

## SYSTEMS FOR WASTE MANAGEMENT





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ELTE has a vast experience in developing and implementing ICT systems for companies from various industries and local government units.



4

# SYSTEMS FROM THE PROS

We offer complex systems which combine state-of-the-art technology and computer science, support and monitor the processes of service provision, optimize the use of resources, and enhance the logistics of transport and communication. All this leads to lower costs, higher quality and increase in satisfaction of your customers.

As the manufacturer of both software and hardware system components, we can guarantee flexible and customized solutions that meet your individual needs, and allow for further expansion and continuous upgrade. The top level of our services, high quality components and professional warranty and postwarranty service have been appreciated by our numerous customers.

Please take a closer look at what we can offer.



# ELTE GROUP:

SOLUTIONS PROTECTED BY LAW

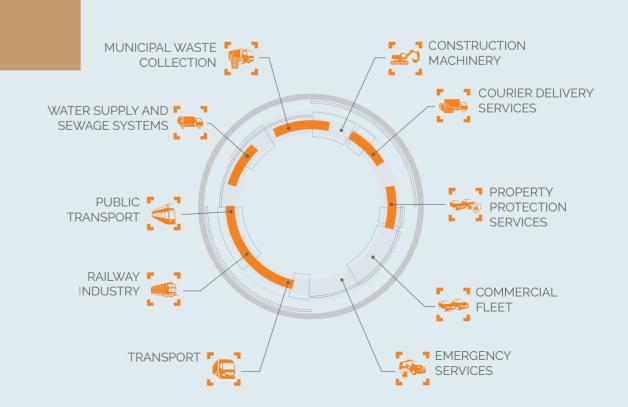
#### PROPRIETARY SOFTWARE

#### SUPPORT FOR COMPANIES OPERATING IN 10 INDUSTRY SECTORS

(municipal engineering, commercial fleet, railway industry, public transport, construction machinery, property protection services, water and wastewater utilities, courier delivery services, emergency services) EQUIPMENT DESIGNED AND MANUFACTURED BY ELTE GPS OVER 100,000 DEVICES ALREADY INSTALLED

> MORE THAN 50,000 VEHICLES MONITORED IN POLAND AND OTHER EUROPEAN COUNTRIES

OVER 10 YEARS OF EXPERIENCE



## SUPPORT WHEREVER YOU ARE



#### Do you manufacture, implement, integrate?

If you implement your own systems, if you cooperate with other providers, then we can also collaborate with you. You can buy single software and device from us. We can meet your needs. You do not have to buy the whole system – you choose the part that you want.

#### Do you sell?

Cooperation with Elte Group is a guarantee, that as our business partner you will provide complex systems which combine the latest technological developments and stateof-art IT solutions to your clients. Those solutions have been already implemented with success for several thousands of our clients, especially in following sectors: waste management, transportation, railways, security services. The form of partnership is established individually.

## REBRANDING

Our business success and market position have been achieved in cooperation with our partners. Policy of being opened to partnership contributed to development of our products and our company itself. Challanges raised by our partners, exchange of experience, mutual assistance and integration led to creation of modern technologies, functional products and lot of implementations in collaboration with Elte Group.

# PARTNERSHIP





Our ICT systems for municipal waste collection services provide solutions that meet all expectations of our customers: from the simplest ones, related to monitoring the location of waste collection vehicles to technologically advanced systems which meet high expectations of the client.





# EXPERIENCE PRECISION **POSITIONING SYSTEM**

The **ET GPS** system is designed to monitor the position of moving objects. The key element of the system is a GPS tracker, which saves the object location, speed, direction of movement, and information from sensors and interfaces. The data saved in the internal memory of the GPS tracker are transferred to the monitoring system. This information allows for making reports on routes, stops, and reports based on additional sensors and interfaces, e.g. sensors of waste loading and unloading.

Various types tracking units used to monitor vehicles, machines and people are shown below.



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Animation and visualization feature of route tracking on a digital map

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List of places where the waste collection vehicle was unloaded (open tailgate)

In **ET GPS** system, vehicles may be monitored via SEPAN application which runs in any web browser.

## **SMOK Mobile**

Monitoring of vehicles is also possible via **SMOK Mobile** application which may be installed on mobile devices, such as a smartphone or tablet running with the following operating systems: iOS, Android.



## EFFICIENCY IN YOUR HANDS AUTOMATIC IDENTIFICATION SYSTEM WITH RFID TECHNOLOGY

**ET Auto RFID**, an automatic identification system with RFID technology, has been developed in close cooperation with our customers from waste management industry so as to meet their needs, expectations and requirements of the market. The automatic RFID module offered by ELTE GROUP may be installed in any waste collection vehicle. Wastebins are identified thanks to RFID antennas and RFID readers mounted on vehicles, and RFID tags mounted in the bins.



It facilitates wastebin/container database management and enhances the efficiency of operations



In this way it improves management and reduces the company operating costs



It also helps to increase the quality of the services provided

## **Automatic RFID LF identification**

Equipping garbage trucks with the wastebin identification system enhances the waste collection process by eliminating potential errors.

#### **KEY SYSTEM FEATURES:** -

- CAN BE USED IN VARIOUS TYPES OF WASTE COLLECTION VEHICLES (picture below)
- COMPLETE WITH A SET OF PROFESSIONAL SOLUTIONS wastebins are identified thanks to a set RFID readers and antennas mounted on vehicles, and RFID transponders mounted in bins.
- AUTOMATIC READING OF THE TRANSPONDER WHEN THE WASTEBIN IS BEING COLLECTED
- SUPPORTS VARIOUS TRANSPONDER TYPES
- OPERATES AT VARIOUS FREQUENCIES
- DETECTS AND SIGNALS IRREGULARITIES DURING IMPLEMENTATION OF THE PLANNED ROUTE
- CAN BE COMBINED WITH THE ROUTE PLANNING AND SCHEDULING SYSTEM (ET Plan)
- CAN BE COMBINED WITH THE SYSTEM FOR IMPLEMENTATION AND CONTROL OF ROUTES AND SCHEDULES (ET Control)
- WORKS WITH THE ON-BOARD COMPUTER (ET Connect).



front-loaded garbage truck



side-loaded garbage truck



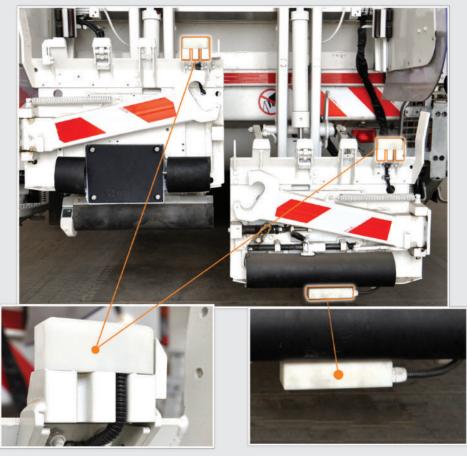
rear-loaded garbage truck



Example of RFID antenna mounting on a vehicle with rear loading

**RFID HDX antenna** 

The wastebin identification system may operate at 125 kHz, 134.2 kHz or in dual mode (125 kHz and 134.2 kHz).



RFID FDX/HDX antenna

**RFID HDX antenna** 

Round ID transponders are fixed in wastebins equipped with a mounting socket. If no sockets are available in wastebins (e.g. metal containers), the ID transponders are fixed on the front or side of the bin so as to ensure they may be read.



Any detected irregularities are signalled to the vehicle crew with visual and acoustic indicators installed on the vehicle. If the vehicle is equipped with a on-board computer, they are also displayed on the screen of the on-board computer.

The automated RFID system in the vehicle may be configured to signal irregularities on the planned route, e.g. the emptying of wastebin which was not included in the waste collection schedule.

It is possible for the RFID system to be configured so as to block the waste container lifter in the case of any attempt to empty a wastebin without an RFID tag or one with a damaged tag, or to empty a wastebin which has not been planned in the route.



Visual and acoustic indicators



 LOADING OPERATION OUTSIDE THE ROUTE
 18

 Attention!
 Found loading operations which are not planned for the current route!

 Antenna No.:3, description: Right side . Antenna 3
 tag: 00400000EC4FBD2

 Note
 Close

ELTE GPS

Indication of blocking the waste container lifter due to an attempt to empty wrong wastebin.

The on-board computer is an important part of RFID system. It enables the driver to communicate with the operator, to check if all the system components operate correctly, to monitor the status of the planned route, to report any irregularities by using predefined notes or own notes with attached photos.





On-board computer - list of waste collection points

This device may be paired with RFID reader and barcode reader to support the route service with a feature of adding notes about any irregularities and attaching photos.

## **Automatic UHF RFID identification**

Combination of vehicle positioning system (**ET GPS**) with RFID transponders operating in UHF standard has resulted in a simple and reliable tool for management and monitoring of waste containers.

#### **KEY SYSTEM FEATURES:**

- CAN BE USED IN VARIOUS TYPES OF WASTE COLLECTION VEHICLES (picture below)
- COMPLETE WITH A SET OF PROFESSIONAL SOLUTIONS The main components are the RFID/UHF reader and antenna, and a container sensor which allows you to detect a container without an RFID/UHF tag.
- READING CAN BE MADE FROM A LONG DISTANCE
- AUTOMATIC READING OF THE TRANSPONDER WHEN the container is being COLLECTED
- CAN BE COMBINED WITH THE ROUTE PLANNING AND SCHEDULING SYSTEM (ET Plan)
- CAN BE COMBINED WITH THE SYSTEM FOR IMPLEMENTATION AND CONTROL OF ROUTES AND SCHEDULES (ET Control)
- WORKS WITH THE ON-BOARD COMPUTER (ET Connect).







skip loader



truck with a hydraulic crane system

RFID/UHF antenna

The main components of the automatic identification system for waste containers or bell-type receptacles are the antenna and RFID/UHF reader. The container sensor allows you to detect a container without an RFID/UHF transponder. The advantage of RFID/UHF technology is the ability to read out RFID/UHF transponders from containers located even a dozen meters away.



RFID/UHF transponder





Regardless of the identification method, gathered data allows for preparing the clearing documentation with a list of emptied wastebins and collected containers.

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Example of RFID antenna mounting on a vehicle with rear loading

## ELIMINATES DOUBTS AND SUPPORTS CONTROL MANUAL IDENTIFICATION SYSTEM WITH RFID TECHNOLOGY

Identification of wastebins and/or containers can be carried out manually with a wireless RFID reader, which reads information from an RFID transponder mounted on any type of wastebin/ container. Such a manual identification is supported by the **ET Manual RFID** system.

### **KEY SYSTEM FEATURES:** –

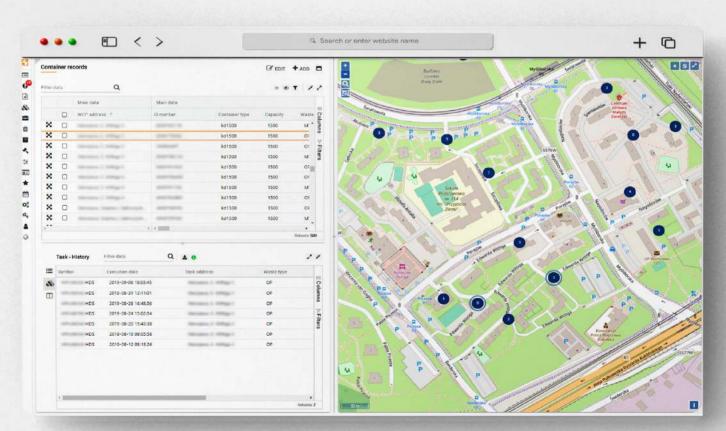
- CAN BE USED IN VARIOUS TYPES OF WASTEBINS AND CONTAINERS
- EQUIPPED WITH A SET OF PROFESSIONAL DEVICES wastebin identification is carried out with a manual RFID reader, which comes with a docking station mounted in the vehicle, and with RFID transponders affixed to wastebins.
- MANUAL READING OF THE TRANSPONDER WHEN THE WASTEBIN IS BEING COLLECTED
- SUPPORTS VARIOUS TRANSPONDER TYPES
- OPERATES AT VARIOUS FREQUENCIES
- DETECTS AND SIGNALS IRREGULARITIES DURING IMPLEMENTATION OF THE PLANNED ROUTE
- CAN BE COMBINED WITH THE ROUTE PLANNING AND SCHEDULING SYSTEM (ET Plan)
- CAN BE COMBINED WITH THE ROUTE AND SCHEDULE CONTROL SYSTEM (ET Control)
- WORKS WITH THE ON-BOARD COMPUTER (ET Connect).





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Data registered by the readers are transmitted to the system software, which allows for preparing the clearing documentation with a list of emptied wastebins and collected containers.



Report on the locations where containers were loaded with a view of these locations on a map

## **BARCODE IDENTIFICATION SYSTEM**

Identification of waste collection, its quantity and type is possible thanks to the barcode technology. The **ET Barcode** system is a solution for monitoring the selective collection of municipal waste using the barcode technology.

### **KEY SYSTEM FEATURES:** –

- CAN BE USED IN VARIOUS TYPES OF WASTEBINS, CONTAINERS AND BAGS
- EQUIPPED WITH A SET OF PROFESSIONAL DEVICES identification is made with a manual barcode reader, which comes with a docking station mounted in the vehicle, and with barcode tags affixed to the various types of wastebins, containers and bags.
- IT IS POSSIBLE TO MANUALLY READ BARCODE TAGS
- TAGS MAY BE PRINTED OUT VIA A DEDICATED APPLICATION
- USE OF VARIOUS TYPES OF BARCODE TAGS
- DETECTS AND SIGNALS IRREGULARITIES DURING IMPLEMENTATION OF THE PLANNED ROUTE
- CAN BE COMBINED WITH THE ROUTE PLANNING AND SCHEDULING SYSTEM (ET Plan)
- CAN BE COMBINED WITH THE ROUTE AND SCHEDULE CONTROL SYSTEM (ET Control)
- WORKS WITH THE ON-BOARD COMPUTER (ET Connect).

The system includes software for label printing (SMOK Label application). The application works with printers which make barcode labels resistant to adverse weather conditions and minor mechanical damage.



All of wastebins, sorts containers and bags marked with barcodes may be identified with a manual barcode reader. The reader was designed for outdoor operation in difficult weather conditions and in a wide range of temperatures. It is shock-proof and allows for reading partially damaged and soiled labels.

The barcode data read by the manual reader are sent online to the SEPAN application via the GPS controller using GSM/GPRS technology. The data recorded by ET Barcode system may be used to make various summaries and reports and to view waste collection points on a digital map.



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-	2019-09-02 06:33:37	Bags	Warszawa,	RFID Reader		

Report from the collection of waste bags tagged with barcodes

## **WASTEBIN STOCKTAKING SYSTEM**

The **ET Mark** system supports the wastebin stocktaking process by assigning a unique RFID transponder or a barcode label to a wastebin and specifying the wastebin location, type and intended use.

## **RFID TRANSPONDER**

Wastebins are most often equipped with RFID transponders. Different kinds of transponders are used depending on the applicable RFID technology and type of wastebins.

## **KEY FEATURES OF RFID TRANSPONDERS:**

- simple installation;
- supporting ET Auto RFID Automatic RFID identification system;
- supporting ET Manual RFID -Manual RFID identification system;
- resistance to weather conditions;
- reliability;
- long service life;
- possible multiple use.



### **BARCODE LABELS**

Barcode labels can be used to identify wastebins as an alternative to RFID transponders. The most commonly used solution are plastic labels with thermal transfer printing.



## FEATURES OF BARCODE LABELS:

- simple installation;
- customizable label pattern;
- supporting the manual RFID identification system - ET Manual RFID.

## **SMOK IPGO APPLICATION**

The **SMOK iPGO** mobile application supports the wastebin stocktaking process. It can assign a unique RFID transponder or a barcode label to a wastebin or a container, specifying the wastebin location, type and intended use. The app may run on an RFID data collector or a mobile device.

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Confirm Cancel	oll. points Map	Cancel

## **RFID DATA COLLECTOR**

The RFID data collector is a specialized device that works with our **SMOK iPGO** app. It has built-in GPS and GSM modules, an RFID reader and barcode reader.

RFID data collector

## RFID READERS FOR MOBILE DEVICES

Our RFID readers known as Check USB and Check MiniUSB work with mobile devices such as tablets via the USB port. They support the mobile app **SMOK iPGO**.

RFID readers for mobile devices



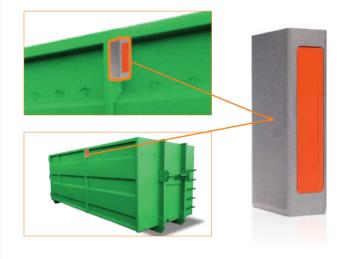


## LOCATION MATTERS WASTE CONTAINER POSITIONING SYSTEM

The key component of **ET Container** system is the waste container tracker, a modern device with built-in batteries designed to monitor the container location. In addition to the power supply module and GSM and GPS modules, the tracker is equipped with a sensor which detects the container loading and unloading operations. It is also possible to configure the data transmission frequency individually.

## BASIC FEATURES OF THE TRACKER:

- TRANSMISSION OF THE CONTAINER LOCATION DATA - once a day and following every loading and unloading operation (standard configuration);
- INNOVATIVE POWER SUPPLY enables device operating for at least 18 months (with standard configuration), battery replacement availability;
- HOUSING DESIGN allows you to fix the tracker on the container and to replace the battery without damaging the tracker.



Example of installation of the waste container tracker

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-	Stop	2019-01-02 15:29:55	GPS DK	NAME AND ADDRESS OF OWNER			
-	Control data	2019-01-03 10:24:17	GPS OK	TABLE PROPERTY AND ADDRESS		P · Beatown	
-	Control data	2019-01-04 10:28:55	OPS OK	Trans-Innovational Print		Activity of the second	Martin Bar B
100.00	Control data	2019-01-05 10.29:38	GPS OK	Calls Hilling High Street			
-	Control deta	2019-01-66 10.23.38	OPS OK	Table Television (Scotting)	P - B - INCOME		( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( )
-	Control data	2019-01-07 10 23:36	GPS OK	Frank Palling Street			·····
-	Ride	2019-01-07 13:29:55	GPS OK	Takin-Televisioning-Turnes	1 (1) 違言		
-	Ride	2019-01-07 13:30:30	GPS OK	COLOR TRACE TO A COLOR		New Parties	<b>A</b>
-	Stop	2019-01-07 14:00:53	GPS OK	territory loss	Andrea A	and and	2
			0	timeste 109	A State of the sta	100 ACC	Carl and a second of the secon

Report on the locations where containers were loaded with a view of the container location on a map

## WASTE BIN FILL-LEVEL MONITORING SYSTEM

**ET Bins** system is our solution for monitoring the current status of waste bin fill-level. The dedicated sensor placed inside the bin measures the level of its filling with waste. These data, combined with information about the bin location, are sent to the system. The waste bin fill-level and bin location are shown on the digital map, so you know immediately which waste bins need to be emptied. The system automatically warns the user of problems such as waste bin overflow, tipping, fire inside the bin, or its unauthorized emptying (waste theft).







Waste bin fill-level sensor

Installation example of waste bin fill-level sensor



## BECAUSE EVERY KILOGRAM COUNTS DYNAMIC WASTE WEIGHING SYSTEM

ET Dynamic is a fully automated dynamic waste weighing system. The weight is determined without stopping the waste container lifter - the waste is weighed when wastebins are being emptied.

#### **KEY SYSTEM FEATURES:**

- MAY WORK IN VARIOUS TYPES OF WASTE COLLECTION VEHICLES (picture below)
- EQUIPPED WITH A SET OF PROFESSIONAL EQUIPMENT, including a weighing computer, accelerometer and a set of loadcells
- AUTOMATICALLY WEIGHS WASTE WHEN THE WASTEBIN IS BEING EMPTIED, WITHOUT THE NEED TO INTERRUPT THE EMPTYING PROCESS
- WORKS WITH LOADCELLS OF VARIOUS SIZES
- MAY BE OFFICIALLY APPROVED BY COMPETENT AUTHORITY
- CAN BE COMBINED WITH THE ROUTE PLANNING AND SCHEDULING SYSTEM (ET Plan)
- CAN BE COMBINED WITH THE ROUTE AND SCHEDULE CONTROL SYSTEM (ET Control)
- WORKS WITH THE ON-BOARD COMPUTER (ET Connect).



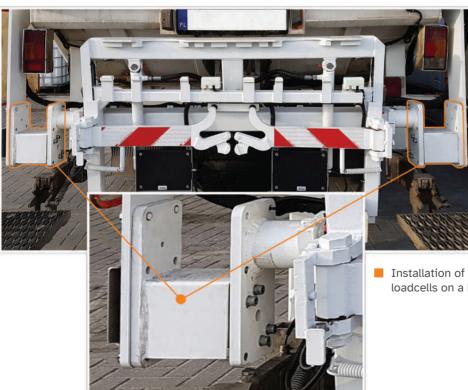
garbage truck



side-loaded garbage truck



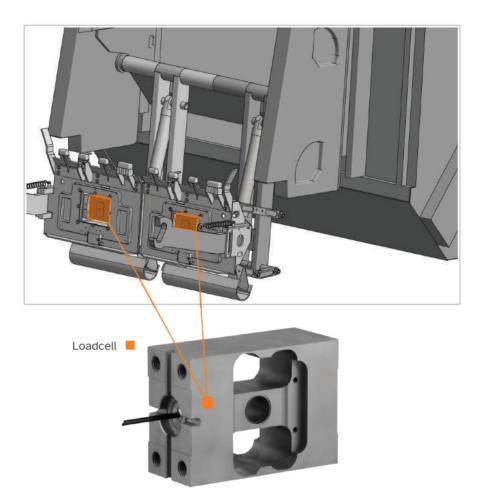
rear-loaded garbage truck



Installation of dynamic weighing system on a single waste container lifter

loadcells on a bin lifter

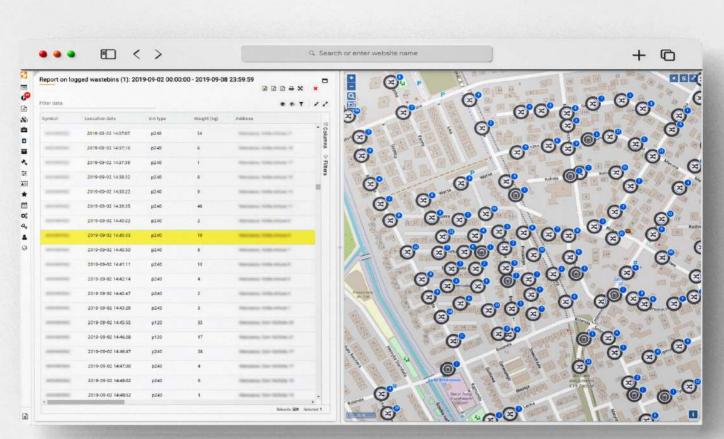
Installation of dynamic weighing system on a single waste container lifter



List of weighing results 9 2 2 07:45								
L.P.	Weighing time	Loader side	Weight [kg]					
1	07:37:58	1	86.0					
2	07:38:03	2	45.0					
3	07:39:41	1 101.0						
4	07:40:32	1 72.0						
5	07:41:00	2	97.0					
	Erase weighing memory		Cancel					
	ELTE C	DC						

A list of weighing results

The on-board computer installed in the vehicle shows the mass of individual weighing operation. This enables the staff to monitor if the task is carried out correctly. The information saved during the process of dynamic weighing is sent to a database. This allows for remote reading of the data and for generating reports, e.g. on the amount of waste collected from individual residents (waste collection points).



A weighting report showing the location of wastebins on a map

## THE COMPANIES WHICH CARRY OUT OR SUPERVISE WASTE COLLECTION CAN USE THE DYNAMIC WASTE WEIGHING SYSTEM FOR:

- precise settlement of the weight of waste collected from residents;
- monitoring the extent to which waste is sorted by residents and businesses;
- comparing the weight of waste collected by the vehicle with the weight of waste dumped in a landfill.

## **STATIC WASTE WEIGHING SYSTEM**

The **ET Static** has been designed as a solution for static weighing of municipal waste. Static weighing can be automated, but it is necessary to temporarily stop the emptying of wastebins and/or waste containers.

### **KEY SYSTEM FEATURES:**

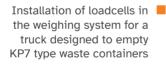
- CAN BE USED IN VARIOUS TYPES OF WASTE COLLECTION VEHICLES (picture below)
- EQUIPPED WITH A SET OF PROFESSIONAL DEVICES, including a weighing computer and a set of loadcells
- ALLOWS A WIDE RANGE OF MEASUREMENTS
- MAY BE OFFICIALLY APPROVED BY COMPETENT AUTHORITY
- CAN BE COMBINED WITH THE ROUTE PLANNING AND SCHEDULING SYSTEM (ET Plan)
- CAN BE COMBINED WITH THE ROUTE AND SCHEDULE CONTROL SYSTEM (ET Control)
- WORKS WITH THE ON-BOARD COMPUTER (ET Connect).

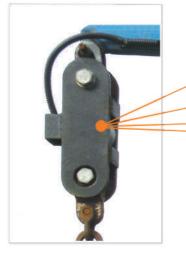


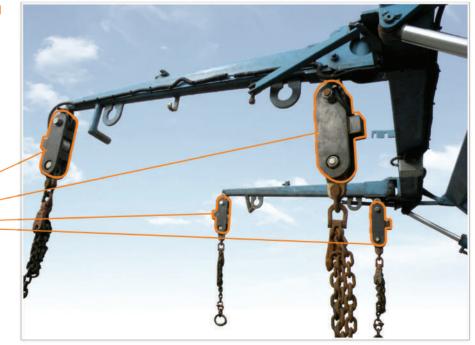






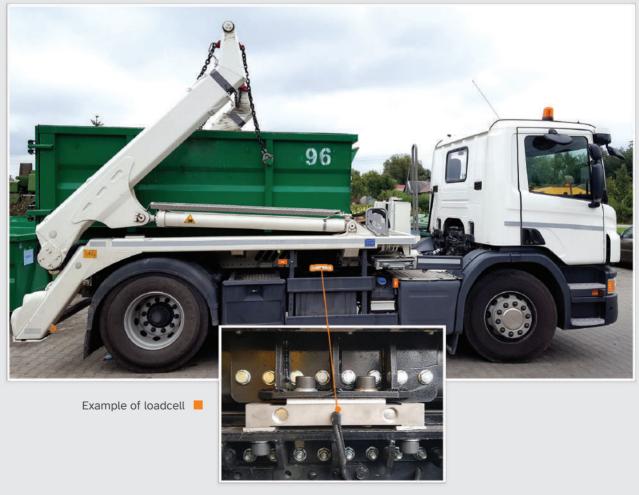








Installation of loadcells in the weighing system for a truck with a hydraulic crane system



Location of loadcells in the weighing system for a garbage truck

The on-board computer installed in the vehicle shows the mass of individual weighing operation. This enables the staff to monitor if the task is carried out correctly.



On-board computer with a list of weighing results

The information saved during the process of static waste weighing is sent to a database. This allows for remote reading of the data and for generating reports, e.g. on the amount of waste collected from individual residents (waste collection points).

eport on log	gged wastebins (1): 20	19-09-02 00:0	0:00 - 2019-0	9-08 23:59:59			1 Y.	
lter data						* * T   * *		× ************************************
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-	2019-09-08 09:28:28	p120	12	Names of Concession, Name	ZM	RFID Reader		
-	2019-09-03 09:23:45	p120	23	Second Concerning St.	ZM	RFID Reader	8	e war an
-	2019-09-03 09:24:38	p120	26	Internet 1 Departmentings in	ZM	RFID Reader		
	2019-09-03 09:24:40	p120	s	Recent + Distincting 0	ZM	RFID Reader	<b>C C</b>	
and second second	2019-09-03 09(25:33	p120	7	Manageria, A. Standard Malago 10.	2M	RFID Reader	S S S	
-	2019-09-03 09:25:42	p120	12	Manager & Street and party of	ZM	RFID Reader		
-	2019-09-03 09:26:23	p120	28	Hermony & Harrisonberge J	ZM	RFID Reader		
-	2019-06-03 09:26:31	p120	22	Names of Concession, N	ZM	RFID Reader		C C
-	2019-09-03 09:26:52	p120	7	Second 1 December 2	ZM	RFID Reader		
-	2019-09-05 09:28:22	p120	6	Income, 1 Surrouting, II	ZM	RFID Reader		
design of the local division of the local di	2019-09-03 09:28:31	p120	10	Manager 1 Concerning 1	ZM	RFID Reader		
-	2019-09-03 09:28:51	p120	4	Names of Concession, N	ZM	RFID Reader	C)	THE REAL PROPERTY AND A DESCRIPTION OF A
-	2019-09-03 09-26:57	p120	6	MICHAEL & DESCRIPTION OF	ZM	RFID Reader	S	
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-	2019-09-03 09:80:05	p120	13	mount 1 (mounting) 1	ZM	RFID Reader	America Strategy	and a state of the state
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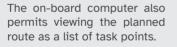
A weighting report showing the location of wastebins and/or containers on a map

# GOOD COMMUNICATION IS KEY TO EFFECTIVE WORK **DRIVER COMMUNICATION SYSTEM**

The **ET Connect** system supports and facilitates the execution of tasks. Among other things, it offers communication with the driver, GPS navigation, and diagnostics of GPS/RFID system components installed in the vehicle. You can also view a route plan as a list of task points. Any irregularities can be reported by the vehicle crew with predefined notes or personal notes, to which photos may be attached.

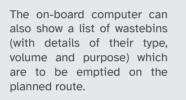
The Diagnostics feature in the on-board computer allows you to check the operation of each device of ELTE GPS systems installed in the vehicle.

Vehicle controller	ОКІ
GPS bearing	окі
Talgate sensor	ОКІ
Power take-off	OKI [2017-12-20 09:59:17]
Activation of the lifter	ОКІ
RFID reader, antenna 4	OKI [2017-12-20 09:58:59]
RFID reader, antenna 3	OKI [2017-12-20 09:58:59]
RFID reader, antenna 2	It does not work
View e	vents Start diagnostics End diagnostics



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WE)		ROUTES	DIAGNOFTICS	SORTING	FUTERING.	UNLOADING		к
Item No.		Address (	of waste collectio	n point		Segregation	Collected	[km]
1	Krakow, Medyczn	a 13			01832	YES	0 of 1	414
	Krakow, Medyczn	a 14			00405	YES	0 of 1	414
	Krakow, Medyczn	a 12			01131	YES	0 of 1	409
	Krakow, Medyczn	a 11			01589	YES	0 of 1	409
5	Krakow, Medyczn	a 10				YES	0 of 1	409
		⇒			Confirm waste	col. pts	Note on wa	aste coll. point

The Navigate function allows for automatic guidance to the selected waste collection point without the need to enter its address in the application installed in the on-board computer.



Any irregularities may be reported by the vehicle crew by their own notes or predefined notes. A note can be linked with a waste collection point or to a specific wastebin or bag.



	X Contract	0 <b>0</b>		L	Р
MENU		a fill		к	
ITEM NO.	Wastebin type	w	aste type	Collected	Status
	unknown	DRY		0 of 6	awaiting
	MGB 120 0040000008C21450	MIXED WASTE		0 of 1	awaiting
P	$\leftarrow$	New auxiliary unit			waste loading veration
~					

Predefined note		<i>∕</i> %\					
1	No wastebin						
2	No access road						
3	Wastebin damaged						
4	No code / RFID TAG						
	Waste type incorrect						
б	Overfilled wastebin						
		Accept	Cancel				
	ELTE (	GPS					

You can use a mobile device with a built-in camera to upload photos to the on-board computer using WIFI network. The sent photo is attached to a note of any irregularity found at a waste collection point.





WI-F

On-board computer software signals irregularities during the route, e.g. collection of container that was not included in the route plan.



The on-board computer permits two-way communication with the operator.



## RECORDING AND MONITORING

The **ET Pics** system allows for using photos or videos to document any irregularities or the completion of tasks. The advantage of the system is the capability of geotagging photos and videos. This function adds the geographical location to a registered image, which allows you to search quickly for images captured while providing the service at the location shown on the map, e.g. a street or a specific address. This system proves useful in verifying the completion of tasks and investigating any complaints. **ET Pics** offers various solutions depending on whether you want to record the image as photos or videos.

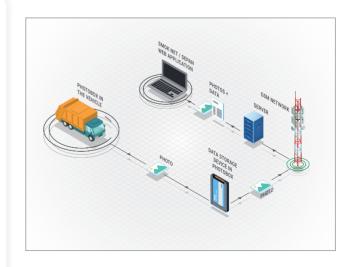
#### **VIDEO RECORDER:**

- captures the image in the form of videos;
- allows you to record the image from multiple cameras;
- offers customizable image recording, e.g. activation by the ignition key, starting the PTO, etc.;
- is customizable in terms of the quality of the recorded image;
- allows you to send recorded images on-line and/ or to save them on an SD card or HDD disk drive.

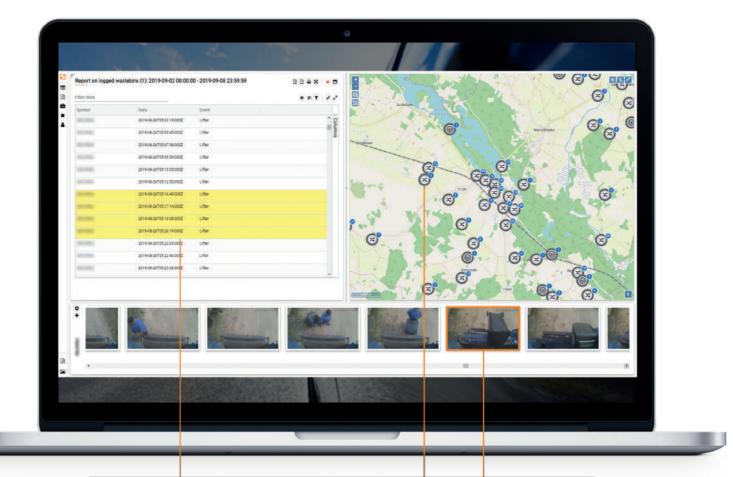


#### PHOTO RECORDER - PHOTOBOX:

- captures the image in the form of photos;
- allows you to record the image from multiple cameras;
- is configurable in terms of the frequency of taking photos;
- is customizable in terms of the quality of the recorded image;
- allows you to send recorded images on-line and/or to save them on an SD card.



The image recording system enables you to view an object on a digital map synchronized with the photos or videos captured at a given location.

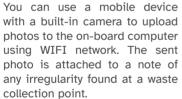




View of the system with the photo display feature



View of the system with the video display feature





On-board computer - a photo may be attached to a note

## SYSTEM FOR DEMANDING TASKS **ROUTE OPTIMIZATION SYSTEM**

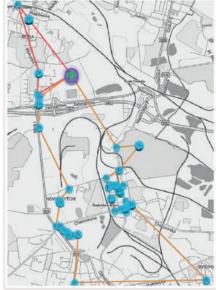
The main challenge for the staff in charge of route planning is the optimal use of the fleet, and planning the routes so that vehicles travel the shortest distance, completing all task as quickly as possible.

Our **ET Optimal** system resolves these issues and ensures efficient use of your fleet. The system takes into account a number of variables and parameters required for the effective planning of routes. It takes into account the capacity of vehicles and wastebins, the frequency of their emptying and their locations. The route is planned so as to maximally reduce the time between waste collection and waste unloading while keeping the mileage as low as possible.

Once the right parameters and variables are entered, the system will plan the routes according to the set criteria.







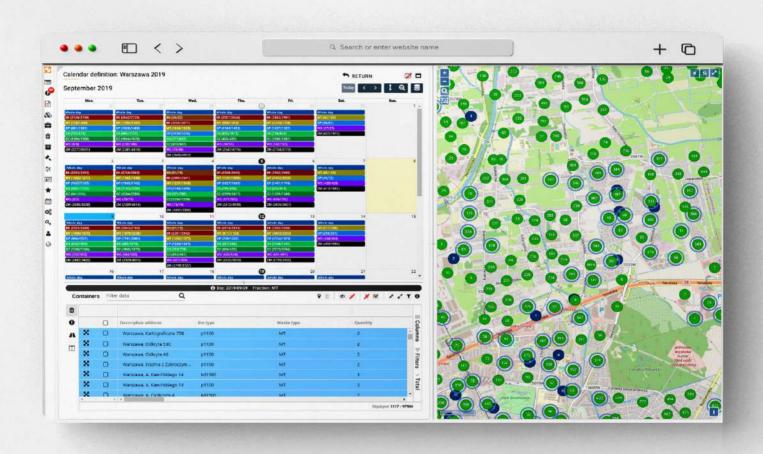
Route after optimization

#### BENEFITS OF ET OPTIMAL SYSTEM:

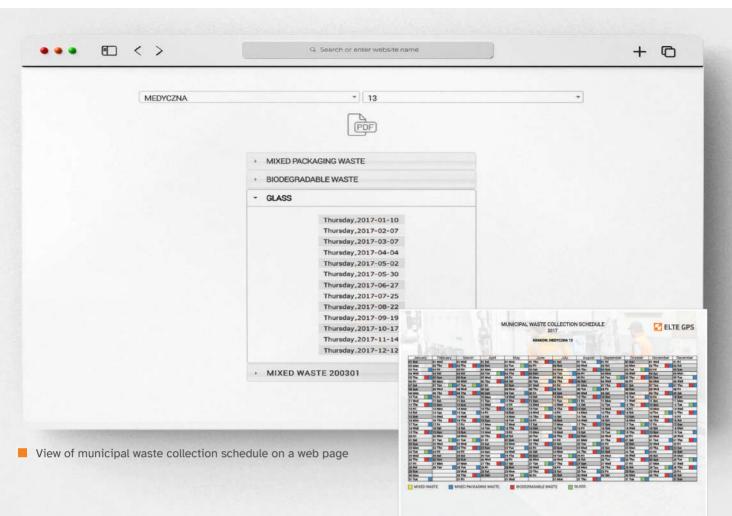
- boosting the efficiency of planners and staff carrying out tasks;
- reduction of mileage and time of order completion;
- optimal allocation of tasks and use of vehicles;
- reduced costs of transport;
- efficient implementation of tasks and improvement of service quality;
- enhanced competitiveness of your company;
- monitoring the correctness of task completion.

#### **ROUTE PLANNING AND SCHEDULING** SYSTEM

The system permits planning of waste collection based on the declared frequency, type of waste and number of wastebins. In this way schedules can be created for a number of days without having to plan each day individually.



The main calendar view with the waste collection schedule and locations of loading operations displayed on the map



View of municipal waste collection schedule in a PDF file

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	the star we have be	ZM	10000	0	96%	406		2019-09-02 00:00:00	2019-09-02-23:59:59	7 21		tin
	the second second	ZM	and the second second	0	53%	525		2019-09-02 00:00:00	2019-09-02 23:59:59	Filters	200	7. 1
	and the first second	ZM	-	*	109%	504		2019-09-02 00:00:00	2019-09-02 23:59:59			
	and the statement	ZM	and the second s	~	100%	366		2019-09-02 00:00:00	2019-09-02 23:59:59			V2 m
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	contraction designations	ZM	and a second sec	0	82%	494		2019-09-02 00:00:00	2019-09-02 23:59:59			
							-			Ackorits: 205	Derny 14	
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Real Property in	Address	Waste t	ype Bin type p1100.		Number of completed t	. RFID number (1)	Container ID	Arrival time 2019-09-02 0	Stocktaking Quantity: 15		- The second second	
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Ξ		ZM	p1100		1/1	-	_	2019-09-02-1	-	3		
-		ZM	p1100		1/1	_	-	2019-09-02 0	quantity. 15 (capaci	ty: 10010)	1 2	
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		1.22							•		Ranghany 1	-
	4									e SDA Selecter 1		

View of the task window with its completion status

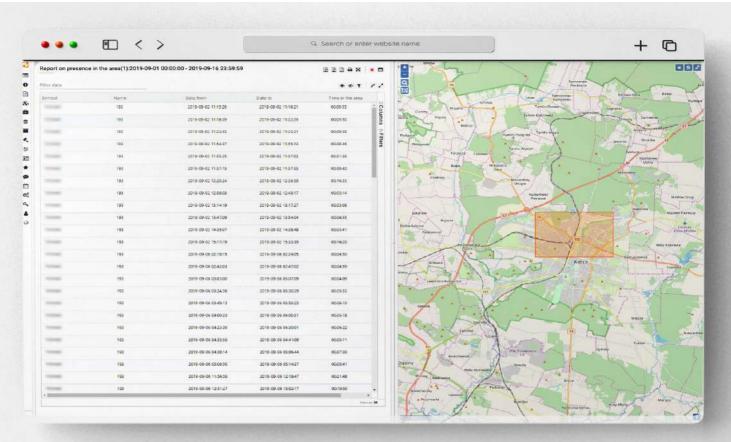
#### SYSTEM FOR IMPLEMENTATION AND CONTROL OF ROUTES AND SCHEDULES

This system is the perfect tool to assess the quality of waste collection services. Not only does it enable you to check the work of vehicle crews, but it also offers the feature of reporting and searching for information about completed and unfinished tasks for any address (point), area, vehicle or date.

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0	of the second design of the	ZM	second second	0	60%	2019-09-16 00:00:00	2019-09-16 23:59:59	2019-09-16 05:40:43	×	O WG	Placement	
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View of search orders window

44



Searching objects in a designated area

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Report on Ic	gged wastebins (1	):2019-09-01 00:00:00 -	2019-09-16 23:59:59				0 2 0 <del>•</del> × • •	<b>1</b>	
ilter date							* * T / / /		
Symbol	Execution date	Planned execution date	Address	Bin type	Type od validation	Note	Execution	Carl Carl Carl Carl Carl Carl Carl Carl	6
	2019-09-03 15:05:12	2019-09-03 01:00:00	Second Conservation	Stockteking	On-board computer		green 0	PP 9	
	2019-09-03 15:03:16	2019-09-03 01:00:00		Stocktolking	De-board computer		owen B		4
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-	2019-09-03 15:06:02				RFID Reader		green	Man Deres 1	A B Elseron
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	2019-09-02 15:21:07	2016-09-03 01 00:00	Measure 2 methods 7	w120	On loant computer		green	and the second s	@ <u></u>
	2019-09-03 15:21:12	2019-09-03 01:00:00	Manageria 2. Manageria	Stockteking	On board computer		guen	and the second s	
	2019-09-03 15-21-17	2010-09-03 01-00-00	Annes L Comp. 1	w120	On-loard computer		green		
	2019-09-03 15:21:21	2010-09-03-01-00-00	Wingerin, J., miningeri	Stocktaking	On board computer		green	×	e e e e e e e e e e e e e e e e e e e
	2019-09-05 15:21:24	2019-09-03 01:00:00	Annana J. Stronge I.	Stocktaking	On-board computer		green	u-16 1*	CO.
	85:15:61-69-65-15:21:28	2019-09-05-01:00:00	Managers, 7 . Manager 7	w120	On-board computer		guen		
	2019-09-03 15:21:33	2019-09-03-01-00-00	Territoria i monore -	Slocktaking	Cerboard computer		green		8
	2010-09-05 15:21:43	2010-00-05-01:00:00	Annana Annanana	w120	On-board computer		green	Sec. Sec. Sec. Sec. Sec. Sec. Sec. Sec.	
-	2019-09-03 15:21:48	2019-09-03 01:00:00	Section Section	w120	On-board computer		green	Cor Cor	
-	2019-09-03 15:24:38	2019-09-05 01:00:00	Manager Manager	w120	On-board computer	No weather	green		and the second
-	2019-09-03 16 12:51					End of the mission	r red		
	2019-09-03 18:00:20				RFID Reader		orange	C. C.	
And Personnel And	2019-09-03 10:00:36			_	RFID Reader		aważe "		A State State
							Reference 40.76 Serence ()		1

Report on logged wastebins with information about completed and unfinished tasks with a note attached

#### ALL INFORMATION IN ONE PLACE VEHICLE AND EMPLOYEE REGISTER SYSTEM

**ET Register** is a vehicle and employee register system, which stores the databases of vehicles used in the company and the data of employees.

### THIS SOLUTION OFFERS A QUICK ACCESS TO:

- vehicle data (such as the registration number, VIN, year of manufacture, color, etc.);
- operating costs, including the history of repairs, refuelling, insurance policies and accidents;
- information about the cost of maintaining the fleet;
- an active schedule which reminds of upcoming events such as vehicle checkups, technical inspections, official inspections, tachograph authentication etc.

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2000/2012										
Type of task	Notification date	Executed	Task description	Additional description	Planned service date	1 Service execution a	date Reporting person	Cost	Mileage	
service	2019-09-26 10:42:14	0	service		2019-09-26 10:42:14		administrator		24580 km	
service	2019-08-20 15:03:20	*	service		2015-08-20 15:03:20	2019-08-30 11:25:00	9 administrator	2.345 EUR	130456 km	
Periodical vehicle in	2018-03-03 09:22:01	*	Periodical vehicle inspection		2018-03-03 09 22:01	2018-03-03 10:40:25	5 administrator	S25 EUR	54178 km	
service	2019-03-02 16:40:46	~	service		2018-03-02 16:40.46	2018-03-10 09:02:30	administrator	768 EUR	33413 km	
Vehicle inspection	2016-01-2011:34:29	~	Vehicle inspection		2018-01-20 11:34:29	2018-01-20 18:00:00	0 administrator	100 EUR	10000 km	
service	2017-11-05 12:27:54	~	service		2017-11-05 12:27:54	2017-11-13 09:56:51	1 administrator	1.234 EUR	65520 km	
service	2017-10-17 15:00:05	~	service		2017-10-17 15:00:05	2017-10-23 11:50:40	2 administrator	3.100 EUR	58952 km	
details Filter dat		۹								+ 2 -
Stat	us of service	Description	Mileage		Execution date		Personne responsable for execution			
ne				2019-09-28 10:43:47						
nt ne							ar Novelle			
						95	0.10494			
Con	ripleted	Disgnostic	24580 km	2019-09-24 10:43:14		250	10.0000	2019-09-25	10.4649	
	sovice Pendossi vitide in service Vende ingestorin service	service 2019-68-2015-60:20 Periodical-vertice in. 2019-63-40.09:22.01 service 2019-63-40.09:22.01 vervice 2019-63-22.01-43-40 2019-63-22.01-43-01-13-42 service 2017-11-61:22.75 service 2017-11-61:	service 2019-08-2015/02-0  Perkodasi vendie m. 2019-08-2016-2019 service 2019-08-2019-02-201 vendie magestam 2019-03-2013-24-2 vendie make 2017-11-05122-54  service 2017-11-0512-54  service 2017-55-54  s	service 2019-08-2015/08-20   Personal vensore mervice Personal vensore Pe	service 2019-69-2015-03-20   Periodical vehicle impection service 2019-69-30 19-52-201   Periodical vehicle impection service 2019-69-30 10-52-201 Periodical vehicle impection service 2019-11-32-202   Periodical vehicle impection service 2019-11-32-202  Periodical vehicle impection service 2019-11-32-202  Periodical vehicle impection service 2019-11-32-202  Periodical vehicle impection service 2019-11-32-202  Periodical vehicle impection service 2019-11-32-202  Periodical vehicle impection service 2019-11-32-202  Periodical vehicle impection service 2019-11-32-202  Periodical vehicle impection service 2019-11-32-202  Periodical vehicle impection service 2019-11-32-202  Periodical vehicle impection service 2019-11-32-202  Periodical vehicle impection service 2019-11-32-202  Periodical vehicle impection service 2019-11-32-202  Periodical vehicle impection service 2019-11-32-202  Periodical vehicle impection service 2019-11-32-202  Periodical vehicle impection service 2019-11-32-202  Periodical vehicle impection service 2019-11-32-202  Periodical vehicle impection service 2019-11-32-202  Periodical vehicle impection service 2019-11-32-202  Periodical vehicle impection service 2019-11-32-30-30-30-30-30-30-30-30-30-30-30-30-30-	service 2019-08-20 15:03.20 × service 2019-08-20 15:03.20 Periodical virtue in 2018-03-00 09:22:01 × Projected virtue inspection 2019-03-00 09:22:01 service 2019-03-02 15:03.20 × service 2019-03-03 09:02:01 vende inspection 2019-01-20 11:34:29 × Virtue inspection 2019-03-20 16:04:04 vende inspection 2019-01-20 × 2019-03-20 11:34:29 × Virtue inspection 2019-01-20 11:34:20 × Virtue inspection 2019-01-20 1	service         201948-2019.00.20         Image: service         201948-2019.00.20         201948-2019.201         201949-2019.2019.2019.2019.2019.2019.2019.2019.	service         2019-08-2015/02-20 <ul></ul>	service         201946-2015/02/0 <ul> <li>service</li> <li>201946-2015/02/0</li> <li>Periodical vehicle inspection</li> <li>201946-2017/2008</li> <li>administrator</li> <li>201947-2019/2018</li> <li>Periodical vehicle inspection</li> <li>201940-2017/2019/2018</li> <li>administrator</li> <li>201947-2018/2018</li> <li>administrator</li> <li>201947-2018/2018</li> <li>administrator</li> <li>201947-2018/2018</li> <li>administrator</li> <li>201948-2018/2018</li> <li>201948-2018/</li></ul>	service         2019-08.2015.00.20 <ul> <li>service</li> <li>2019-08.2015.00.20</li> <li>Periodical vinicie imperation</li> <li>2019-08.2015.00.20</li> <li>Periodical vinicie imperation</li> <li>2019-08.2015.00.20</li> <li>Periodical vinicie imperation</li> <li>2019-08.2015.00.20</li> <li>Periodical vinicie imperation</li> <li>2019-08.2015.00.20</li>                 &lt;</ul>

The active schedule may be set up in the time interval mode (e.g. every year) or the distance interval mode (e.g. every 20,000 km). The schedule takes into account dynamically changing data about vehicles, e.g. mileage

#### **INTEGRATION SYSTEM**

The **ET Integrator** system enables the integration our ICT solutions with other systems, including the systems for clearing the provided services, monitoring of working time, invoicing, scheduling, etc. The data can be exchanged via files or Webservice.

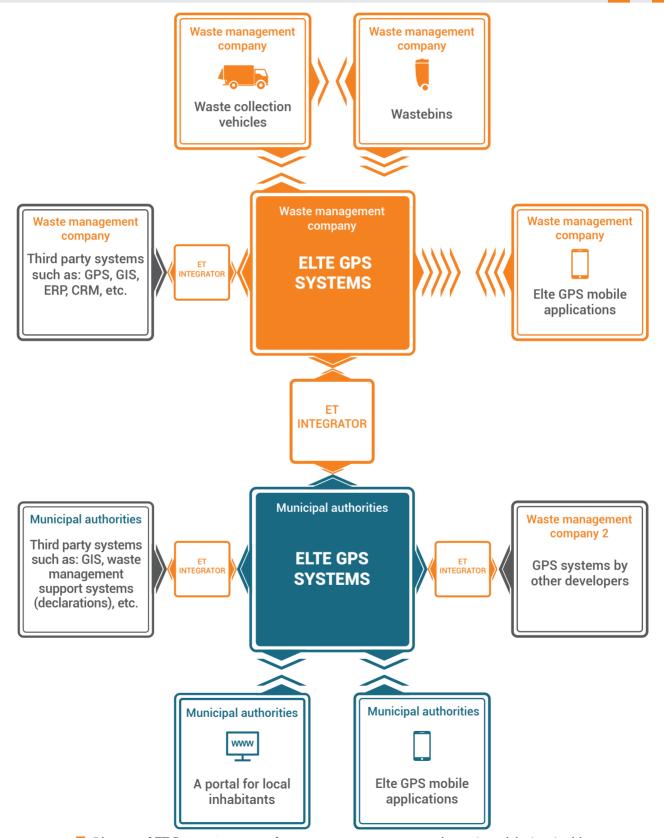


Diagram of **ET Integrator** system for waste management companies and municipal authorities

#### KEEPING WINTER AND SUMMER UNDER CONTROL SUMMER AND WINTER ROAD MAINTENANCE SYSTEM

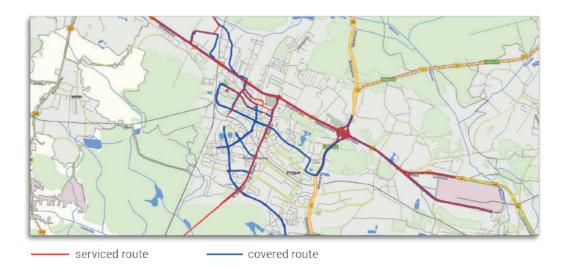
**ET Roads** is a system that monitors municipal specialized vehicles such as salt spreaders with snow plows or sweepers. The system supports and controls processes related to summer and winter road maintenance.

Salt spreaders with snow plows are equipped with sensors of plow position and sensors of salt spreading, which allows for monitoring their operation. Information about the operation of these sensors is transmitted to the SEPAN system software with other basic data such as simultaneously registered location and time. In the case of sweepers, the activation signal for brushes and the sprinkler may be monitored. Modern sweepers and salt spreaders also make it possible to read these and other data (such as the amount and width of salt spreading) via the CAN-BUS.



A map view with the location of vehicle and its parameters

The data recorded by the devices mounted on vehicles for snow removal and road cleaning are displayed in the SEPAN application.



The SMOK system allows you to generate a variety of reports on summer and winter road maintenance services.





Salt spreading sensor

Plow position sensor

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le May		Vehicle logbook Tasks					
						19 <b>16:00</b> 200	0000
5-12-201	7 13 58 30 18-12	100					00 22:59/58 26-12-2015 U+y -
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nicle .	Date Location 2017-01-01 00:00 00	h	Travel time	Distance Ploug	phing without spreading - time. Ploughing without spreading - distan 0.0	ce Spreading without ploughing - time Spreading without ploughing - distanc 0.0	<ul> <li>Ploughing and spreading - time Ploughing and spreading - distance</li> <li>0.0</li> </ul>
	2017-01-01 16:22:01		01125-33	10.5	0.0	0.0	0.0
	2017-01-03 04-17-00		00:03:27	1.5	0.0	0.0	0.0
	2017-01-03 04:18:08		00116-04	4.2	0.0	0.0	0.0
-	2017-01-02 04/19-48		00/02/16	1.9	0.0	0.0	0.0
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	2017-01-03 04:25:16		00:03:55	1.3	0.0	0.0	0.0
-	2017-01-03-04:27:42	and the second second	00:04:44	0.5	0.0	0.0	0.0
	2017-01-03 04:40:34		00:02:29	0.5	0.0	0.0	0.0
	2017-01-03 06:51:59	and the second se	00:01:55	0.0	0.0	0.0	0,0
	2017-01-03 06:56:00		00:01:13	0.6	0.0	0.0	0.0
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	2017-01-13 05:40:07		60:01:50	1.0	0.0	0.0	0.0
	2017-01-13 05:40:36		00:04:34	1.4	0.0	4.0	0.0
	2017-01-13 05:42:45		00:02:33	14	0.0	0.0	0.0
	2017-01-13 05:43:51		00:05:51	0.5	0.0	0.0	0.0
-	2017-01-13 05/49/42	And Personnelling	00:16:36	6.2	0.0	0.0	0.0
-	2017-01-13 06:07:09	and free or a local data	00:23:57	5.4	0.0	0.0	0.0
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-	2017-01-13 06:54:53	and the second	00-01-26	0.9	0.0	0.0	0.0
	2017-01-13 06/15-43		00/02/18	0.9	0.0	0.0	0.0

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	aintenance service	Name of the street	km to maintain	equipment operation	to of maintained km
1 1		Armi Krajowej	0.795	0.000	0%
e 3		Banašika	0.156	0.000	0%
1		Nemcewicza	1.057	0.000	0%
i 1		Celniloba	0.290	0.000	0%
1		Chopina	0.896	0.000	0%
1		Chropaczówka	1.948	0.000	0%
1		Dab	1.580	0.000	0%
0 1		Dąbrowska	1.852	0.000	0%
1 1		Dąbrowkiego	1.458	0.000	0%
2 1		Olugoszyńska	2.068	0.000	0%
2 1		Emili Plater	0.826	0.000	0%
4 1		Fabryczna	0.829	0.000	0%
5 1		Gémików z Danuty	0.727	0.000	0%
6 1		Grunweldzice	2.934	0.000	0%
7 1		Henryka Patryki	0.393	0.000	0%
B 1		Norzyńskiego	0.700	0.000	0%
9 1		Hetmanska	1.210	0.000	0%
0 1		Inwestycyjna	0.583	0.000	0%
1 1		Jana Kantego Steczkovskiego	0.155	0.000	0%
2 1		Kaczeńców	1.439	0.000	0%
3 1		Katowicka	2.800	0.000	0%
4 1		Ks.Maksymiliana Kolbego+ parki	0.309	0.000	0%
5 1		Leina	1.132	0.000	0%
6 1		Lavezana	0.661	0.000	0%
7 1		łącznik Grunwaldzkiej z Al. Tysią	0.340	0.000	0%
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9 1		Motejie	0.734	0.000	0%
0 1		Miynaraka	0.853	0.000	0%
11 1		Moniuszki	1.339	0.000	0%
12 1		Mostowa	0.416	0.000	0%
33 1		Obrońców Września 1939	3.052	0.000	0%

#### THE ET ROADS **SYSTEM ALLOWS THE USER:**

- to obtain current information about the location of tasks;
- to create reports on completed tasks;
- to check if the tasks were completed correctly.

# DESIGNED TO SAVE YOUR MONEY FUEL MANAGEMENT SYSTEM

The **ET Fuel** system has been designed to facilitate fuel management. It enables fast and efficient compilation of data about fuel tanking and fuel consumption with regard to a particular vehicle or a group of vehicles.

Fuel consumption may be monitored thanks to a range of gauges and signalling devices such as the CAN interface, digital microprocessor fuel probe and fuel filler cap sensor with an anti-theft strainer.



Installation of digital microprocessor fuel probe with an RFID fuel filler cap sensor and an anti-theft strainer



efueling/fuel los:	report(1): 2017-01-01 00:0	0:00 - 2019-09-16 23:59:59					
lar data					*** ZZ		
bject	Event	Data from	Data to	Quantity (f)	Location		
1000	Refuelings	2019-01-29 19:14:06	2019-01-29 19:19:27	29	- Co	1 - / / - + F + - 1	f = f
-inte	Refuelings	2010-01-30 19:01:49	2019-01-30 19:06:01	27.3	Internet internet	41/	
	Refuelings	2019-01-31 17:55:20	2019-01-31 17:57:40	19.6	Sector Sector	1 Martin	and the second second
	Refuelings	2016-02-01 10:02:44	2019-02-01 19-00-10	32.6	1000 10011	and the second se	
train .	teructings	2019-02-04 10:53:45	2019-02-04 10:55:45	19.5	Annual Appendix	The second second	1 1
	Refuelings	2019-02-05 10:48:55	2019-02-05 10:55:10	33.5	Anna Angela		had a family and
	Refuelings	2019-02-06 08-35:37	2019-02-06 08:38:11	30.4	Server-Sep-14	-	
	Refuelings	2019-02-07 12:07:52	2019-02-07 12:11:43	30	1000 (mp.1)	A CONTRACTOR OF A	18X
	Refuelings	2019-02-08 11:10:21	2019-02-05 11:12:59	31.2	Sec. ratio		
-	Refuelings	2010-02-11 19-02-02	2019-02-11 19:07:37	36.6	100.000		i-antin P
	Refutings	2019-02-12 19:07:18	2019-02-12 19:10:48	30.3	term family		
	Pertualings	2019-02-13 10:46:12	2019-02-13 10:49:28	25.6	Name Transfer	+ I Marman	
	Refueltops	2019-02-13 18:33:43	2019-02-13 18:36:49	33.7	Name Travel	x x	
ning '	Refuelings	3019-02-14 12:11:31	2019-02-14 12:16:33	344	1000.0001	sk. the second	
	Fuel losses	2019-02-14 15:31:50	2019-02-14 15:51:04	7.8	many logistic		
1000	Refueings	2019-02-18 11:08:49	2019-02-18 11/11/31	39.5	Name Take 1	warris and any till the second	and the second second
	Refueings	2019-02-19 19 33-13	2019-02-19 19 38.42	33.8	Anna Capital	and the second s	Sector Sector
1000	Refueings	2019-02-20 13:27:23	2019-02-20 13 30.44	41.9	Sec. San A	Operative Distance Zonane	and the state
	Refueings	2019-02-25 19 18:56	2019-02-25 19:23:23	345	Anna Taurita	and the second s	Contraction -
	Refuelings	2019-02-26 19:07:11	2019-02-26 19:11:22	24.3	Name Tage (1)	An and A state of the state of	
-	Refueings	2019-02-27 19:22:00	2019-02-27 19:23:33	17.2	time has to		
	Refuelings	2019-02-28 18:52-42	2019-02-28 18:55:37	22.3	Term Term 1	Ricryphene Unions	The work is a
	Refuelings	2019-03-01 19:25:01	2019-03-01 19/28/00	31.5	Same Same	Unezjoka	
1000	Refuelings	2019-05-17 11:57:16	2019-05-17 12:00:04	32.5	tame institute	Amazzar	Contraction No. Service Contraction of the Contract

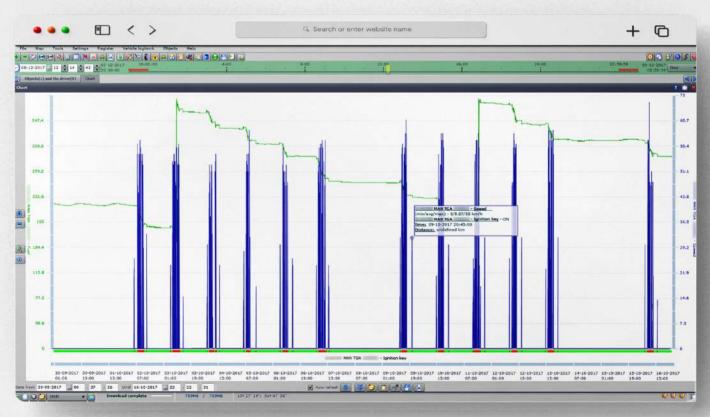
A system window with the report on refueling/fuel losses, graph of fuel consumption over time and a map of refueling locations

Object	Event	Data from	Data to	Quantity (I)	Location
1000	Refuelings	2019-01-29 19:14:06	2010-01-20 10:19:27	89	Kielce,
tanings:	Refuelings	2019-01-30 19:01:49	2019-01-30 19:06:01	27.3	Kielce
1000	Ratuelings	2019-01-31 17:55:20	2019-01-31 17:57:40	19.6	Kielce
	Pertuelings	2019-02-01 18:03:44	2019-02-01 18:06:10	22.6	Kets
101000	Refuelings	2019-02-04 10:53:45	2019-02-04 10:55:45	19.3	Kielce
-	Refueings	2019-02-05 10:48:55	2019-02-05 10:55:18	33.5	Kielce
1000	Refuelings	2019-02-06 08:35:37	2019-02-06 08:38:11	30.4	Kieke
1000	Rehadings	2019-02-07 12:07:52	2019-02-07 12:11:43	30	Kelce
1000	Refuelings	2019-02-06 11:10/21	2019-02-08 11:12:59	312	Kieke
1000	Refuelogs	2019-02-11 19/02/02	2019-02-11 19:07:37	36.6	Kieke
-	Refueings	2019-02-12 19:07:10	2019-02-12 19(10:46	30.3	Kieke.)
	Refuelings	2019-02-13 10-46-12	2019-02-13 10-49-28	25.6	Kielce
1000	Petuelings	2019-02-13 18:33:45	2019-02-13 18:36:49	35.7	Kieke
	Refuelings	2019-02-14 12:11:31	2019-02-14 12:16:33	34.4	Kieke
	Fuellosses	2019-02-14 13:31:50	2019-02-14 15:51:04	7.8	Kieke,
Termin (	Refusings	2019-02-18 11:08:40	2019-02-18 11-11:31	30.5	Kielce
1000	Refueings	2019-02-19 19:33:13	2019-02-19 19-38-42	23.9	Kielce
and a second	Refueings	2019-02-20 13:27:23	2019-02-20 13:30:44	41.9	Kieke
	Perfuelings	2019-02-25 19:38:58	2019-02-25 19(23)23	34.5	Kieke,
1000	Refueings	2019-02-26 19:07:11	2019-02-26 19:11:22	24.3	Kelce
1000	Refusings	2019-02-27 19-22-06	2010-02-27 19-25:33	172	Kielca
1000	Perfuelings	2019-02-28 18:52:42	2019-02-28 18:55:37	22.3	Kielce
	Refuelings	2019-03-01 19:25:01	2019-03-01 19/28-00	31.5	Kielce
	Refuelings .	2019-05-17 11:57:16	2019-05-17 32:00:04	83.5	Keice

An example of fuel management reports - Fuel loss and refuelling report

• • •	□ < >	>		Q Searc	ch or enter website n	ame	J	+ ©	)
toute report (1): 2	2019-01-01 00:00:00 - 2019-0	9-31 23:59:59						8 8 8 4 X	
illor data									1
vahicle	Date	Distance (km)	mefuelings (7)	Fuel loases (I)	iomal fuel level (t)	minal fust level (f)	tual consumption (I)	Awrage fuel consumption (I/109km)	
10000	2018-02-01 Priday	89.43	23	*	187	186	23	25.95	*
1004	2019-02-02 Seturday	3.10	÷		186	186	0	12	
	2019-02-03 Skinday	2.97	5		196	186	0		
1000	2019-02-04 Monaty	81,31	19	Æ	166	184	22	26.86	
11110	2019-02-05 Tuesday	114.30	33	- 10 A	184	187	30	26.55	
10000	2010-02-06 Wednesday	126.68	30	2	187	147	30	23.70	
	2019-03-07 Thursday	119.97	30	8	187	187	80	24.82	
1004	2019-02-08 Pikey	130.71	31	10	187	186	31	23.58	
1000	2019-02-09 Security	2.73			158	188	٥		- 1
11100	2019-02-10 Serdey	341			188	188	D		
	2019-02-11 Monday	347.05	37		188	187	30	25.51	
	2019-02-12 Tuesday	122.42	90		387	186	29	23,74	-1
11110	2019-02-13 Wednesday	250.45	61		188	126	63	25.07	
10100	2019-02-14 Thursely	136.33	34	8	186	179	42	31.00	
(manufacture)	2019-02-15 Floay	0.60			179	178	0		-
11146	2019-02-16 Securday	1.30		*	178	178	0	14 U	-
1000	2019-02-17 Sunday	1.02		12	178	178	0		
1000	2019-02-18 Mondey	139.63	40		178	187	31	22.05	-1
1004	2019-02-19 Tuenday	177.46	24	THE C INC.	187	109	21	18.27	-1
1000	2019-02-20 wearwaday	178.53	42	2	189	186	45	25.06	_
	2019-02-21 Thursday	1,37			180	185	,		
1000	2019-02-22 Pilosy	30.56		*	185	180	5	16.55	
1000	2019-02-23 Seturbey	2.42	4		180	150	0	14	
1000	2019-02-24 Sunday	1.74			160	160	0		
								Rd	ekurda 43

An example of fuel management reports – General vehicle logbook



Graph view of the amount of fuel relative to time and an additional parameter - vehicle speed

#### BOUNDLESS INFORMATION SYSTEM FOR MONITORING VEHICLE OPERATING PARAMETERS

These days, the vast majority of newly produced vehicles, machines and superstructures are fitted with the CAN Bus, which provides access to various operational data that may be read out and recorded in the **ET CAN** system.

The **ET CAN** system allows for monitoring and saving various parameters associated with the current operation of the vehicle without the need to install many additional sensors.

#### THE LIST OF PARAMETERS THAT MAY BE READ USING THE ET CAN SYSTEM INCLUDES:

- fuel level,
- odometer,
- pressure in the brake circuit,
- fuel consumption,
- current engine speed (rpm),
- coolant temperature,
- parameters of superstructure installation.







#### **EMPLOYEE IDENTIFICATION SYSTEM**

The **ET ID** system is a solution for employee identification which allows for keeping track of each employee's working time on individual vehicles and/or machines. It offers information about mileage and speed, fuel consumption, activation of pumps, power take-off, etc. in company vehicles.

Depending on the applied solutions, the employee/driver can be identified with a personal RFID card and reader, RFID keychain or Dallas chip.



	•	< >	•			9, Sean	ch or enter we	bsite name				+	G
Rapport or	n driver's working time	(1): 2019-0	09-01 00:00:00 - :	2019-09-16	23:59:59							o R	aex.
Eiffer data													* # T
Date	Oriver	voracie	Stort of ede	End of ride	lotal time	Heal ride time	Working time	Time of stops bei	wr12 min 1 Nu	mber of stops below 12 mm	Time of stops above 12 min	Number of stops above 12 min	Effective
2019-09-02			05:44:13	13:11:51	07-27-38	03-23:00	05:06:10	01.32;49	90		02:31:49	3	04/26:41
2019-09-02			12.30-36	18:11:51	00.4115	003537	05:06:10	00.05.38			00.00.00	6	00.49-05
2019-09-03			05,54,16	08:30:44	02-36-28	01/28/21	04,35,47	00.40.36	16	1	00:27:31		021642
2019-09-03			08-43-44	1546.40	03:03:05	01.43.36	04/35/47	00.39-46	23		00-39-43	1	62/35(31
2010-00-04			05-41-29	13/09-22	072753	032609	05/10/34	0165-24	51	(	02.06-20	1	05-24-28
2019-09-03			0549428	10:06:23	041855	02:30:38	05:40.25	01.03.53	28		00.42:84	1.	03.39:04
2019-09-01			10:38:52	13:02:51	0213:59	01.17.09	0140.21	00.34.54	11		0021:50	τ.	62:01:24
2019-09-06			05:41:10	12:25:58	CE-64-68	05:11:11	04:39:25	01:14:01	35		02:19:55	3	6413:05
2019-09-06			11.32.30	12:25:58	0633-28	00.27:17	043428	00.0511	3		00.00.00	0	00.14:07
2019-09-09			05:42:35	0541-20	03:58:45	0157:37	05/03/57	0126.17	37		00.40.51	ï	03 18.26
2019-09-09			10/02/59	12,49:57	024658	0112.24	05/03/57	0022.40	12		01/11/54	1	(1.44:0)
2019-09-10			05/49/43	10.54(29	050448	03.00:18	04(29)14	012605	43		00/38/20	1	042932
2019-09-11			05+536	1029115	044333	023237	054164	012156			00/9/05		03:36:15
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3010-00-11			0542.24	107010	042137	024803	05400-15	013656	43		003749		0.050000
2019-09-12			105017	12/53/14	02.02.57	012348	0409-15	0039.09	-0		00.00.00	0	02/05/15
			0544.19		020257		04/48/44	0116.05				0	0203113
2019-09-13	Contract (second second			12:39:17		03.07.05	34332341	0500775	41		02:31:47		
2019-09-14			19:59:57	20,57,44	06:57:47	00.41:20	08.57.36	00:16:27	7		00.00.00	0	01:12:05
2019-09-16	second strategy		05/37/00	13-25-02	07:46:02	033423	05:52:30	015433	57	8	02/19/06	4	05-29-50
2019-00-14	-		105957 053700 Report Valuelo	205744 13-25:02	00-57,47 07-46.02	004120	05:52.00	015432	51		02/19/06	*	05-29-5
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Report - Vehicle logbook - Driver's login

#### INFORMATION AT YOUR FINGERTIPS MOBILE APPLICATION - SMOK MOBILE

**SMOK Mobile** is a mobile device application which displays the location of vehicles, their parameters and statuses of sensors installed on objects equipped with Elte GPS devices. **SMOK Mobile** runs on the following operating systems: iOS, Android.



Map – view



Map – details – view



List - view

#### MONITORING IN YOUR MOBILE PHONE MOBILE APPLICATION - SMOK KOMUNAL

Mobile devices with installed **SMOK Komunal** application can be used to support the process of order implementation. The application allows for reporting any irregularities with predefined or own notes, to which photos from a digital camera may be attached.

9		List of WCP		
	Address		Distance	Load
			65 km	
			66 km	2
	Sort by address		Sort by distance	
ji.	Search by code	Filter		Мар

List of various waste collection points

50,2690, 19,1535
No GPS signal RFID: 1 Executed: 0/1
Barli ODO

Details of task implementation

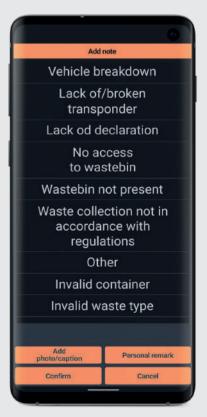
**SMOK Komunal** application can also be used to report irregularities, using predefined messages or your own notes. A note may be associated with a waste collection point or with a specific wastebin or bag.



Adding a geotagged photograph

Planned route may be displayed as a list of waste collection points.

The application can also show a list of wastebins (with details of their type, volume and purpose) which are to be emptied on the planned route.



Adding a note about a loading operation

#### STOCKTAKING IN YOUR MOBILE PHONE **MOBILE APPLICATION - SMOK iPGO**

The mobile device app **SMOK iPGO** is a tool which supports stocktaking of containers. It also enables audit checks to find out if waste is collected properly and whether residents sort and discard waste in accordance with their declarations.

#### THE MOBILE DEVICE APP SMOK IPGO FEATURES:

- quick and easy validation of container stocktaking;
- independent control tools, e.g. in the event of lack of similar solutions in the company that collects waste;
- quick and easy reporting of irregularities in the form of notes and photos;
- verification of declarations made for a given waste collection point; it also provides an additional source of documentation in the case of complaints or disputes;
- checking inspectors' work after opening the app the inspector's location is visible in the system.

Loading the wa	aste coll. Pts
Group:	
KRAKOW	
Address:	
Detailed address-related options	Hide
in distance from	m
only wastebins without	t code
stock-taking before	
stock-taking after	
Only unapproved	
Search by code	Clear filters
Download waste collection points	Cancel

Searching for waste collection point where irregularity was found

No.	Address		stock- taking	load.
1.	30-688 KRAKOW, MEDYCZNA 13	No distance	78	1 (0)
2.	30-688 KRAKOW, MEDYCZNA 13	No distance	78	1 (0)
3.	30-688 KRAKOW, MEDYCZNA 13	No distance	78	1 (0)
4.	30-688 KRAKOW, MEDYCZNA 13A	No distance	78	1 (0)
5.	30-688 KRAKOW, MEDYCZNA 15	No distance	78	1 (0)
6.	30-688 KRAKOW, MEDYCZNA 17	No distance	78	1 (0)
	Load waste	coll. poi	nts	
Add	waste coll. points		Мар	

Search results

	-			
	List of w	aste collec	tion	
			. stock- taking	
	30-688 KRA MEDYCZNA		78 nce	1 (0)
	30-688 KRA	KOW No	78	1 (0)
	Waste coll.	point o	ption	
3.	30-688 KRAKÓW, N		2	$\rightarrow$
	View details	ALD TO ZINA		
4.				— )
	Add a note			
5.	Show on the n	nap		)
	30-688 KRA MEDYCZNA		78	1 (0)
	MEDICZNA	17 dista	nce	- 1
	l cod a	vaste coll.	nointe	
	LUad	vaste coll.	politis	
Ad	d waste coll. poi	nts	Мар	

Selection of waste collection point where irregularity was found

	Adding a	note	GPS OK
Text:			
Wrong se	gregation		
Predefined Wrong s	note egregation		
		),9939	
Wrong s	egregation		
Wrong s	egregation 50,0139, 19	urrent pos.	
Wrong s	egregation 50,0139, 19 3m from co Take a phot	urrent pos.	cel

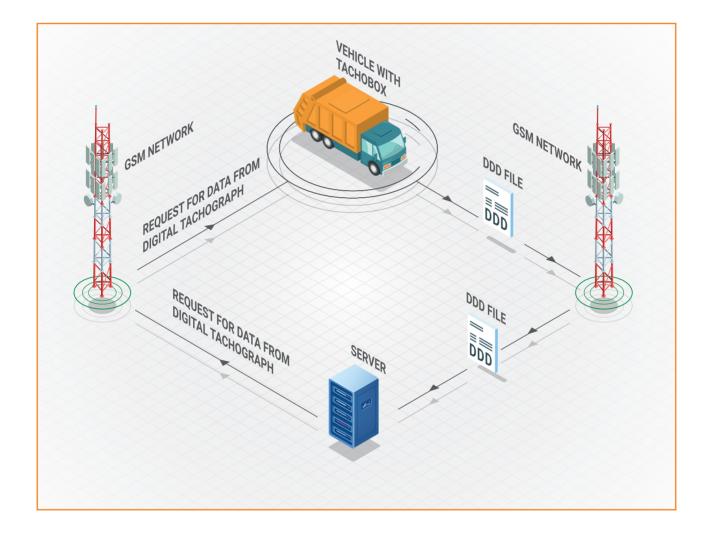
Adding a note



Attaching a photo

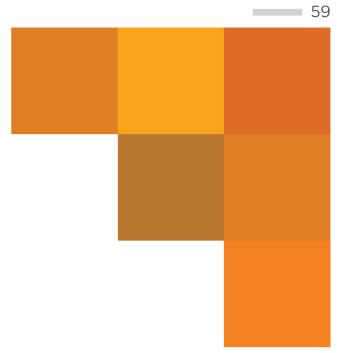
#### **TACHOGRAPH MODULE**

Tacho Box is a perfect solution dedicated for vehicles equipped with digital tachograph. It enables remote download and import of DDD files from tachograph.



#### MODULE CHARACTERISTICS:

- Mutual cooperation with different types of digital tachographs;
- Easy mounting on the vehicle due to small size of the device;
- Remote download and import of DDD files.



# THANK YOU



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