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## Accessibility of the Poznań Ławica Airport and the FUA

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Analysis of the multimodal mobility system  
at the Poznań Airport and the FUA

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Written by Robert Loch, Adam Machelski





# Table of Contents

1. Introduction .....	2
2. Ławica and Functional Urban Area (FUA) .....	2
2.1. General description .....	2
2.2. Airport: facts and figures .....	4
2.3. Facts on environmental and social engagement .....	5
3. Characteristics of the mobility system .....	6
3.1. Access to the Ławica Airport and the FUA .....	6
3.1.1. Characteristics of the road network and services .....	7
3.1.2. Characteristics of the rail network and services .....	8
3.1.3. Characteristics of the cycling network and services .....	9
3.2. On-demand mobility services .....	10
3.2.1. Car-sharing .....	10
3.2.2. Ride-sharing .....	11
3.2.3. Other on demand services .....	11
4. Mobility information systems .....	11
4.1. Description of existing mobility information systems .....	11
4.2. Potentials and gaps of mobility information services .....	14
5. Conclusions .....	15
6. Sources .....	16



## 1. Introduction

The international Henryk Wieniawski Poznań-Ławica Airport (IATA code: POZ, ICAO code: EPPO) is one of the oldest airports in Poland, situated 7 km west of the center of Poznań. In terms of the number of served passengers and the number of air operations, this is the 7<sup>th</sup> largest Polish airport, after Okęcie in Warsaw, Balice in Krakow, Rębiechowo in Gdańsk, Pyrzowice, Starachowice in Wrocław and Modlin. At first, the Port was to be named after Ignacy Jan Paderewski, but as this name was given to the airport in Bydgoszcz, the patron had to be changed. In 2005, action was taken to name the Port after Henryk Wieniawski - a prominent Polish violinist, composer and pedagogue. The name was given on 29 October 2006 - on the day of the final of the 13<sup>th</sup> Henryk Wieniawski International Violin Competition.

## 2. Ławica and Functional Urban Area (FUA)

### 2.1. General description

The Ławica Airport is situated in the western part of the administrative territory of the City of Poznań, only 7 km from the city center. The Airport connects Poznań with cities in Europe and around the world, and serves about 1.5 million passengers a year. Until 2012, the airport did not fully utilize its capacities due to, among other things, its poor, compared to European standards, infrastructure (a small passenger terminal, no parallel taxiway for airplanes), as well as the state's transport policy, favoring for decades the development of the central airport in Warsaw. A continued growth in the number of passengers using the Airport has been observed since 2012. This situation is presented in the graph below.

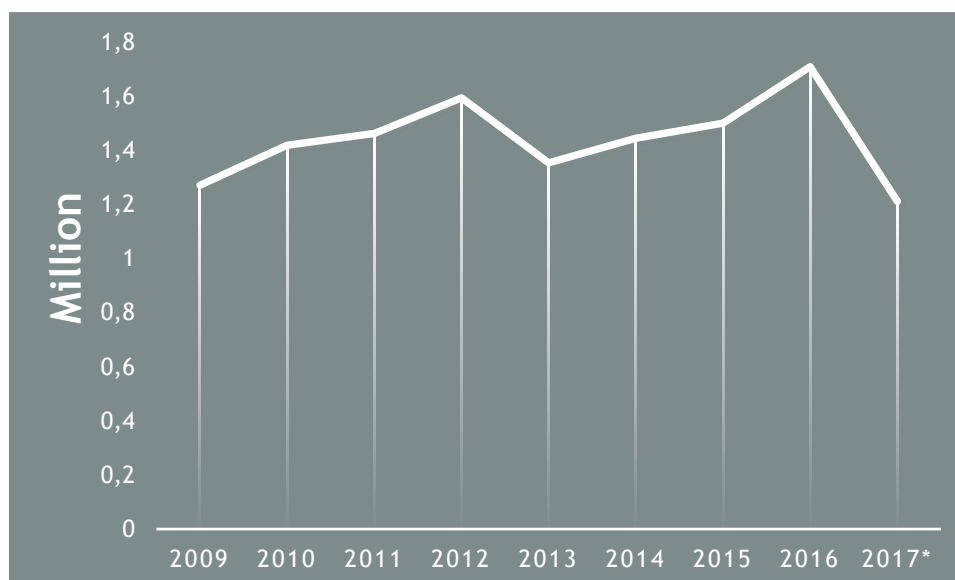


Figure 1. Number of passengers during last few years (2017\* - data based on September report).

The situation improved owing to, e.g. the modernization of the airport's infrastructure (the passenger terminal and the taxiway were extended, new parking spaces were created) due to UEFA EURO 2012. A check-in hall, arrival hall, baggage handling area and office facilities were built adjacent to the existing terminal on its western side.

It is estimated that the current infrastructure enables serving 3.5 million passengers a year.

Functional Urban Area (FUA) - an area included in the Poznań Metropolitan Area. The FUA is located in the Wielkopolskie Voivodeship and covers the urbanized area around Poznań with centers having well-developed functional ties in the social and economic areas, with developed transport infrastructure. These ties are particularly strong with Poznań - the capital of the region. The FUA is made up of 23 territorial units (Buk, Czerwonak, Dopiewo, Kleszczewo, Komorniki, Kostrzyn, Kórnik, Luboń, Mosina, Murowana Goślina, Oborniki, Pobiedziska, Poznański Powiat, Poznań, Puszczykowo, Rokietnica, Skoki, Stęszew, Suchy Las, Swarzędz, Szamotuły, Śrem, Tarnowo Podgórne), arranged in two rings surrounding the central city (Poznań). The FUA accounts for 11% of the Wielkopolskie Voivodeship and is inhabited by 1 million people, i.e. 30% of the population of Wielkopolska.

The areas of the town and municipality of Śrem are the southernmost area of the FUA. In the east, the agglomeration is delimited by the areas of the towns and municipalities of Kostrzyn and Pobiedziska. The northern part of the agglomeration is made up of the areas of the towns and municipalities of: Murowana Goślina, Oborniki and Szamotuły. The landscape of this part of the agglomeration is dominated by forests. In the west, the agglomeration is delimited by the areas of the Tarnowo Podgórne municipality and the towns and municipalities of Buk and Stęszew. The FUA is characterized by a high level of urbanization of non-urban areas, high demographic potential, a resilient and well-developed labor market, dynamic economy, a well-developed transport network, abundant natural environment and high attractiveness for tourists. All this offers good prospects of comprehensive development of this area, which is attested to by leading positions occupied by the FUA in rankings of the development level of Polish agglomerations and by actual investment projects pursued there by both domestic and foreign enterprises. The agglomeration accounts for 40% of companies operating in the Wielkopolskie Voivodeship and over 40% of employees working in Wielkopolska.

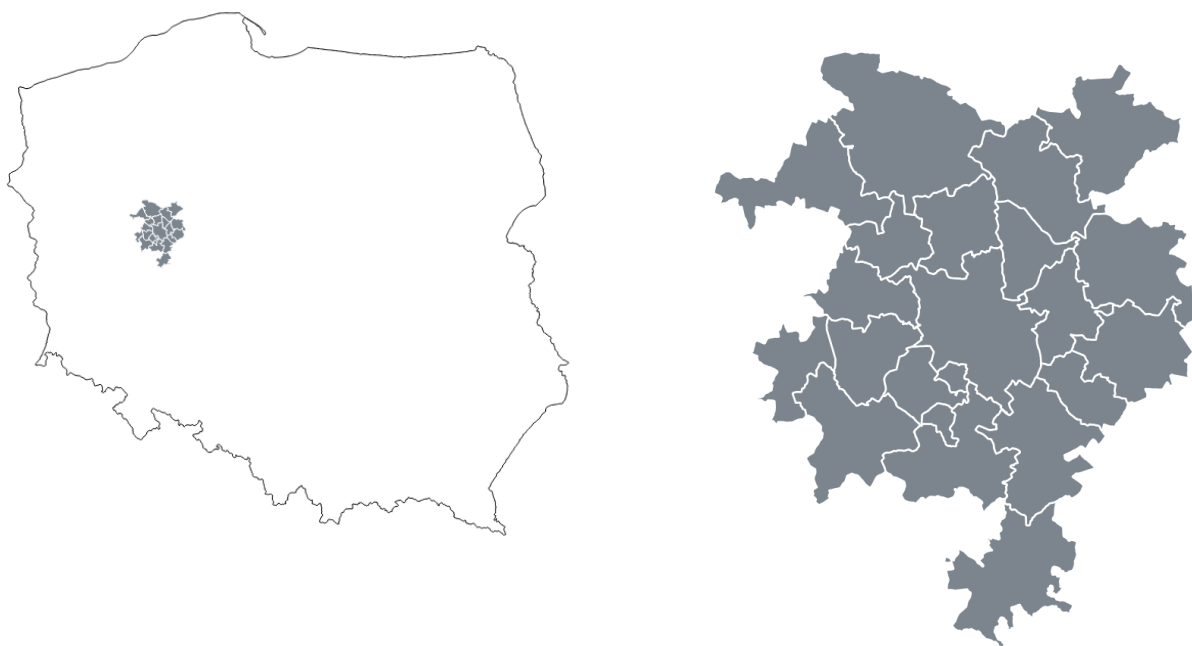


Figure 2. Functional Urban Area (FUA) Poznań. The FUA relative to the administrative borders of Poland.

Due to its location, the Ławica Airport is an international airport. A short distance to Warsaw (about 200 km) is the reason why airline operators offer a large number of regular flights between Poznań and Warsaw. This route is covered in about 55 minutes. The catchment area of the airport is presented in the figure below.

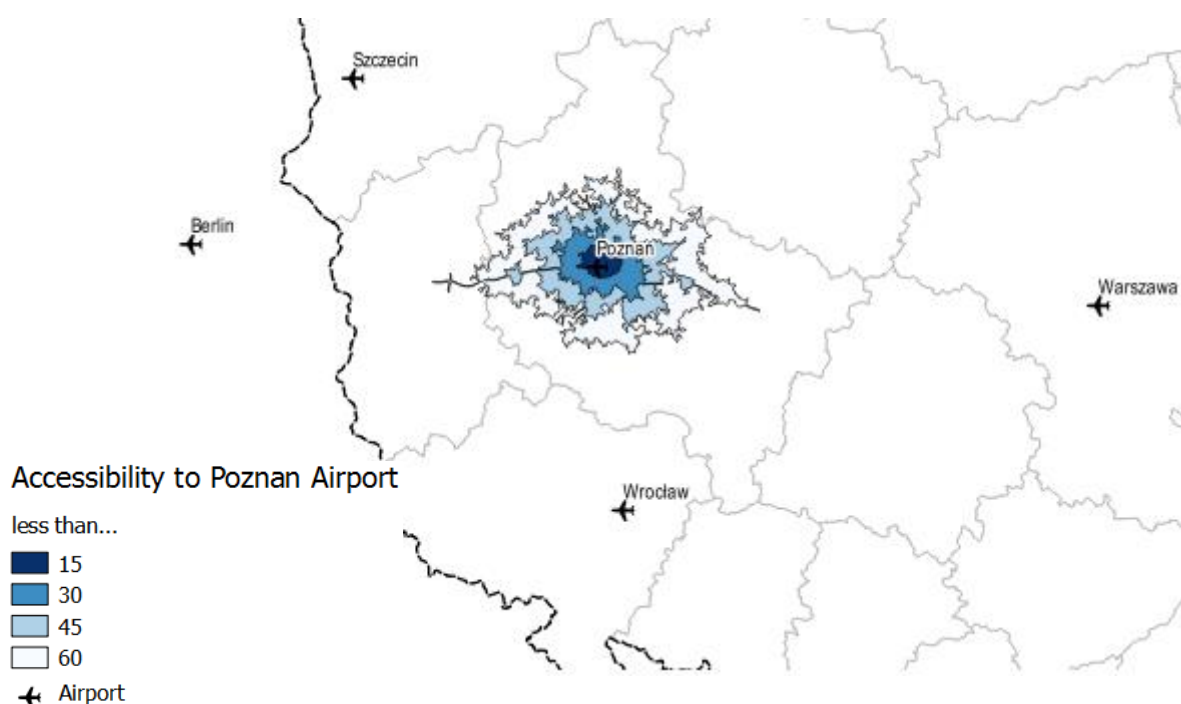


Figure 3. Catchment area of the Ławica Airport (minutes).

In the illustration above, other nearby airports are also presented. The figure shows the accessibility of the airport for means of transport, within maximum 60 minutes. The catchment area covers almost the entire Wielkopolskie Voivodeship. The accessibility area is extended in the east-west direction by the A2 motorway. The Ławica Airport's catchment area is inhabited by 712,256 people living in the 15-minute travel time zone and 1,741,611 people living in the up to 60-minute travel time zone.

## 2.2. Airport: facts and figures

The Ławica Airport is an international airport. This is the 7<sup>th</sup> airport in Poland in terms of the number of served passengers. During the preparations for UEFA EURO 2012, the Airport infrastructure was significantly improved (the passenger terminal and the taxiway were extended, new parking spaces were created). The Airport's passenger transport capacity is estimated at 3.5 million passengers (before the modernization, this was 1 million). The Poznań Airport handles now 7 regular connections (Warsaw, Frankfurt am Main, Dusseldorf, Copenhagen, Munich, Dubrovnik, Zadar) and 18 low-cost connections (e.g. Burgas, Barcelona, Bristol, Edinburgh, Liverpool, London, Oslo, Paris, Rome and Stockholm). In the summer season, travel agencies offered 29 charter destinations in Bulgaria, Croatia, Egypt, Greece, Spain, Morocco, Portugal and Turkey.



Month	Total Passenger Traffic	Air Operations	Regular Traffic	Charter Traffic	General Aviation
2017 *	1 212 246	15 756	868 712	340 501	3 033
2016	1 710 216	24 776	1 295 556	408 900	5 760
2015	1 500 918	21 819	1 096 878	397 614	6 426
2014	1 445 350	20 998	1 025 264	413 333	6 753
2013	1 355 056	20 602	1 022 095	326 636	6 325
2012	1 595 221	25 261	1 194 530	393 671	7 020
2011	1 463 468	23 069	1 066 568	389 835	7 065
2010	1 419 121	23 601	1 040 139	372 056	6 926
2009	1 271 757	22 862	923 530	341 977	6 250

Figure 4. Statistics of Poznań Airport (2017\* - data based on September report).

## 2.3. Facts on environmental and social engagement

### Acoustic environment

The last few years saw an intensive development of the Poznań Airport infrastructure. Modernization works involved the development of the Airport infrastructure, improvement of the security system and development of fire safety systems. The works were carried out in a manner that did not have major adverse effects on the environment. The Airport undertakes environment-friendly actions in order to meet the EU environmental standards. The Ławica Airport takes extensive measures to reduce aircraft noise. In 2009-2011, the Ławica Airport put special emphasis on implementing solutions that will enable reducing night-time air operations, which will translate into better acoustic conditions, especially in urban areas near the Airport. As a result of mediations with carriers and reorganization of the aviation infrastructure related to the necessary extension and modernization of the Ławica Airport, the Airport undertook measures to reduce the number of night-time air operations to 12 take-offs and landings of passenger aircrafts (regular and charter flights) and to 4 take-offs and landings of General Aviation (GA) aircrafts with turbofan engines with a take-off weight of not more than 5,000 kg.

Due to its extension, the Ławica Airport applied, in 2011, for a legal approval of the restricted use area delimited based on the assumptions and data adopted in the environmental impact report for the planned extension and modernization. The restricted use area covers 10.16 km<sup>2</sup>, while the area of the zone related to residential development is 2.75 km<sup>2</sup>. The estimated number of inhabitants is about 6 thousand, i.e. approximately 1,100 residential buildings in the inner zone of the area.

As part of measures to improve the acoustic conditions for residents of the inner zone of the restricted use area, a conciliation procedure has been developed to help owners of real estate to verify claims related to improvement of the acoustic comfort in a cost-effective and fast way instead of long court proceedings.



Moreover, a continuous descent approach (CDA) was introduced in August 2012. Using this approach allows for minimizing fuel consumption as well as reducing noise and exhaust emissions to the atmosphere.

#### Flora and fauna

As there are no protected natural habitats in its immediate vicinity, any modernization of the Airport and its operation have no adverse effects on fauna and flora. Bird control methods are in place at the Port to enhance the passengers' safety.

#### Society

The Airport has been conducting a long-term campaign concerning the project's impact on the environment and residents. The Airport's information services carry out a comprehensive social dialogue with residents of Poznań and the entire Wielkopolskie Voivodeship. An email address for stakeholders who can make comments and inquiries or put other motions related to the Port's impact on the environment has been launched on the Airport's websites.

#### Water and sewage management and municipal waste

In order to ensure high efficiency of the equipment, which guarantees the safety of the land and water environment, the systems for pre-cleaning and discharging waste into soil are regularly inspected and subjected to regular maintenance works in accordance with the manufacturers' instructions. A permit required under the Water Law Act for the construction of water facilities related to the projects being implemented was issued on 23 January 2012. Works are underway to complete documents necessary to obtain a permit required under the Water Law Act for post-military areas (airport apron on the northern side of the Airport) obtained by the Port.

All waste generated within the Port is and will be recorded with respect to its quantities and quality, in accordance with applicable law. Waste generated within the Airport is selectively collected and then stored in designated and marked storage locations in the storage facility. Once an adequate quantity has been collected, waste is transferred for recovery or disposal. The Airport transfers all waste generated within it to companies authorized by a competent authority to conduct business involving waste management (recovery, disposal, storage, collection and transport). The Airport carries out selective collection of waste generated by its employees, passengers and guests using the services rendered within the Port.

The Airport puts a lot of emphasis on reducing the generation of hazardous waste: energy-saving lighting devices are used, modern and durable equipment is purchased, deposits for packaging of used hazardous substances are being introduced. Grass on green areas is mown, dried and sold to private entities, which attests to a high level of "waste" culture.

## 3. Characteristics of the mobility system

### 3.1. Access to the Ławica Airport and the FUA

The Airport can be accessed only by road (using 307 voivodeship road - Bukowska Street). The entire Airport is located within the administrative territory of the city of Poznań. The Port is in the western part of the city, only 7 km away from the center of Poznań. Its location is presented in the figure below.



Figure 5. Location of the City of Poznań and the Poznań Airport.

### 3.1.1. Characteristics of the road network and services

#### Access to the Airport by car

The Airport can be accessed easily by car using the modernized Bukowska Street. The most convenient way to get to the Airport from the east and south leads through Poznań A2 motorway. Taking A2 motorway towards Świecko, turn right at road interchange Poznań-Zachód and, driving along S-11 express road, get to 307 national road (exit: Poznań-Ławica) which will lead you directly to the Ławica Airport. This way is also the most convenient if you want to get to the Airport from the west. If you are coming in from the north, take S-11 express road and then, at Poznań-Ławica interchange, turn left to 307 national road which will lead you directly to the Airport.

#### Access to the Airport using public transport

The Ławica Airport in Poland is well-connected with the city center by public transport. There are bus stops right in front of the passenger terminal and in its immediate vicinity. At present, there are four bus connections between the Airport and the city center - the shortest and fastest one - Line 59 - connects the Airport with Poznań Główny Railway Station in 22 minutes, and depending on the time of the day - shuttles every 15 - 20 minutes. Equally fast but more comfortable transport services are rendered by taxis.

In order to accelerate travel between the Airport and the city center, special facilities for buses and taxis have been arranged along Bukowska Street, e.g. bus-only lanes and right-of-way at intersections.



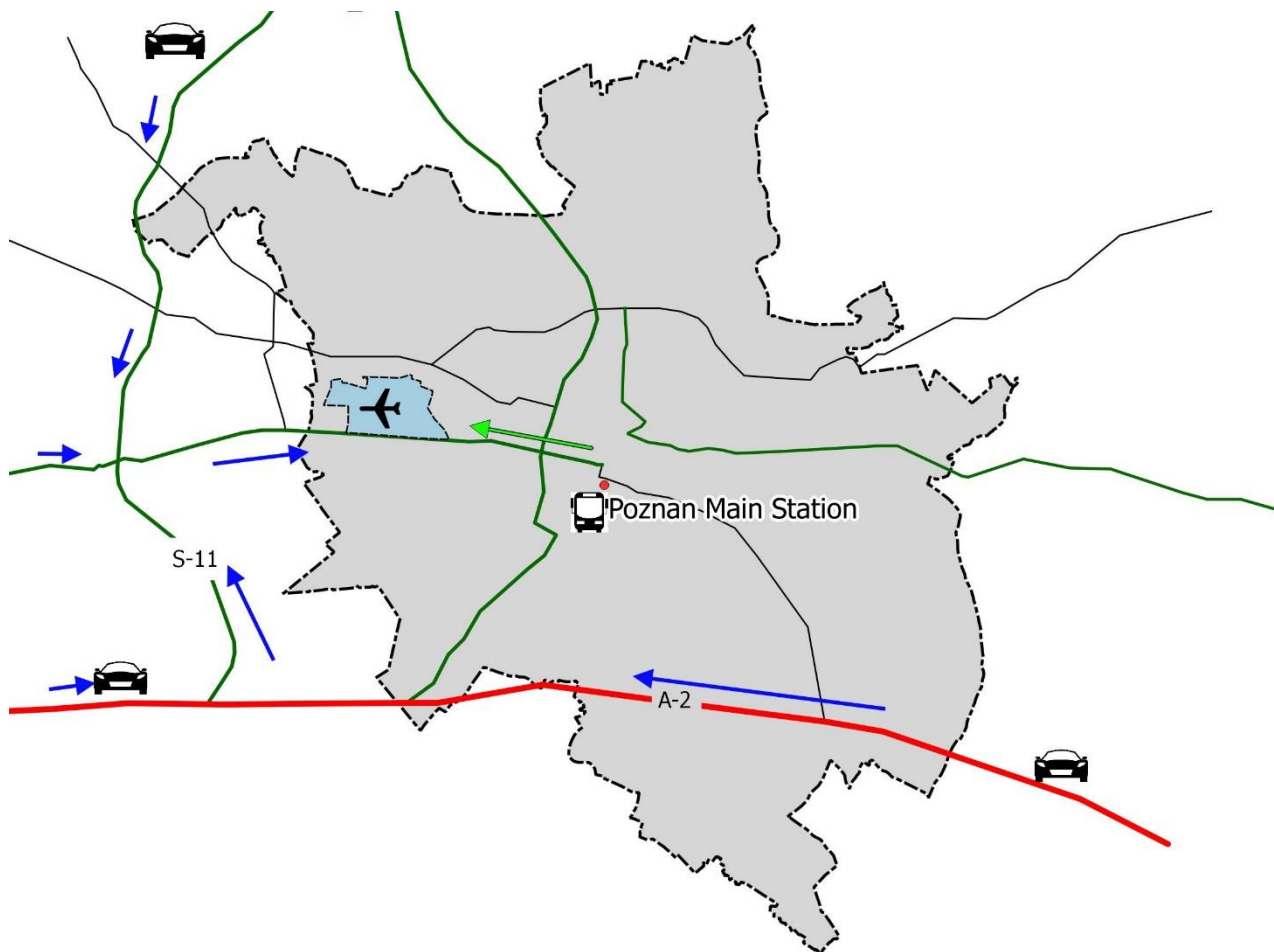


Figure 6. Access to the Airport by car and public bus.

### 3.1.2. Characteristics of the rail network and services

At present, the Ławica Airport is not connected with public railway transport (tram or train). Conceptual work in this respect was commissioned by the Marshal Office in 2007 and by the Poznań City Hall in 2012. Both concepts assumed that such a connection should be fast, reliable (punctual), attractive, aesthetic, cost-effective and feasible. A railway connection between the Ławica Airport and the Poznań Główny Railway Station was taken into account. Performed analyses were aimed at accomplishing the above objectives so as to develop a solution that would be competitive with other means of transport, especially the car, which is the main reason for congestion of the city's transport routes. Improved access gives greater chances of winning new customers of the Airport and retaining the existing ones. In the case of the Ławica Airport, improved access has to be based on two features, namely short time and reliability of access. **Time of access** calculated based on the total time needed to arrive at the Airport, i.e. the time of travel, reaching the point from which the travel starts, time of waiting for the vehicle and change, is of particular importance in the case of shorter access ways. On further distances (from outside the FUA), **reliability** of the connection is more important. Besides improving the access to the Airport, the connection between the Ławica Airport and Poznań Główny Railway Station is aimed at:

- balancing the transport system on roads leading to the Poznań Ławica Airport,
- increasing the prestige of the Poznań Ławica Airport,

- low costs of the maintenance of the connection and its short time,
- no adverse impact on the environment.

There were a lot of concepts of how to connect the Airport with the railway station in Poznań. The figure below shows an option which has been considered to be the most feasible due to low construction costs and favorable functional characteristics.

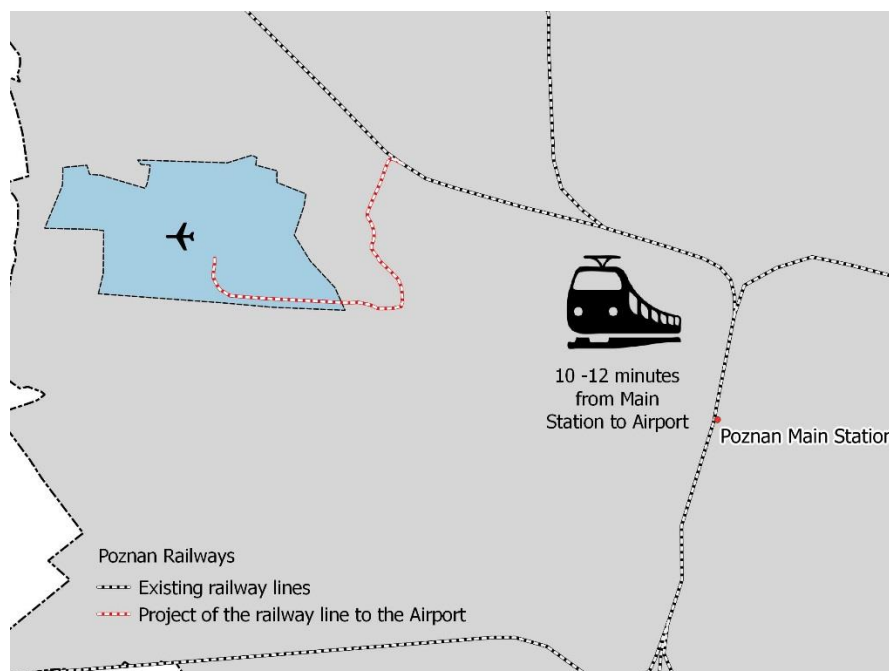


Figure 7. Recommended Poznań Główny - Poznań Ławica railway connection.

### 3.1.3. Characteristics of the cycling network and services

The Ławica Airport is accessible also for cyclists. Around the railway station there is bicycle infrastructure enabling people to get around using bicycles. The city center is connected with the Airport by a bicycle lane with a total length of 6.1 km, running mainly along Bukowska Street. When weather and traffic conditions are favorable, the travel time is about 21 minutes.

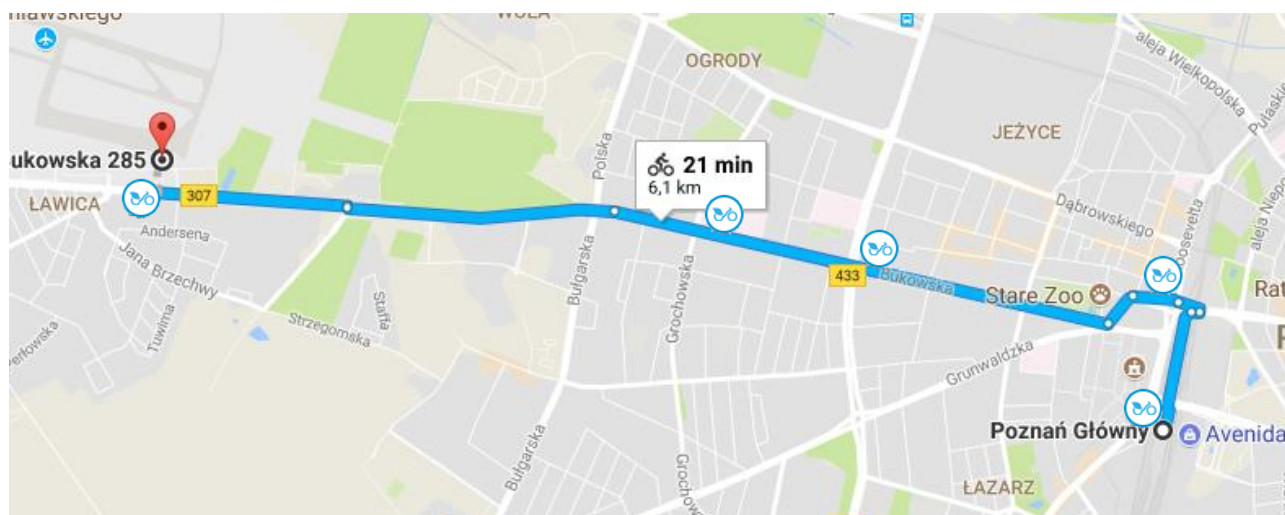


Figure 8. Access to the Airport by bicycle.

Poznań operates Poznań Public Bike System (*Poznański Rower Miejski - RPM*) used by an increasing number of users. The number of PRM stations and bicycles keeps increasing as well. The nearest PRM station is located 500 meters from the Airport (on Brzechwy Street).

A bicycle can be rented using a mobile application. For up to 20 minutes, a bicycle can be rented free of charge. It is possible to get from the railway station to the Airport free of charge as there are 3 PRM stations along the route at which the bike can be changed to start travel anew.

### 3.2. On-demand mobility services

The city of Poznań has developed a car-sharing concept providing for self-service pay-per-minute car rental. It is assumed that hybrid cars will be deployed first, to be followed by electric ones. At present, Traficar, offering a fleet of 150 cars, is the company responsible for the maintenance and repairs of shared vehicles.

Furthermore, thanks to cooperation with Blinkee, the City of Poznań offers electric scooters which can be rented per minute using a mobile application.

Besides sharing cars and scooters, it is possible to rent a private car - the price is to be agreed in an agreement concluded with the private owner operating the sales point in the Airport lobby.



Figure 9. Logos of Traficar and Blinkee.

#### 3.2.1. Car-sharing

Traficar, dealing with per-minute car rental, offers an opportunity to rent a car to get to the Airport in Poznań. For covering about 10 km by a rented car, residents of Poznań pay approximately PLN 8. Having downloaded the application, one can create an account and get around freely by a pay-per-minute rental car. With the application, it is possible to book one of the cars shown on the map. The user has 15 minutes to get to the car. To open the car, the user should scan the QR code on the car. Then, he/she should get into the car and take the key or card from the glovebox. To discontinue rental, the user should put the key or card back to the glovebox and click on "discontinue rental". One shared car can substitute up to 19 private ones. Thanks to the economy of sharing, not only do we reduce the number of vehicles moving around the city, but we also contribute greatly to the promotion of pro-ecological and pro-social attitudes. All cars in the Traficar's offer meet the Euro 6 standard which, compared to Euro 1, reduces dust emissions by more than 96% and those of nitric oxides and hydrocarbons - by 85%.

With the mobile application, one can find and rent a scooter parked nearby. The user has 15 minutes to get to the vehicle. The scooter is started and the rental is discontinued also via the application. Once



the vehicle has been unlocked, the user should open the storage compartment and take from it a safety helmet with a sanitary liner. The user has free two extra minutes to get ready for the ride. After arriving at the destination, the user should park the scooter, put the helmet back to the storage compartment and discontinue using the vehicle in the application. Depending on the selected package, a scooter can be rented even for as little as PLN 0.11 per minute in the case of a 3-month subscription. In the case of standard recharging, the cost of renting a vehicle is PLN 0.69 per minute. Students pay PLN 0.43.

### 3.2.2. Ride-sharing

As regards ride-sharing, the BlaBlaCar web portal can be used, through which drivers can offer a seat in their cars, while passengers can find journeys offered by drivers. Each user of the ride-sharing system decides with whom they want to travel and how the cost of the journey will be shared. After the ride, BlaBlaCar users may also rate each other. The system can be used for both long- and short-distance journeys, and its flexibility allows for travelling both to and from the Airport.

### 3.2.3. Other on demand services

Besides the above options of moving around the city, travellers can use also services rendered by private car owners cooperating with Uber. With the Uber application, one can order a ride with an experienced driver in just a few minutes. When ordering a ride, the customer knows its price. Just one click and the ordered car is already going to pick up the passenger. The driver knows exactly where to go and the passenger does not need cash to settle the transaction.

## 4. Mobility information systems

There are different mobility information systems and services in Poland. Mobility information systems deployed in Poznań include mainly websites and telephone applications containing information on public transport and enabling selection of the optimum public transport route by the passenger. The most popular search engines dedicated to public transport include: Jak Dojadę, MyMPK, Wirtualny Monitor and Ginger. As regards an information application dedicated to the Ławica Airport in Poznań, this is Poznań Airport Guide.

### 4.1. Description of existing mobility information systems

The “Jak Dojadę” website, with the application which can be installed also on smartphones, is the most popular search engine dedicated public transport. The website is visited over 8 million times per month and enables route searching and access to public transport timetables. It also updates any delays and suggests using various means of transport in selected cities.

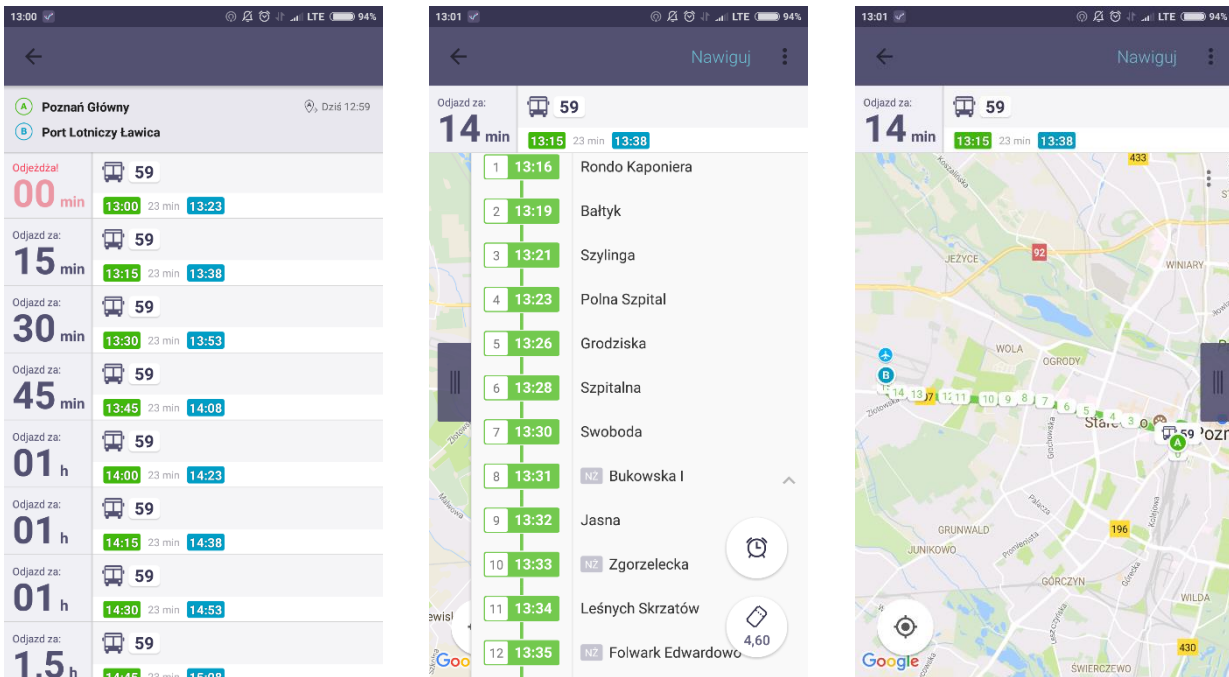


Figure 10. “Jak dojadę” application in Poznań.

The “Wirtualny Monitor” website, in collaboration with the Poznań Electronic Agglomeration Card, helps find a route based on the name of the stop, street or the number of a public transport line.

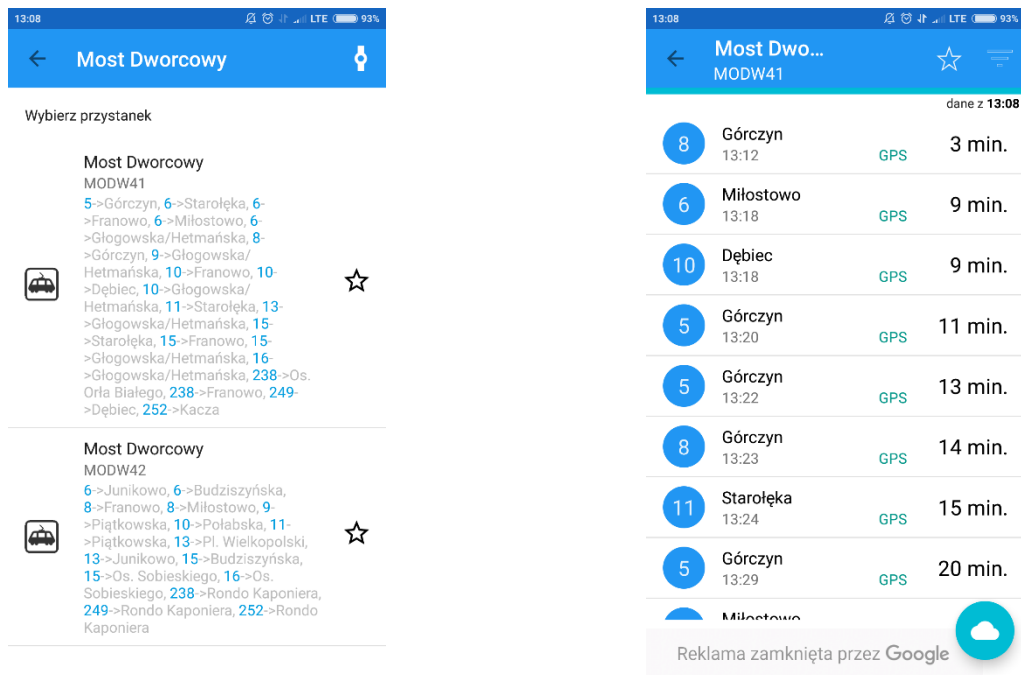


Figure 11. “Wirtualny Monitor” application in Poznań.

My MPK is a new mobile application for Android smartphone users. Users of this application can keep track of unexpected events that result in delays or necessitate changes in public transport routes. The use of this application is free of charge. The application has six tabs: about MPK, events, traffic incidents, repairs and obstacles, poll and contact.

Ginger is a mobile application enabling access to the public transport timetable on telephones on which Java can be run or Android telephones. Ginger has been used for 9 years and runs even on simple phones. Ginger stores the complete timetable on the phone and never connects to the Internet, nor does it generate any additional costs.

The Mobilny Poznań application is the key source of information for each resident of Poznań and those visiting the city. It enables monitoring the timetable, as well as searching for stops while specifying the current departure times and localization of points on the map. The application includes locations of ticket vending machines and city parking meters, and enables sharing any information, including information about events planned in Poznań. The map uses Google Maps, layers of the detailed Poznań Plan and layers of Buildings. Note: data concerning ticket vending machines, parking meters and transport need to be downloaded only once and then the application can be used without having to lose the Internet transfer.

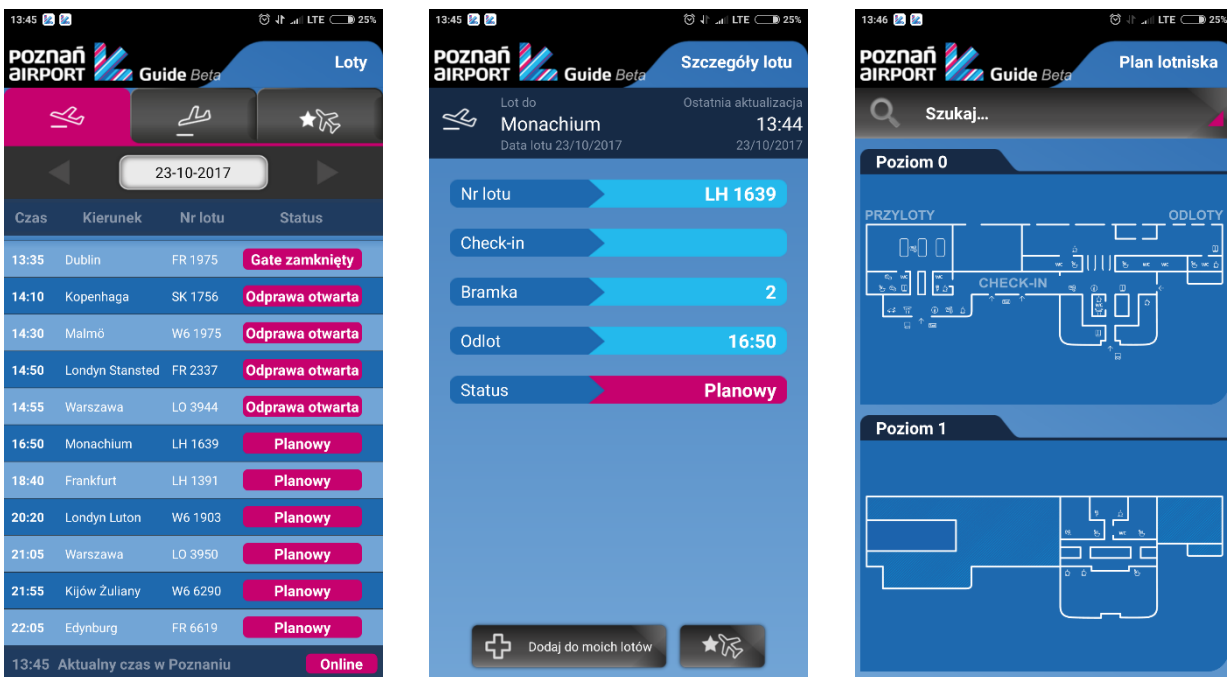


Figure 12. Poznań Airport Guide screenshots.

Poznań Airport Guide is an official application of the Ławica Airport, which contains information about: the flight timetable, the plan of the Airport and the car parks, as well as public transport and train timetables, parking information and information concerning major attractions in Poznań. Poznań Airport Guide provides permanent access to actual flight timetables of the Poznań Airport, including delayed arrival and departure alerts, a multimodal travel planner for the public transport, including commuter transport, the Airport parking plans with information about the prices and availability of parking spaces, a comprehensive search engine for points of interest (POI), current timetables of buses and trams in Poznań and of all trains throughout Poland. The “Poznań Airport Guide” mobile application is distributed free of charge via Google Play.



Figure 13. Mobile applications of the City of Poznań.

## 4.2. Potentials and gaps of mobility information services

At present, all information systems based on mobile applications enable easy access to information concerning public transport, making moving around smooth and easy. In case of unexpected events, the user is informed thereof on an ongoing basis through information boards or mobile applications.



## 5. Conclusions

The Ławica Airport in Poznań can be easily accessed, mainly by passenger cars. This is possible due to the modernization of Bukowska Street which connects the Port with the city center and the western part of the FUA. It is particularly convenient to travel by car at night, from 10 p.m. to 6 a.m., as the traffic is light then and there are no sufficient public transport connections at that time. The City sees the need to enhance the role of public transport, which it struggles to achieve by introducing optional solutions, such as access to the Airport by train or tram. An alternative direct train route from Dworzec Główny Railway Station to the Airport would be covered in about 12 minutes. So far, a concept with a dozen or so options has been developed, but no decision has been made to date as regards the launch of the project.

In case of further modernization of the Ławica Airport (related e.g. to the extension of the infrastructure), it will be necessary to develop a **long-term strategy accounting for the planned enhanced accessibility of the Airport based on low-carbon means of transport**. Providing a train connection between the city center and the Airport may encourage people to use other means of transport. The development directions proposed in the final document will be consistent with other projects which are being developed.

The City faces a great deal of challenges that need to be responded to improve the mobility of passengers using the Ławica Airport. Poznań's strength is undoubtedly a number of mobile applications dedicated to public and air transport which makes travelling much easier for residents of the city. All these factors will make the city more passenger-friendly, which will be reflected in the constantly increasing number of users.





## 6. Sources

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- Concept of a train connection between Dworzec Główny Railway Station in Poznań with the Ławica Airport in Poznań (*Koncepcja połączenia kolejowego Dworca Głównego PKP w Poznaniu z Portem Lotniczym Poznań Ławica*) commissioned by the Marshal Office of the Wielkopolskie Voivodeship, 2017
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