



ENGLISH SUMMARY - AUTOMATIC ACCESS CONTROL AND TRAFFIC MANAGEMENT SYSTEM PLAN BUDAPEST FREEPORT LOGISTICS LTD.

Version 1
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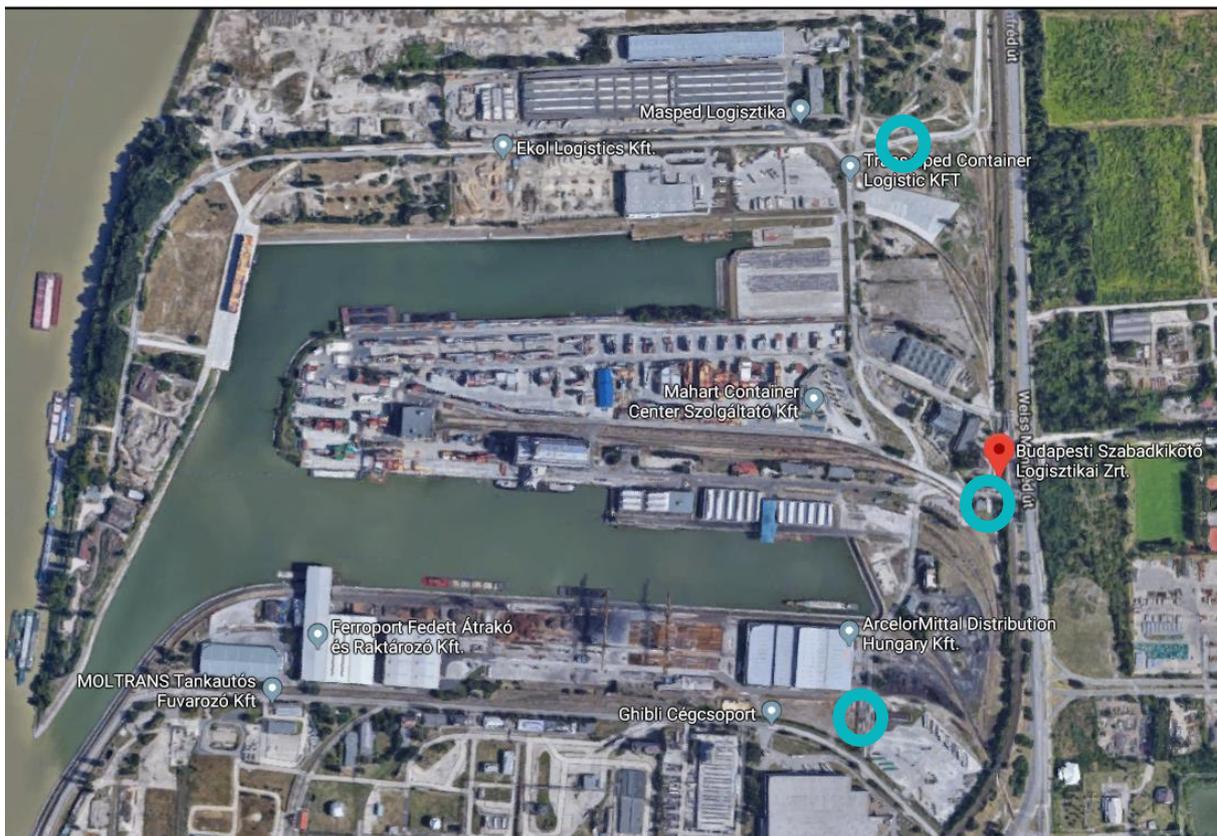
1. Introduction

The Budapest Freeport Logistics Ltd. successfully applied for and won support in the Interreg CENTRAL EUROPE CE-1278 CORCAP project.

This business specification excerpt summarizes the plan of the automatic access and traffic control system (system) for road vehicles at Budapest Dock Freeport Logistics and Industry Park (BFL).

Environment of the system:

There are three gates in operation on the territory of BFL currently. The automatic access control system will be implemented here.



1. Image - Territory of BFL and position of the gates

Source: <https://goo.gl/maps/8LxvJR8cZGquyn3aA>

- Gate North - (gate nr. 1, a new gate, which is not at its final location yet)
- Gate II. - (mainly for personal vehicles or small trucks)
- Gate South - (gate nr. 4 - 90% of all the lorries use this entrance and a scale is also located here)

The system shell be planned for an estimated average traffic of 5000 vehicles daily in peak season.

Project co-funded by the European Union.



Barriers and cameras are already installed at the gates. Pictures are taken of the vehicles automatically during entry and the images are saved. The system has a license plate recognition feature, but its operation is instable yet. However, the recognized license plate number will be saved as well if the recognition is successful. The barriers automatically open after a pre-set waiting time with the support of sensors built in the road. There is no control of access in place, nor real use of the saved license plate number information currently.

Traffic management to the tenants are not solved after the access on site. Due to lack of capacity and space the creation of buffer area is planned.

Based on this plan, offline, online, artificial intelligence, sensors, cameras, cloud-based solutions and mobile applications will all help to develop an automated control system that enables efficient movement within the site of BFL. Proper vehicle management solves bottlenecks and provides a greener, faster and more efficient service provider.

1.1. Methodology

Besides continuous discussions with BFL, on-site consultations, field visits, infrastructure surveys and interviews with tenants took place 6 times during the nearly 60 days of preparation of the business specification. The map data to be digitized (location, area, roads, building positions) were surveyed. Pictures were taken and visualization made for the tasks to be carried out for the system development and for the Pilot Action.

Tasks	June				July			
	3	10	17	24	1	8	15	22
Regular discussions (email, telefon)								
Coordination								
Personal meetings								
Field work								
Digitalisation survey								
Interviews								

2. Image- Table of tasks related to the specification and its schedule

Source: RowanHill Digital Ltd.



2. System requirements

For the automated access of road vehicles, an automated access control system with cameras and barriers is required. For the management of traffic on site BFL, a navigation application (**app**) needs to be developed as well.

- The license plate numbers of road vehicles shall be automatically recognized and stored to a central database upon arrival to gates.
 - Automated recognition and storage of vehicle characteristics (truck or passenger car) to a central database.
 - Ability to identify and recognize logos, images, information placed on vehicles, and linking its content to the tenant; to speed up the identification of the vehicles arriving to a specific tenant.
- Input: Searching for and entering the tenant where the vehicle has arrived to. It should be possible for the driver to be able to do this in a few seconds at an info point or via the app. Assigning the input information to the license plate number(s) and store it to the central database.
- The system shall notify the tenant about the arrival of a vehicle. The access rights of the vehicle shall be validated in the system by the tenant.
- If a vehicle cannot gain access, the system should be able to handle it accordingly (e.g.: staff alert, setting the vehicle aside)
- Based on the input, the system will plan a direct route for the vehicle to the tenant of BFL with the application. (Navigation will happen via the app, info point - printing map with route information)
- Vehicles that are identified via the access control and entered their destination, the system shall be able to navigate them on site BFL with the support of Intelligent (SMART) displays.
- Directing to buffer parking. Vehicles should be directed there if waiting for loading at the address requires this. Tenants or the system shall be able to call the waiting vehicle from the buffer as soon as capacity has freed up.
- Possibility to report status of the number of vehicles on site BFL, how many are in buffer, etc. The movement of vehicles on site should also be traceable for traffic management and safety purposes.
- The system should be able to provide data to the Integrated Port Information System (KIR), which is currently under development.
- The system shall be modularly scalable, especially ready for the connectivity to the electronic enterprise resource planning systems of the tenants. (Possibility to connect via web interface)



3. Access control

Informing the vehicles about the system to be used on site BFL begins well before entry. (Official communication channels, website, information boards, etc.)

Usage of the system may begin with the app well before arriving to gates. However, the first time a vehicle arrives to BFL, it will be informed about the possibility of using an app or an info point.

Controlled entry requires license plate number recognition and input for destination. The registration of the license plate number is automatic, and the destination is assigned to the database by the system, based on the input provided through either at the info point or by the app.

The current barrier and camera system installed at BFL, from Digital Entry System Control, a personal and automotive access control system integrated with license plate number recognition, to which the system to be developed needs to be adjusted.



3. Image- Current access control system installed at BFL by Digital Entry System Control.

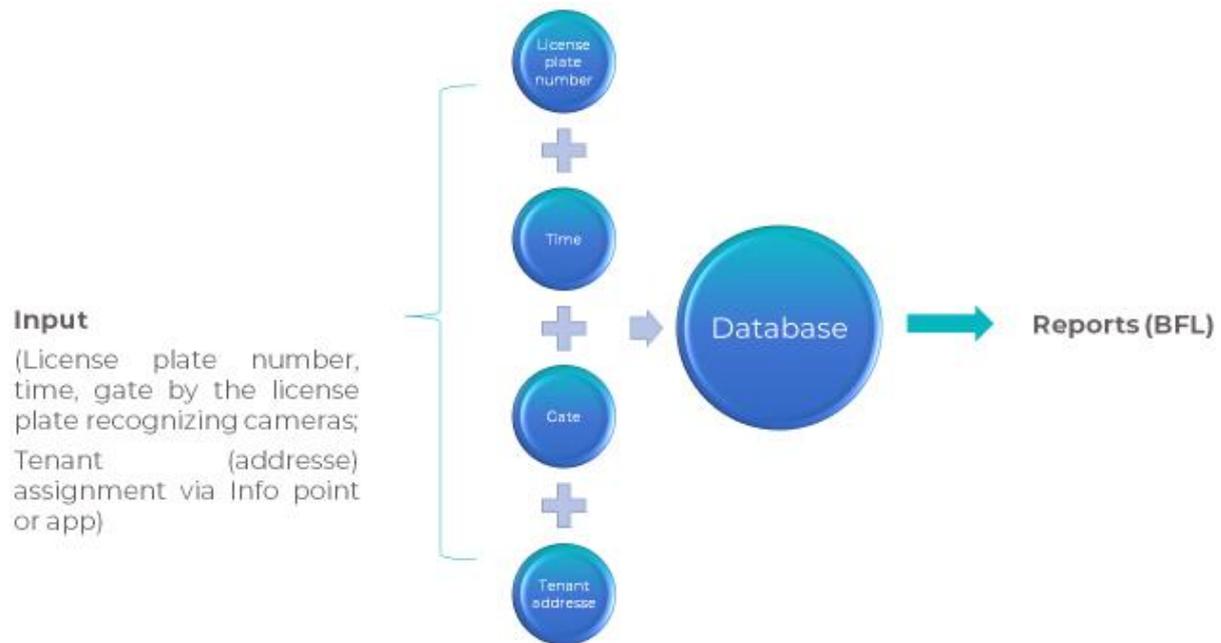
Source: RowanHill Digital Ltd.

3.1. Operation of the access control system

The navigation application of the system receives input for traffic management indirectly from the access control system, directly from the database. Data entry is accomplished through the hardware and software components of the access control system as well as through the info point and app interface.

Input data: license plate number, time, gate, tenant (addressee), other...

Project co-funded by the European Union.



4. Image- Input and data flow in the system

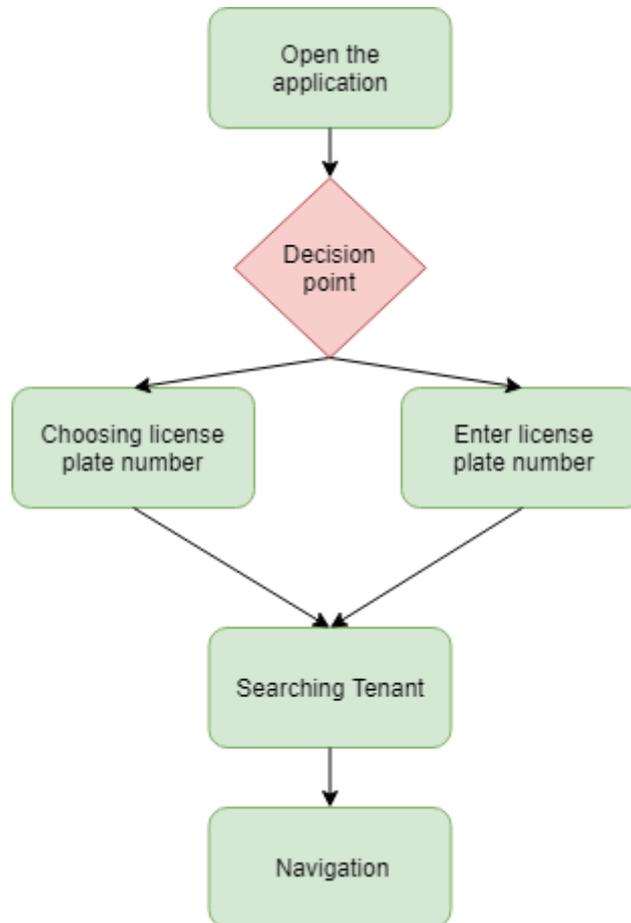
Source: RowanHill Digital Ltd.

At the info point, after selecting the desired language, a kiosk enables the entry of the desired tenant for those who arrive the first-time, have not yet used the application or do not have a device to use the navigation application with.

The navigation application is provided with WIFI technology upon entry and at the info point on site BFL.



3.1.1. Accessing BFL by using the app:



5. Image- App usage

Source: RowanHill Digital Ltd.

App users can provide input to the system by entering/choosing their license plate number(s).

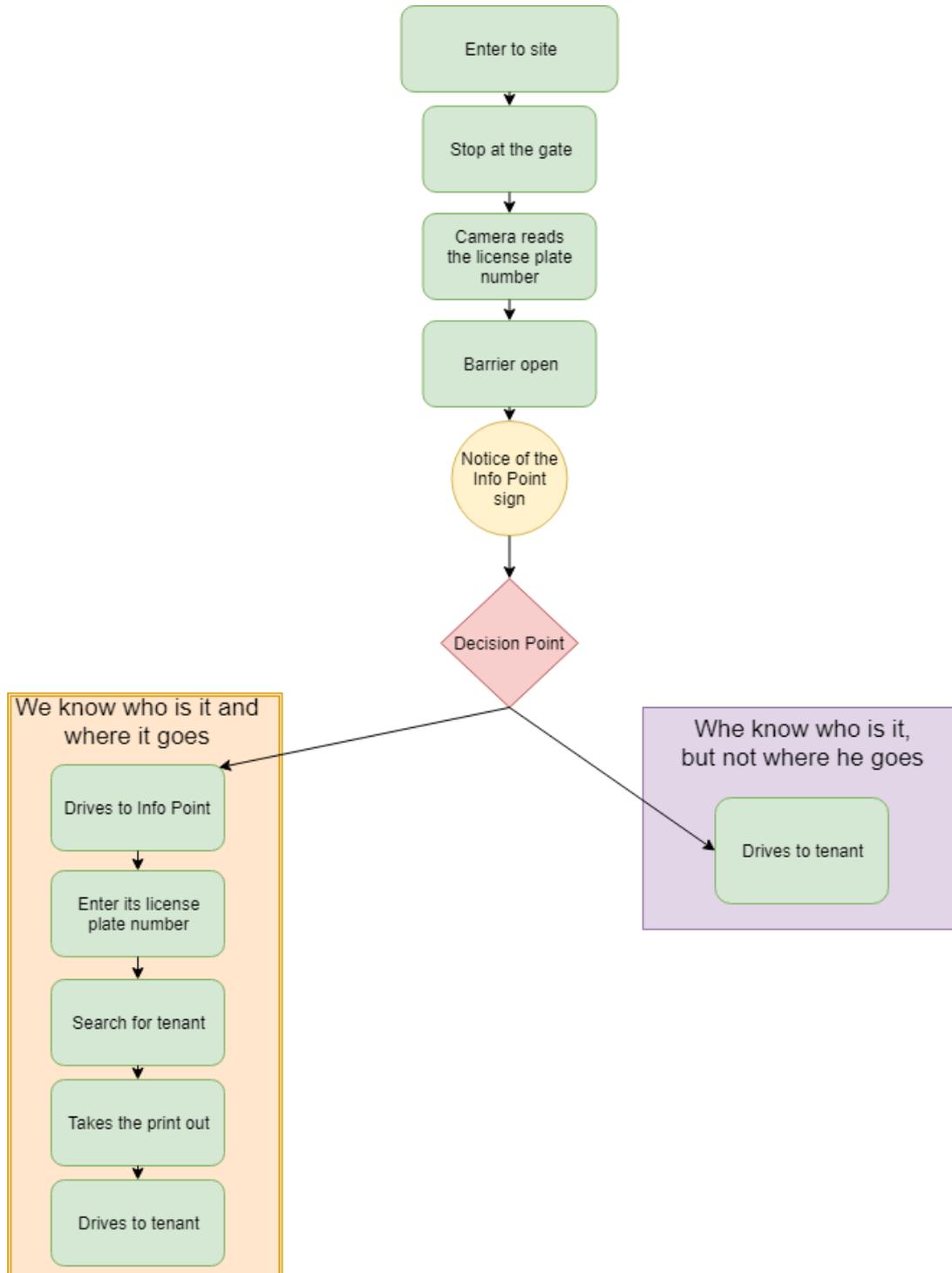
For returning vehicles, if the vehicle with which the user arrives changes, it is possible to enter multiple license plates; it is always an option to select the current license plate number or enter a new one.

By selecting the tenant, the app will navigate on the planned route.

Upon entry, the license plate recognition system updates the database with the inputs from the application based on the license plate number and manages the SMART displays according to the route plan.



3.1.2. Accessing BFL by not using the app:



6. Image- Entering to BFL without app usage

Source: RowanHill Digital Ltd.

Those who do not use the app, they will be able to check in/enter inputs at the info point and get directions if they do not know they way around yet.

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The input can be provided for the system by entering the license plate number and tenant/addressee at the Info point.

The driver will get a printed direction from the kiosk after entering the tenant. With the planned route, he can navigate to the desired tenant.

The system updates the inputs with the license plate number stored in the database upon entering the site at the gate and manages the SMART displays according to the route plan.

Those who knows where to go and does not enter input either through the app or the info point, the system will not be able to provide data about that, only the information of entry and exit of the given license plate number.



4. Traffic management

Once entered to the site, the system can navigate the vehicle to the tenant or buffer parking along a route based on the inputs of the database, using the app, or a printed map, supported by SMART displays and cameras.

The system assigns the address and route to the license plate number in the database, which is supported by SMART displays and the cameras on the displays when the vehicle arrives to them, showing the correct direction based on license plate number recognition.

For users of the app, they smart devices navigate to tenants directly.

For users of the printed map, smart displays at the junctions will help and the vehicle will be able to follow the markings of the buildings to the tenants; with the support of building signs with road painting.



5. Hardware

Hardware requirements of the system:

5.1. Barrier and camera system

License plate recognizing cameras: PARK-IT (ARH) cameras.

The automatic barriers are Ditec **QIK Barriers**:

“The high performance and high flexibility of the model make it suitable for the task at BFL. QIK is the ideal solution for monitoring safe passage in medium to high traffic environments.”

(Source: <https://www.ditec.hu/automatske-rampe/>)

5.2. WIFI

Free, limited, high-bandwidth Wi-Fi technology must be provided with the most appropriate devices at the gates and info point (4 pcs) for downloading the application.

Outdoor system		
Point-Multipoint central transmitter	Specification	Value
	Radio:	Rocket PRISM AC
	Antenna:	Sector antenna
	Transmitting mode:	5GHz TDMA PtMPt
	Network mode:	Bridge
	Power:	PoE Switch and UPS
	Router device:	EdgePoint R6
Point-Multipoint client receiver	Specification	Value
	Radio:	NanoBeam vagy NanoStation AC
	Antenna:	built in
	Transmitting mode:	5GHz TDMA PtMPt
	Network mode:	Bridge
	Power:	PoE sender, optional UPS
	Network topology:	direct connection with table or kiosk

5.3. Kiosk

The basic parameters of the device that provides solution for data entry and information at the info point:



Access and information kiosk	
Application	Outdoor
Material	Painted steel
Color	Based on demand
Display	21" Multitouch touch screen
Speakers	Integrated
Camera	Integrated IP cameras
Keyboard	Vandal-proof outdoor metal keyboard with 101 buttons
Printer	Integrated outdoor industrial thermal printer
Control	Integrated Kiosk
RAM	4GB
Lan	10/100 Ethernet
Operation system	Windows7
Applicatoin software	Ykiosk Lite Secure Browser
Size	2100x630x250mm

Screen requirements:

- Resolution at least: 768X1366(HD Ready)
- Touch: Multi capacity
- Technology: TFT LCD
- Colour set: 16 million
- Brightness at least: 200 nits

Required water and dust resistance standard:

- IP68(total water and dust resistance)

Operation system:

- Windows

Power supply:

- DC 12V 100-240V V @50/60Hz

Required accessory:

- Thermal printer with cutter

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Communication standards, optionally containing at least 1:

- LAN
- WIFI
- 3G

5.4. SMART displays

To support traffic management, it is necessary to use weatherproof and clearly visible LED displays that are well-operating under extreme conditions as well. When connected to cameras, it can intelligently inform oncoming vehicles at the junctions about the route to be followed once the license plate number is recognized.

Multifunctional LED Display	
Specification	Value
Resolution	120x80
Luminous intensity	>6500 nits
Color	16
Communication	LAN Cat5
Display area	960x640mm
Size	1040x720x50mm
Minimum readability	8m
Operating range	-30-+50C
Max.performance	500W
Average performance	100W
Immunity	IP65
Reading angle	H140, V120



6. Software

6.1. Automatic license plate recognition system

Producer and distributor of controllers and access control software:

DigitalEye IT Ltd.

The software is developed by DigitalEye with ARH license plate recognition. (ARH is the manufacturer of speed cameras and vignette control cameras used on public roads).

6.2. Database

Microsoft MSSQL 18

Microsoft's relational database is recommended as the basis for the database. Considering the technologies used, the Microsoft SQL database engine is able to guarantee optimum performance while maximizing the technical solutions required.

6.3. Kiosk and communication

.NET core

Communication between the core system and a Kiosk can take place through an API layer. The task of this layer is to combine the data transmitted by the Kiosk with the data received from the license plate recognition system and to write it to the database of the core system.

The API layer is recommended to be made on C# basis and .NET core base system.

6.4. Navigation

- Google Maps
- Waze
- Point of Interest (POI)

The navigation software is based partly on locations that can be marked on Google Maps and partly on POIs.

The two types of solution are needed because POIs are used in traditional satellite (GPS) navigation solutions, whereas connected smart device solutions are mostly based on points marked on Google Maps.

The app to be developed will launch navigation directly from the application using Google Maps or Waze. Navigation can be used by users in a familiar environment but with BFL-specific content.

6.5. Application

Microsoft Xamarin

The application may be based on the language of Microsoft Xamarin. Xamarin is a cross-platform development solution based on Microsoft's CLI infrastructure, often known as .NET. This Microsoft

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solution is built on language elements of C # but split into iOS and Android. Each branch is similar to native solutions, but with C # features.

6.6. Web

- HTML5
- Ajax
- Jquery
- CSS3

Web content development can be based on HTML5, CSS and javascript technologies. Responsiveness must be the main consideration when choosing technologies.

6.7. SMART displays

.NET core

Communication with SMART displays can be implemented by the API layer mentioned above. The API layer is responsible for addressing the smart table controller and passing the data to it in the proper form.

Triggers and automations running in the database layer are also responsible for the functionality of the layer.

The API layer can be made in .NET core framework. Semantically, it is recommended to use the language of C#.



7. Pilot Action

The automated access control and traffic management system to be implemented at the BFL, will be developed based on this business specification, but it will be validated in a Pilot Action first.

The system and integrated tools developed during the Pilot Action, as well as the lessons learned from the processes implemented, experiences at the gate, and the impacts of these on the life of BFL will all be recorded.

Pilot Action will be documented, which will allow other logistics centres in the corridor to adopt and apply well-developed solutions developed at BFL.

The specific tools and technology included in the plan are primarily a recommendation and can be replaced by the need for improvement and the lessons learned from the Pilot Action where necessary.

The system will be evaluated according to the methodological requirements that will be developed in WPT2. The effects of the system will be evaluated against what was planned, lessons learned during implementation, and success factors for deliverability will be identified.

The pilot action will be documented, and experience will be shared with other target groups and international partners.

If any error occurs during the Pilot Action (e.g. info point is in the wrong place, the confirmation process needs to be modified) it will be corrected before it is implemented by any partner or other logistics centre.



8. Action plan (GANTT)

Interreg CENTRAL EUROPE CORCAP	Task	Responsible	Deadline	T	T+1	T+2	T+3	T+4	T+5	T+6	T+7	T+8
CORCAP - Pilot Action Automatic access control and traffic management system for road vehicles. Budapest Freeport Logistics Ltd.	Preparation and planning phase											
	New system procurement											
		Detailed business specification	RHD	2019. júl. 29.								
		Procurement	BFL	2019. aug. 30.								
		Preparation of documentation for procurement	BFL	2019. aug. 9.								
		Processing offers (Hardware and Software)	BFL	2019. aug. 16.								
		Decision supporting material / Decision	BFL	2019. aug. 23.								
		Schedule review	BFL	2019. aug. 30.								
	Development and implementation											
		Detailed technical specifications	Supplier + Developer	2019. okt. 31.								
		System documentations	Developer	2019. okt. 31.								
		Hardware procurement	Supplier	2020. jan. 31.								
		Development	Developer	2020. jan. 31.								
		System implementation (Hardware installation, software)	Supplier + Developer	2020. jan. 31.								
		Testing	Supplier + Developer	2020. febr. 28.								
		Testing plan and testing	Supplier + Developer	2020. febr. 28.								
		Test reports	Developer	2020. febr. 28.								
		Preparation to go-live	Supplier + Developer									
		Planning to go-live	Supplier + Developer	2020. márc. 31.								
		User manuals	Developer	2020. márc. 31.								
		Educational aids	Developer	2020. márc. 31.								
		Pilot documentations	Developer	2020. márc. 31.								
	Go-live											
	Support	Developer										
	System usage statistics	Developer										
	Collection of user experiences	BFL										
	List of change requests	BFL										

7. Image- Action plan of the new system development

Source: RowanHill Digital Ltd.