



isoe11 11th INTERNATIONAL
SYMPOSIUM ON
DIGITAL EARTH
Florence (Italy), September 24 – 27, 2019

Digital Earth in a transformed Society

Digital Twin of City of Cagliari

Matteo Vocale – CRS4
matteo.vocale@crs4.it

CRS4 is an Interdisciplinary research center focused on **Computational Sciences** located in the **Science and Technology Park** of Pula, Sardinia, Italy.

Founded in **1990** by Nobel Prize Awardee Carlo Rubbia, RTD staff of **~150** people

Research and Development of enabling technologies:

- Data Intensive Computational Solutions
- Visual Computing
- Bioinformatics
- Matematical & physical modelling

Applicative focus on:

- Energy & Environmental Sciences
- Biomedical Sciences
- Industrial Processes
- Information Society

Support to scientific and industrial community

- HPC infrastructure
- Next Generation Sequencing (NGS)



Our Key Strengths

WITH WORLDWIDE INSTITUTIONS and PRIVATE COMPANIES



Cagliari - CRS4 collaboration

August 2014: CRS4 + Cagliari **signed an agreement** in order to define **strategies for the evolution towards a smart city**

Year 2015: strategic discussions + policy making + roadmap definitions

- Various strategic discussion involving CRS4, Municipality of Cagliari and various public/private entities
- Defined several policies + immediate actions
- Start of Open Data infrastruccion + inclusion of Cagliari in the international OASC initiative (Open & Agile Smart Cities)
- Shared Objectives
 - Improve **high-bandwidth diffuse connectivity**
 - Create standardized methods and models for **distributed sensing** to measure quantities of public interest
 - **Open data Infrastructure** based on international standard
 - Use **big data technologies** for analysis, forecast presenation and validation particularly in correlation with **ubiquitous sensing**

Vision

Creating a Beautiful, Thriving and Happy Cagliari



Number One
Tourism Destination



Leading Environment for
Innovative ICT Services



People Leading Inspired
& Fulfilling Lives

1. Smart Tourism Platform
2. Technology-Enablement of Historical Artefacts
3. Tourism Big Data
4. City Wi-Fi
5. Destination Card

1. ICT Startup Ecosystem
2. ICT Industry Development
3. ICT Manpower Development
4. Smart Port & Logistics
5. MSME Cloud

1. Public Safety
2. Smart Parking
3. Smart Home
4. Smart Streetlights
5. Integrated Intelligent Transport System

6. Smart Education
7. Smart Healthcare
8. Eco-awareness & Sustainability

Enablers

1. Digital Cagliari Committee
2. Digital Cagliari Program
Departments
 - Secretaria
 - Project Management
 - Data Management
 - Facilitation
 - Performance
 - Management
 - Marketing and Promotion
3. Digital Ecosystem
4. Implementation Roadmap
5. E-participation for citizens
(Sentiment Analysis, e-vote...)

Common Platforms Support

**Intelligent Operations
Centre (IOC)**

Converged Communications
Platform

CAD

Video
Service

**IoT
Platform**

GIS

**Big
Data**

Data

Government
Open Data

IoT

GIS
Database

BIM
Database

2D & 3D
Models

Video



Wireless
connectivity



AP Wi-Fi



Fixed
Line

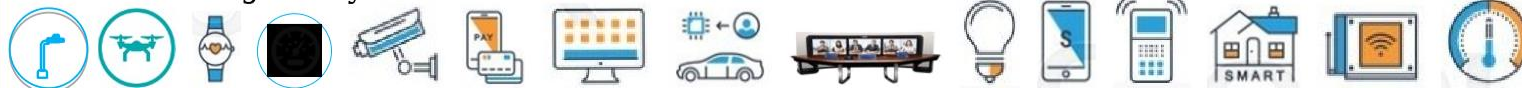


Cloud
DC

IoT gateway

IoT terminal

Network terminal





Create a «Digital Ecosystem»

Joint Innovation Center: a National Smart City Competence Center



HUAWEI



REGIONE AUTONOMA DI SARDEGNA
REGIONE AUTONOMA DELLA SARDEGNA



NetCom
Group
telecommunication solutions



JIC - Joint Innovation Center: Smart City Research Project

Lenders & Partners: **Huawei, Regione Sardegna, CRS4, SME's**

Project duration: 15/9/16 - 14/9/20

Joint Innovation Center: **Objectives**

- Experimental infrastructure for the development of new technologies for **metropolitan-scale** connectivity
- Provide HPC solutions for the development of mathematical models aimed at solving issues related to **Smart Cities**;
- Experimentation of diffuse sensors for the acquisition of large architectural data bases for **Open Data, Big Data, AI, Blockchain & IoT**
- Study on new generation networks (**e.g. 5G and U-LTE**)

Joint Innovation Center: **Objectives**

- Energetic awareness and **Virtual Energy networks**
- Testing emergency **telecommunication** Systems
- Improving the **safety of citizens** with respect to environmental hazards (**small-scale weather forecasts**)
- **Mobility** and **Road** safety
- Smart **Connectivity**

Vertical projects



Smart Maintenance
for Industry 4.0



Smart Infrastruct. Condition
and Security Monitoring



Safe City



Smart Port



Smart Beach



Smart Stadium



IOC 2.0

Smart Wheather and Forecast



Bus As A Sensor



TDM:
Metropolitan Digital Tissue



Smart Healthcare



Smart Parking



Smart Mobility



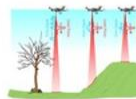
Luna Rossa



National Fire Brigade
Emergency Team



5G Testing



DASS: Sauron



Smart Environment

Joint Innovation Center (JIC) 5.0 : Next phase

- Become the **Smart City Competence Center** in Europe
- **Expand** the existing **ecosystem**
- Be the **enabler** and **test bench** for new Smart Services
- Evolving capabilities according to new **technologies (5G)**
- Involve **Other Projects** into the **JIC infrastructure**

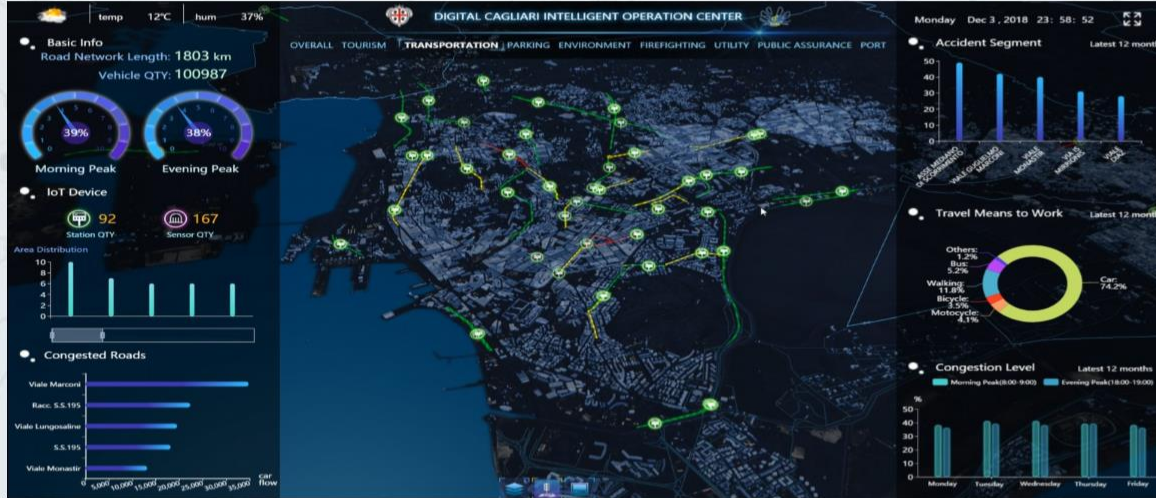
JIC: City of Cagliari – Our Lab



Joint Innovation Center (JIC) 5.0 : Smart City Control Room



JIC 5.0 : Digital Cagliari - Intelligent Operations Center (IOC)



Command center
(CAD+GIS+CCTV)

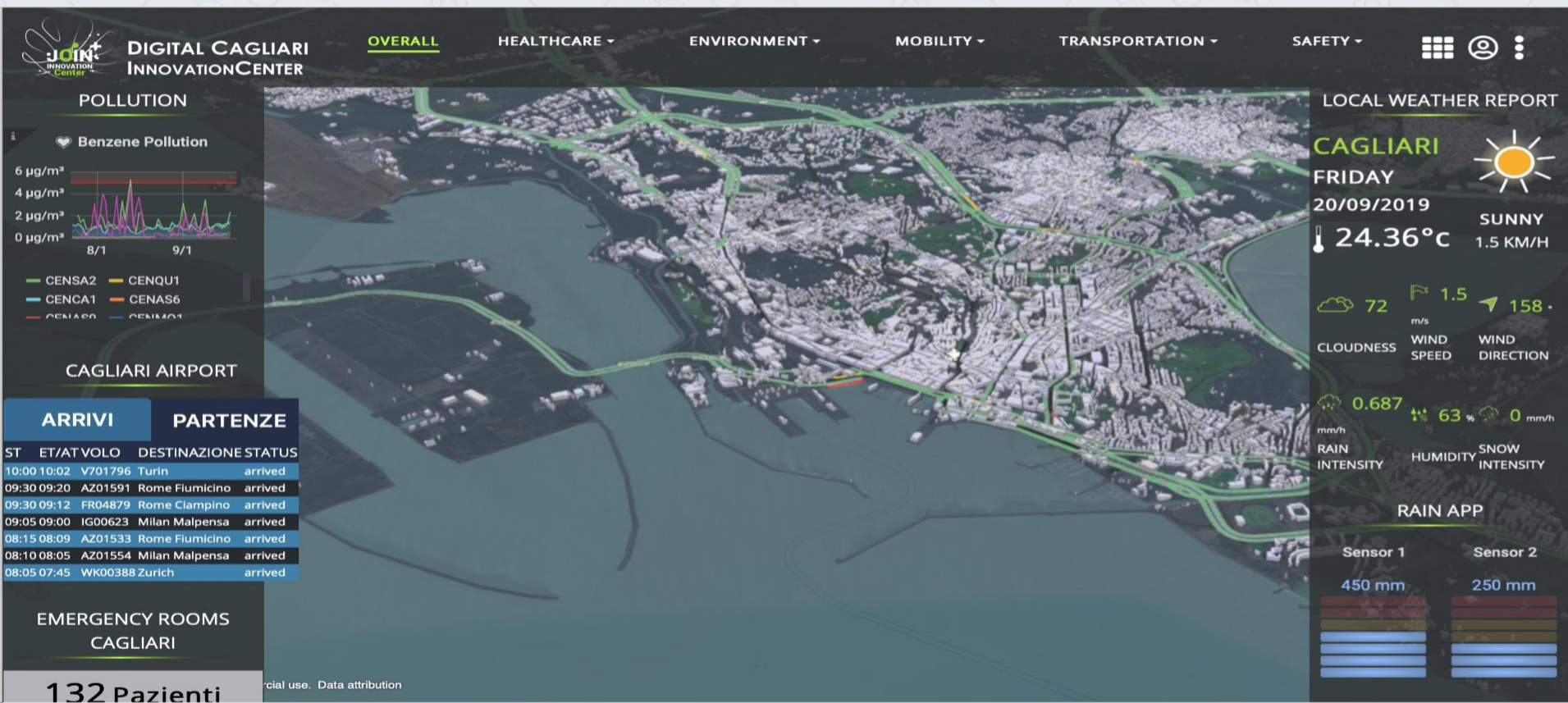
Telepresence collaboration
(Video conference +CCTV)

Case Video Analysis
(HD videos + Business intelligence)

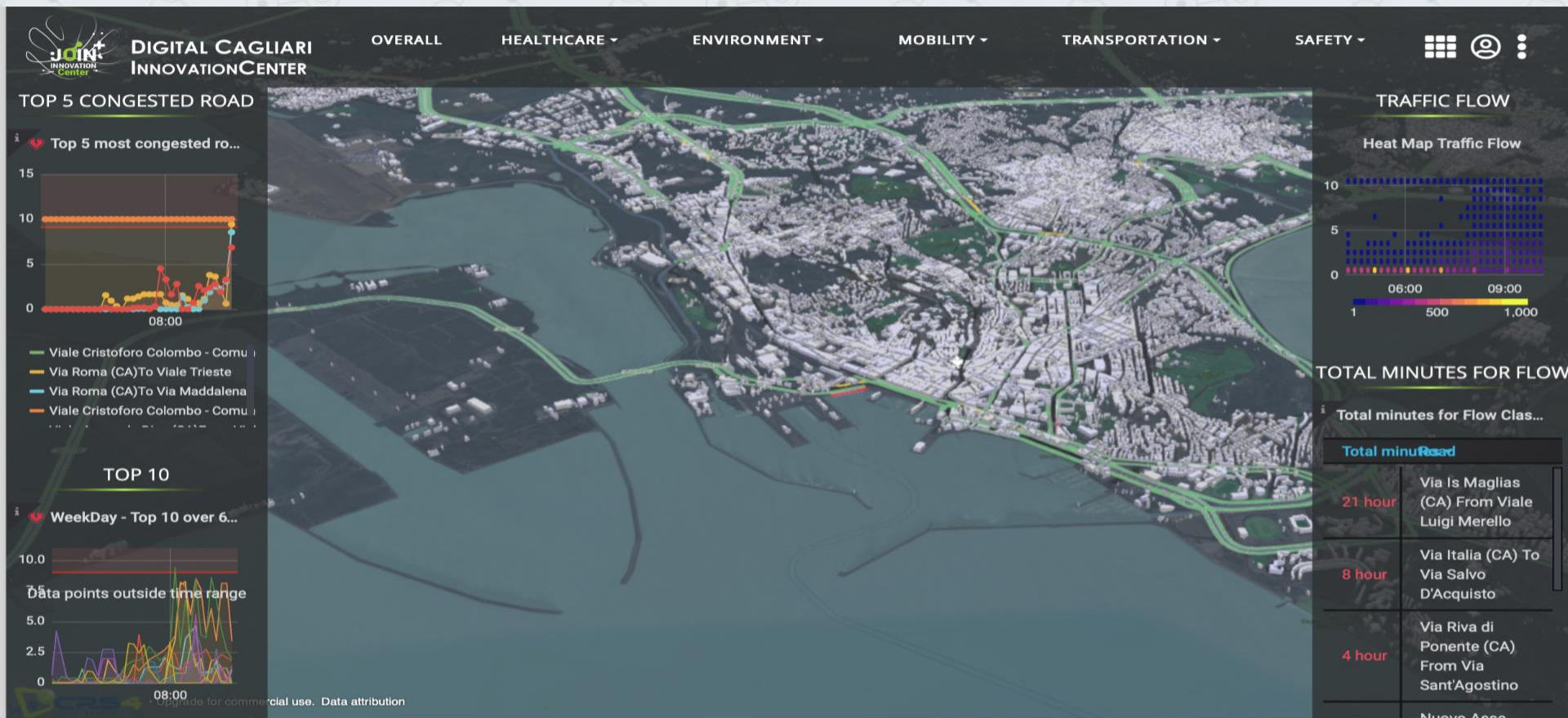
City Database Center



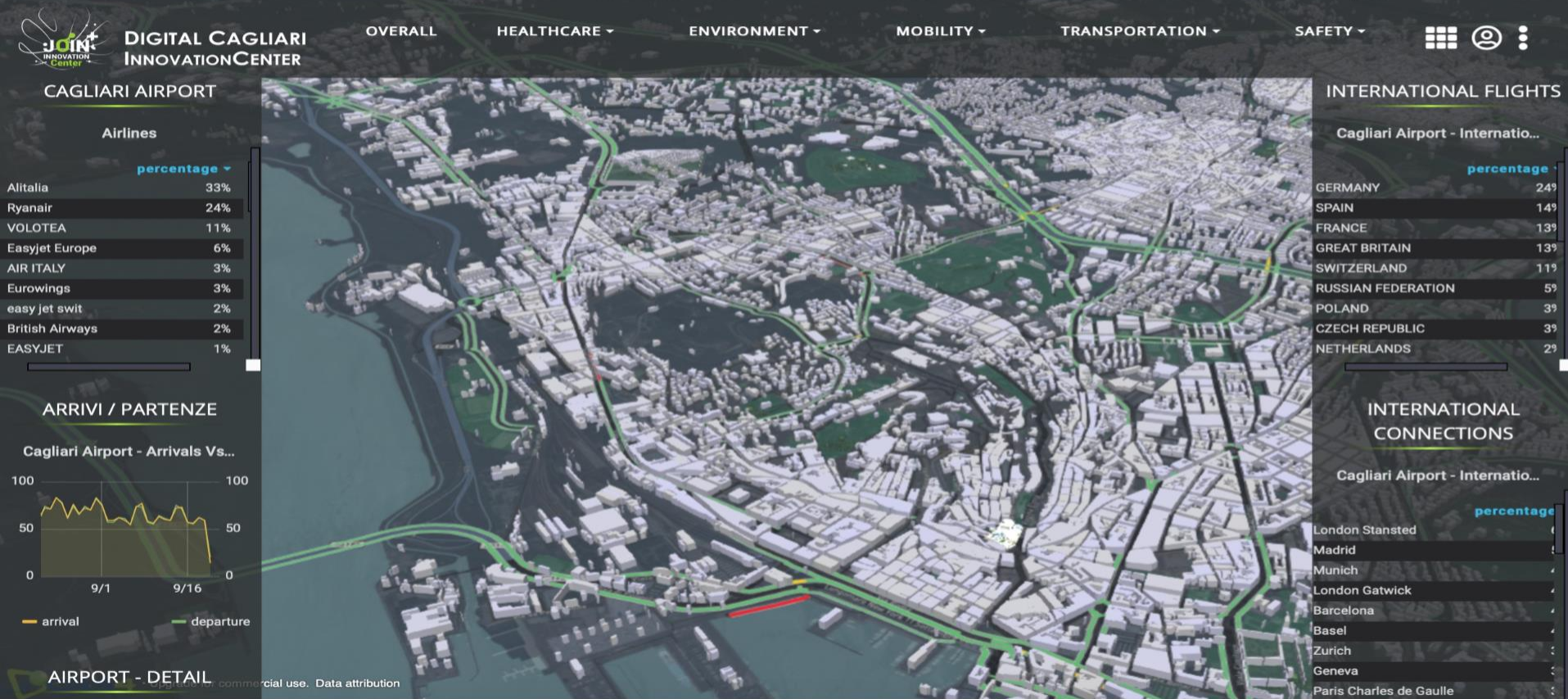
IOC 2.0: The Dashboard



IOC 2.0: Traffic Informations



IOC 2.0: Airport Arrivals





THANK YOU !!!

For further informations, please visit:

<http://www.crs4.it>

<http://www.jicsardinia.it>