

ACTUAL SITUATION AND PERSPECTIVES OF DEVELOPMENT OF BUSINESS JET PLANES

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This paper is to evaluate information on actual situation and perspectives of the development of business jet planes with emphasis on business-class liners and wide-body biz-jets. The first part describes the theoretical basis for business jets, their distribution and methods of operation. It also outlines the situation of European business jet market. The second part compares the tactical and technical data and two charter companies. Part three presents a proposal of other facilities of operated Opera Jet's fleet and the reasons for the recommended purchase of new business jets.

Key words: Business Jet, Business Liner, Charter Company.

1 INTRODUCTION

Aircraft is a device capable of motion in the atmosphere due to other reactions such as reaction with air Earth's surface. Business Jets (or biz-jet in short) form a group of aircraft used mainly for private purposes. They are usually smaller, designed for transporting smaller groups of people usually up to 19 passengers. These aircraft can be adapted to other purposes, such as evacuation of casualties, special delivery mail, transport government officials, or special forces, aerial works, flying hospitals, construction, parachuting, communications, aviation schools etc. Business Jets are the most used by private individuals, employees of large companies or government officials. Because of high costs associated with owning and operation of such aircraft, part of the solution is stock ownership or use of aircraft charter traffic. Thanks to great demand for this mode of transport, particularly in Western Europe and in the USA, there are many charter companies worldwide, currently. The end of the first part contains information on commercial jet aircraft from the beginning of their use and entry into service, further information about biz-jets manufacturers, distributors, international standards, information on operating biz-jets and the European market for business jets aircraft. The analysis section describes the current status and prospects for the aircraft category-biz jets, with an emphasis on the two classes and the business liners, which are major modification transport category airplanes and big biz-jets wide body. The analysis is also comparison of the aircrafts' tactical and technical. Finally, this section describes the activity of two charter companies, Slovakia and the U.S.. The proposal provides two options for extension activities Slovakian charter company. The paper is prepared from resources available on the Internet, magazines and internal company materials. [1]

2 BUSINESS JETS

The increase in commercial traffic began shortly after the end of World War II. Civilian users got new, more powerful aircraft that were originally

used for military purposes. The right by taxi was no exception. Basically, it is a classic commercial transportation to a lesser extent, using smaller aircraft. The basic philosophy is letting the air taxi aircraft to the customer. It creates an alternative transportation options to the classic line-carrier. Classical carriers use to fill the capacity of transport aircraft ticket sales tied to individual seats. Companies engaged in the transportation by air taxi, sell aircraft as a whole, not linked to seating capacity. Their services particular offer individuals and businesses requiring high operational efficiency and time independence. Transporting perishable goods, human organ, or government officials or as a flying hospital are commonplace. Aero-taxi is extensively used by various companies for business trips of their managers. The advantage of such forms of transport is the possibility of landing on airports where classical carriers do not fly. [1]

3 ANALYSIS

Before the carrier proceeds to purchase an aviation equipment, one has to clearly define the range of activities intended to be performed. Explored are other options of market extension, in terms of its activities. For each airliner, it is important to keep the aircraft busy. With increasing number of flights operating costs per flight hour operation decrease, making operation profitable. Currently, the market is served by lots of different types of aircraft of this category, whether used or brand new. Nearly 90% of European market is covered by two companies - Textron Cessna Company and Piper. This is indicative of the popularity and reliability of these aircraft. In determining the deployment of aircraft equipment and the next purchase the choice of destination to which the carrier will fly is less important. Yet, the aero-taxi traffic is highly specific. The actual form of transport taxi takes place under an agreement with customers. The customer comes to the need to get to place of business meetings or holidays. If this requirement is met by the techniques (range,

runways, crew) years shall be made market share, which the company participates Raytheon Beechcraft. In any case, it is appropriate do market research in terms of customer interesting destination. After evaluating the survey and select the most suitable and interesting destination, the carrier may, to some extent compete with larger carriers. Great advantage over more traditional or carriers is high time flexibility and opportunity transport customers to airports, to which other carriers do not fly. Business clients are usually need to the place of business meetings quickly and efficiently. Frequent equipment cabins are tables with their own light, comfortable leather seats. Cabins are usually pressurized, because these aircraft provide the best performance at high levels. Similarly, the aircraft flying out of main zones of meteorological phenomena. Aircraft with are pressurized to address business clients is very important. Considerable time flexibility, the possibility of landing at the airport at the earliest meeting venue and custom clearance before and after landing, making this type of transport is very attractive. [1]

4 CURRENT STATE OF BIZ-LINERS

For any company the aircraft as a Business Jet-compromise solution for highly efficient transport for longer distances. The aircraft are a valuable tool that allows companies and their management to achieve a more less time. For some companies, this means an advantage of the transport of key personnel who it can handle more problems in less time.

The biggest advantage is that biz-liners link interior design proposals with already installed and certified aircraft systems. It includes fuel systems for long-haul flights, distribution and electrical systems designed to support and installation of standard office equipment, accommodation including specially configured kitchens, toilets, bathrooms and other spaces.

Office equipment is different and, if necessary possible configuration of office and business equipment, from tables and working stations to computer networks, wireless Internet or phone, can be made available.

But despite all these advantages, biz-liners have the same limitations imposed on their size. They are larger and heavier aircraft for the flight to longer distances, requiring take-off runways of larger size, which limits choice of airports. The track shall be designed for weight, wingspan, and the wheelbase. So planning goal brings restriction that smaller aircraft do not have to face. Requirements for the crew from the general Force different. Despite the benefits that provide biz-liners, either space,

equipment, comfort, and speed connecting half the planet without difficulties and inconveniences experienced with traditional airliners. For comparison aircraft I chose the following features:

Interior

As the first comparative character is interior. Unfolding of space planes that offer best aircraft are Airbus ACJ series, his wide body to offer the greatest possibilities of the interior. All types of biz-liners have the option to change the original configuration by own customers' wishes and still have almost the technical possibilities of whether the connection Internet, TV circuit, or other satellite and communication links. Optional equipment of all the three companies offer are very similar, possibly the same.

Technical Specifications

Technical and operational data are one of the key characteristics by which customer select an aircraft. Very important data are external dimensions of the aircraft, which of course influence the internal cabin dimensions volume and the luggage compartment. Comparison of the width and the height of the aircraft is shown in picture 1, from which it is clear that from this perspective, the Airbus is by far the best.

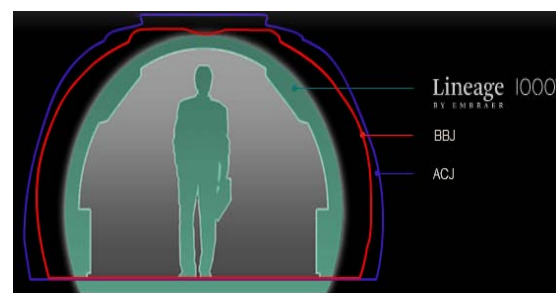


Figure 1 Comparison of biz-liners

Price

When figuring out which aircraft has the highest value, whether market or outside it, finding the resulting price is one of the first steps in buying the aircraft. Figure 2 shows that the introduction of aircraft market saw the biggest rise in Airbus ACJ319. Nevertheless, the highest price has BBJ3 Boeing. Conversely, the most cost-effective aircraft is the Embraer Lineage 1000. [2]

MODEL	Cena (v miliónoch USD)					
	2011	2010	2009	2008	2007	2006
AIRBUS-ACJ318	\$65.0	\$62.0	\$62.0	n/a	\$47.0	\$45.0
AIRBUS-ACJ319	\$80.0	\$75.0	\$75.0	\$75.0	\$61.5	\$55.0
AIRBUS-ACJ320	\$85.0	\$80.0	\$80.0			
BOEING-BBJ	\$67.1	\$65.5	\$62.3	\$61.3	\$58.0	\$57.5
BOEING-BBJ2	\$82.5	\$80.5	\$75.9	\$74.8	\$69.5	\$69.5
BOEING-BBJ3	\$89.9	\$87.7	\$82.7	\$81.8	\$78.5	\$77.5
EMBRAER LINAGE 1000	\$50.5	\$49.3	\$45.0	\$45.7		

Figure 2 Comparison of prices biz-liners

5 CURRENT STATE OF WIDE-BODY BIZ-JETS

Commercial jet aircraft have expanded their range of wide body aircraft. Wide body business jet are designed primarily for international flights with a long offers a range extension of the interior. Today the largest manufacturers of the aircraft company are the Airbus Corporate Jet Centre and the Boeing Business Jets. At present one can choose from a large offer of commercial jet aircraft to best suit his needs. The greatest luxury can be provide only by wide body aircraft, offering space and comfort as equal as on earth, if not more. It is difficult to simultaneously compare a single-deck aircraft and two-storey one. It is therefore necessary to compare them separately. Between double-deck aircraft are B747-8 and ACJ380, other aircraft are single-storey.

Single-storey and wide-body biz- jets

Furnishings of these aircraft are very different from the biz, interior liners of their companies. Airbus offers the magnification of cabins, which brings greater capacity and passenger comfort and space for offices, lounges, living rooms, bedrooms and bathrooms. The Boeing company provides aircraft with non-traditional "green condition" for the customers who want the interior of the aircraft adapted to adapt themselves, bringing great options. The level of comfort and convenience is at the same level.

As regards the comparison of technology equipment of the youngest aircraft companies namely ACJ350 and B787, substantial technological advances is seen on the part of the Boeing. The B787 is of a new, integrated design, advanced aerodynamics, new solutions composite hull, wings and tail, modern integrated systems. Aircraft ACJ350 based on aircraft such as A330 external and internal regulation and thus having limited compositional parts. The smallest of these aircraft are the size of ACJ 330-200 and B787-8, ACJ350-800 and B787-9, ACJ340-300, B777-200 ER, B777-200 LR, ACJ 350-900, ACJ340-500,

ACJ340-600 and B777-300 ER, which are generally the aircraft of the Boeing aircraft manufacturing company are longer and are wider instead. These dimensions have resulted in the smallest area has booths B787-8 and has the largest paradoxically, B777-300 ER. The smallest trunk volume is at the ACJ350-800 and also B777-300 ER. The capacity of Airbus made aircraft moves from 60 to 100, while Boeing is in the 45 to 75 passengers. All Airbus aircraft have an operating speed M 0.86, except the ACJ350 with operational speed to M 0.89. Boeing Aircraft Company to lower operating speeds, aircraft B777 M 0.84 B787 aircraft and M 0.85. Range of the aircraft is between 17 094 km (777-300ER) and 18 000 km (ACJ 350-800). ACJ330-200 aircrafts and ACJ340-300 aircrafts' range is to 14,800 km. Table 1 shows prices of different types aircraft, which shows the price of the best planes, the ACJ330-200 and vice versa. Currently, the most expensive aircraft is the B777-300 ER VIP.

Model	Price (million USD)
Airbus ACJ330-200	170,0
Airbus ACJ340-300	238,0
Airbus ACJ340-500	261,8
Airbus ACJ340-600	275,4
Airbus ACJ350-800	245,5
Airbus ACJ350-900	277,7
787-8 VIP	193,5
787-9 VIP	227,8
777-200ER VIP	244,7
777-200LR VIP	275,8
777-300ER VIP	298,3

Tab. 1 Comparison of prices with wide-biz jets

Two-storey and wide-body biz-jets

Aircraft ACJ380 and B747-8 VIP from the beginning of their production of large competitors, each of which excels in a different another area. As for the interior, Airbus ACJ380 has the advantage of more space of 551 m2, unlike the B747-8, with s an area of 444.5 square meters, in what ACJ380 a distinct advantage, although the volume trunk is larger in B747-8 by 25.5 m3. Interior depends on the owner aircraft. In both cases the choice of basic configuration, or you can plane adapt to their needs,

and Basic version is available on the B747 rooms: bedroom, bathroom, kitchen, dining room, offices, two conference rooms, rest areas with a height of 3.60 m. Aeroflot is the advantage that saves space. ACJ380 offers the following facilities: fitness center, theater rooms, auditorium, conference rooms, rest rooms, showers and baths, dining room, separate accompaniment for the main deck, below deck are selected stores, smaller gymnasium and kitchen. B474-8 has 32 to 100 seats, while ACJ380 to 120 seats, which is similar to the advantageous in commercial versions. This parameter is influenced by the size of the aircraft as external as well as internal. The length of the B747-8 the only dimension that is greater than the ACJ380 by about 3.6 m. But the ACJ380 is higher by 4.6 meters higher and has a larger wingspan by 11.3 m. This affects the internal parameters of the aircraft, a comparison is shown in Fig. 3 **horná paluba-upper deck, hlavná paluba – main deck, 35% -né zvýšenie kapacity sedadlá so šírkou 46cm-35% increase in capacity, seats in width of 46 cm,, dl% increase in capacity, seats in width of 43 cmhšia-longer, 8% zvýšenie kapacity sedadlá zo šírkou. -**

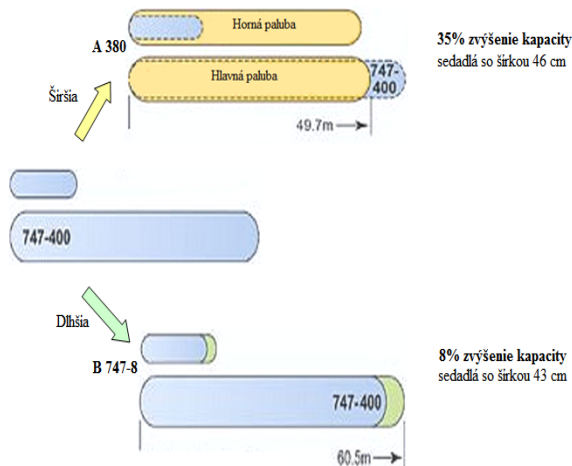


Figure 3 Comparison of B 747-8 VIP and the ACJ 380

Operating speed of the ACJ380 is Mach 0.89, while that of the B747 "only" Mach 0.86. Range aircraft ACJ380 is 17 250 km and B747-8 has a range of 17 196 miles. ACJ380 MTOW is 560 000 kg and aircraft B747-8 MTOW is 442 252 kg.

Today, fuel consumption is a very important factor in selecting an aircraft. The U B747-8 has consumption of 2.8 liters per seat for 100 km thanks to improved aerodynamic properties of wings shape, while at U ACJ380 is 2.9 liters of seat to 100 km.

Price is one of the most important criteria for selecting an aircraft, too. Currently, the price ACJ380 375.3 million USD and price B747-8 is

317.5 million USD. It means that for every purchase of five aircraft ACJ380 the sixth aircraft B747-8. [3]

6 OPERATORS OF PRIVATE JETS AIRCRAFT

Flying commercial jet aircraft is not only for those who own their own aircraft. There are many opportunities for individuals and companies who are interested in this kind of transport, either directly owning whole aircraft or stock ownership. They are mostly used by charter services companies. These are companies that offer private commercial aircraft on lease. Like with major airlines, there are differences the menus. For comparison, two are selected Airlines, Slovak Opera Jet OJSC in Bratislava and the American Society Airstream Jets, INC. based in Boca Raton Florida.

The above-mentioned charter companies are limited in its environment, prosperous societies, each with its own portfolio of services. Since Airstream Jets are more company-based in America, its services are of course of broader scope not only in America but also in Europe and other continents. Although Opera Jet is only a small company in Central Europe, yet one of the most successful companies of this type.

7 EVALUATION AND RECOMMENDATIONS

Opera Company Jet Ltd. is currently a successful charter company with the largest fleet of business jets aircraft in the Czech Republic and Slovakia. Their activity is limited to operation of own and foreign aircraft with a maximum capacity of 8 passengers, which represents maintenance, pilot training, catering, serving alcoholic and non alcoholic beverages, choose partners with the highest precision and caution. In addition to these activities, the Opera Jet became the sales representative for commercial aircraft Gulfstream company in Slovakia, the Czech Republic, Hungary, Bulgaria and Romania.

All these activities are sufficient for them to be in demand, being the most successful company in Central Europe.

If, however, competition in the neighboring countries increases, the company would be forced to adopt measures that could help increase company. One possibility is in the widespread activity aircraft owned Jet Opera. The second option is to purchase or lease of new aircraft higher capacity and greater flying range than

aircraft which currently operate. The main objective of the design of the present proposal other uses of aircraft in operation and most advantageous offer aircraft from aircraft were included in the analytical part, for the expansion of the fleet of the Opera jets.

Potentials of aircraft utilization

The requirements for this type of aircraft operations involve particular, convenience and speed of transportation. Aircraft technology also provides other potential uses. It depends on the carrier to expand its operations. There is a choice of different activities such as agricultural work, aerial work, flying hospital building work, parachute flight, communication, establishing aviation schools, etc. A suitable option for the company Opera Jet is communication. Communication includes:

- Lift banners
- Dropping leaflets
- Sound on board aircraft advertising.

The most likely activities to expand services is flying cruise flights. Yoga may be an appropriate addition of services due to relatively large favorites. They are divided into classic and luxurious. Classical sightseeing flights in Slovakia are focused on natural beauty, monuments, national parks, dams, lakes, lakes, historical buildings etc. Luxury flight would have included sightseeing flights in foreign destination with the possibility of landing and spending some time there, if required. It would also entail catering services.

The last option is in aerial works, which are classified into aircraft research, observation and radiography. One can use them to undertake monitoring density of traffic, survey and monitoring of agricultural areas, field survey, monitoring fires and other natural disasters. Such action require good frame quality, equipment and other support tools as well as special permits and inspections for flight crew members.

Outline of aircraft used currently

Opera Jet aircraft operated with a maximum capacity of 8 passengers and a maximum flying range 5556 km. In the case of need to extend the fleet of aircraft from business groups liners that provide greater space and thus more comfort, capacity and range is proposed Embraer Lineage 1000 aircraft the following reasons:

- Flexibility of interior,
- Size of the trunk,
- Comfortable and modern technical equipment

- Interior,
- Low maintenance costs,
- High processing performance,
- Compared to other business liner, the lowest price in the market.

The only drawback is in its external dimensions, carrying capacity and cab dimensions. The basic information include aircraft dimensions, engines, equipment and warranty. The dimensions are compared with the BBJ and ACJ family, the smallest, yet sufficient to provide flight at comparable comfort. Embraer Lineage 1000 is the engine type GE CF34-10E7-B (picture 21), with thrust of 88.96 kN. The engines offer high reliability to 99.8% and quality of individual components based on proven technology. The are of modular design - easy for integration of major assemblies and components and power plants system integration and dual FADEC system. Aircraft equipment meets the requirements of II category for a precision approach for III category automatic landing. Equipment includes automated flight manual with optimal performance data, EVS system, RNP 0.3, EGPWS system, dual FMS system with international databases, vertical angle of approach mode and LNAV / VNAV. Also included are the SATCOM equipment, display for pictorial view vertical situation, the dual FDR / CVR (DVDR), next AOC, meteorological radar with turbulence detection mode, ELT positioning system with responder and intelligent probes the system controls the angle of attack. Warranty for the different parts of the aircraft is shown in Tab. 2.

Parts	Warranty
Embraer Parts	5 rokov / > 5000 FH
Engine	5 rokov / > 5000 FH
Avionics	5 rokov / > 5000 FH
APU	5 rokov / > 3000 APUH / > 6000 cycles
Exterior paint	2 roky / > 1000 FH
Other vendor parts	5 rokov / > 5000 FH
Interior	2 years

Tab. 2 Warranty Embraer Lineage 1000

Embraer Lineage 1000 capacity is 19 passengers which is 115.7 cubic meters available and luggage space of 17.4 cubic meters cabin height 2 m, width 2.67 m and a length of 25.7 meters. The maximum speed aircraft is Mach 0.82, range 8344 km (picture 22). Permitted take-off runway length is 1,869 m and a maximum takeoff weight is 55,000 kg. The basic airframe useful volume is 115.7 m³, designed for 19 passengers, free, or mobile partitions divided the work up to five state-rooms and private sections for the rest of passengers such as WiFi-equipped with modern technology, Internet, enabling circuit TV monitor several programs and the like. Bid Embraer Lineage 1000 is \$ 50.5 million. [1] [4]

8 CONCLUSION

Ten years ago, the industry of trade jets began to focus mainly on the United States and to a lesser extent on Europe. On the contrary, Asia, the Middle East and African continent were not so relevant those days. The rapid growth of the trade jets industry and the end of the economic and financial crisis in 2008 and 2009 changed the situation in the market, turning around and selling aircraft to the U.S. which the slowly was transferred to Europe and Asia.

During the last three years, the interest shifted of small business jets to business jets with larger cabs, long distance capacity from 20 to 80 passengers in luxury and comfort, especially for the Middle East, South Africa, Asia and the Pacific. Just during the last year, aircraft were sold to China, the Philippines, Brazil, Nigeria, New Zealand, Indonesia and many other countries. This is a VIP B747 aircraft configuration, 757, 767 and 737, but most of the new Boeing Business Jet, Airbus ACJ and others.

The shorter distance or fewer passengers domestic routes customers may still choose from a wide range of small aircraft from Hawker to after Gulfstreams. Aircraft on biz-liners offer their clients the same level of comfort. The technical parameters in terms of range, speed and capacity are the same only with small variations. Therefore, the critical parameters remain dimensions, price, as internal, as well as external outfit. But the total perspective, taking into account all the parameters and for comparing aircraft, the most preferred airplane is the Embraer Lineage 1000.

Currently, the most competitive biz-liners are biz-wide body jets of Boeing Business Jet and Airbus ACJ, which offer a double deck aircraft. These are planes that offer the greatest comfort with the greatest capacity, speed to 0.89 M and a range of 17,250 km. From among the single storey wide-

body aircraft, more favorable are the Boeings, despite the larger space offered by Airbuses, because their new systems and structures achieve an ever decreasing fuel consumption and noise. Flying commercial jet aircraft is not only for those who own their own business jets. In addition to full ownership of aircraft and a unit of ownership is a possibility charters that offer charter company. These companies may operate their own aircraft or foreign aircraft have its own owner, but the charter company ensures the maintenance crew, flight planning and flight clearance sale. In Slovakia there is a charter company - Opera Jet. Although the Opera Jet is that only a small company in Central Europe is one of the most successful companies types. The proposal offered two options for the Opera Jet Company Ltd., of which the most appropriate and most likely activity are classic and luxury sightseeing tours due to great popularity and opportunities offered by our **destinations to Africa** with its variety of classic scenic flight. These activities would enable increased competition not only in Slovak, Czech, or Poland, but also in other countries Central and Eastern Europe.

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