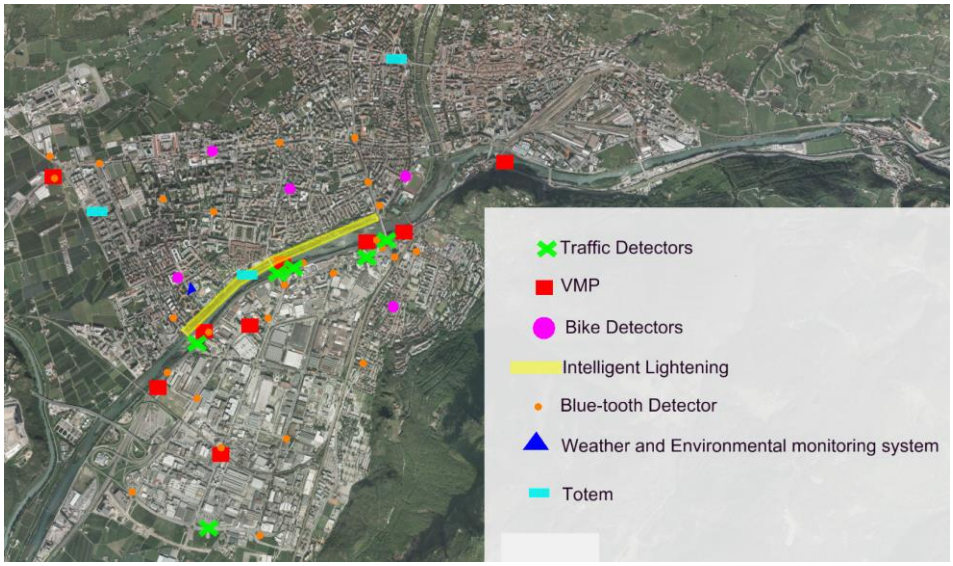
Factsheet

USOS - SMART POINTS GRID
Municipality of Bolzano

SINFONIA stands for "Smart INitiative of cities Fully cOmmitted to iNvest In Advanced large-scaled energy". This project has received funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement No 609019

PROFILE

Name and address	USOS - SMART POINTS GRID Municipality of Bolzano City of Bolzano
Map	
Type of installation	The Usos smart point grid is made up of a net of vehicle traffic monitoring sensors (including vehicle traffic monitoring stations, bicycle counters, Bluetooth sensors), an environmental station, variable-message signs and an intelligent lightening system. In addition to the Usos smart point grid three different multifunctional totems (a parking area totem, an urban area totem and a green area totem) offer interactive services to Bolzano's citizen and tourists, such as touristic information, phone charge, bike air compressor and an e-car charging system. The chosen solutions for the USOS - Smart Point Grid include high precision sensors (bike counters, vehicle traffic stations) that provide accurate data for the long-term planning and real time monitoring. The low-cost Bluetooth counters were developed within the "Intergreen" project, funded through the program "Life". The Usos smart point grid can be integrated in the already existing traffic monitoring and information system of the Municipality of Bolzano.
Ownership	Municipality of Bolzano

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Number of smart points	129 Smart points: • 6 traffic detectors • 9VMP • 5 bike detectors • 26 bluetooth traffic detectors • 82 components of the smart lightening system • 1 weather and environmental system 3 different Totems: • a parking area totem • an urban area totem • a green area totem

THE CONCEPT

Detailed characteristics of the infrastructure / service	From the HOC: Periferic local multifunctional traffic data management unit: CMOS low consumption technology, integrated real time clock and watchdog, embedded linux, Web server, capable to survey as the data mattering the single vehicle as those grouped. Variable message panel: based on the LED SMD modules. Bikecounters: Bidirectional bike number surveying, information for cyclists, local and remote control. Environmental station: • one CO, NO2, O3, C6H6, CH4 SENS-IT (TF-MOS-thick film metal oxide semiconductor) sensor • one CO, NH3, SO2, H2S, VOC SENS-IT (EC electrochemical technology) sensor

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	• one SENS-IT (IR infrared technology) • one dust module (orthogonal light scattering) • one dust module (OPC) • a data logger Bluetooth detectors: based on a single board computer. Smart lightening system 82 pieces: • adhesive Antenna, • Integrated m2m modem • WSN radio unit • GSM antenna • Din rail 24 Vdc power supply • MID certified three phase multimeter • WSN P5-485 antenna 2.4 GHZ with an RS485 interface • PIR sensor • one WSN node • various software and services Parking area totem: • 4 usb phone chargers • 1 microphone • 1 speaker • 1 web camera • 1 little monitor • 1 SOS button • 2 touchpad monitors • 1 e-car charger Urban area totem: • 4 usb phone chargers • 1 microphone

	• 1 speaker • 1 web camera • 1 little monitor • 1 SOS button • 2 touchpad monitors • 2 e-bike chargers • 1 bike compressor Green area totem: • 4 usb phone chargers • 1 microphone • 1 speaker • 1 web camera • 1 little monitor • 1 SOS button • 1 touchpad monitor • 1 backlit city plan with the bike lanes network • 2 e-bike chargers • 1 bike compressor
Concept	The concept of the USOS - Smart Point Grid was developed and thought by the scientific partner Eurac Research through a in GIS developed multicriteria analysis. The needs of the various stakeholders were taken in account and divided as described In D8.3 in the following categories: mobility, weather conditions monitoring, citizen services and safety/security. Basing on these categories the analysis the needs were weighted through a multicriteria analysis, developed in a GIS environment. Thanks to this analysis, the position and the form of the USOS-Smart Point Grid net were defined. Also, the proposed functions and locations of the totems were at the end discussed through a common participative path made by the Municipality of Bolzano, Eurac Research, IUAV, and the supplier firms ACS. The design of the totems was developed by IUAV.

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	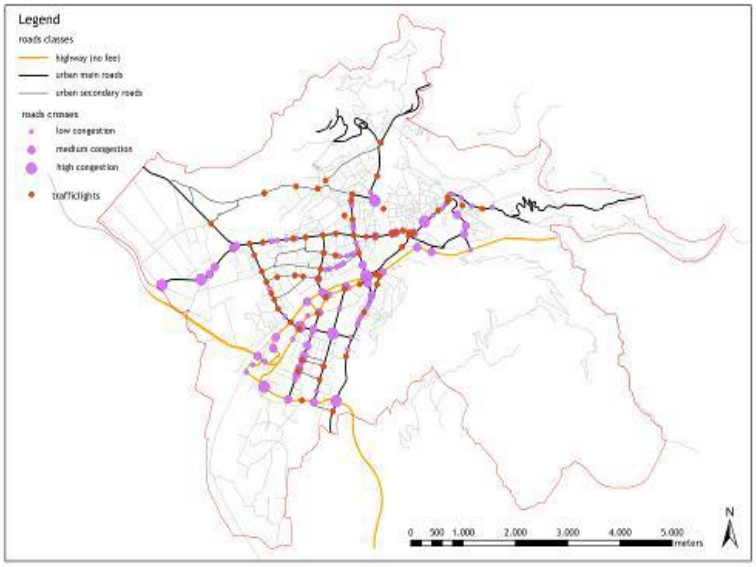 PHOTO: Eurac Research, Displays for traffic routing
Energy solutions	The retrofitting of the light system on the Isarco River through the smart lightening system allows a reduction of lightening emissions and energy saving.
Technologies considered in the design	The traffic monitoring sensors and the environmental station send the data over the 3G net. Also, the bike-counter station can communicate over the UMTS, Ethernet and wired network, radio and wireless. The Bluetooth sensors monitors the Bluetooth devices on board of the vehicles, identifying them anonymously. The smart lightening system allows a remote control over IP and an automatic management of the brightness. The totems are equipped with: • USB phone charge • Microphone • Speaker • camera • SOS button • 48'' monitors Besides the common equipment, each totem provides different services: a car charging system in the parking area totem, a bike charging system and an air pump in the green area totem and in the urban totem, a single monitor and a bike lane net map in the green area totem.

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Performance targets	The bike counters and the totems stimulate the positive usage of the bike lanes. The implementation of the sensors' grid allows a more efficient traffic management.
Financing model	Resources: 340000,00€ Sinfonia (50%) 15000,00€ WP5 (100%), VAT excluded.

IMPLEMENTATION

Stakeholders involved	
Contracting authority	Municipality of Bolzano
Project Co-ordinator	Emanuele Sascor
Technical system designer	IUAV (Totem), Eurac Research
Manufacturer / supplier	Peripheric local multifunctional traffic data management unit, Variable message panel, bike counters, environmental station: FAMAS SYSTEM S.p.A Bluetooth detectors: IDM Südtirol Alto Adige Smart lightening system: Algorab s.r.l. Totems: ACS Trenching and cable laying works (excavation works): Stradasfalti S.r.l.

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Costs	
Cost breakdown	Costs: 21000,00€ supply of the smart lightening system 107179,04 € supply and installation of the totems 6393,44€ supply and installation of the Bluetooth sensors 14028,76 € excavation works for the totems 148124,00€ supply of the Peripheric local multifunctional traffic data management unit, Variable message pane, the bike counters and the Environmental station All the costs do not include the VAT

Implementation planning	
1 - Signature consortium agreement	**2014**
approval of the European Community; the City Council of Bolzano approved the participation in the project, start of the Sinfonia project.	
2 - Planning of the energy pilot district	**2014**
3 - Assignment of the supplying and installation of the smart grid sensors' (vehicle traffic monitoring stations, bicycle counters, Bluetooth sensors), an environmental station's and variable-message signs' net and an intelligent lightening system)	**2017-2018**
Single tenders were awarded in accordance to the different types of sensors and installation works	
4 - Execution of the supplying and installation of the smart grid sensors' (vehicle traffic monitoring	**2018-2019**

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stations, bicycle counters, Bluetooth sensors), an environmental station's and variable-message signs' net and an intelligent lightening system)	
5 - Elaboration of the preliminary project of the totems and assignment of their design to IUAV	**2016-2017**
6 - Tender phase and awarding of the production and installation works of the three totems	**2017-2018**
7 – elaboration of the executive project of the totems	**2019**
8 – installation of the totems	**2020**

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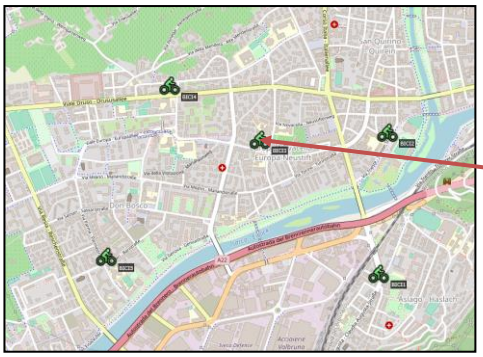
Work progress

Installation of the bike counters

Bike-monitoring sensors: 4 monitoring stations along the cycling lanes



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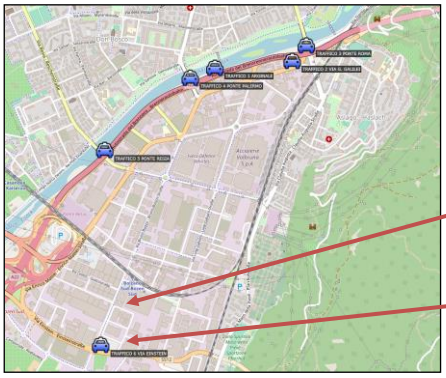
Traffic monitoring sensors

Traffic-monitoring sensors: 6 monitoring stations

- Long-time traffic planning
- Real-time traffic monitoring



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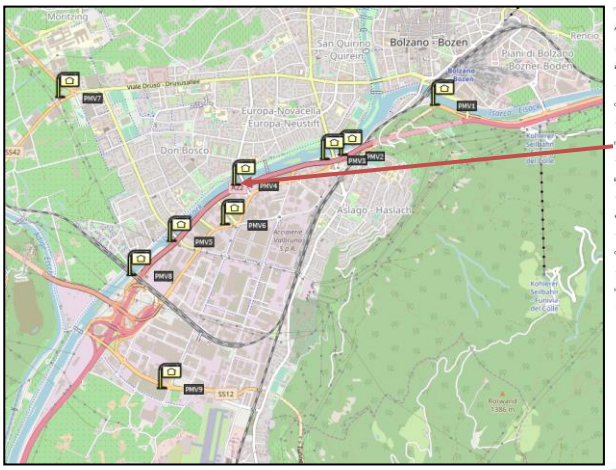
Variable message panels

Variable Message Panels: 9 panels

- Traffic management
- Information by the municipal police



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Air quality monitoring station

Air Quality Monitoring: 1 compact monitoring station

Environmental monitoring system, mesure of air pollution:

- NO_2
- NOx
- CO
- O_3
- $PM_{2.5}$

Sensors for meteorological data:

- Temperature and relative humidity
- Wind Speed and direction
- Global solar radiation

Sinfonia

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Smart lightening system

Some pictures of the installed hardware

Sinfonia

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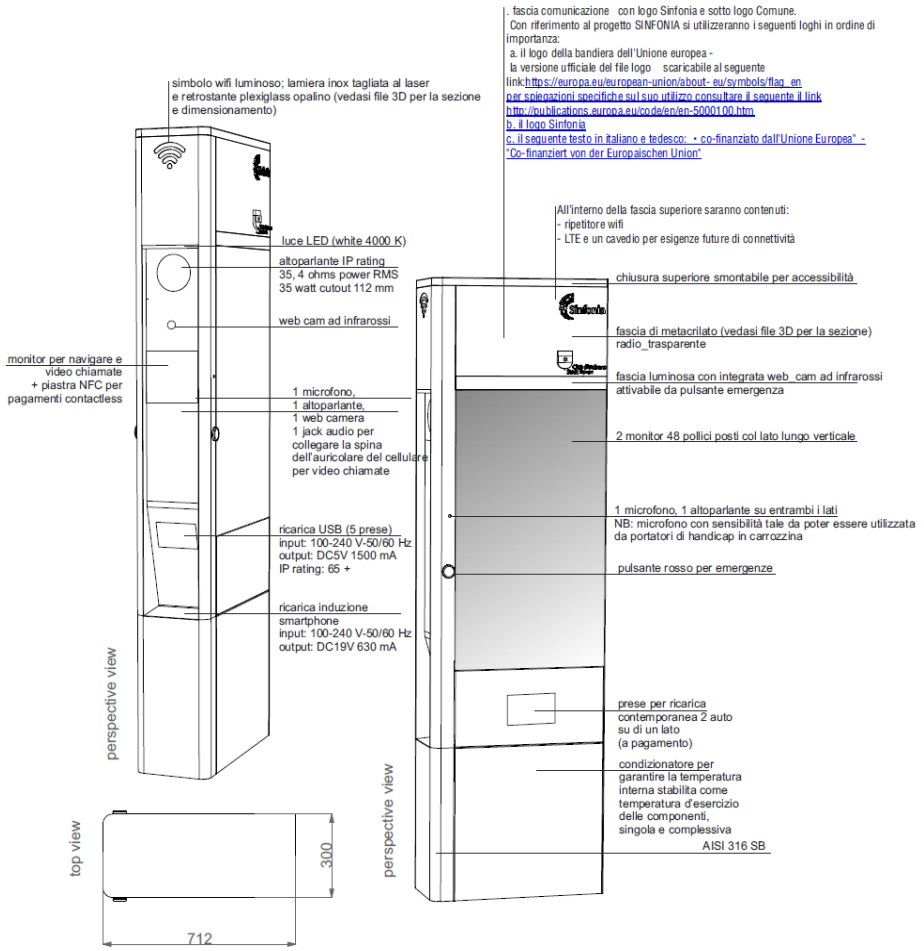
Totem A – Parking Area Totem

Project by IUAV



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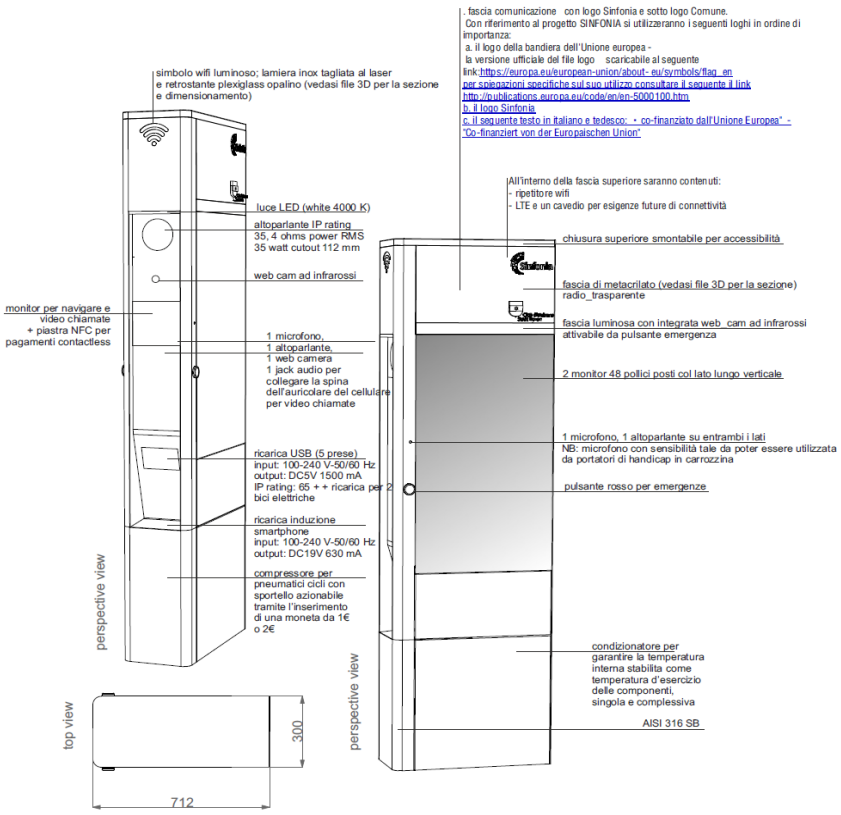
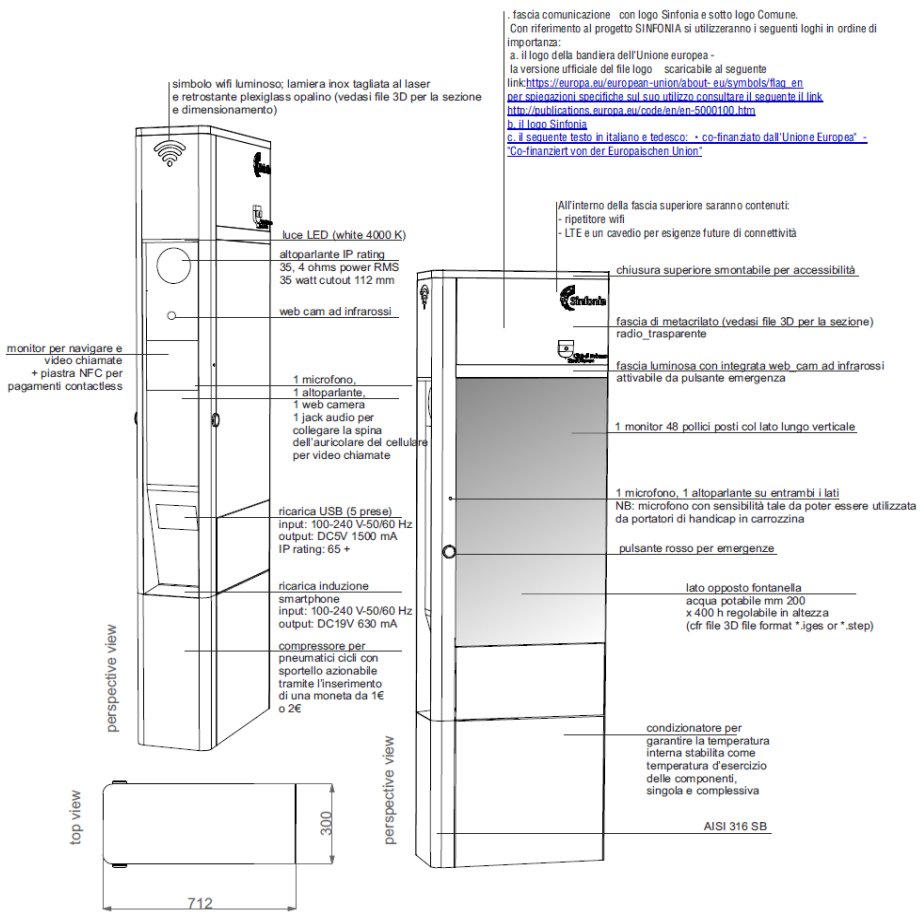
Totem B - Urban Area Totem Project by IUAV	 From WP8 BOLZANO, IMPLEMENTATION & REALISATION, UPDATE WP8 – M60, Rosenheim, 10-11-12/09/19

Totem C – Green Area Totem

Project by IUAV



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Totem A - Parking Area Totem Installation	  Photo: Ing. Brunella Franchini
Totem B - Urban Area Totem Installation	  Photo: Arch. Rosita Izzo and Ing. Brunella Franchini

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Totem C – Green Area Totem **Installation**	  Photo: Arch. Rosita Izzo

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