ITS MOBILITY ACTION PLAN

D.T2.1.6 | ITS Mobility

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1. Project background and programme context

LAirA addresses the specific and significant challenge of the multimodal, smart and low carbon mobility integration of airports in the mobility systems of Functional Urban Areas (FUAs) of Central Europe (CE). Airports are key assets of CE FUAs and important transnational transport gateways for CE citizens. The magnitude and growing trend of air traffic (on average 10% per year in the EU) requires actions for the improved and sustainable landside accessibility of FUAs to airports.

LAirA's ambition is to reduce the energy use and the negative environmental impacts of transport activities in central-European urban centres and their hinterlands by provoking a change of mobility behaviours of passengers and employees of airports. By building novel strategies that are available for public entities low carbon mobility planning should be improved. The 56 million passengers and 39,000 employees of the airport systems in the FUAs of Vienna, Budapest, Warsaw, Bologna, Stuttgart, Dubrovnik and Poznan are addressed by the LAirA efforts. LAirA shall develop the capacities of public entities – local and regional authorities and airports -, that jointly plan and implement low carbon mobility solutions.

A transnational and innovative comprehensive approach is used that integrates seven key thematic areas:

- – Electric mobility,
- – Air-Rail links,
- – Walking & cycling,
- – Shared mobility,
- – ITS,
- – Wayfinding,
- – Road Public Transport.

LAirA defines in a transnational policy learning dialogue the action plans for low carbon mobility of airport passengers and employees, taking into consideration multiple types of interventions/actions/measures?! (the seven LAirA thematic areas) not only related to public transport (competence of authorities) but also to further integrate other low carbon mobility solutions (e.g. e-mobility, car-sharing).

Strategies for low carbon integration of airports in FUAs are defined in a governance process involving airports, authorities, agencies, transport providers, associations & nodes. WPT2 focuses on action planning low carbon mobility services & changing behaviour for low carbon airports accessibility in FUAs. The expected output is a transnational Action Plan for multimodal, smart and low-carbon accessibility in airport FUAs.

2. LAirA thematic focus: ITS Mobility

a) Definition for the LAirA context

Intelligent transport systems (ITS) are considered as transport-related development that increases safety as well as network efficiency and mitigates negative environmental effects. Information and communication technologies form the backbone of ITS. Considering efficient ITS mobility for (central) Europe, activities need to be coordinated properly. The deployment of ITS developments proceeds differently, always depending on the technological and economic progress in a region or country. Applications that belong to ITS mobility are for example toll systems, automated and connected driving, management of stationary and flowing traffic and multimodal travel information. The accessibility of airports can be described by listing road or rail infrastructure, but also by having information and communication technology that enables or simplifies a journey through providing relevant travel information. In the LAirA context, ITS mobility focuses on multimodal travel information and reliability in terms of landside accessibility by road and rail.

b) Current trends across Europe

ITS is a highly relevant topic for the European Commission. In July 2010 a legal framework (Directive 2010/40/EU) was adopted to accelerate the deployment of these transport technologies across Europe.[1] Priority areas of this EU directive are for example the optimal use of travel data, the promotion of ITS solutions enhancing traffic safety as well as the connectivity between vehicles and infrastructure.[2] A measure that is mentioned in this directive is the availability of EU-wide multimodal travel information systems. In May 2017 the EU Commission published the delegated regulation (EU) 2017/I926 as supplementing the Directive 2010/40/EU with regard to the provision of EU-wide multimodal travel information services.[3] The regulation should apply to all transport modes in the Union, such as schedule based (also including air), transport on demand and personal based. The aim is to make various data accessible to users through national or common access points.[4] More information can be found here: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L:2017:272:FULL&from=EN.

Other ITS developments are the implementation of the interoperable 'emergency call' (eCall), which automatically dials Europe's single emergency number 112 in case of a serious road accident and directly communicates the vehicle's location and submits this information to the emergency service. In the field of connectivity, meaning vehicle-to-vehicle and vehicle-to-infrastructure communication, relevant developments such as C-ITS (cooperative ITS) and automated & connected driving are being implemented. These topics also include the equipment of road (or rail) infrastructure with digital infrastructure elements (e.g. sensors alongside the road), dynamic traffic management (e.g. by better detecting dynamic traffic flow on the roads) and the provision of these collected traffic data for end-users and journey planning. On a transport participant's level, multimodal travel information and mobility-as-a-service solutions are relevant subjects at the moment. Automated and connected driving tests are going on across Europe. For airports (FUAs) and its passengers (and employees) a huge benefit could be to actively participate in on-going European and national developments in the fields of ITS, as the airport also (somehow) appears as a transport provider. It is important for people commuting to/from the airport to rely on real-time travel data and receive sufficient information for journey planning (e.g. on mobile devices). At an airport, not just flowing traffic (approaching or leaving the airport by road) but also local traffic searching for permanent or short-term (drop-off) parking spaces is relevant to traffic managers.

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[1] https://ec.europa.eu/transport/themes/its/road/action_plan_en

[2] https://eur-lex.europa.eu/legal-content/DE/TXT/?uri=CELEX:32010L0040, Artikel 2, (1)

[3] https://ec.europa.eu/transport/sites/transport/files/c20173574-multimodaltravelinformationservices-delegatedregulation.pdf

[4] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L:2017:272:FULL&from=EN (10)

2.1. Relevance of LAirA topic for airports in general

a) Policy background

On EU level, the **Directive 2010/40/EU** on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport was put into force many years ago. *"The main aim of the Directive is to increase the pace and coordination of the deployment of intelligent transport systems, in turn improving the functioning of the road transport system, including its interfaces with other modes, and in so doing reduce the negative effects of road transport, e.g. considering pollutant and CO2 emissions, congestion and road safety."*[5]

The white paper **"Roadmap to a Single European Transport Area"** aims at preparing the European Transport Area for the Future by e.g. using transport and infrastructure more efficiently through use of improved traffic management and information systems, such as ITS.

In Austria, the **ITS Action Plan**, a strategy for the implementation of an Intelligent Transport System is available and may be updated soon. On behalf of the government AustriaTech, an organisation of the Ministry for Transport, Innovation and Technology, is responsible for the development, deployment and strategic consultation in the field of Intelligent Transport Systems. In autumn 2018 the new action package on automated mobility will be released and put into force. ITS most likely is also embedded in Smart City or Smart Region policy papers (e.g. such as in the Smart City Strategy of Dubrovnik).

b) Best practices in/around airports

Not available.

c) Potentials and limitations

ITS mobility developments and deployments are complex and located on a higher (governmental) level. Nevertheless, regional (and local) stakeholders can contribute to an overall connected and intelligent transport system by efficiently cooperating on small scale levels, such as in the field of (multimodal) travel information. As airports are important entry points to transport systems, information on transport modes and travel times should be available on-site and sufficiently communicated to passengers (and employees). With regard to increasing passenger numbers and structural expansions of airports across Europe, traffic management (or rather, being part of traffic management) should be an important subject to airports. Otherwise, traffic will rise but may not be handled properly and the reliability when accessing or leaving airports may decrease. In its role as intermodal/multimodal hub, airports have the potential of consolidating relevant travel information and allocate them among their passengers (and employees). By being actively involved in ITS developments, airports may be able to better forecast current transport flows, but may also better handle future scenarios by utilising available data for transport models. Furthermore, passengers (and employees) may be better guided when it comes to transport mode and route choice for traveling to/from the airport (e.g. in case of delays or disruptions in the landside transport network). For the Airport of Budapest a key challenge in the field of ITS mobility is to develop and sustain business models for smart city projects and implementations. However, another key challenge for the Airport/City of Dubrovnik is the availability of suitable infrastructure, respectively financial investments and financing models. Furthermore, human-machine-interfaces (HMI) play a crucial role in ITS as well, since each service must be transmitted to ITS users in a suitable form. These challenges, however, may not be faced and neither solved within the LAirA project. Within the LAirA Project recommendations for the future development path can be provided.

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[5] https://ec.europa.eu/transport/themes/its/consultations/2017-evaluation-its-directive_en (25.09.2018)

d) Project Partners insights

The following table shows the current state of the art when it comes to ITS availability in one specific LAirA airport FUA:

Airport FUA	Example given: Available/planned ITS supply in Vienna FUA
FUA Vienna (Provided by AustriaTech)	• By October 2018 a new working program for ITS Austria war released. It focuses on connectiyity, digitalization, and mobility. • "Verkehrsauskunft Österreich" (VAO) provides multimodal travel information for Austria. VAO is a nation-wide, coordinated, intermodal and by infrastructure providers as well as transport mode operators/providers authorised routing platform. The routing platform includes information on individual motorized transport, public transport, cycling and walking and intermodal connections whereas most of the data is provided in real-time. The two information sources for mapping are the Graph Integration Platform (GIP) and an open source map. Airport data covering arrivals and departures are not included in this transport information system. • The Austrian highway-network is equipped with 2500 weather sensors, 2000 sensors among the road network and 2000 sensors in tunnels. • AustriaTech is the secretary general of the C-Roads platform, which is an authority driven platform that brings Member State authorities and road authorities together with the aim to deploy interoperable C-ITS services across Europe. There is a designated working group on 'evaluation and assessment' that aims to assess the impact of the C-ITS services in terms of operability, sustainability, safety, efficiency and environmental aspects.

2.2. LAirA key objectives for future developments

Of course, the key objectives within this topic aim at achieving the set overall European/Interreg programme goals as well as the LAirA goals. The programme specific objective is to improve capacities for mobility planning in functional urban areas to lower CO2 emissions. Hence, the LAirA project aims at setting/recommending actions and measures to reduce the carbon foot print of transport activities related to airports landside connectivity in FUAs. LAirA aims at reducing energy use and the environmental impacts of transport activities in FUAs with reference to the landside mobility needs of airports passengers and employees. It aims at reducing air pollution and GHG emissions of transport traffics between the airport and the FUA in which it is located (urban cores and hinterlands) and the neighbouring FUAs which are part of its catchment area. The LAirA strategic goal and introduced change are comprehensive strategies dealing with the dimensions of transport services organization (new services and improvement of existing ones), funding of transport services & infrastructures, technological innovation and behavioural change in transport choices of citizens, towards a low carbon and environmentally sustainable airport landside connectivity in FUAs. This is done by increasing the capacities of public entities in low carbon mobility planning, delivering change in citizens mobility behaviours and by developing novel comprehensive local and transnational strategies in airports – FUAs connectivity.

Within this field, and especially addressing CO2 footprint reductions, LAirA aims at promoting ITS mobility for addressing priority fields such as efficiency and environment particularly with the overall goal of achieving climate protection targets.

According to the project's and program's objectives, more specified objectives as well as actions and measures are recommended within the LAirA field of ITS mobility for airports (see table 1 below).

Table 1: LAirA ITS Mobility Objectives and Actions

Objectives	Actions	Related to …
• Availability of comprehensive landside-access-related travel data for passengers and employees	(1) Cooperation with local/regional/national transport providers and establishment of a comprehensive travel data platform/storage (2) Provision of an interface that enables travel data sharing for user-centred front-ends (e.g. map/route planning applications)	Provision of data to end-users
• Mitigation of negative environmental effects by better using ITS applications	(3) Cooperation with other ITS relevant stakeholders (e.g. road/rail infrastructure providers) and ('smart') cities or regions	Traffic & infrastructure management
• Effective on-site transport management within an airport's responsibility	(4) Deployment or enhancing of ITS infrastructure and services at airports	

3. LAirA actions: ITS Mobility

3.1. Action 1: Establishment of a comprehensive transport data platform/storage though internal and external cooperation

Similar as provided for Austria ("VAO"), a common data and mapping basis for transport-related data seems to be appropriate for supplying a region with intelligent transport services (assumed that sensors, radars etc. are available/equipped at vehicles and infrastructure for collecting the data). The Austrian transport related platform VAO was established based on funded research projects involving various stakeholders. In 2015 the VAO GmbH, a company founded by the federal agency ASFINAG, the Austrian motorway operator, the Austrian transport association (ÖVV), the Austrian Railways (ÖBB), the Austrian Ministry for Transport, Innovation and Technology and the ÖAMTC, an Austrian Automobile Association. The Airport of Vienna yet does not provide the VAO with traffic information (neither landside, nor airside). In order to integrate ITS in the airport's daily business, cooperation between departments and/or with order stakeholders in this field needs to be established and sustained on a long-term basis. In Vienna, the Austrian highway operator, ASFINAG and the Austrian federal railway operator, ÖBB are yet cooperating in terms of exchanging travel/traffic (flow) information on certain routes, e.g. from the city centre of Vienna ("Wien Mitte") and the airport. In case of traffic disruption on either the road network (highway A4) or the railway network, both operators provide alternative route information for their passengers. However, as by now, the Vienna Airport is not involved in these traffic management operations. This would require commitments by airports and assignments of responsible project managers and/or teams/departments.

a) Overview on measures

The following Table 2 shows the proposed measures, actors to be involved, arising barriers, a rough timeline as well as accompanying changes and improvements.

Table 2: Measures ITS Mobility Action 1 – Establishment of a comprehensive travel data platform/storage through internal and external cooperation

Measure	Actors involved (Target groups and agents of change and their role)	Barriers	Timeline	Estimated changes/improvements in general addressing airports and their FUA
Screening of local/regional/national travel data providers (and open APIs for travel data)	Airports departments	Missing resources at airports (e.g. staff), lack of responsibilities	Short-term	Knowledge on available travel data providers and where/with whom to connect/cooperate
Establishment of contact with travel data providers and clarification of an airport's role and its potential contributions	Airports departments, travel data providers	Missing resources at airports (e.g. staff), lack of responsibilities, lack of travel data providers	Short-term	Knowledge on current state of the art and win-win-situations to be taken
Installation of airport-related ITS group/department	Airports departments	Missing resources at airports (e.g. staff), lack of responsibilities, lack of cooperation between different	Middle-term	Better integration of traffic management and travel data management within airport environment and subsequently enhanced information provision

		airport departments, missing expertise		towards passengers and employees
Establishment of platform where real-time data of different modes of transport is available e.g. on privately operated busses as well	Airports departments (above mentioned ITS group)	Lack of willingness to cooperate by private operators, lack of airport internal resources and responsibilities	Middle-term	A better visibility of available transport options can be achieved and behavioural change can be initiated
Dissemination of efforts being made towards ITS mobility	Airport departments, consortium dealing with ITS in the respective region	Lack of available resources at airports, lack of cooperation between stakeholders	Long-term	Marketing and dissemination activities enhance the visibility of improvements regarding ITS developments and availability of interfaces for end-users

b) Information on other modes/topics that would be affected

Through the implementation of ITS mobility measures, all other transport modes that are addressed within LAirA should be affected. This means that every transport mode that is available in a region (as well as their transport data) should be involved in the considerations and implementation process.

3.2. Action 2: Provision of an interface that enables travel data sharing for user-centred front-ends (e.g. map/route planning applications)

The (effective) functionality and acceptance of ITS mobility systems and applications strongly depend on the design and implementation of suitable Human-machine-interfaces (e.g. also a LAirA IT tool providing travel information is a human-machine-interface). Hence, the LAirA IT tool represents an important aspect of the future penetration of ITS mobility applications on airports – covering any kind of transport mode. Airports need to be pro-active and ideally rush ahead in case they'd like the airport's needs to be included in an overall ITS mobility plan. Upstream requests for measures (before a user-interface makes sense) are shown in Action 1 (chapter 4.2).

a) Overview on measures

Table 3 provides measure addressing Action 2.

Table 3: Measures ITS Mobility Action 2 – Provision of an interface that enables travel data sharing for user-centred front-ends

Measure	Actors involved (Target groups and agents of change and their role)	Barriers	Timeline	Estimated changes/improvements in general addressing airports and their FUA
IT tool for passengers – mock-up version/pilot testing results from LAirA and guideline for future developments and deployments (incl. lessons learned)	LAirA partners	Lack of cooperation and contributions	Short-term	Deep confrontation with actual user needs when it comes to commuting to/from the airport and feasibility analysis of a potential tool.
Strategy for data sharing and cooperation among suppliers/service providers	Airport department(s)	Lack of willingness of sharing data and shared business models	Middle-term	Joint agreements and concepts on data usage and sharing, airport is aware of its position and competences within such a stakeholder alliance (e.g. covering municipalities, transport providers)
Allocate responsibilities regarding data privacy and protection	Airport department(s), external experts on data privacy/protection	Lack of resources and perceived need/priority	Middle-term	Awareness regarding data protection and privacy build, responsibilities allocated and further questions to be addressed to a responsible person/department.
Integration of route planning application/add-on to existing airport apps build upon cooperation with transport providers	Airport IT departments, application developers/external experts, relevant transport providers,	Lack of need for airport app update/revision	Long-term	Added value to airport app by including a searching function for choosing between transport modes and routes and being provided by relevant

	LAirA experts			travel information (e.g. time, costs, CO2).
Development of business model for airport including travel information for customers	Airport department(s), airlines, travel agencies, transport providers, municipalities, other involved associations	Lack of need from an airport's perspective	Long-term	Knowledge on economic benefits and potentials when recognising landside travellers' information as part of the airport's value chain and not solely being reliant on parking space rentals.

b)   Information on whether also another mode/topic would be affected

Through the implementation of ITS mobility measures, all other transport modes that are addressed within LAirA should be affected. This means that every transport mode that is available in a region (as well as their transport data) should be involved in the considerations and implementation process.

3.3. Action 3: Cooperation with other ITS relevant stakeholders (e.g. road/rail infrastructure providers) and ('smart') cities or regions

a) Description of action (*category: dialogue, knowledge-exchange*)

A constant, profound and reliable cooperation with other ITS relevant stakeholders is needed when it comes to the establishment of a "smart" airport region respectively functional urban area. In places where associations dealing with transport-related (real time) data already do exist, respective airports should be engaged in assessing whether an affiliation may be reasonable. Airports, especially in bigger city agglomerations often represent important mobility hubs but are not yet included in ITS developments. Landside transport modes are often cut-off airside transport modes, and hence, seamless information chains do not exist. By also involving airports in these stakeholder groups, joint strategies and win-win situations may be achieved.

b) Overview on measures

Table 4: Measures ITS Mobility Action 3 – Cooperation with other ITS relevant stakeholders (e.g. road/rail infrastructure providers) and ('smart') cities or regions

Action	Actors involved (Target groups and agents of change and their role)	Barriers	Timeline	Estimated changes/improvements in general addressing airports and their FUA
Host regular meetings for fostering established cooperation	Airport departments (incl. above mentioned ITS group) and other stakeholders	Lack of willingness to join such events by other stakeholders, lack of airport internal resources, lack of ITS relevant topics	Long-term	Fostered cooperation and knowledge/information exchange
Regularly identify need for actions to be taken and next steps in creating an "Overall ITS environment"	Airport department(s)	Lack of interest, resources	Long-term	Always up-to-date regarding needed actions to be taken and integration of the airport in regional/national ITS-related activities.
Interest representatives on European Level/EC level should take up the topic and place it in the EU's agenda	Interest representatives (on EU level)	Lack of interest	Long-term	Topic is well-placed on European level and grant funds may be generated/justified

c) Information on whether also another mode/topic would be affected

By fostering the ITS-related cooperation, also stakeholders from road and rail transport are affected by this action. Moreover, actors from the information and communication field are involved.

3.4. Action 4: Deployment or enhancing of ITS infrastructure and services at airports

a) Description of action (*category: task force, strategy building*)

In order to involve the airport as a stakeholder in ITS activities on national/regional level, a working group, mainly operated by certain departments of the airport can be set-up and implemented. The working group may come together twice a year also inviting external experts/stakeholders dealing with ITS topics and being responsible for national decision making.

b) Overview on measures

Table 5: Measures ITS Mobility Action 4 – Deployment or enhancing of ITS infrastructure and services at airports

Action	Actors involved (Target groups and agents of change and their role)	Barriers	Timeline	Estimated changes/improvements in general addressing airports and their FUA
Set-up of working group	Airport staff/department(s), external experts/ consultants, other stakeholders from the field of ITS	Lack of resources at the airport, lack of interest, lack of ITS (applications) in respective region/country	Short-term	A stakeholder mapping may raise the awareness towards ITS applications and need for contributions in the respective region → chances for the airport to better be included in landside transport (information) systems
Definition of goals for enhancing traffic management at airports	Dedicated group set-up of staff from different airport departments	Lack of defined responsibilities and willingness of cooperation	Short-term	Common mind-set on how to proceed and where to start implementing/deploying (infrastructure-wise and stakeholder-wise)
Identification of ITS supply and needs at the airport location	Airports departments	Lack of defined responsibilities	Short-term	Knowledge on existing data sources and physical infrastructures for enhancing traffic management
Regular meetings of the working group on ITS	Airport staff/department(s), external experts/ consultants, other stakeholders from the field of ITS	Lack of resources at the airport, lack of interest, lack of ITS (applications) in respective region/country	Middle-term	By having regular meetings, needs and required contributions can be discussed and more detailed/effective measures of how to better involve the airport in landside access can be discussed and solutions can be designed
Implementation of ITS strategy for the airport	Airport's departments, external consultants	Lack of interest or resources	Long-term	Awareness towards relevant (on-going) ITS topics and placing of airport-specific contributions and needs for a long-term perspective

Deployment of ITS services/infrastructures at the airport/for airport access	Airports departments	Lack of resources (financial, staff, infrastructure)	Long-term	Availability of enhanced traffic management (for stationary and flowing traffic) in order to better understand airport's (road and rail access) capacities

c) Information on whether also another mode/topic would be affected

When establishing an interdisciplinary working group for better integrating ITS in the (daily) airport's mobility business, persons from different competence fields need to be involved. For example, parking, individual motorised transport, soft-mobility offers, public transport, air-rail links etc. need to be considered for planning the overall transport approach for the airport.

4. Risk Mitigation Measures

The implementation of this action, respectively the addressed measures, depends on the allocation of responsibilities and commitments. Hence, the following Table 6 shows appropriate mitigation measures.

Table 6: Risk Mitigation Measures ITS Mobility

Potential risks	Mitigation measures/strategy
No considerable ITS applications available in respective region/country, but investing staff hours for applying this strategy	Screening of national situation and available strategies for identifying the ITS potentials for the upcoming years; keeping in mind meetings with relevant stakeholders for "not forgetting" the task; not considering ITS topics for the respective airport and concentrating on other focus themes.
Lack of adequate competences for ITS at the respective airport	Teaching of staff and/or setting initiatives for employing ITS experts (if need be)
Lack of regular meetings or on-going process	Identify and determine a responsible person for this job of fostering and promoting ITS developments for the respective airport

5. Sustainability Potential/impacts

The table below shows potential impacts on defined actions:

Table 7: Sustainability Impacts ITS Mobility

Sustainability area	Potential impacts on defined actions
Ecological	Interactions between transport users and modes can be optimised by using new and modern technologies, especially in the field of transport and mobility. New technologies driven by the gigatrend of digitalisation enable enhanced information and communication flows that subsequently support traffic management and decision support (e.g. in route or mode choices). Hence, a transport system can respond flexibly to changing traffic volumes and make use of the available infrastructure and vehicles.
Social	When it comes to social impacts, the main benefit of better integrating ITS is the increase of road safety and mitigation of potential crashes between different road/transport users. The connection of vehicles and transport infrastructure as well as users enables better communication and information flows in order to prevent collisions or misperceptions/-interpretations by using assistance services.

Economic	From an economic point of view, transport can be organised more efficiently and cost-effective when having more information and transparency of the transport system.

6. List of figures and tables