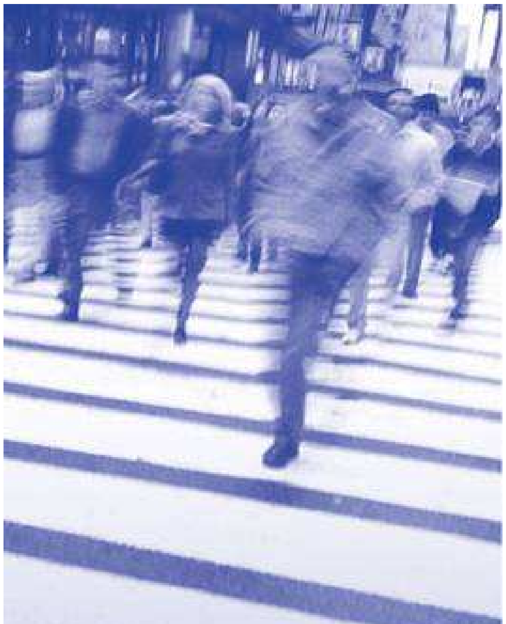

CIVITAS
Cleaner and better transport in cities

ARCHIMEDES
AALBORG • BRIGHTON & HOVE • DONOSTIA - SAN SEBASTIÁN • IAŞI • MONZA • ÚSTÍ NAD LABEM

Iasi

T14.1 Bus Priority Measures in Iasi
Iasi

November 2010

THE CIVITAS INITIATIVE
IS CO-FINANCED BY THE
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Contents

1. Introduction

1.1 Background CIVITAS

CIVITAS - cleaner and better transport in cities - stands for CIty-VITAlity-Sustainability. With the CIVITAS Initiative, the EC aims to generate a decisive breakthrough by supporting and evaluating the implementation of ambitious integrated sustainable urban transport strategies that should make a real difference for the welfare of the European citizen.

CIVITAS I started in early 2002 (within the 5th Framework Research Programme);
CIVITAS II started in early 2005 (within the 6th Framework Research Programme) and
CIVITAS PLUS started in late 2008 (within the 7th Framework Research Programme).

The objective of CIVITAS-Plus is to test and increase the understanding of the frameworks, processes and packaging required to successfully introduce bold, integrated and innovative strategies for clean and sustainable urban transport that address concerns related to energy-efficiency, transport policy and road safety, alternative fuels and the environment.

Within CIVITAS I (2002-2006) there were 19 cities clustered in 4 demonstration projects, within CIVITAS II (2005-2009) 17 cities in 4 demonstration projects, whilst within CIVITAS PLUS (2008-2012) 25 cities in 5 demonstration projects are taking part. These demonstration cities all over Europe are funded by the European Commission.

Objectives:

- to promote and implement sustainable, clean and (energy) efficient urban transport measures
- to implement integrated packages of technology and policy measures in the field of energy and transport in 8 categories of measures
- to build up critical mass and markets for innovation

Horizontal projects support the CIVITAS demonstration projects & cities by :

- Cross-site evaluation and Europe wide dissemination in co-operation with the demonstration projects
- The organisation of the annual meeting of CIVITAS Forum members
- Providing the Secretariat for the Political Advisory Committee (PAC)
- Development of policy recommendations for a long-term multiplier effect of CIVITAS

Key elements of CIVITAS

- CIVITAS is co-ordinated by cities: it is a programme “of cities for cities”
- Cities are in the heart of local public private partnerships
- Political commitment is a basic requirement
- Cities are living ‘Laboratories' for learning and evaluating

1.2 Background ARCHIMEDES

ARCHIMEDES is an integrating project, bringing together 6 European cities to address problems and opportunities for creating environmentally sustainable, safe and energy efficient transport systems in medium sized urban areas.

The objective of ARCHIMEDES is to introduce innovative, integrated and ambitious strategies for clean, energy-efficient, sustainable urban transport to achieve significant impacts in the policy fields of energy, transport, and environmental sustainability. An ambitious blend of policy tools and measures will increase energy-efficiency in transport, provide safer and more convenient travel for all, using a higher share of clean engine technology and fuels, resulting in an enhanced urban environment (including reduced noise and air pollution). Visible and measurable impacts will result from significantly sized measures in specific innovation areas. Demonstrations of innovative transport technologies, policy measures and partnership working, combined with targeted research, will verify the best frameworks, processes and packaging required to successfully transfer the strategies to other cities.

1.3 Participant Cities

The ARCHIMEDES project focuses on activities in specific innovation areas of each city, known as the ARCHIMEDES corridor or zone (depending on shape and geography). These innovation areas extend to the peri-urban fringe and the administrative boundaries of regional authorities and neighbouring administrations.

The two Learning cities, to which experience and best-practice will be transferred, are Monza (Italy) and Ústí nad Labem (Czech Republic). The strategy for the project is to ensure that the tools and measures developed have the widest application throughout Europe, tested via the Learning Cities' activities and interaction with the Lead City partners.

1.3.1 Leading City Innovation Areas

The four Leading cities in the ARCHIMEDES project are:

- Aalborg (Denmark);
- Brighton & Hove (UK);
- Donostia-San Sebastián (Spain); and
- Iasi (Romania).

Together the Lead Cities in ARCHIMEDES cover different geographic parts of Europe. They have the full support of the relevant political representatives for the project, and are well able to implement the innovative range of demonstration activities.

The Lead Cities are joined in their local projects by a small number of key partners that show a high level of commitment to the project objectives of energy-efficient urban transportation. In all cases the public transport company features as a partner in the proposed project.

2. Iasi

The City of Iasi is located in north-eastern Romania and is the second largest Romanian city, after Bucharest, with a population of 366,000 inhabitants. It is also the centre of a metropolitan area, which occupies a surface of 787.87 square kilometres, encompassing a total population of 398,000 inhabitants.

The city seeks to develop possibilities for habitation, recreation and relaxation for all citizens in the region, business opportunities and provide opportunities for more consistent investments.

The city has five universities with approximately 50,000 students, the second largest in Romania. The universities and their campuses are located in the central and semi-central area of the city. In the same area, there are also a large number of kindergartens, schools and high schools with approximately 10,000 pupils. This creates a large number of routes along the main corridor, served by the public transport service number “8” (Complex Tudor Vladimirescu - Copou) with an approximate length of 10 km. The City of Iasi will implement its integrated measures in this area to be known as the “CIVITAS+Corridor”.

The city's objectives in CIVITAS - ARCHIMEDES are based on the existing plans related to transport, Local Agenda 21, approved in 2002, and the Sustainable Social-Economic Development Strategy for City of Iasi. The CIVITAS Plus objectives were integrated in the Strategy for metropolitan development which was finalized in May 2009.

3. Background to the Deliverable

The combination of increasing car traffic and a lack of special priority for public transport services has combined to lead to an increase in delays to public transport services as they share the same road space in Iasi.

Furthermore, the high number of traffic accidents and the fact that the traffic control systems were old and obsolete led Iasi City Hall to propose the installation of new detection and control units.

This project presented itself as a good opportunity to improve the mobility of citizens, reduce the time lost in traffic congestion and reduce pollution in one of the biggest and most important cities in Romania.

3.1 Summary Description of the Task

The objectives of this task were:

1. to define priority routes for public transport vehicles - buses and trams (but also open to taxi-cabs) in the CIVITAS corridor

and

2. implement a traffic system with new detection units and traffic controllers at 15 intersections, linked to a central computer server and monitor for the co-ordination of the system.

It was expected that these measures would improve overall traffic flow and increase the efficiency of public transport within the overall system.

4. General Features of the Project

4.1 Description of the Work Done

4.1.1 Priority routes for public transport

Because of the intense overall level of traffic (especially in the city centre) public transport services have frequently not been able to follow their schedule. This problem has been increasing as traffic jams have become more frequent, mainly within peak hours. In order to reduce the frequency and severity of these occurrences and also to help public transport users benefit from efficient public transport services without delays, the local authority decided to create special traffic lanes reserved for public transport (buses, minibuses, taxis), marked accordingly to international standards, separated from the other lanes.

The public transport lanes were implemented in both directions of a 1250 metre section of Independentei Boulevard, which was the only part of CIVITAS Corridor which had enough space to allow this kind of traffic separation.

The layout of Independentei Boulevard is shown in schematic form in Annex 1 and in the following pictures.

Figure 1: Lane marking of the bus priority lane on Independentei Boulevard

Figure 2: Lane marking of the bus priority lane on Independentei Boulevard

Independentei Boulevard is one of the busiest routes in Iasi, along which many representative institutions of the city are located: the impressive University Hospital and the University of Medicine and Pharmacy Grigore T. Popa; also, 100 metres away from these famous buildings, two important high schools can be found: the High School for Arts “Octav Băncilă” and College of Economics no.1 Iasi.

Therefore, undoubtedly, Independentei Boulvevard is one of the most congested routes of the city, mainly because within its area are placed the above mentioned buildings, so important for the citizens, especially for pupils and students that have to use the available public transport services in order to cover their transport needs.

At the same time, this boulevard links 9 different public transport lines, which between them focus an average number of 1556 vehicles per direction on each working day.

4.1.2 Traffic Light Priority System

Iasi City Hall has decided upon the locations where the traffic light priority equipment has been installed on CIVITAS Corridor, as shown in Annex 2.

The most important aspect in implementing this type of traffic control system is that the controllers should work in real time, adapting the cycle timings according to the number of cars counted by the detectors on the approaches to the controlled junctions.
The software installed on the central server communicates through GPRS with the signal control systems. Diagnostics and traffic data are presented using tables or directly on the Common Graphic User Interface as follows:

- Map View: displays the whole network in cartographic form.
- Intersection View: presents detailed data directly on the intersection map.
- Signal Group Diagram: status of selected signal groups and selected detectors in a given time period.

- Time Space Diagram: displays signal changes in several controllers simultaneously and superimposes speed lines to facilitate the analysis of the coordination.
- Status Reports and Traffic Data Presentation: provide the access to the diagnostic and traffic data archive of the system.

A full specification is presented in Annex 3.

Figure 3: Traffic signal and radar detector at a junction on the priority corridor.

Figure 4: Traffic light control system at a junction on the priority corridor

Iasi City Hall, working with a specialised company, has installed on the CIVITAS corridor the following equipment:

- 15 traffic control units
- 54 radar traffic detection units

The devices are connected to the actual traffic management systems. The locations are:

1. **Splai Bahlui (mal drept) - B-dul T. Vladimirescu**
2. **B-dul Chimiei - B-dul T. Vladimirescu**
3. **Aleea Prof. Ghe. Alexa - B-dul T. Vladimirescu**
4. **Str. V. Lupu - B-dul T. Vladimirescu**
5. **Str. Elena Doamna - Str. Ghica Vodă**
6. **Str. Elena Doamna - Str. A. Panu**
7. **B-dul Independenței - Str. Sărăriei, str. Stihii**
8. **B-dul Independenței - Str. I.C. Brătianu, str. M. Eminescu**
9. **B-dul Independenței - Str. V. Alecsandri**
10. **B-dul Independenței - S tr. V. Conta**
11. **Rond Eminescu**
12. **B-dul Carol I - Str. Toma Cozma**
13. **B-dul Carol I - trecere pietoni Universitate**
14. **B-dul Carol I - trecere pietoni str. Ghe. Asachi**
15. **Str. Cuza Voda - Str. I.C. Brătianu**

The private company was selected by a transparent public procurement tender, according the applicable legal provisions, and this company offered and installed the controllers and the radar detectors. Within the requirements of this procedure, Iasi specified the procurement of equipment that followed international standards and also quality standards.

Two training sessions were organised for the staff members designated to have the main responsibility for monitoring and maintaining the installed equipment.

4.2 Main Outcomes

Traffic regulation and marking of public transport special lanes, where no other vehicles could run or could park, led in Iasi city centre to a significant reduction of public transport travel timing and to traffic flow improvement.

The adaptive system implemented optimizes traffic flows across the CIVITAS Corridor. Besides a lot of other improvements, the most important improvements for the citizens living in Iasi are:

- 15% decrease in travel times for public transport from 80 minutes to 68 minutes
- 15% reduction in queuing time from 13 minutes to 12 minutes

This information will be supplemented and fully explained in the full measure evaluation.

4.3 Communication Activities

During the implementation of the measure, various local media presented news about both tasks, based on press releases issued by Iasi City Hall. Figures 1-5 provide several examples.

http://www.ziaruldeiasi.ro/local/verde-continuu-pentru-mijloacele-de-transport-in-comun-pe-toata-ruta-tudor-copou~ni6ape

Ziarul de Iasi

Verde continuu pentru mijloacele de transport in comun, pe toata ruta Tudor - Copou

AUTOR: FELIX CUZCA

DATA PUBLICARII: 23/04/2010

S-a stabilit firma care va implementa sistemul, lucrarea urmind a fi finalizata in maximum trei saptamini. Vor fi modificati si timpii semafoarelor de pe acest traseu.

Sistemul de unda verde destinat mijloacelor de transport in comun va fi implementat in perioada urmatoare. Investitia va fi realizata de firma UTI Traffic. Societatea a cistigat licitatia organizata de municipalitate cu o oferta de 230.000 lei. "Cred ca saptamina viitoare vom semna contractul. Apoi, functie de ordinul de incepere a lucrarilor, investitia ar trebui sa fie gata in termen de zece zile", a declarat Andrei Trofor, purtatorul de cuvint al Primariei.

Lucrarile vizeaza traseul Civitas, de la rond Agronomie si pina in Tudor Vladimirescu. Pe aceasta distanta, la intersectiile semaforizate vor fi montate camere radar. "Aceste camere vor numara masinile aflate in zona semafoarelor, in functie de numarul acestora, vor modifica si timpii semafoarelor. Vor trebui montate 54 de camere radar", a afirmat Trofor.

Intregul sistem va fi coordonat de un server ce urmeaza sa fie montat la "Piramida lui Dubet", pe Soseaua Nationala. Aceasta va fi prima etapa din actiunea de a crea un sistem de unda verde pentru mijloacele de transport in comun.

Tot prin proiectul Archimedes, pe mijloacele de transport in comun vor fi montate aparate GPS. Aceste echipamente vor fi legate apoi de reteaua existenta si vor putea fi folosite pentru a permite accesul cu

Figure 1: Positive article about green light corridor – local newspaper

http://www.bzi.ro/banda-de-circulatie-pentru-transportul-in-comun-47867

Figure 2: Positive article about separate tracks for public transport – local newspaper

http://curierul-iasi.ro/un-nou-sistem-de-management-al-traficului-pe-coridorul-civitas-782

Figure 3: Positive article about green light corridor and separate tracks for public transport – local newspaper

http://www.newsiasi.ro/eveniment/actualitate/cele-15-intersectii-in-care-semafoarele-isi-vor-schimba-culoarea-in-functie-de-trafic-verdele-va-dura-mai-mult.html

Figure 4: Positive article about green light corridor – local news portal

http://www.iasiplus.ro/news/5/22577/Culoarea+semafoarelor+din+Iasi,+schimbata+prin+satelit.html

Figure 5: Positive article about green light corridor – local newspaper

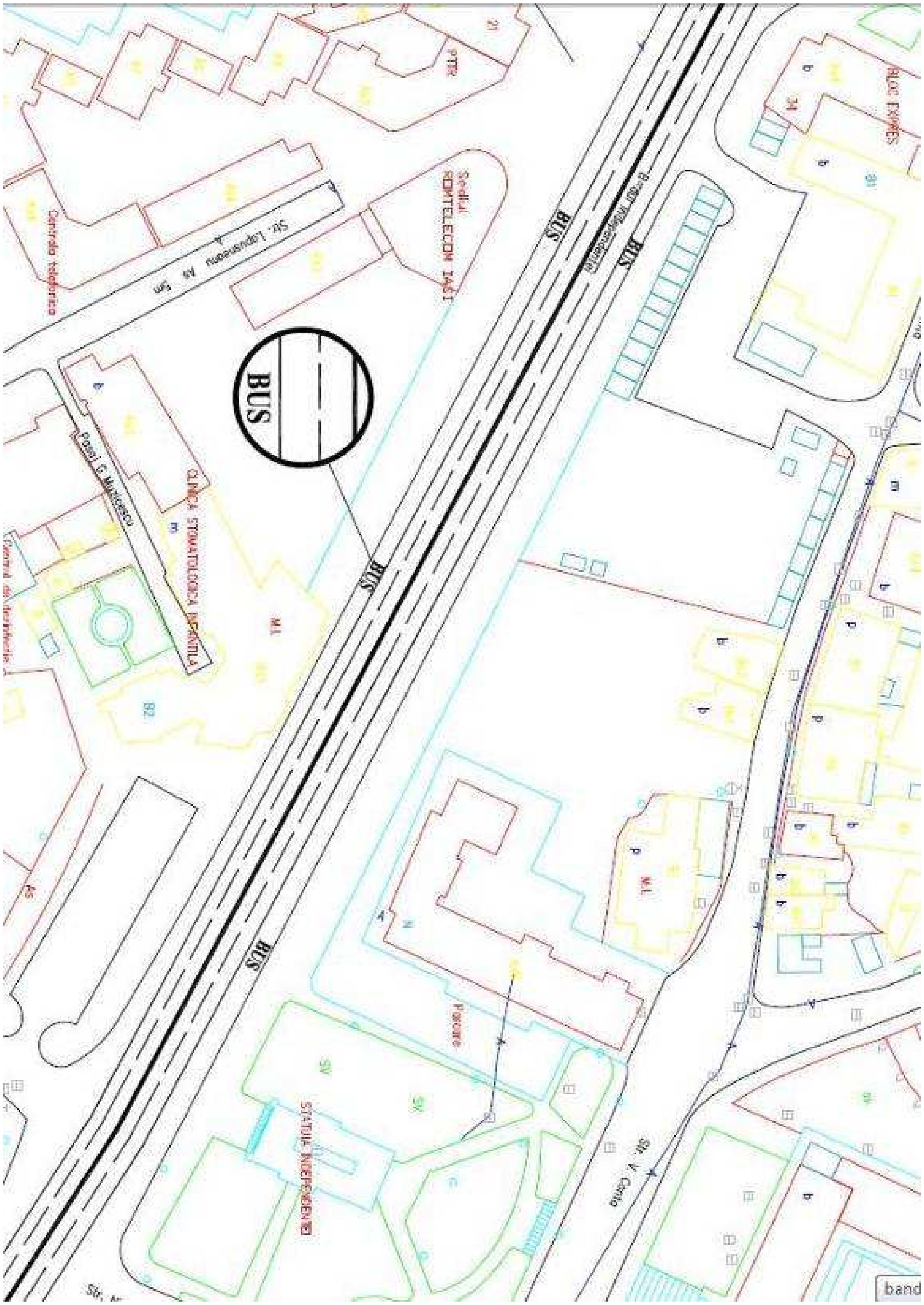
4.4 Problems Identified

No problems have been detected for the traffic light controllers or for the radar detectors or priority lanes for public transport.

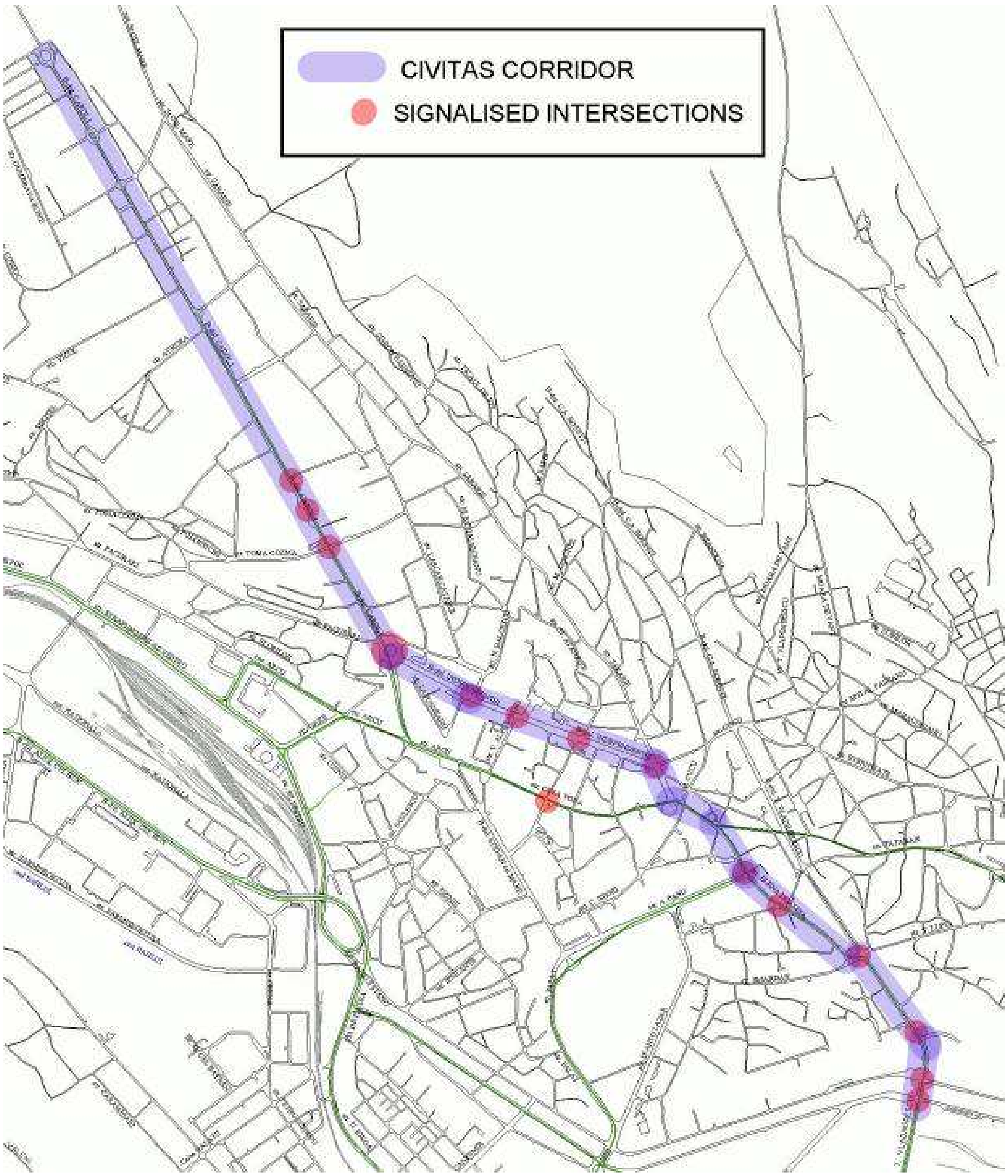
4.5 Future Plans

Now that these systems have been implemented as part of ARCHIMEDES measure 14, Iasi Municipality will implement a special project for traffic management, intended to monitor the entire city traffic area. This project will use co-ordinate the Green Light System across the city centre as part of a broader Traffic Management System. This will be implemented according to the description of ARCHIMEDES measure 76.

ANNEX 1: Layout of Bus Priority Lane on Independentei Boulevard in Schematic Form



ANNEX 2: Map Showing the Locations of the Traffic Light Priority Systems on the CIVITAS Corridor



ANNEX 3 - Traffic Controller (data sheet)

SOFTWARE FUNCTIONS

The ITC-2 controller's standard software provides a large number of parameter-controlled functions.

- There are 16 traffic plans and 16 traffic situations available with standard parameters for programming of local and central co-ordination. Cable-free linking is possible with a GPS clock.
- One controller can control up to four independent intersections in four separate rings. Each ring can have eight primary stages and an unlimited number of secondary stages. The logic is signal group controlled with a full conflict matrix between all groups.
- Traffic counting with internal detectors with seven-day backup. User defined counting interval.
- Fulfils Scandinavian LHOVRA specification.
- Built-in bus priority functions.
- Built-in advanced programmable control logics enabling the user to create new functions.
- For control and supervision ITC-2 has interfaces to Omnia/Utopia/Spot, Omnivue and EC-Trak UTC systems. The controller can send SMS or e-mails in case of faults.
- Internal web-interface.

CONFIGURATION AND TESTING

For the configuration and test of parameters, a Windows-based easy-to-use software tool is provided.

SAFETY

A safety CPU guarantees that no hazardous situations occur. The CPU monitors:

- All colour and green/green conflicts
- Signal sequences
- Min. and max. times for all signal states
- All flash periods
- For coordinated signals min. and max. cycle time
- Wait lamp duration
- Min. and max. lamp load for red, amber and green
- Min. and max. main supply voltage for safe operation
- Min. and max. main supply frequency
- Max. mains voltage dip before restart

	• The safety CPU also includes 4 general purpose inputs and 4 general purpose outputs
TECHNICAL DETAILS	• Basic sizes (signal groups): 16,32,48 • Loop detectors: 32,64,64 • Video detectors: Rackvision, Atlas • Voltage: 230 VAC ±15% • Ambient temperature:-40 - +80℃ • Load per output: Max 500 VA • I/O interfaces: 5-48 V, 100 mA • Total output: 3,7kVA • Cabinet (large) 900x1300x420 mm Cabinet (small) 600x1300x350 mm Indoor rack (32 sg) 480x400x240 mm Indoor rack (16 sg) 480x135x240 mm • Communication: RS 232, Ethernet • System connections: Utopia/Spot, Omnivue, EC-Trak • Certifications: EN-12675, EN-50293, HD-638 S1

RADAR DETECTOR (datasheet)

Operating Principle

The dynamic MW 33x Series of ASIM Doppler Radar Vehicle Detectors are designed for detecting vehicles moving into or through their field of view in short to medium range.
The digital output of the detector is activated as long as objects within the field of view are moving. When the movement stops, the output will be reset.
Correct alignment of the detector and a stable mounting structure are mandatory for optimal performance.

How does it work?

The multi-functional model supports additional functions which can be set my a one-button-interface:

- Direction discrimination: Detector reacts only to approaching traffic or both directions.
- Minimum speed threshold: 4 or 8 km/h (2.5 / 5 mph)
- Timer function: automatically activates the output to simulate the arrival of a vehicle if the MW 334 has not changed state for a period of 2.5 minutes.
- The detector can be mounted overhead or on a pole on the side of the road. The recommended mounting height is within the range of 1 to 5 m (3 to 16 feet).

Applications

The radar vehicle detectors are ideal for a variety of traffic and intersection control applications:

- Direction dependent vehicle detection
- Request of green phase
- Extension of green phase

Product Highlights

- Easy installation and maintenance The supplied standard mounting bracket allows an easy und stable mounting for all common applications.
- Front LED to signal the activated output: To easily check the alignment and functionality of the detector.
- Small and rugged housing: The splash proof, rugged housing of anodised aluminium protects the detector in the harshest environmental conditions.
- Operating temperature -40 to +75℃ (34 to +167℉)
- Low power consumption
- Maximum detection range of 60 m
- Configuration via one-button interface, no computer necessary

Technical Specifications

Mechanical	
Dimensions	See drawing
Housing	Aluminium, nat. anodised
Bracket	Stainless Steel V2A
Weight	App. 600 g (1.3 lbs)
Cable Feeds	1 x M12 Outer Cable Diameter: 4.5 … 7.0 mm (0.18 … 0.28")
Radar Sensor	
Doppler Radar	K-Band 24 GHz
Range	Typ. 45 m
Speed Threshold	4 km/h or 8 km/h, can be set via one-button-interface
Turn-on Time	0.1 s / 0.8 s
EMC Specification	ETS300.339
Electrical	
Supply Voltage	12 - 30 V DC / 24 V AC (± 10%)
Current Consumption	Typ. 40 mA @ 12 V DC
Alarm Relay Output	Max. switching power: 60 W or 125 VA resp. Max. switching current: 2 A Max. switching voltage: 250 VDC or 300 VAC resp.
Wiring Terminal Block	0.34 mm² - 1.5 mm² (AWG 22 - 16)
Accuracy	
Counting	Typ. ± 3%
Velocity	Up to 100 km/h: +/- 3 km/h Over 100 km/h: +/- 3%
Environmental	
Operation Temperature	– 40°C … + 75°C (– 34°F … + 167°F)
Humidity	95 % RH max.
Sealing	IP 67 temporal immersion proof

SERVER with Monitor LCD 19"

- Processor Intel Pentium Dual Core 6600
- Memory capacity: DDR2 2048MB
- 2 HDD 250GB
- Network card
- Optical unit type DVD RW DL
- Rack 19"
- Power supply 600VA
- Hardware communication GPRS unit for command and control of traffic controllers