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POSSIBLE SOLUTIONS FOR GENERAL AVIATION OF THE CITY OF ZAGREB

ABSTRACT

General aviation, which in practice includes small aircraft in non-commercial traffic, in the City of Zagreb uses two aerodromes, Pleso and Lučko. Zagreb Airport at the Pleso location is primarily intended for the handling of commercial aircraft, but provides also services to small aircraft in commercial and non-commercial flying. The airfield Lučko is a sport and training aerodrome which accommodates operations of sport and recreation flying, pilot training, activities of parachutists, gliders and flying-model constructors. Lučko Airfield is open to traffic about half a year and it does not satisfy the non-commercial general aviation requirements. The work presents the possibilities of developing the capacities for the needs of general aviation in the City of Zagreb.

KEY WORDS

general aviation, airport, airport development

1. INTRODUCTION

The City of Zagreb is served by two aerodromes: Zagreb Airport, located south-east of the city and Airfield Lučko, located south-west of the city. Zagreb Airport is part of the combined civil-military aerodrome, constructed and equipped for international and domestic traffic whose manoeuvring area, apart from commercial aircraft is also used by the Croatian Air Force (Hrvatsko ratno zrakoplovstvo - HRZ). Airfield Lučko is also a combined aerodrome, military-civil, owned by the Ministry of Defence of the Republic of Croatia. Apart from the needs of the Croatian Air Force and police, it is also used for sport and recreational flying, parachuting, gliding, flying-model construction and pilot training. The manoeuvring area is not a joint one. Because of the grass manoeuvring area, the airfield is operative about half a year, i. e. it is

open to traffic only during the dry season and does not satisfy the needs of non-commercial general aviation.

2. CURRENT CONDITION AND TRAFFIC

At Zagreb Airport the public civil air traffic as well as flying of military aircraft are operated on the same runway. Aircraft traffic is measured in tens of thousands of operations. At Airfield Lučko the operations of military and civil aircraft are independent from the aspect of manoeuvring areas, and they proceed on grass manoeuvring area.

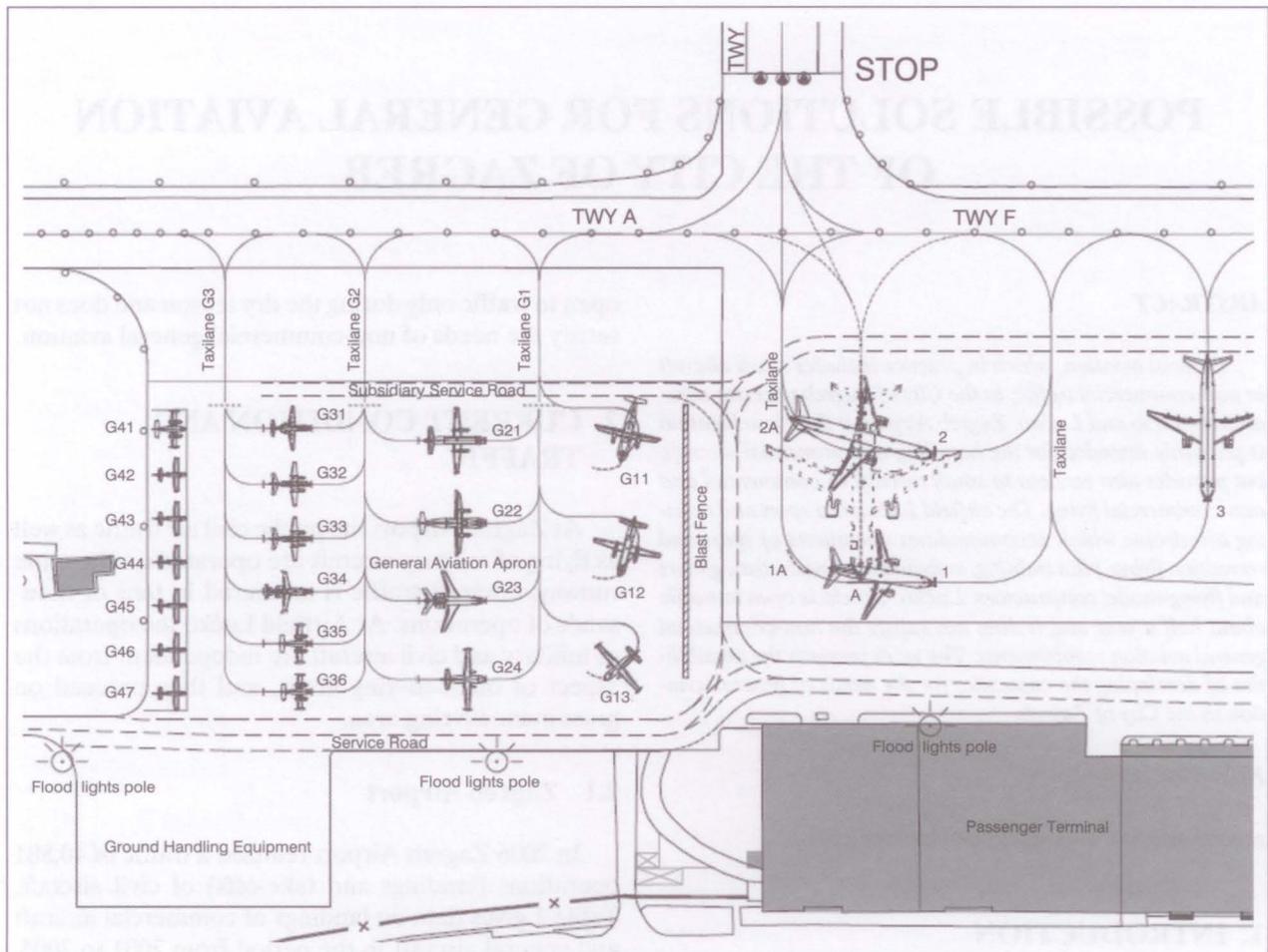
2.1 Zagreb Airport

In 2006 Zagreb Airport realized a traffic of 40,881 operations (landings and take-offs) of civil aircraft. Table 1 gives data on landings of commercial aircraft and general aircraft in the period from 2001 to 2005. The air traffic has increased over the last five years by 46%. The share of small aircraft in this period fluctuated between 17 and 22.6% in relation to the total number of aircraft. The increase in the number of small aircraft over the last five years is 40%.

The aircraft are handled at the apron of the size of about 1000×170m with 21 positions for commercial aircraft and 20 positions for general aircraft. The section of the apron for small aircraft is presented in Figure 1. The apron capacity during peak load is almost fully utilized and there is the need to expand, i. e. increase the apron capacity. In the winter flight schedule the apron capacity is satisfactory whereas in summer flight schedule the traffic is increased and there is the problem of the lack of apron capacity for commercial aircraft and general aviation. With the increase in annual air traffic, there is also the tendency of a greater

Table 1 - Landings of commercial and general aircraft in the period from 2001 to 2006 at Zagreb Airport [1]

Landings	2002		2003		2004		2005		2006	
	Landing	%								
commercial	11,550	82.3	11,555	77.4	12,817	78.5	15,674	82.1	16,960	83.0
gen. aviation	2,491	17.7	3,371	22.6	3,516	21.5	3,413	17.9	3,480	17.0
total	14,041	100.0	14,926	100.0	16,333	100.0	19,087	100.0	20,440	100.0

**Figure 1 - Section of Zagreb Airport planned for general aviation**

increase in the number of aircraft in peak periods in the summer months.

Zagreb Airport is planning to expand the apron for small aircraft towards south-west and to reconstruct the existing section of the apron for small aircraft in order to accommodate commercial aircraft on the respective area. The apron expansion thus comes to the facilities which represent a barrier and limitation to further development (water-supply and meteorological station and airport fence).

2.2 Lučko Airfield

At Lučko Airfield there is no systemic monitoring and recording of the number of operations. The ca-

pacities of the manoeuvring area and apron are greater than the existing traffic needs. The location is presented in Figure 2. For many years already there has been a plan [2] for the construction of a paved manoeuvring area which would allow the airfield to be open the whole year round. Due to this drawback, the aerodrome is used for civil flying i. e. other activities in favourable meteorological conditions, and this is the period from spring to autumn. In the remaining period of the year, due to rain and snow, the grass area gets soaked and the loading capacity falls below the minimally permitted for usage. The aerodrome is closed then for air traffic (NOTAM is issued). The Croatian Ministry of Defence (MORH) as the owner of the land has no interest in constructing a runway

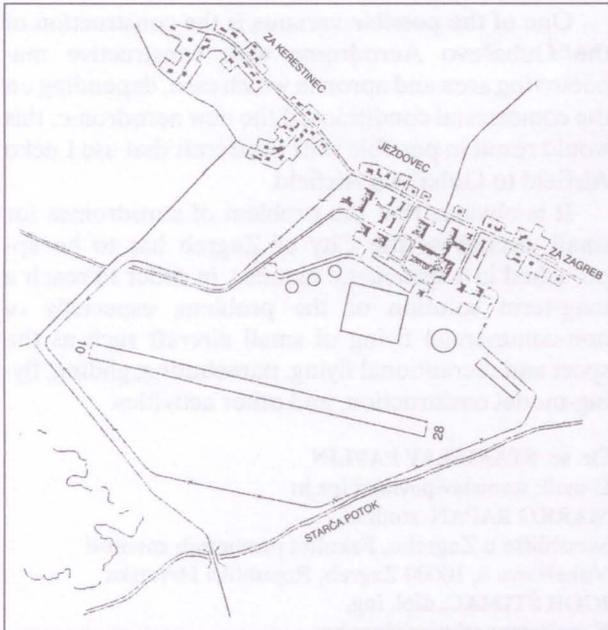


Figure 2 - Location of Airfield Lučko

since the army is using their own heliport whereas Lučko Airfield users cannot provide the means for the construction of a constructive aerodrome manoeuvring area.

3. GUBAŠEVO AERODROME AND OTHER AERODROMES IN THE ENVIRONMENT OF ZAGREB

There is an initiative to construct an aerodrome for small aircraft in the Krapina-Zagorje County. The Gubaševo location has been selected, at some 30 kilometres from Zagreb. The aerodrome at that location would cover the needs both of the Krapina-Zagorje County and the City of Zagreb. Basic documentation has been made, the location permit obtained and now the land purchase is in its final phase. The construction of a paved manoeuvring area and apron for the critical aircraft of some 15 seats is planned.

Gubaševo Airport can be very attractive for the users from Zagreb since it is in close vicinity of the motorway and in given conditions, in case the manoeuvring area is constructed, could be adequate replacement for the Airfield Lučko, in favourable commercial conditions for landing.

There are also other aerodromes in the Zagreb surroundings which do not have the paved manoeuvring area, nor has their construction been planned. These are:

- Landing site Buševac, 26km from Zagreb, and
- Landing site Šarampov, 43km from Zagreb.

4. POSSIBLE SOLUTIONS

The construction of the manoeuvring area and apron at the Airfield Lučko is a cost of several tens of millions of kunas. The revenues of aerodrome and non-aerodrome activities should cover the costs of investment and exploitation. The revenues from the current users of the Lučko Airfield services are far from sufficient for starting the mentioned investment. A possible solution that should be restudied economically is, with the consent of all the participants, by redirecting the general aviation in domestic traffic from Zagreb Airport to Lučko Airfield.

The feasibility study should prove whether it is sufficient to move only the domestic general aviation from Zagreb Airport to Lučko Airfield, or, in order to make the investment economically justified, it is necessary to move also the general aviation in international traffic i. e. whether along with moving the complete general aviation, such investment is justified. The moving of the general aviation to Lučko Airfield would require also the construction of the passenger handling facility.

In order to provide services to everyone under equal conditions, the aerodrome operator should be an independent body. One of the solutions would be in the establishment of an enterprise (operator) by the City of Zagreb that would manage the aerodrome.

Before making the Feasibility Study of the development of the facilities and the areas for commercial general aviation at the location of Lučko Airfield, it is necessary to analyse the spatial, traffic and navigation possibilities of location. The approach from the west features barriers, both natural and artificial that do not penetrate the approach landing area only in the conditions of non-instrumental runway of reference code A, so that the aerodrome could be used only for the aircraft of general aviation that require reference runway length of up to 800m, having wingspan of up to 15m and main landing gear wheel spacing of up to 4.5m [3, 4]. The approach from the east is today free of barriers and for instrumental approach, at least the non-precision one, for runway of reference code 2, which means bigger aircraft of general aviation. The present illegal construction of private houses could one day endanger the approach from this side.

The construction of the new passenger terminal and apron at Zagreb Airport would free the area of the existing apron and passenger terminal that would remain in the function of handling general aviation, low-cost, non-scheduled carriers, VIP aircraft, etc. [5].

With the development of traffic at Zagreb Airport the single runway with simple system of taxiways could become the capacity limitation from the aspect of combining small and big aircraft that have different speeds in landing and increased aircraft separation.

Here are also the aircraft of the Croatian Air Force that use the airport runway. This could require re-direction of small aircraft to Lučko Airfield. Already today it may be noticed in the taxiing along taxiways that small aircraft represent a disturbance to the big ones during peak times and that the optimal location of the apron for small aircraft would be approximately in the middle of the runway so that small aircraft would burden the taxiways and the runway as little as possible.

All this makes it obvious that it is necessary to analyse the capacities of the manoeuvring area and the apron of Zagreb Airport, develop the air traffic forecasts and determine the possibility of long-term handling of small aircraft at the airport. On the other hand, it is necessary to make an analysis of the necessary investments in Lučko Airfield for the accommodation of small aircraft as well as the revenues from aircraft and non-aircraft activities and to determine the investment cost-efficiency.

5. CONCLUSION

General aviation has not been solved in a satisfactory manner in the city of Zagreb, primarily because of the grass manoeuvring area at Lučko Airfield. The aerodrome operates for half a year only and thus limits the users of the sport and recreation aircraft, gliders and parachutists in their activities. The majority of these activities cannot be performed at Zagreb Airport.

A possible solution for the financing of the construction of the Lučko Airfield infrastructure is to re-direct small aircraft from Zagreb Airport to Lučko Airfield. This idea has to pass the spatial planning, traffic and navigation analysis as well as checking through the Feasibility Study. The expected air traffic indicates the possible lack of capacities of the runway due to combining small, low-speed and big, high-speed aircraft, resulting in greater separation in approach, and reducing the runway capacity. In one phase of development there will come to saturation of capacities as if it were common that first small aircraft are eliminated from traffic at Zagreb Airport.

Long-term development of Zagreb Airport plans the construction of a new passenger terminal, respective aprons and other surfaces. In that case the existing apron remains with large capacity for the handling of non-scheduled, low-cost and other carriers as well as general aviation. After having completed this phase of development, in the commercial sense, Zagreb Airport will probably tend to keep the general aviation and not leave it to Airfield Lučko, unless small aviation, due to the lack of manoeuvring area capacities becomes a hindrance to regular operations of commercial aircraft.

One of the possible variants is the construction of the Gubaševo Aerodrome with constructive manoeuvring area and apron in which case, depending on the commercial conditions of the new aerodrome, this would result in possible shift of aircraft that use Lučko Airfield to Gubaševo Airfield.

It is obvious that the problem of aerodromes for small aircraft of the City of Zagreb has to be approached in a systematic manner, in order to reach a long-term solution of the problem, especially of non-commercial flying of small aircraft such as the sport and recreational flying, parachuting, gliding, flying-model construction, and other activities.

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SAŽETAK

MOGUĆA RJEŠENJA ZA GENERALNO ZRAKOPLOVSTVO GRADA ZAGREBA

Generalno zrakoplovstvo, koje u praksi obuhvaća male zrakoplove u nekomercijalnom prometu, u gradu Zagrebu koriste dva aerodroma, Pleso i Lučko. Zračna luka Zagreb na lokaciji Pleso prvenstveno je predviđena za prihvata komercijalnih zrakoplova ali daje i usluge malim zrakoplovima u komercijalnom i nekomercijalnom letenju. Airfield Lučko je sportsko-školski aerodrom na kojem se odvijaju operacije sportsko-rekreacijskog letenja, obuka pilota, aktivnosti padobranaca, jedriličara i aviomodelara. Airfield Lučko je otvoreno za promet oko pola godine i ne zadovoljava potrebe nekomercijalnog generalnog zrakoplovstva.

U radu se ukazuju mogućnosti razvoja kapaciteta za potrebe generalnog zrakoplovstva u gradu Zagreba.

KLJUČNE RIJEČI

generalno zrakoplovstvo, aerodrom, razvoj aerodroma

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