are given in Table 2. As seen from the Table, 60% of the domestic and 85% the international commercial aircraft traffic, and similarly 61% of the domestic and 86% of the international passenger movements are from Atatürk Airport.

AIRPORT MASTER PLAN STUDIES

In 1990's, three master plan studies was carried out for Atatürk Airport. In the Middle East Technical University's plan (1994), because of the unavailability of the development area, new airport was proposed. In the Istanbul Technical University plan (1997), development in the existing area was proposed. And with the plan prepared by a private company, for the excess of capacity, coordination with the nearby airports is suggested. These plans have not been officially implemented.

The latest Master Plan (2030) for Atatürk Airport is prepared by the Middle East Technical University (METU), the Built Environment, Design Practice and Research Center (MATPUM) in 2010. The latest Master Plan (2028) for Sabiha Gökçen Airport is prepared by Ove Arup & Partners Ltd. (ARUP) in 2009. This plan is also covered the studies for "techno park and commercial-social areas" around the Airport. None of these master plans are open to public use.

The following section regarding the limitations and bottlenecks of airports are organized according to the other available public shared sources, such as annual sector reports and ministerial or institutional official statements.

LIMITATIONS AND BOTTLENECKS OF AIRPORTS

As many other important hub airports in the world are facing with capacity constraints (Gelhausen & Berster & Wilken, 2013), Atatürk Airport is in the same situation.

The main bottleneck for the Atatürk Airport today is the commercial slot value, where it does not meet the demand of airlines, and new slots are hardly available for additional flights and the new comers. This creates a problem for the most of the Turkish air carriers, other than

Turkish Airlines (THY), that they cannot have any additional flights from the Airport (TOBB, 2010). According to the existing 55 commercial slot/hour, the Airport reached its 90% use of runway capacity (on the basis 2011 aircraft movements with of 19.5 hours/day normal use). This is a very high use of average utilization, where the Airport has a known side wind problem and during side winds, only one of the runways can be used. That is why, number of late night flights are increasing day by day (In 2012, THY spread her flights to 21.5 hour/day operation and this opened new slot positions). In addition, important amount of the domestic flights has begun to use Sabiha Gökçen Airport.

Another important bottleneck for Atatürk Airport is the number of aircraft stands. Airport is the main base of Turkish Airlines and many other Turkish air companies, where many of their aircraft makes night stops. The only possibility to increase the number of aircraft stands is the use of military area, which is a part of the airport area. It is known that, many negotiations held between DHMI and military authorities, but no improvement was achieved. Even if additional aircraft parking stands opened in the military area, runway crossings will create significant difficulties and delays in the operations.

Thirdly, Atatürk Airport's existing cargo terminal capacities and facilities are not sufficient even for today's operations, including road connections. Although the Airport is very near to the Sea (and Istanbul is surrounded by seas) maritime transport connection and/or integration is not possible at all. Atatürk Airport's cargo capacity can be maximized up to one million tons/year capacity with additional new buildings. But, forecast studies, made by METU/MATPUM, shows that, in 2030 the air cargo carriage of Istanbul will reach to 2.5 million tons/year.

Sabiha Gökçen Airport is a new one and with the existing facilities do not have immediate problems. However, with the high increase of aircraft traffic movements, second runway and additional passenger terminal facilities will be required in the very near future.

AIR TRAFFIC INCREASE AND REQUIRED MAJOR DEVELOPMENTS

In last 10 years, Turkey has experienced more than 20% yearly increases in both aircraft and passenger movements. Today, the rate of increase is about 10%. In 2012, the commercial aircraft traffic of Atatürk Airport is increased 14.8% regarding to 2011. It is very well known that, Atatürk Airport has almost reached to its runway capacity, and there is no possibility for a new runway. Sabiha Gökçen Airport has no increase during this period, but second runway studies are already started.

Aviation forecasts (made by METU/MATPUM in 2010) indicate that, in 20 years Istanbul Airports commercial aircraft traffic will exceed 1 million aircraft and 118 million passenger movements a year and cargo movements to 2.5 million if infrastructure is available (TOBB, 2012). Actual passenger values show that, more growth realized during 2011 and 2012 regarding the estimates (Table 3).

According to the forecasts and known bottlenecks of airports, the required major developments for two airports are summarized below:

- Atatürk Airport;
 - Additional terminal capacity,
 - Additional aircraft stands,
 - New cargo terminal building,
 - Additional car parking's,
 - Additional support facilities.

- Sabiha Gökçen Airport;

- Second runway,
- Additional terminal capacity,
- Additional aircraft stands,
- New cargo terminal building,
- Additional car parking's,
- Additional support services.

NEW AIRPORT NECESSITY

Even if all necessary new facilities stated for Atatürk and Sabiha Gökçen Airports are done, the total passenger capacity will be limited to 100 million passengers/year. However, the forecast studies projects approximately 118 million passengers/year for 2030.

On the other hand, the regions they serve and the regional air carriers flying, it is not possible for these two airports to share the similar number of domestic and/or international passengers. During the mentioned forecast studies, statistics and assessments showed that the European sited airports will share almost 70% of the total passengers for long years. It can be assumed that the domestic flights will be equalized through the years progressed, but majority of the international flights will continue from the European side. Because of this distribution, at least 75 million passengers/year total capacities are required for the European sited airports. (This requirement is for 2030, there is no doubt that the required capacity will increase in the following years).

As a result, the airports on the Anatolia side, regardless to their passenger capacity will only attract the passengers on that region. Moreover, because of the limited capacity of Atatürk Airport, the new one is inevitable, especially for the international flights.

The most important factor here, as the leading company, is the THY's behavior. THY can move her operations partly or fully to the new airport. This, of course will have a significant impact on the new airports opening capacity. However, despite the existing comprehensive maintenance and training facilities at the Atatürk Airport, from the commercial point of view, full transfers of operations are expected. The prospects for the Atatürk Airport and the new airport of the European side is mostly depended on the THY and will vary according to THY's home base activities.

The new airport is planning to build in the Arnavutköy/Akpınar district, near the Black Sea side (Picture 2)

EXPECTATIONS

Definitely, the new airport with the high offered capacity of aircraft, passenger and cargo movements will be the Istanbul's main metropolitan airport in the near future. This should be seen as an inevitable and indisputable fact. The Ministry of Transport, Maritime Affairs and Communications has already made many statements along these lines.

Istanbul is a city with most important social, cultural and economic activities and expected to become one of the mega aviation cities - more than 10,000 long-haul passengers per day - in the coming years (Airbus, 2012). Moreover, this requires not only an airport but also the airport city development, including comprehensive air cargo facilities, in the site.

Many of the mega aviation cities today, developed their airports in accordance with the "airport or cargo city" concepts (Amsterdam Schiphol, Frankfurt, Paris Charles de Gaulle, and many others). In particular, newly established airports, such as Seoul Incheon and Dubai Al Maktoum, planned airport and surrounding areas regarding to these concepts, shortly airports are integrated by the surrounding areas and the city. In Turkey, no airport has developed this

way and most of them missed this opportunity due to unrelated urbanization, such as Istanbul Atatürk and Izmir Adnan Menderes Airports.

In the past, airports and their facilities were limited by their borders and had no relation with surrounding areas or cities they serve. Airport cities, in short, could be defined as the combination and integration of airport facilities (especially non-aeronautical ones) with the surrounding areas. The most appropriate application is of course to realize the airport and the airport city together, where Istanbul's third airport has this chance today. The requirements for airport cities are as follows (Conway, 1980 & 1993):

- Common planning approach and development strategies between authorities, for making the airport as a center of attraction and developing surrounding areas as an airport city,
- To have adequate and sufficient area for both airport and airport city development,
- To develop in the vicinity of the airport, social-cultural activities, business and finance centers (with office buildings), convention centers, logistic centers (with warehouses), shopping centers, hotels, recreation and accommodation areas,
- To have multimodal transportation modes, such as; direct access or connection to interstate highway and railway systems, express train and metro facilities, different routes for cargo transportation and long/short term parking's (including trucks),

As mentioned before, Istanbul is the major city for Turkey's air cargo import and export activities. Therefore, the new airport must be realized as a global cargo airport and cargo facilities both inside and in the vicinity of airport must be planned and developed accordingly. The requirements for the cargo airports (cities) are as follows:

- Global scale cargo flight connections,
- Cargo and logistic facilities in and around the airport area,
- High-tech infrastructure and facilities for cargo services,
- Separate cargo terminals and facilities for specialized products (when necessary),
- Available office and ware-house areas and infrastructures for business, logistic and manufacturing companies,
- Multimodal transportation modes and truck parking's (such as airport cities).

OPPORTUNITIES

- New Airport, New Layout and Development Plan

The very important advantage of a new airport is to have most appropriate infrastructure for existing and future needs with detailed master planning studies. It is very well known that, Ministry of Transport, Maritime Affairs and Communications realized many studies, but not an under master plan concept. However, it is still an important situation that current and future capacities are determined and necessary land devoted. Both the airport and the integrated other infrastructure and the accessibility will have an important effect on the whole region (Appold & Kasarda, 2011).

- Available Slots for New Flights

Air transportation in Istanbul is continuing to grow. Despite all the limitations of Atatürk Airport, commercial air traffic and passenger movements are increased 14.8% and 20.5% respectively in past 12 months. One of the reasons for these high increases, of course the very rapid growth of THY. With the new Airport's more available traffic capacity,

definitely new or more flights to will be in service. To expand Istanbul's role in the global markets must be the main desire for civil aviation development.

- New Regional Planning (Airport City, Cargo City)

Airports clearly have major spatial and economic impacts and it is one of the reason why they are seen as powerful economic development tools (Freestone, 2009). As it is mentioned before, Istanbul with high amount of passenger and cargo movements and with her cultural, financial and economic activities is ready for airport city and cargo city development. The area envisaged for the new airport does not have any important accommodation yet. This is a great opportunity simultaneous formation of airport city and cargo city concepts from the beginning with detailed development plans for the future. Airport and cargo city concepts will have a positive effect for the economical development of the new region, which of course will be a positive input for to the city.

- Flights with Very Large Aircraft

Atatürk Airport's existing facilities are not appropriate for very large aircraft operations (e.g., A380). New airport will be the opportunity for this kind of aircraft operations which will maximize the passenger transport.

- Improved Transit Flight/Passenger Services

Turkey with her exceptional geographic location has a great advantage for transit flights between Europe, Middle East, Asia and Africa. In this context, Turkish Airline attaches great importance to the transit operations (both passenger and cargo) and significant increase has been achieved past few years. With the new airports transit service facilities, transit activities will increase more rapidly.

- New and Rapid Transportation Systems

Access time to airports is one of the important factor for passengers (Hess & Polak, 2005). Atatürk Airport has multimodal transportation facilities but, there are no rapid train services and road transportation has many difficulties (high traffic density). It is expected for the new airport to have better multimodal transport services, such as; direct connection to State highway networks and express/rapid train services (including metro) which will provide easy access to airport.

- Noise Abatement Procedures

Atatürk Airport has important aircraft noise problems because of the dense settlements surrounding the airport and under the approach/departure patterns. With the new airports operations, this problem will be eliminated. However, necessary precautions need to be taken in regard of noise abatement, in accordance with the ICAO's balanced approach principles (ICAO Doc 9829, 2008), for the new airport immediately (e.g., new noise abatement procedures, prevention dense settlements, insulation of new buildings, noise preferential routing).

CONCLUSIONS

Governmental authorities already ruled to build a third airport in Istanbul. The new airport is planned to build on Black Sea side, approximately 33.5 kilometers north of the existing airport (Picture 2). Construction (and operation) companies invited to tender on January 23, 2013, by DHMI. New airport, which will be built on 77 million m² area, will have 150 million/year capacity (the third largest airport in the world in terms of passenger capacity).

The BOT model bidding process will take place on May 3, 2013. DHMI predetermined 25 year fix operating period. The winner of the tender will be determined according to the reimbursement proposals.

The future of Atatürk Airport is unknown and a mystery. According to the Ministry of Transport, Maritime Affairs and Communications' statements, the Airport will be used mainly for general aviation purposes.

There is no doubt about the need for a new airport on the European side of Istanbul. However, the new airport must completely eliminate the existing capacity and other problems which require a joined-up planning of all related parties, including people in the region. Airport development plans must be prepared according to the clearly defined goals with collaborative and multidisciplinary approach. Airport city and cargo city concepts and close integration with the region must be realized.

On the other hand, land-use planning, design and development for aviation activities have to create a balance with environmental care. Local habitat and wildlife must be protected and enhanced. Necessary measures need to be developed from the beginning. Economical, social and environmental sustainability must be maintained.

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APPENDIX

Table 1: Airports Physical Characteristics (Source; Turkish AIP and DHMI, 2012)

Airports	Atatürk		Sabiha Gökçen	
Airport Area	11,650,000 m ²		5,350,000 m ²	
Runways	05/23	2,580x60 m	06/24	3,000x45 m
	17L/35R	3,000x45 m		
	17R/35L	3,000x45 m		
Commercial A/C Slot	55 aircraft/hour		28 aircraft/hour	
A/C Parking Positions	98		61	
Terminal Capacity	40,000,000		25,000,000	

Table 2: Airports Commercial Aircraft and Passenger Traffic (Source; DHMI 2012)

Istanbul Airports Commercial Aircraft Traffic (thousands)									
Years	Atatürk			Sabiha Gökçen			Istanbul Total		
	Dom.	Int.	Total	Dom.	Int.	Total	Dom.	Int.	Total
2010	95.0	178.9	273.9	62.1	36.8	98.9	157.1	215.7	372.8
2011	103.9	197.6	301.5	72.0	40.2	112.2	175.9	237.8	413.7
2012	114.8	231.3	346.1	70.1	41.9	112.0	184.9	273.2	458.1
Istanbul Airports Passenger Traffic (million)									
2010	11.8	20.3	32.1	7.5	3.7	11.2	19.3	24.0	43.3
2011	13.4	24.0	37.4	8.7	4.4	13.1	22.1	28.4	50.5
2012	15.3	29.8	45.1	9.7	5.0	14.7	25.0	34.8	59.8

Table 3: Istanbul Passenger Forecasts (Source; METU/MATPUM Master Plan Studies)

Istanbul Passenger Forecast (million pax.)					
Year	Atatürk		Sabiha Gökçen		Total
	Estimate	Actual	Estimate	Actual	Estimate
2011	33,9	37,4	7,3	13,1	41,2
2012	35,1	45,1	7,9	14,7	43,0
2013	36,2		11,5		47,7
2014	37,9		12,5		50,4
2015	39,5		13,7		53,2
2020	48,6		21,1		69,7
2025	62,8		28,1		90,9
2030	81,8		36,5		118,3

**Picture 1:** Atatürk and Sabiha Gökçen Airports



Picture 2: Istanbul's Airports (including the third airport)

