

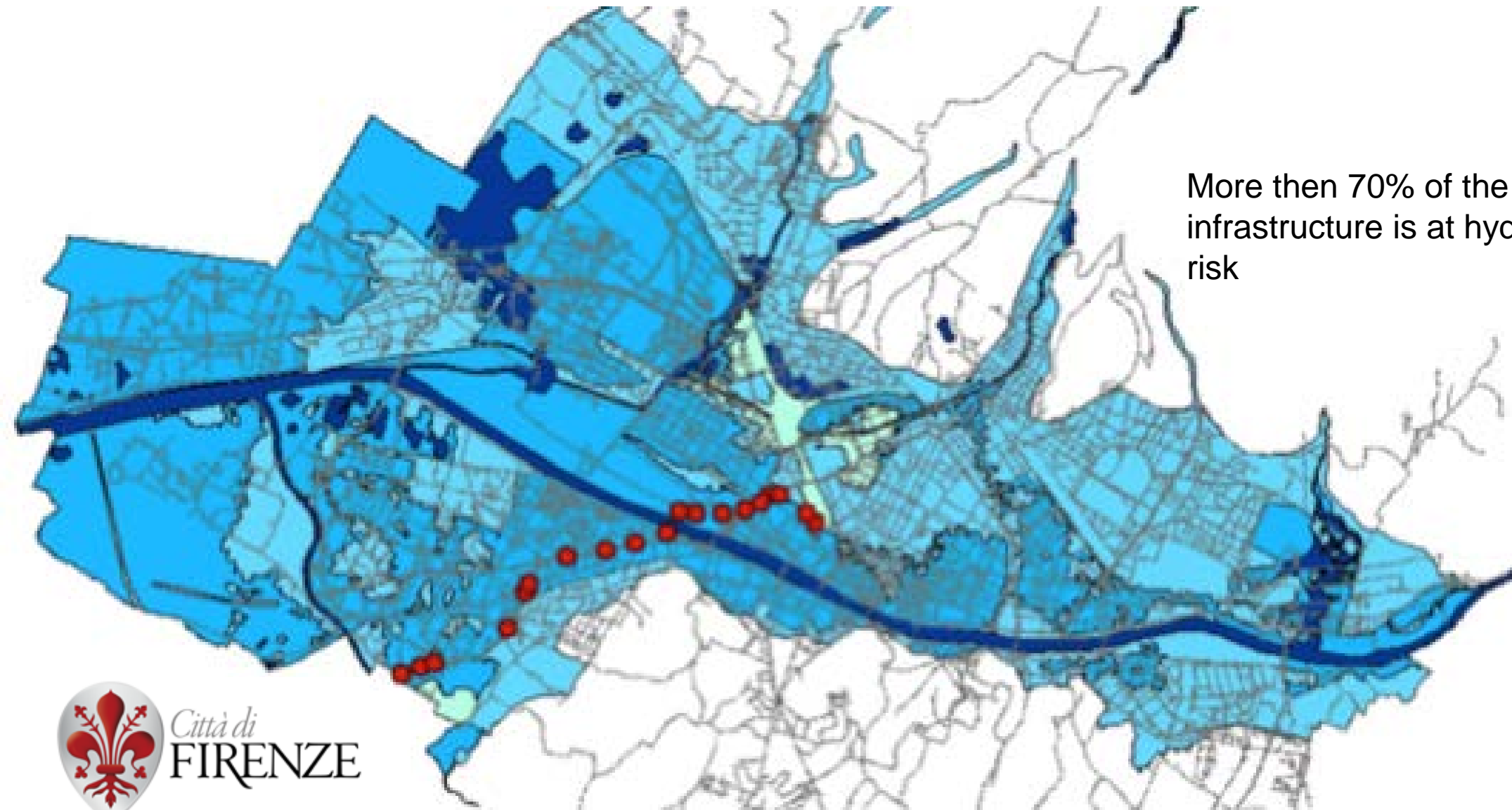


Pilots in Florence

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More than 70% of the city transport infrastructure is at hydrogeological risk



Urban Transport Systems in Florence:

Data from:

- Traffic sensors
- Underpasses sensors
- Restricted traffic areas Gates and Cams
- Transponder car keys and other parking charge systems

Analysis possible at:

- Centralized city lights control
- City bus and tram company control room
- Traffic supervisor center

In case of critical events, disasters...

In the immediate aftermath of a flood, cloudburst, traffic goes jammed, if not totally paralyzed

We need urban transport system able to adapt to the new situation

What can we do:

- Inform the public as soon as possible
- Redirect traffic toward safe areas
- Mobilize emergency relief and civil protection staff
- Save lives, reduce people sufferings

Resilience as awareness

A more resilient city can

- Be aware of the long term problems (returning centennial floods, earthquakes)
- Fast response to emergence
- Know more about emergence impact
- Have a better distribution of emergency forces and security tools
- Have an educated, aware citizenry
- Protect the people, both residents and visitors
- Invest more rationally and efficiently

Florence Traffic Supervisor

Data collection from sensor networks

City lights control

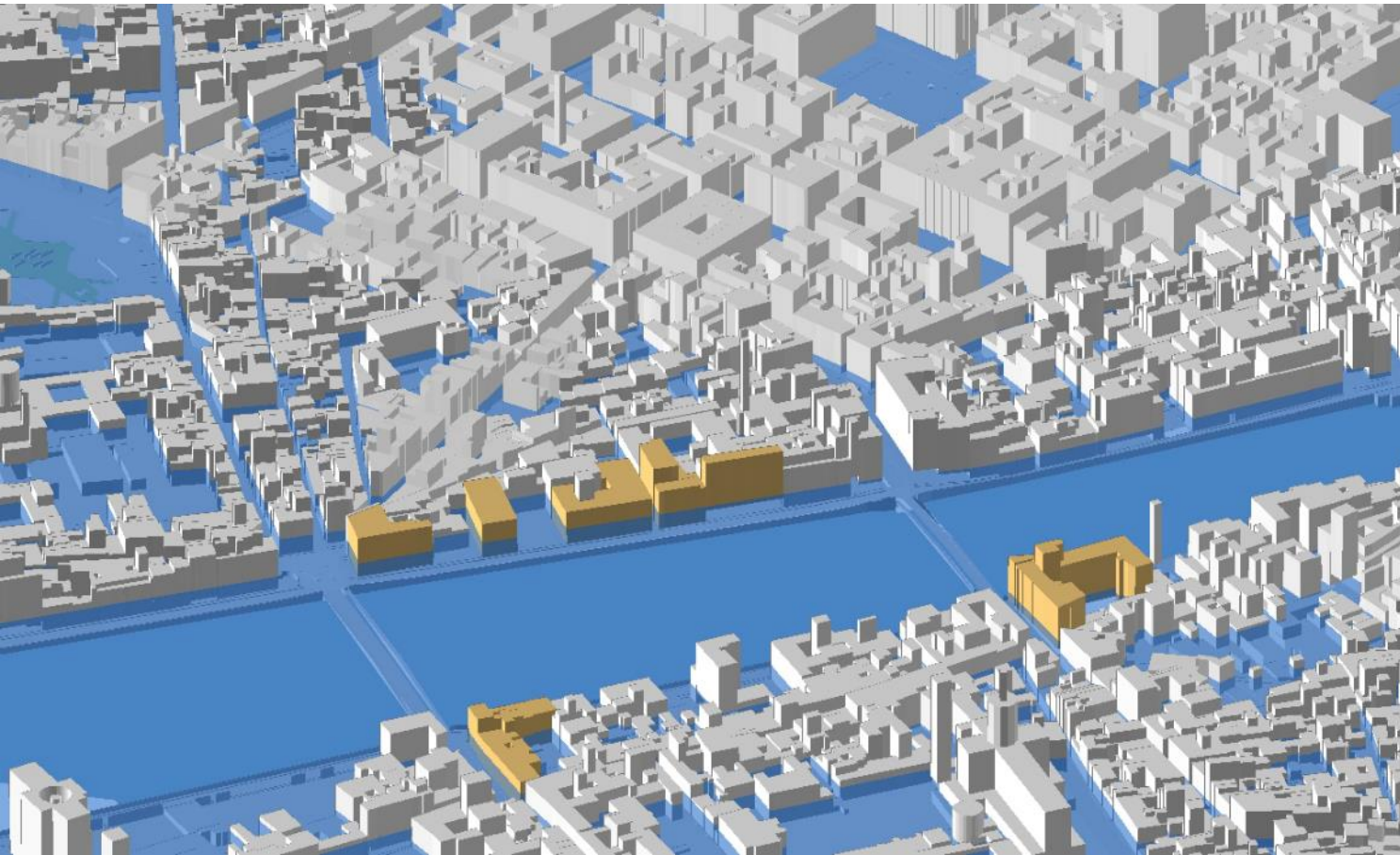
Distribution of recommendation
on public signage systems

Traffic redirection

Study of scenarios



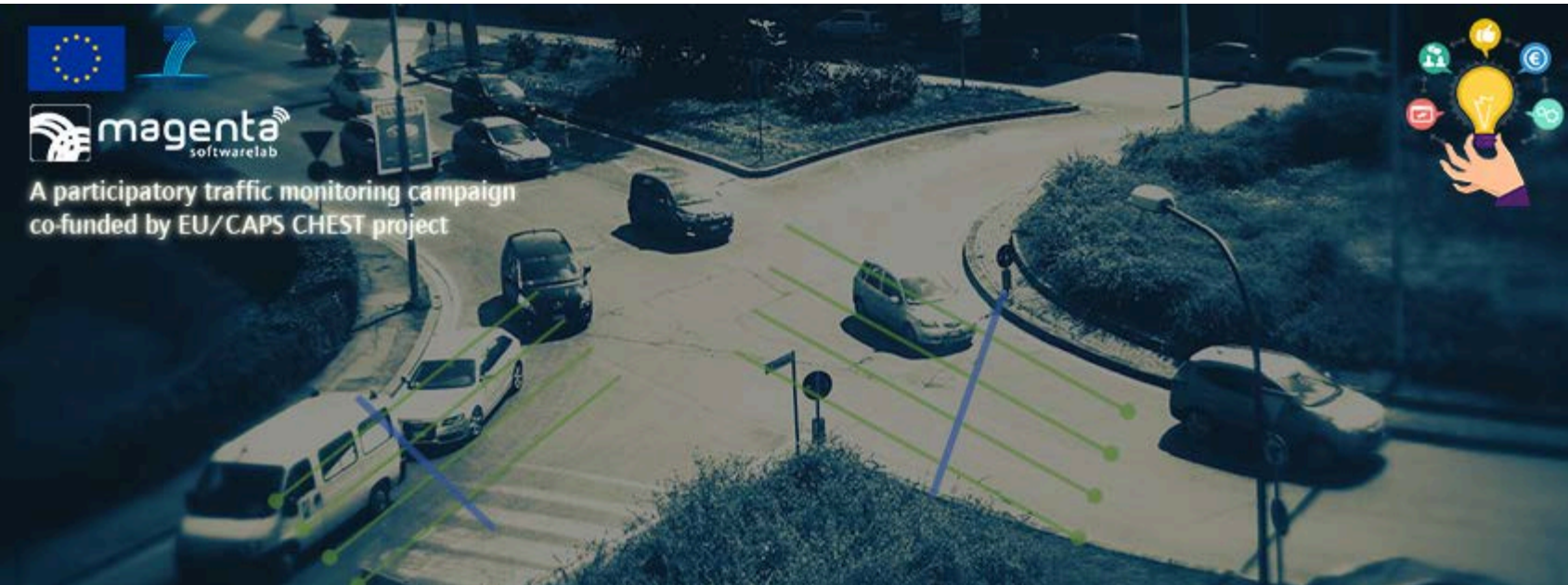
New data about the city



Rilievo 1:500 LIDAR e Ortophoto flight

Useful to analyse the level of the Arno river during the big floodig of the '66 in order to measure the impact on the city services and buildings.

Realtime mobility control in Florence



Every 15 minutes
data are collected
from the sensor network

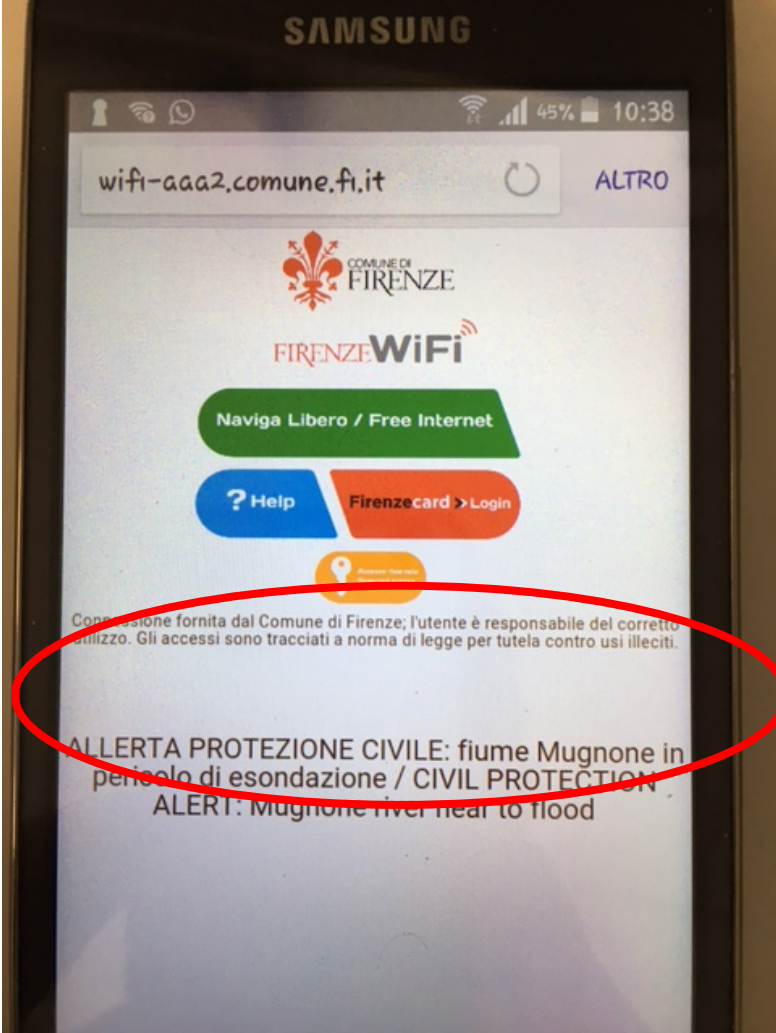
Realtime info
from the main
multi-level parking
utilities

We are working with the public transport companies to
share also data about buses

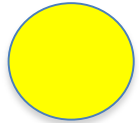
Public WiFi and its strategic outcomes

It allows to estimate the number of persons affected

The splash page reach 10,000 people per day

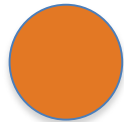


Communication escalation

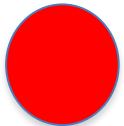


Yellow level
emergency
(low)

Channel	Audience
SMS	Operators
INFOSOC -> (Facebook, Twitter, App Infosoc)	The general public
Press release	The general public



Orang and red level
emergency
(middle to high)



Channel	Audience
SMS	Operators and experts
FAX	Operators and experts
EMAIL - PEC	Operators and experts
INFOSOC -> Facebook, Twitter, App Infosoc	The general public
Press release	The general public
Florence WiFi Splash page	Residents and visitors
Digital signage (Silfi – Ataf)	Residents and visitors
App Alert System	Residents and visitors
Civil Protection Alert System	Residents and visitors

Resilience approach to underpasses

1. Ordinary, regular maintenance checks (with a special attention to drain pumping)
2. Signage to drivers
3. Underpass flood sensor → red light → alarm led at the Supervisor
4. Underpass control via traffic cam



First impact of the ERMG adoption

More cooperation among actors (institutions, utilities, security bodies) – Example: fast data exchange in connection with the Lungarno Torrigiani collapse

Multiplication of sensors – Examples: new UNIFI sensors on the Ponte Vecchio; increasing traffic sensors; using of WiFi data; collection of info about fragile people with special needs (children, disabled, old, ventilated people).

Doing public Civil Protection Exercise in order to continuously review rules and procedures – Example: the Mugnone Civil Protection Exercise (along a minor river in Florence)

More resilient new infrastructures – Examples: new water-proof electric distribution panels, after having studied historical flood data

We do know realtime children presence at school



We do know where fragile people live



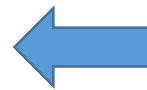
How have we become more resilient...

Keep all the datasets up to date to support decision in time of emergency

More info to the public, using more channels, in the right order

Redirecting traffic in a more effective way

Disseminating RESOLUTE through serious games and game apps, events, publications



More than 40 crucial datasets are updated every day by the Municipal ICT and transmitted to the Civil Protection – They can be accessed also in case of ICT shutdown, network and electric blackouts



How have we been learning from past disasters

Events from the past have been revised under the light of a resilience approach:

-Cloudbursts, floods, traffic jam cases

Scenarios and exercises have been studied

More information and formation to the public is being provided





Mugnone river Scenario

Data elements supporting resilience in relation to addressed scenario:

10.700 inhabitants

5.600 families geo-referenced

1.784 over-75 years old inhabitants

34 registered disabled, fragile people

2 Kindergarten and 2 Schools

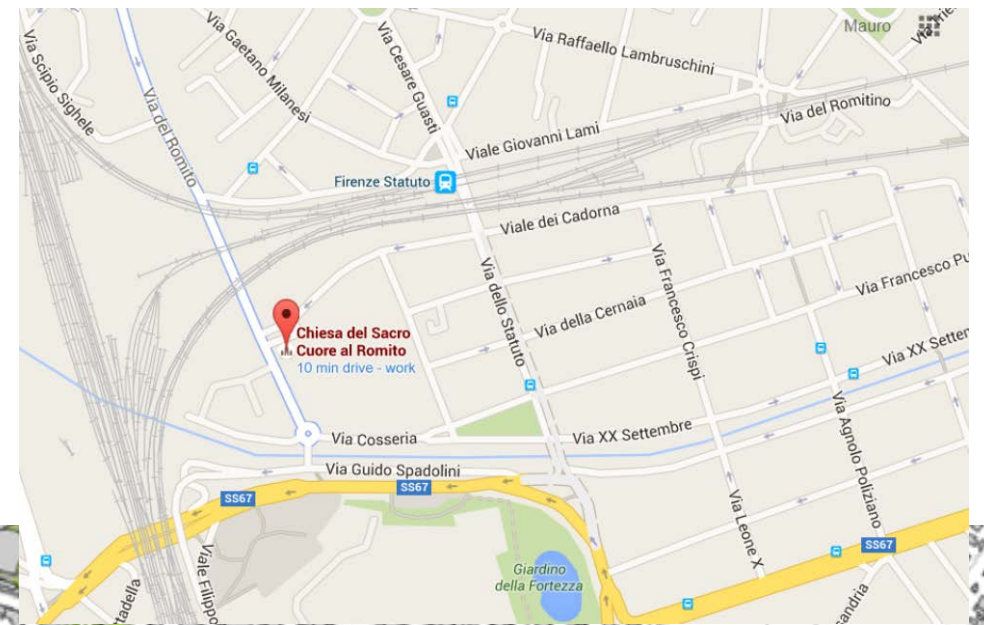
2 retirement homes

1 day-time centre for elderly people

137 shops, bars and similar

3 pharmacies

4.627 parking lots



RESOLUTE in Florence at a glance



Communication channels (media, Apps, Social nets, Wifi Splash page, Public digital signage, etc)

Info to the public

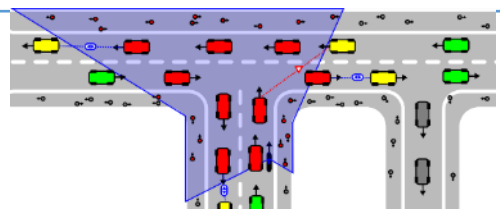
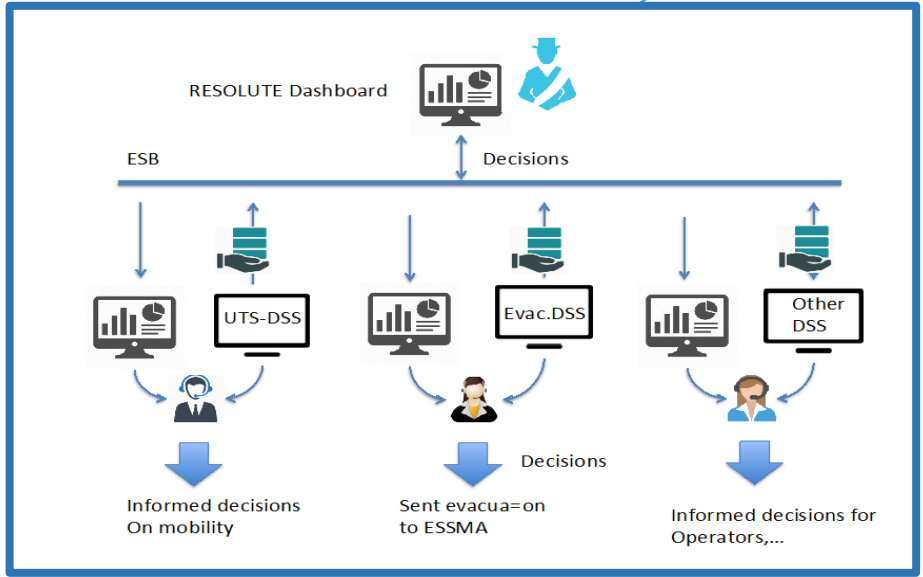
ESSMA app

Civil protection and emergency relief actions

Fast response



CRAMSS



scenarios study

Traffic redirection and UTS adaptation

Geographic information system

SIT

Data from sensor networks



Resilience Awareness level of the area

A survey conducted during the Mugnone Civil Protection exercise 2016 in Florence among the citizens living in the area of the exercise has revealed the following preliminary results:

20% of responders stated that they feel prepared to cope with an emergency;

34% of the citizens claimed that they tend to follow their own heuristics instead of the official communications during the emergency.

6% of the responders indicated their willingness to adapt their behaviour according to the instructions provided by the authorities.

86% of the responders did not consider such exercise useful to increase their preparedness and safety.

Data needed

- Mapping fragile people with special needs (children, older, disabled, ventilated)
- Mapping flood shelters and first response centers
- Collecting the number of the kids at schools in the area
- Knowing what kind and how many services are in the area affected
- Knowing

Actors involved

The following Municipal bodies are involved:

- Mobility Department
- Infrastructure Maintenance Dept
- the Local Police Dept
- the Civil Protection Authority, which concentrates every power in case of emergency
- Tuscan regional authorities are involved, in particular the Tuscany Civil Protection, because they have technical instruments and scientific bodies able to forecast floods and to trigger flood alarms.
- The Metropolitan City of Florence is another body involved in the supervision of traffic and mobility on a metropolitan-wide scale.
- Public utilities (buses, taxi companies, car-sharing companies).
- Private commuters (four-wheels and two-wheels).

Other authorities, bodies, forces are involved in case of emergence, under the coordination of the Florence Civil Protection Authority (whose responsible is the Mayor of Florence):

- Fire-guard brigade
- Ambulances and other mobile health units
- State police troopers
- Railways personnel
- Civic and religious associations and their volunteers
- Evacuation responsible (eDSS operator)

Preconditions

Control points that trigger the emergency situations are:

- forecast issued by Tuscan bodies of weather forecast (12-36 hours notice)
- rain and water sensors along the Mugnone watercourse (0-3 hours notice)
- human observation driven local alarms, coming from the upstream (0-1 hours notice)
- meeting of the Emergency Coordination Centre and declaration of the Emergency state by the Mayor
- Regular mobility conditions over the Mugnone river surrounding area. Regular traffic to the Careggi Hospital.

Regular conditions for the following assets:

- Traffic plans
- Roads works agenda
- Public constructions sites
- Available infrastructures
- Available traffic sensors, lights remote controls, digital signage
- Available communication channels to the city (Variable message signs, official website, socialmedia, FirenzeWiFi splash page, etc.)

Postconditions

Main consequences to be studied in this case:

- private traffic reduction or block since the early warning of the flood
- avoiding traffic jam in the Rifredi and Novoli suburbs (north of the block)
- ordering people to stay home (or wherever they are at the moment the alarm is triggered)
- ordering people to climb up at upper floor of the building if there is any available
- ordering people to shut doors and windows and hold onto tables and beds if they remained imprisoned in ground floor only buildings
- ordering people to absolutely avoid any attempt of putting in security cars and other goods at ground zero or, even worse, underground
- evacuating areas, guiding people to safe places with minimum impact in the current traffic

Expected impact

- Demonstrate capacity of timing intervention and operator's synchronization
- Timely activation of traffic limitations and deviations.
- Effective information propagation through multiple communication channels (mobile app, city panels, radio, etc.)
- Fast restoration of pre-emergency traffic and UTS conditions.
- A stronger perception of the risk and within the community
- A better help to people living in the suburb, isolated
- A stronger awareness to the need to be prepared



Thank you for your attention

Credits

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