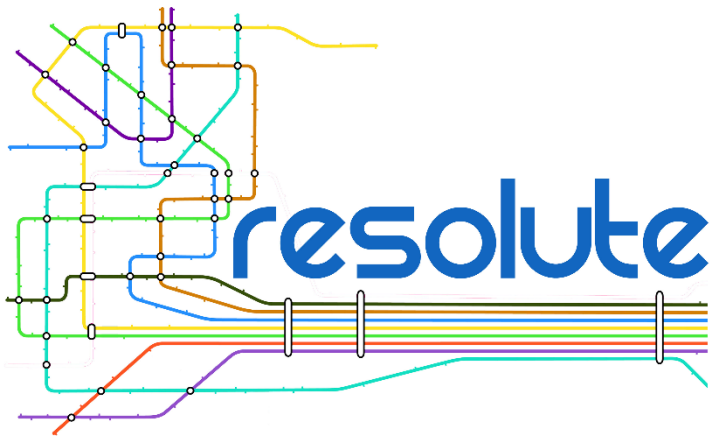
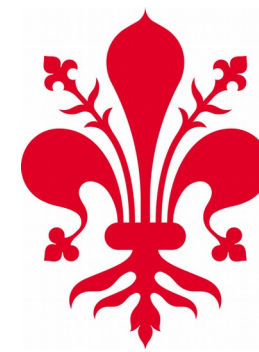


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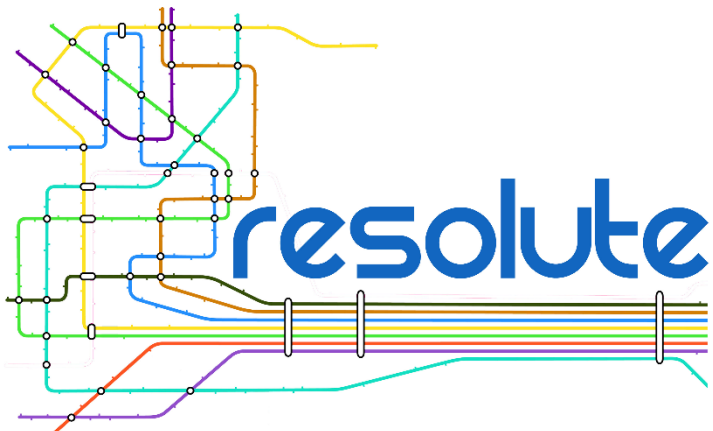
Resilience in Urban Transport Systems The Florence Pilot





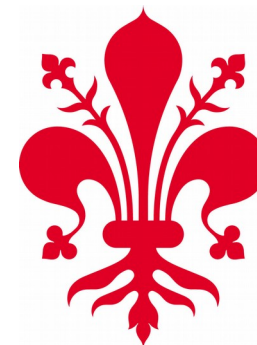
SUMMARY of this presentation:

- What urban (and UTS) resilience is, why does it matter, how it save lives
- The RESOLUTE project and its early results in Florence
- Examples of RESOLUTE scenarios under scrutiny in Florence



RESILIENCE

The ability of a system to anticipate, prepare for, and respond, and adapt to change



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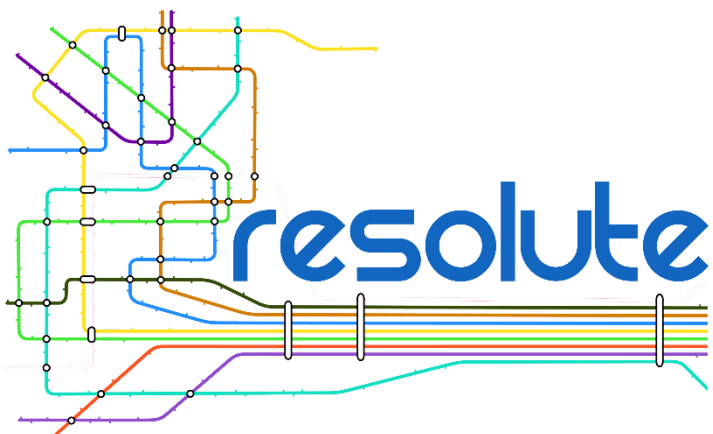
A FUNCTIONAL
PERSPECTIVE:
4 COGNITIVE,
ORGANIZATIONAL
CHALLENGES

ANTICIPATE

MONITOR, PREPARE

RECOVERY, RESPOND

LEARN, ADAPT



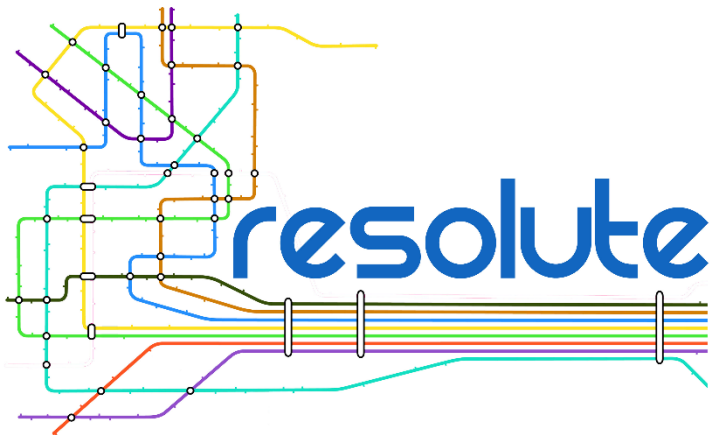
In case of
ordinary stresses,
extraordinary disasters,
grand events...



...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
- And much more!



The Resolute Project in FLORENCE

- European project (Horizon2020 program) - May 2015 – May 2018
- Resilience in UTS with respect to:
 - Natural disasters (floods) in Florence
 - Terror attack in Athens

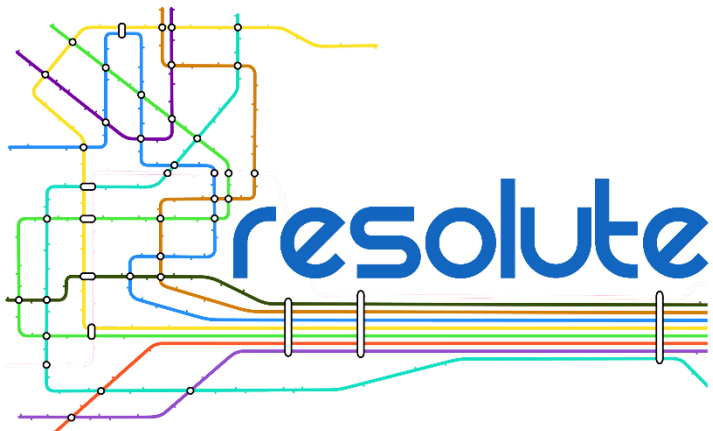
Florence Municipality is concentrated on:

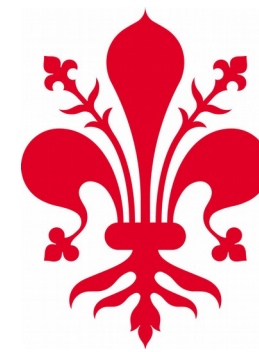
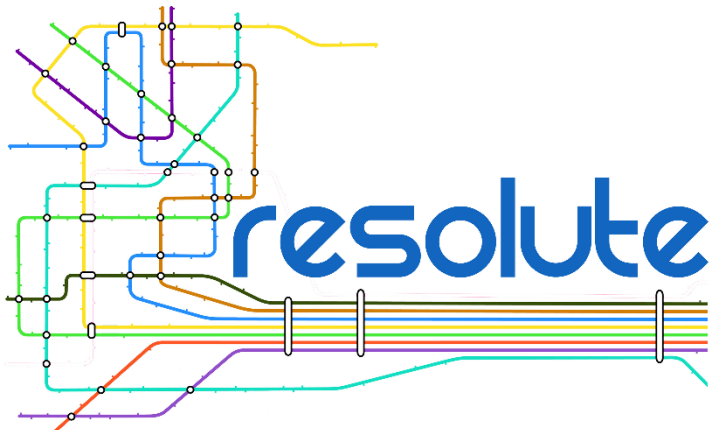
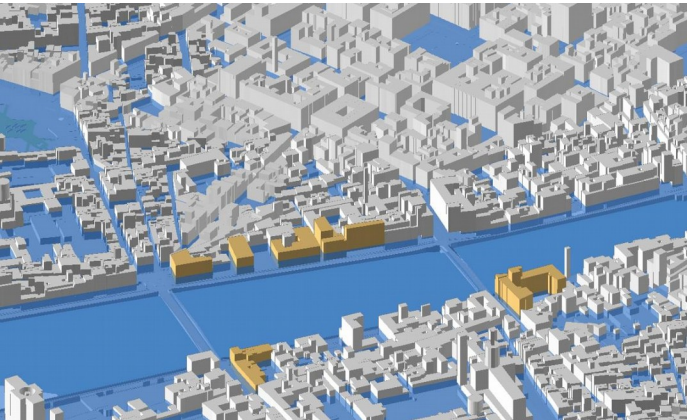
- Providing DATA
- Improving EMERGENCY PROCEDURES



A resilience awareness can provide a city with

- Knowledge of the long term problems (returning centennial floods, earthquakes)
- Expertize for a better distribution of emergency forces and security tools
- A more educated, aware citizenry
- Effective protection of both residents and visitors
- Wiser long term investments





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Data from:

- Geo datasets
- 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

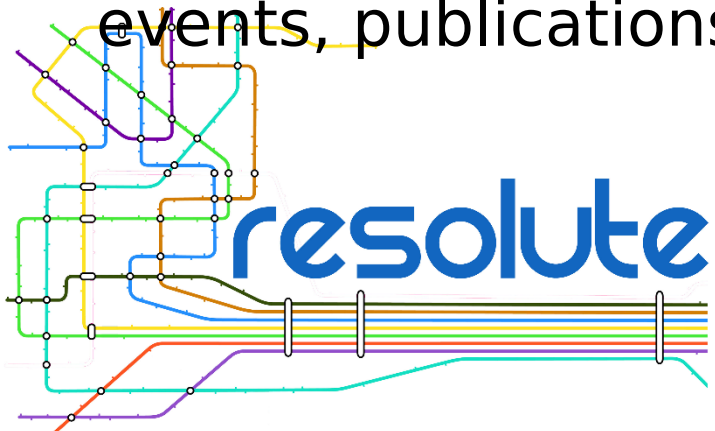
How have we are becoming more resilient...

Updated data to support decision in time of emergency

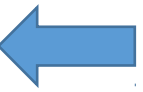
More info to the public, using traditional and innovative channels

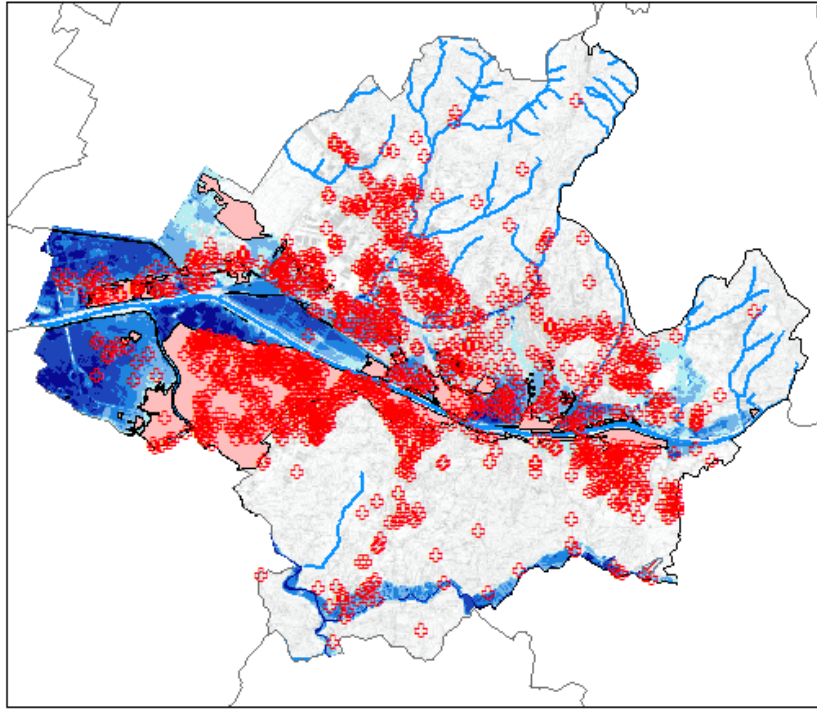
Redirecting traffic

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





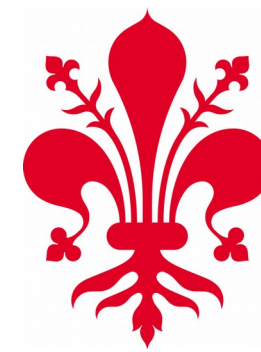
Legenda

Zone di Transito

Battente relativo (m.)

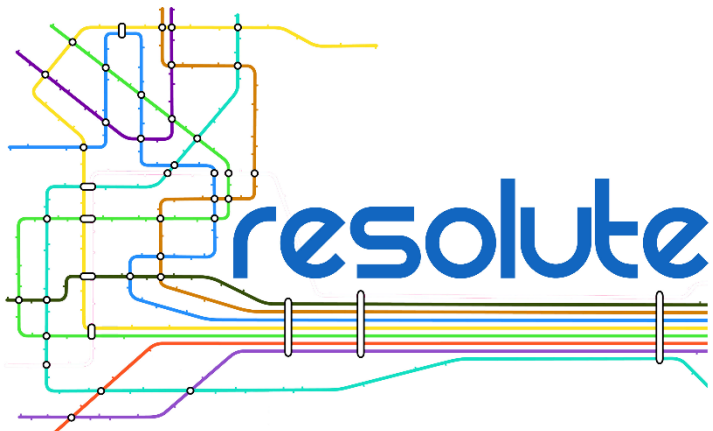
0,00 m. < h ≤ 0,30 m.
0,30 m. < h ≤ 1,00 m.
1,00 m. < h ≤ 2,00 m.
2,00 m. < h ≤ 3,00 m.
> 3,00 m.

(*) Fonte AIB fiume Arno - Direzione Ambiente - SIT Comune di Firenze



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Mapping fragile people with special needs (children at schools; older, disabled, ventilated people)



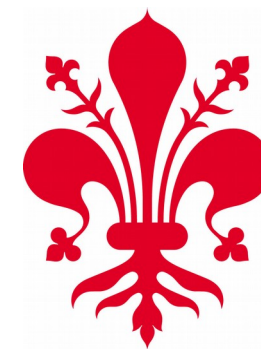
AND ALSO

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

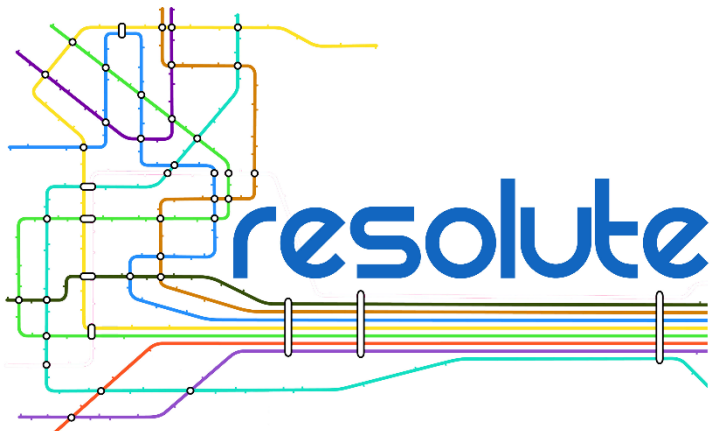
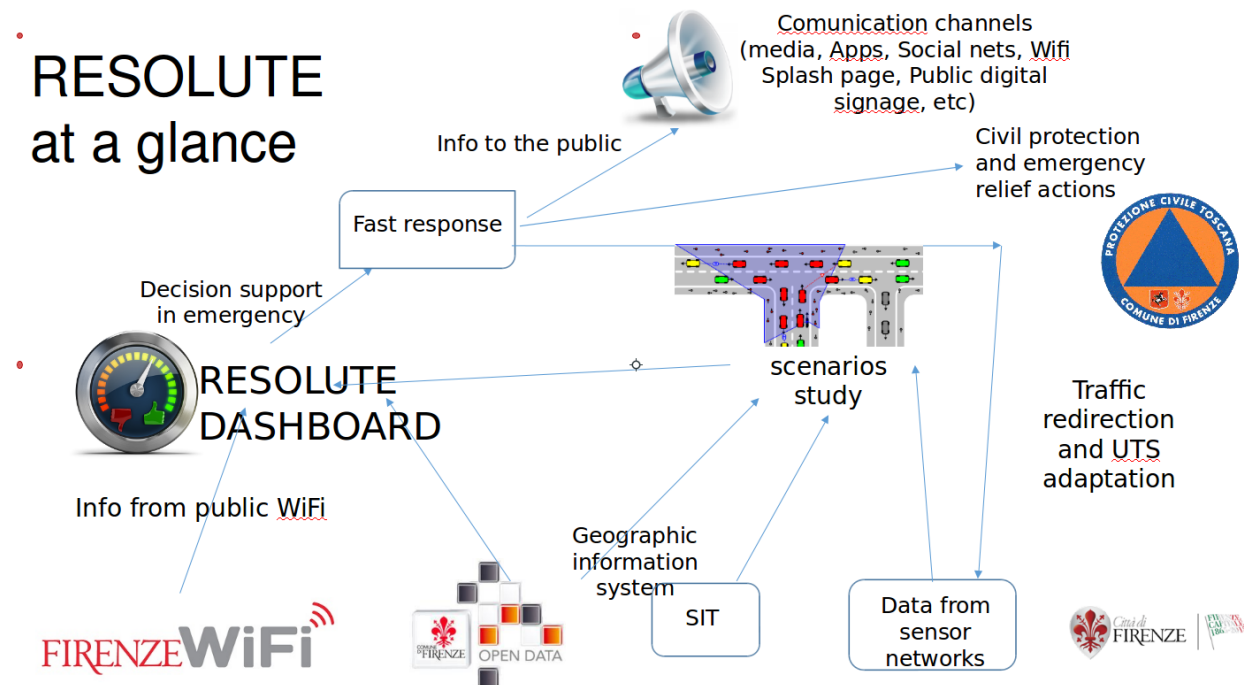
Civil Protection Exercises in order to continuously review rules and procedures – Example: the Mugnone Civil Protection Exercise (along a minor river in Florence)

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



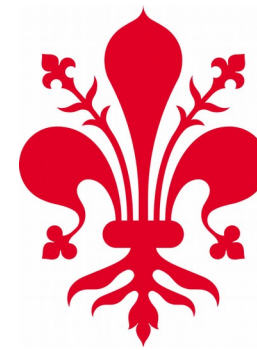
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RESOLUTE at a glance

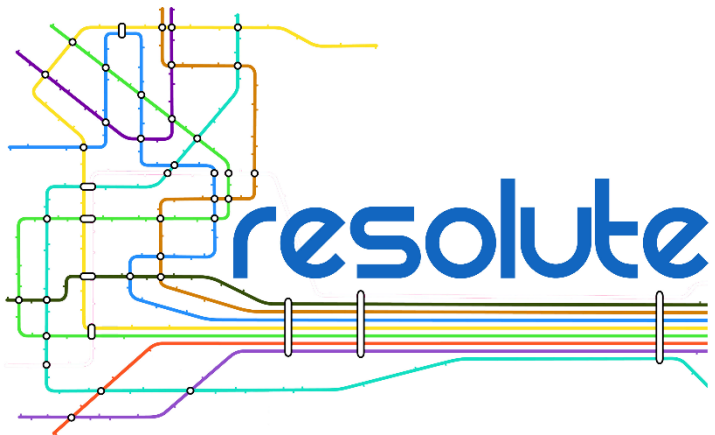
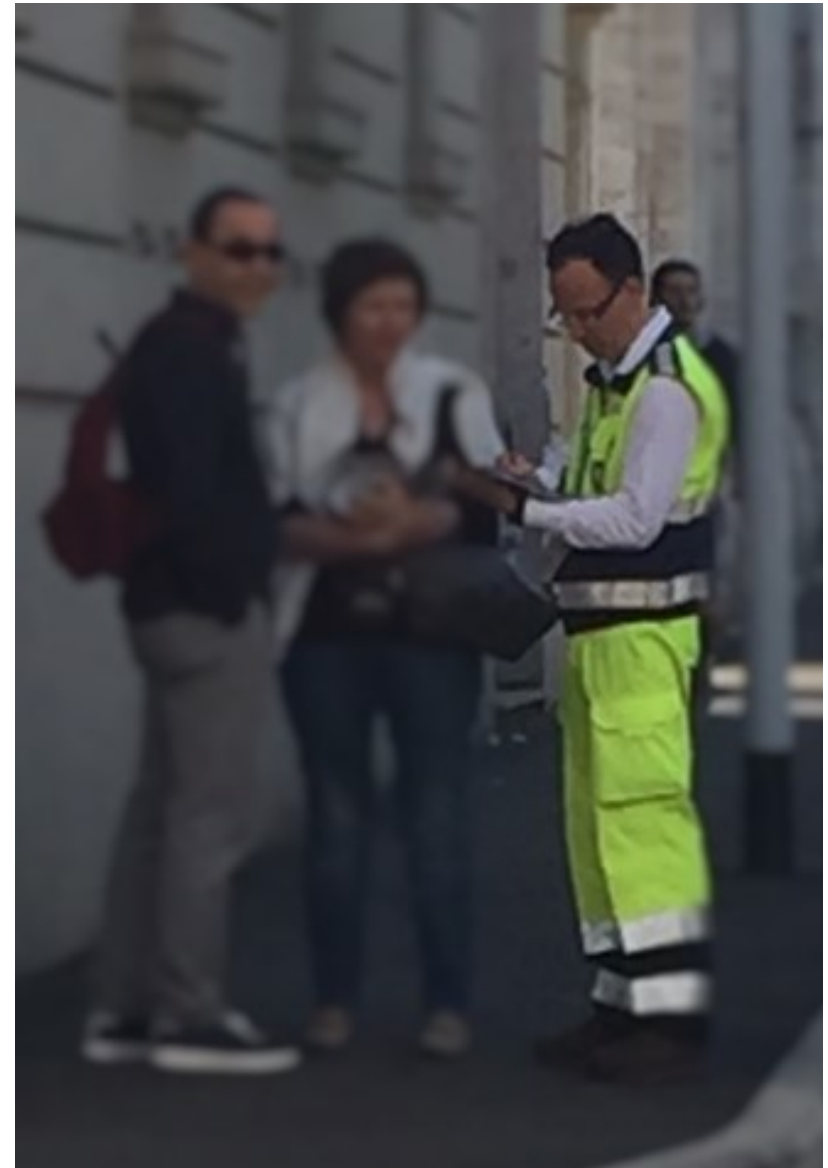


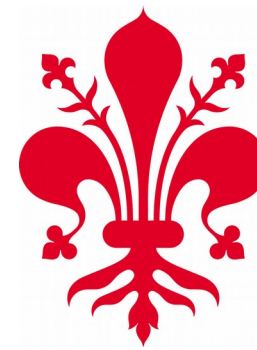
Events from the past are being revised under the light of a resilience approach:

- Cloudbursts, floods, and other crises have been made objects of Resolute scenarios



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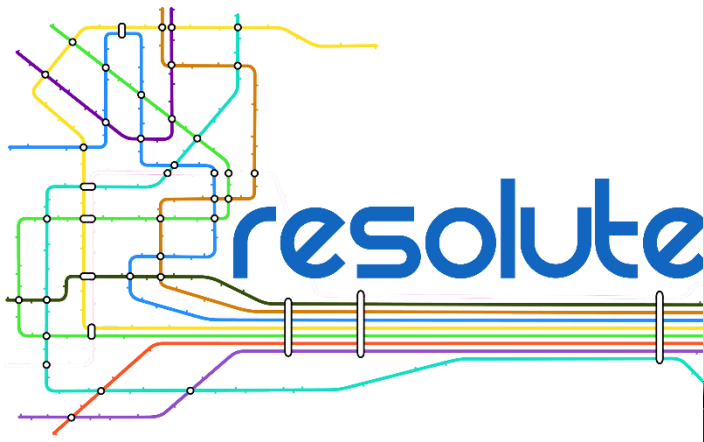
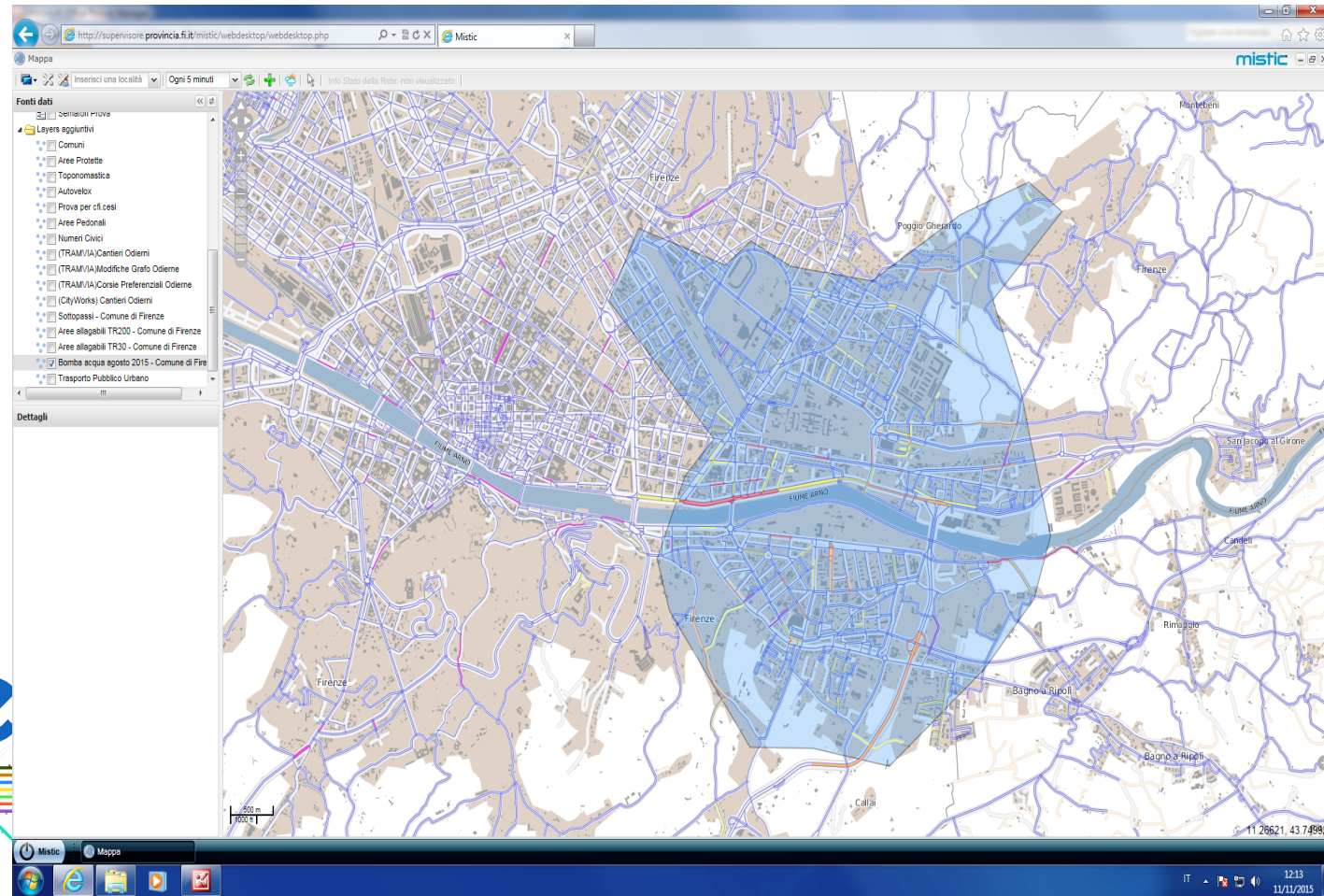




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Scenario #1
South
Florence
Cloudburst

Traffic
redirection
Keeping the
traffic outside
the affected
area

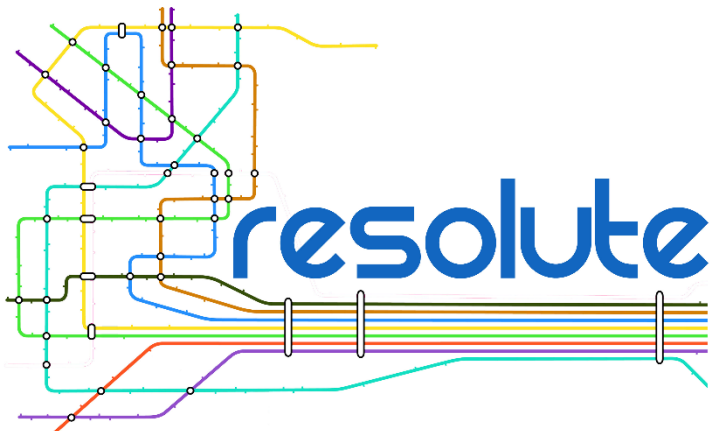
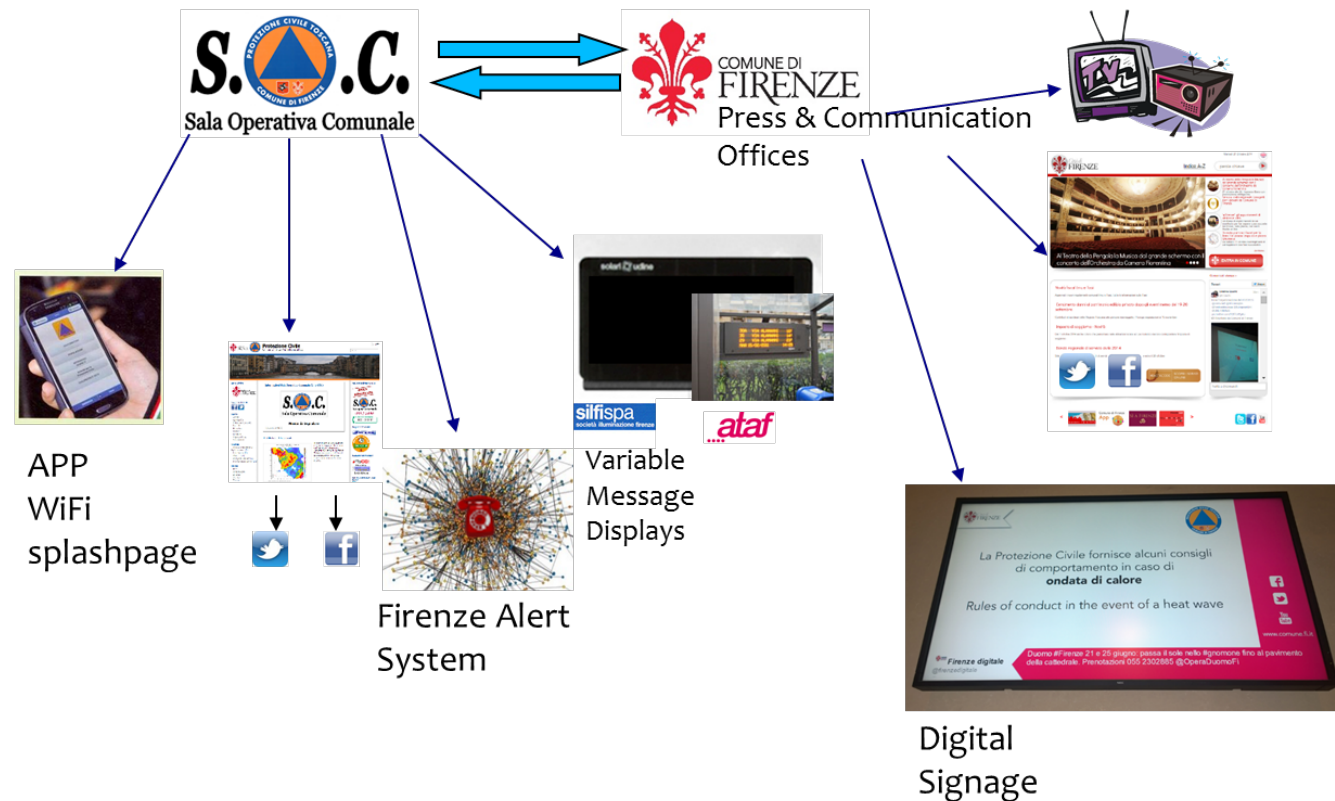


Scenario #2 30 years probability flood

Coordination of info to operators, experts, the public

Emphasis on good practices

Mapping those who have special needs

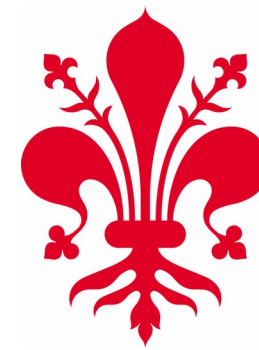


Stopping private traffic

Redirecting public transports

Organizing evacuations

Scenario #3
200 years probability
grand flood



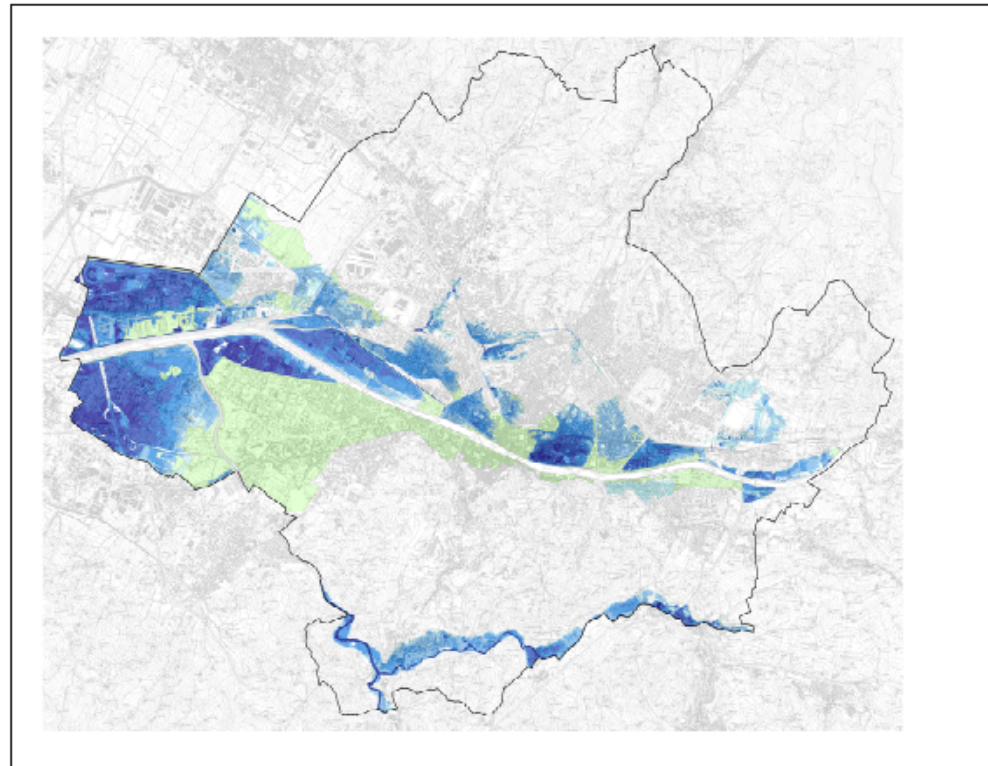
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Carta Aree Allagabili per T.R. 200 anni

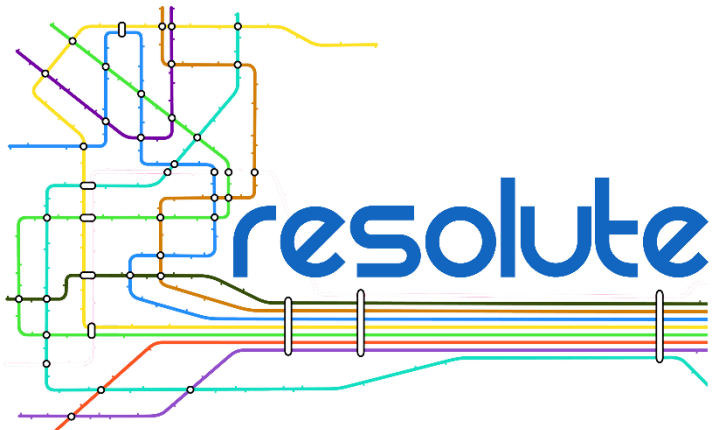
Variante al PS 2010
 Approvazione deliberazione C.C. n. 1918/00025 del 02/04/2015

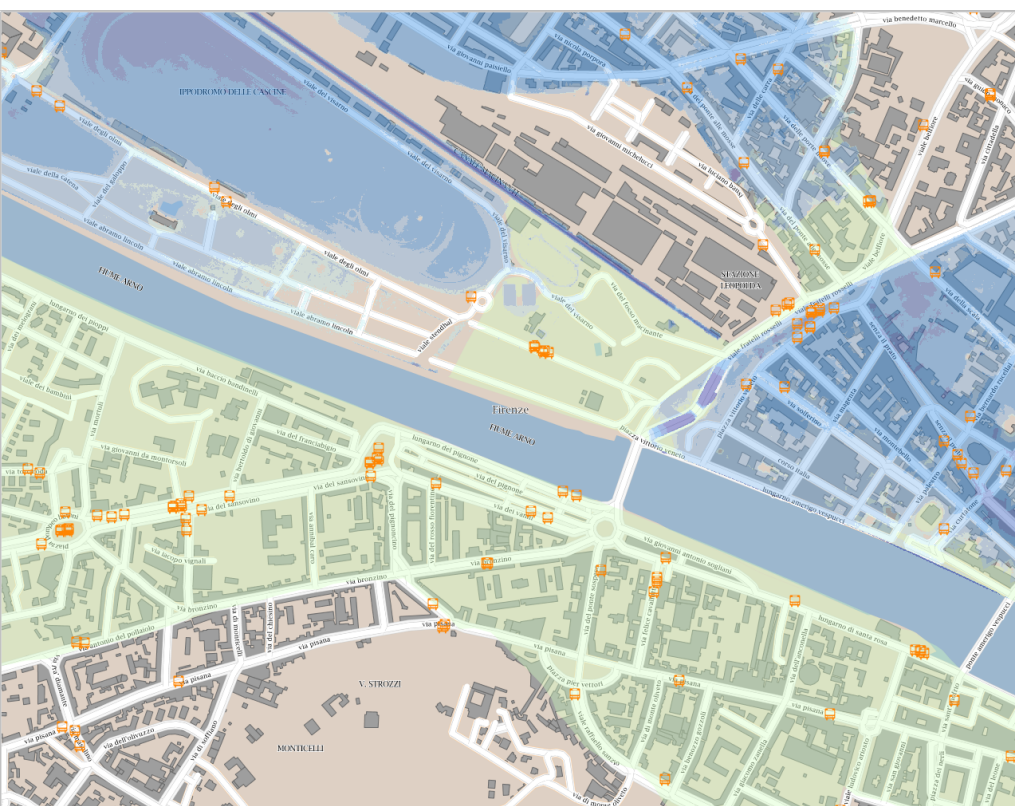
Scala 1:21000



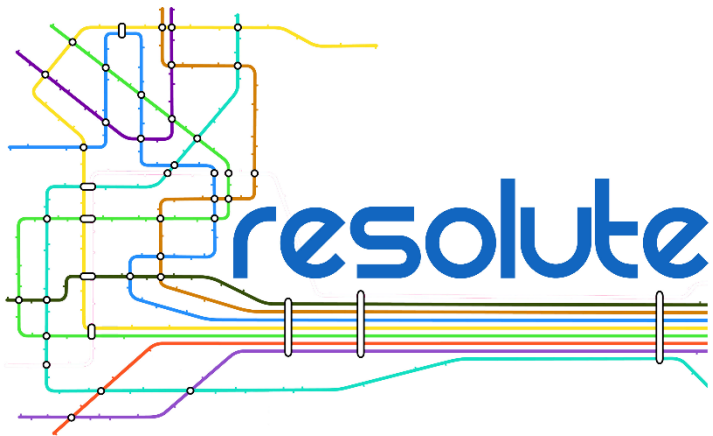
Altezza d'acqua di esondazione

0.00 mt < h ≤ 0.30 mt
0.30 mt < h ≤ 1.00 mt
1.00 mt < h ≤ 2.00 mt
2.00 mt < h ≤ 3.00 mt
> 3.00 mt
aree di transito per Tr.200 anni (altezza convenzionale 0,30 mt)





Scenario #4
Local overflow at the
Cascine central park
with tramway
interruption
(rump line operating)





This project has received funding
from the European Union Horizon 2020 Programme
under Grant Agreement n°653460

Thank you for your attention

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