

EuroGeographics General Assembly 2019 “The National Response”

Manchester, Great Britain, 7th October 2019



EVOLUTION OF THE ITALIAN CADASTRAL CARTOGRAPHIC SYSTEM: *the online dynamic search and surfing*

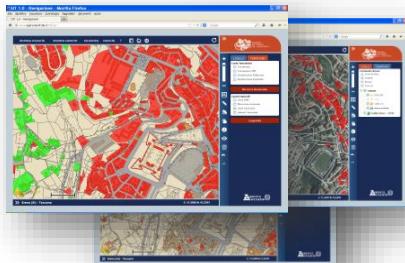
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EVOLUTION OF THE ITALIAN CADASTRAL CARTOGRAPHIC SYSTEM: the online dynamic search and surfing

Agenda



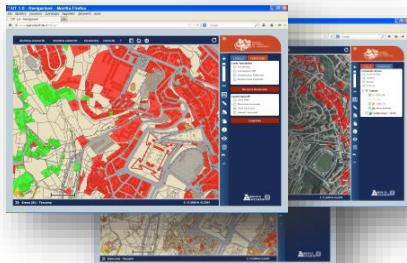
The Italian Cadastral
Cartography



Interoperability services
concerning Cadastral Cartography

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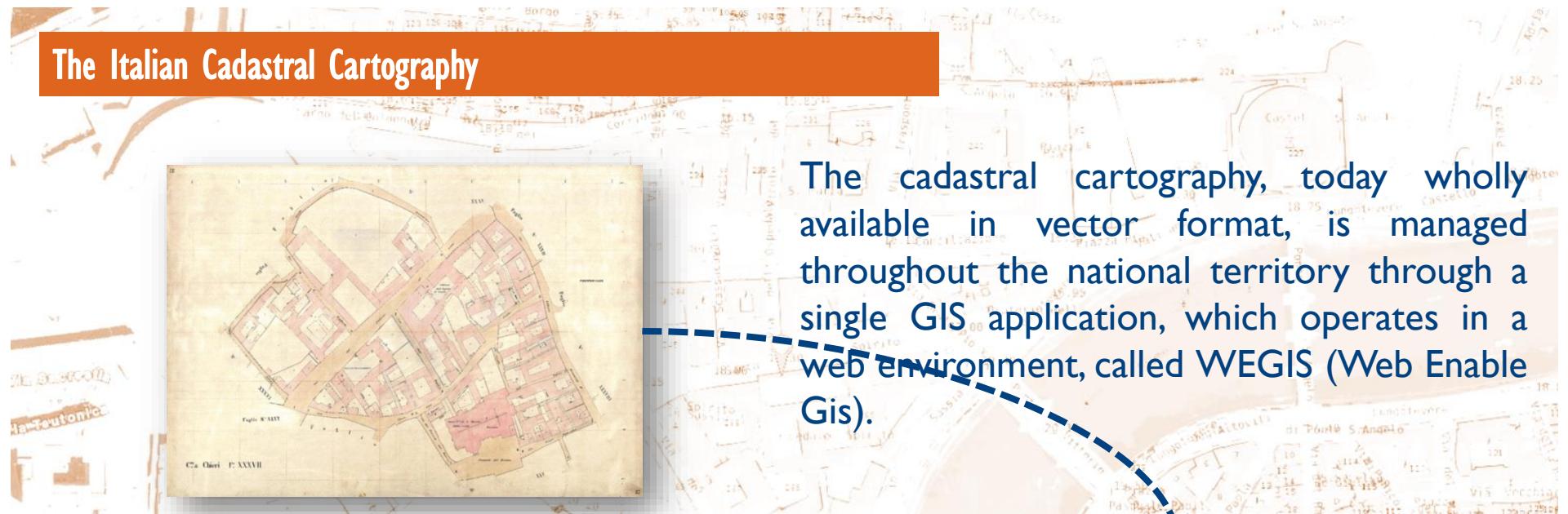


The Italian Cadastral
Cartography



Interoperability services
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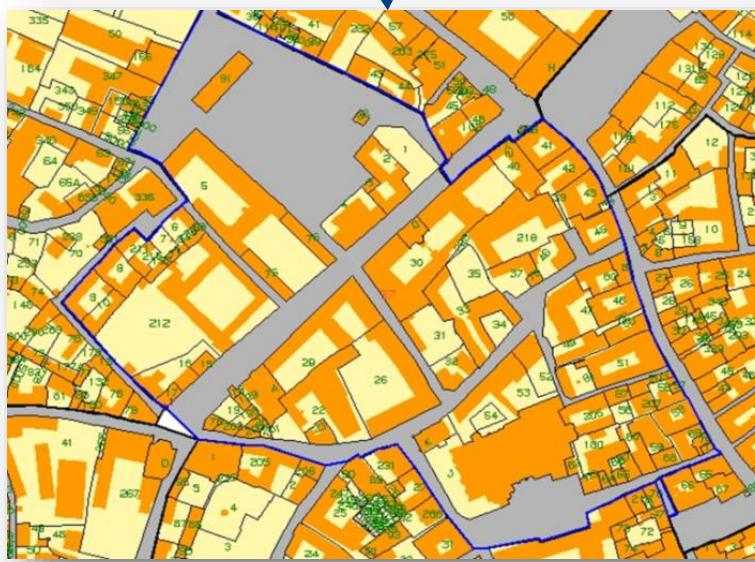
The Italian Cadastral Cartography



Original paper map sheet

The WEGIS functions make possible to query cartographic databases, provide users (technical professionals, citizens) with abstracts of cadastral vector maps upon request, update cadastral cartography in vector format either through its digitalization functions or by supplementing updating documents submitted by technical professionals.

The cadastral cartography, today wholly available in vector format, is managed throughout the national territory through a single GIS application, which operates in a web environment, called WEGIS (Web Enable Gis).



Map in "vector" format

CADASTRAL CARTOGRAPHY in the context of the geographical data

National authorities providing geographical data in Italy

Law n° 68/1960					Military bodies
1	I.G.M.	Military Geographic Institute	Small scale cartography	1:25.000 – 1:1.000.000	
2	I.I.M.	Navy Hydrographic Institute	Maritime cartography		
3	C.I.G.A.	Air Force	Airport obstacles map		
4	A.d.E.	Cadastre	Large scale map	1:2.000	
5	I.S.P.R.A.	Geologic Service	Geologic small scale cartography	1:25.000	

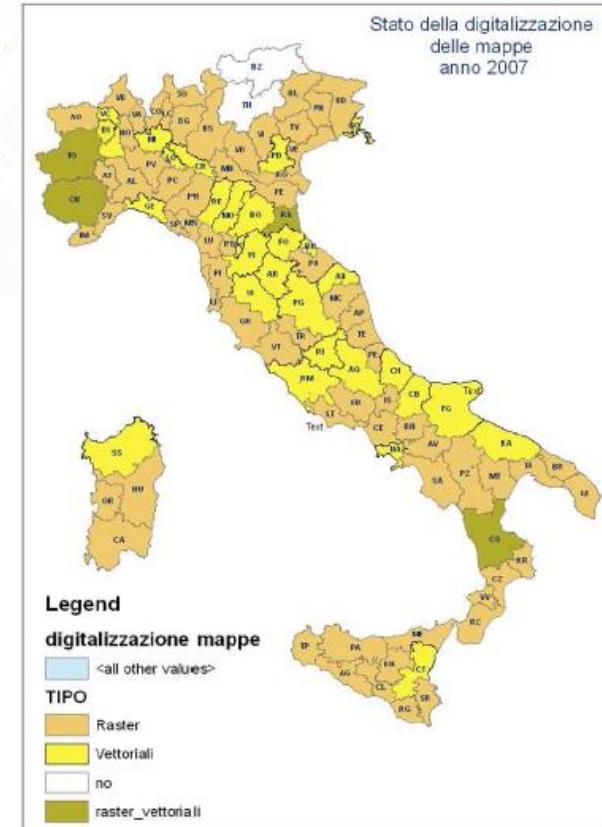
Furthermore...

Regions	provide medium scale cartography (1:5.000 – 1:10.000)
A.G.E.A. (Agency for agricultural subsidies)	provides aerial images (GSD 20 cm) – updating every 3 years over 1/3 national territory

GSD: Ground Sampling Distance

THE COMPUTERIZATION OF CADASTRAL CARTOGRAPHY

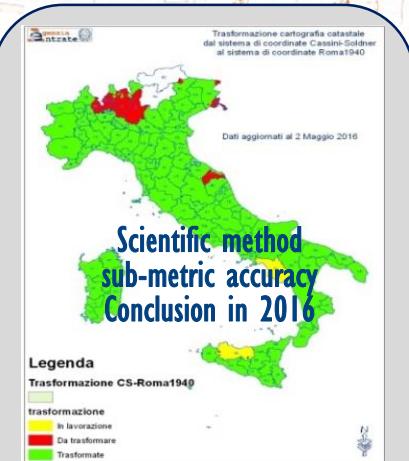
- Starting from 80's processes and rules for the digitalization of the maps were realized; precisely the digitalization of transparent plastic templates with prior updating from the paper copies
- At the end of 90's the situation was as shown in the picture beside: 30 provincial offices with vector format maps, 67 with paper maps, 4 with a mixed situation
- In 2000 the Italian Cadastre opted for using the paper copies in raster format digitized by A.G.E.A. that had used 100 dpi resolution roller scanner
- From 2000 to 2007 the cartographic system was managed in mixed format : totally vector in some offices, raster/vector in other ones
- In the years 2007/2008, for the operations related to «Buildings not declared to the Cadastre» operations, the digitalization of the maps, using paper copies raster images provided by A.G.E.A., was concluded



THE TRANSFORMATION of cadastral cartography in other national and global reference systems

1° Step:

From cadastral systems
to the national system
Roma1940



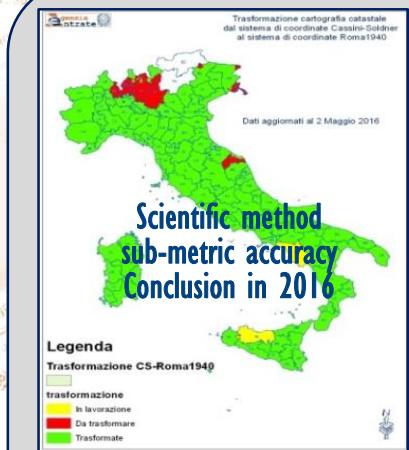
Roma1940
coordinate system

EFFECTS for Institutions

Cadastre-IGM joined service
about cadastral cartography
transformation

2° Step:

From the national system
Roma1940
to the global ETRF2000
In execution of European
Directive INSPIRE
D.P.C.M. 10.11.2011



ETRF2000
coordinate system

EFFECTS for Professionals

ETRF2000 map extracts

MILITARY GEOGRAPHIC INSTITUTE

Transformation matrix

THE CARTOGRAPHIC SYSTEM OF ITALIAN CADASTRE TODAY



It is complete and homogeneous all over the nation



It is based on high-scale maps
240.000 maps scale 1:2000
30.000 maps scale 1:1000
30.000 maps scale 1:4000



It's available in every coordinate systems in charge in Italy :
Cadastral (Cassini-Soldner) – National (Roma1940 Gauss-Boaga) - Global (WGS84 - ETRF2000). Furthermore is interoperable with all kind of geographic data external to the Cadastral field

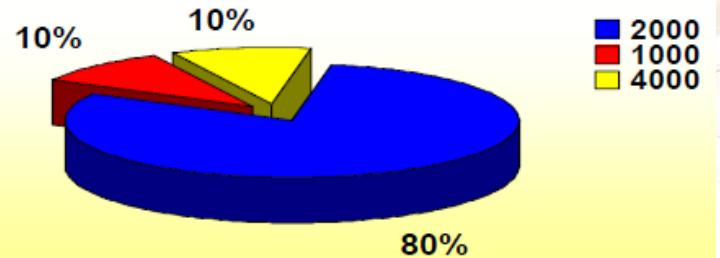


It is directly related to the administrative census DB of the Land Cadastre through a unique identifier: the parcel number



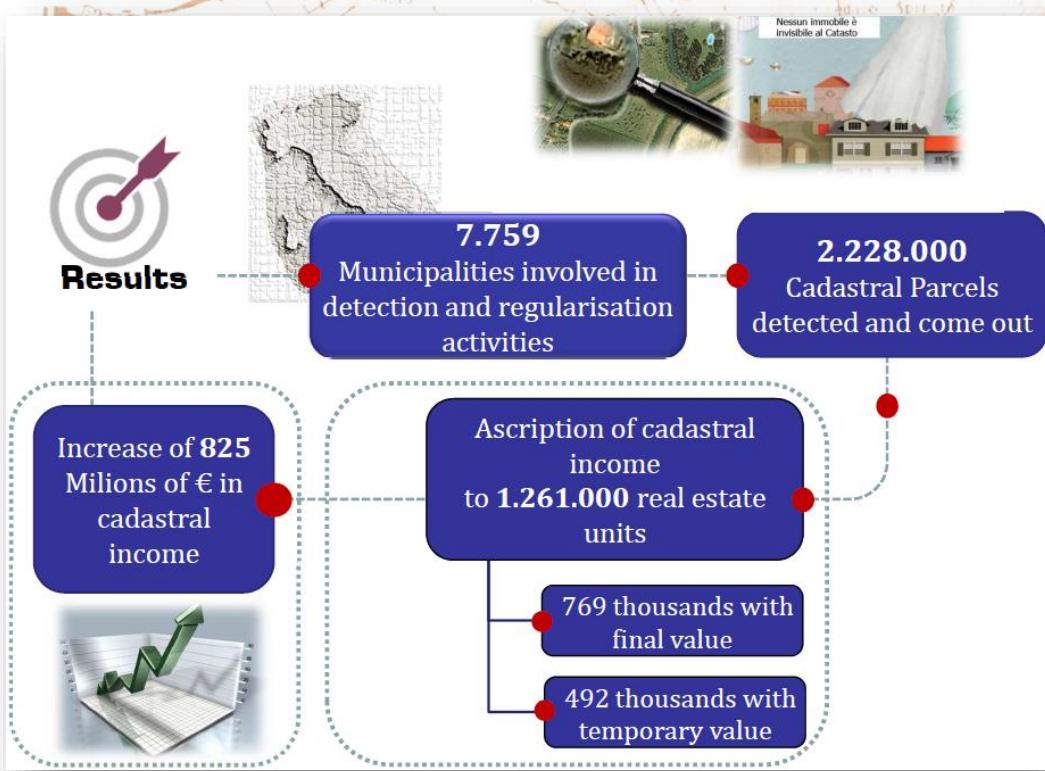
It is integrated with a high resolution ortho imagery (GSD 20 cm) and National road maps

It is totally managed in vector format

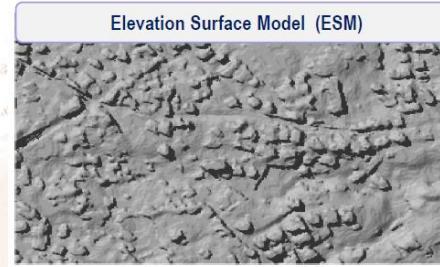


STRATEGICAL PROJECT BASED ON CADASTRAL CARTOGRAPHY FOR THE FIGHT AGAINST TAX EVASION

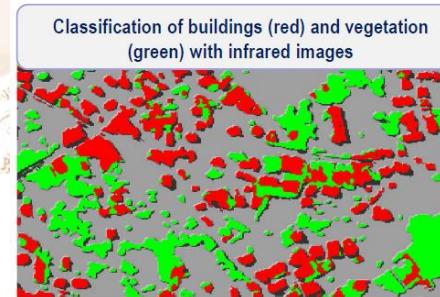
Automatic identification of buildings not declared to cadastre



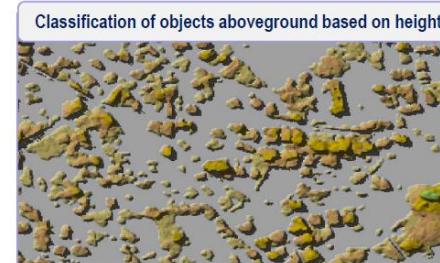
1



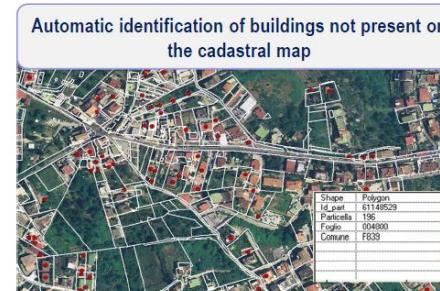
2



3



4



The OMI's Quotations DB based on cadastral cartography

Half-yearly the Observatory on Italian real estate market (OMI) processes and publishes the average market prices of sales and rentals for different buildings typologies (houses, offices, commercial, industrial) throughout the entire country. Buildings values are available, free of charge, through the Agency's web site in the OMI Quotation Database.

over 180.000 value quotations in:

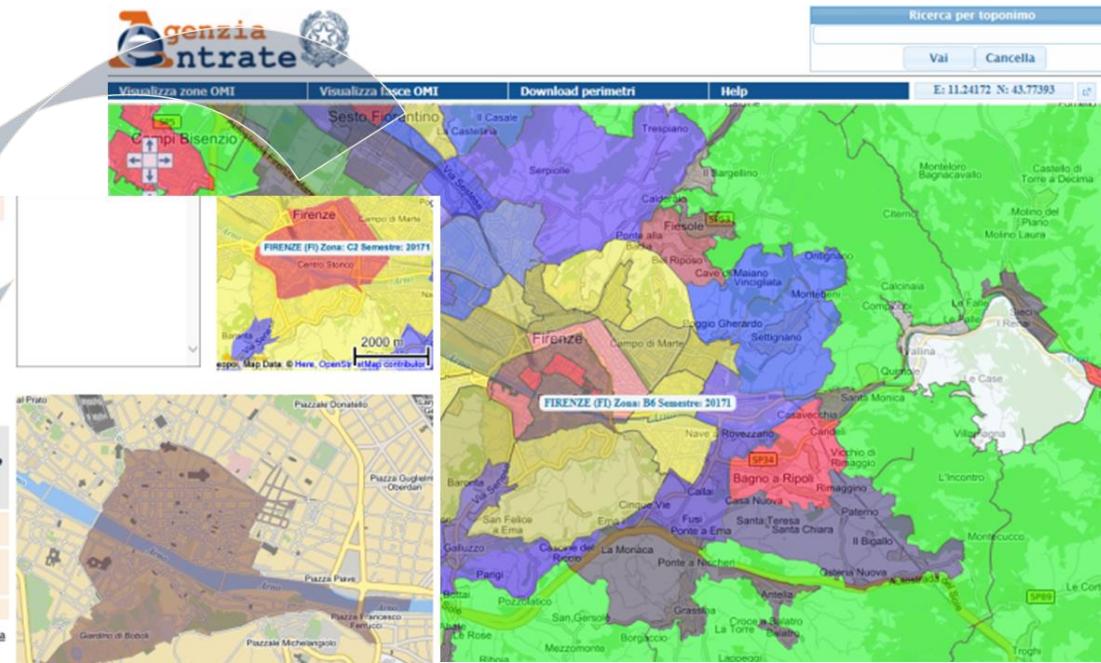
- 8.100 municipalities
- 31.000 homogenous zones
- 17 different building typologies

Banca dati delle quotazioni immobiliari - Risultato
Risultato interrogazione: Anno 2017 - Semestre 1

Provincia: FIRENZE
Comune: FIRENZE
Fascia/zona: Centrale/CENTRO STORICO (SIGNORIA - DUOMO - PITTI - SAN NICCOLO)
Codice zona: B5
Microzona: 0
Tipologia prevalente: Abitazioni civili
Destinazione: Residenziale

Tipologia	Stato conservativo	Valore Mercato (€/mq)		Superficie (L/N)	Valori Locazione (€/mq x mese)		Superficie (L/N)
		Min	Max		Min	Max	
Abitazioni civili	Normale	3300	4700	L	9.9	14.2	N
Abitazioni di tipo economico	Normale	2600	4100	L	8.7	12.6	N
Box	Normale	3100	4600	L	12.4	18.5	N

Stampa **Legenda**



About 5 million quotations consulted yearly



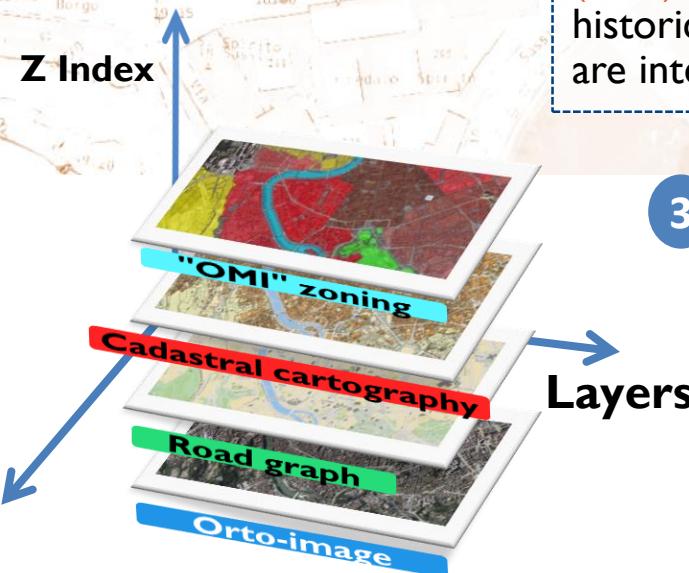
THE INTEGRATED LAND INFORMATION SYSTEM – SIT (Sistema Integrato del Territorio)

CATASTO CENSUARO CATASTO GEOMETRICO OMISE ANAGRAFE DEI TITOLARI

HOME

1

SIT is an evolution of the current cadastral cartographic system, a modern web GIS



5

SIT goes beyond the current system based on the separation of all the archives (Cartography, Census DBs, Plans) and on a web-architecture spread on 101 AdE Provincial Offices

2

SIT is part of a wider project for the implementation of the **Integrated Real Estate Register** (A.I.I.). The data managed historically in different systems are integrated in this system

3

In the **Integrated Real Estate Register** the whole AdE information asset is unified into one national system whose elements are conveniently integrated each other

4

SIT allows the geo-based data surfing and search of all the information managed by the AdE, the spatial analysis and the integration with other data external to the cadastral domain



THE INTEGRATED LAND INFORMATION SYSTEM – SIT

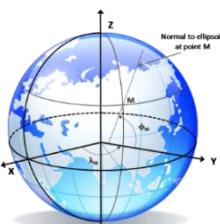
FEATURES



- **Single cadastral database**, no longer divided into cartography, land and urban census archives
- **Geo-referred information**, cartographic objects (parcel, building, road, water, etc.)



- **Management of the building** as an **autonomous cadastral entity**, represented by its attributes and its life cycle, subject to specific updating rules



- **Cadastral entities** also represented in a single reference system, the **WGS84-ETRF2000**, in compliance with the European directives
- **Cadastral cartography** structured in the data model of the **persistent topology** (topological relationships between the territorial objects stored directly in the datum)

EVOLUTION OF THE ITALIAN CADASTRAL CARTOGRAPHIC SYSTEM:
the online dynamic search and surfing



THE INTEGRATED LAND INFORMATION SYSTEM – SIT

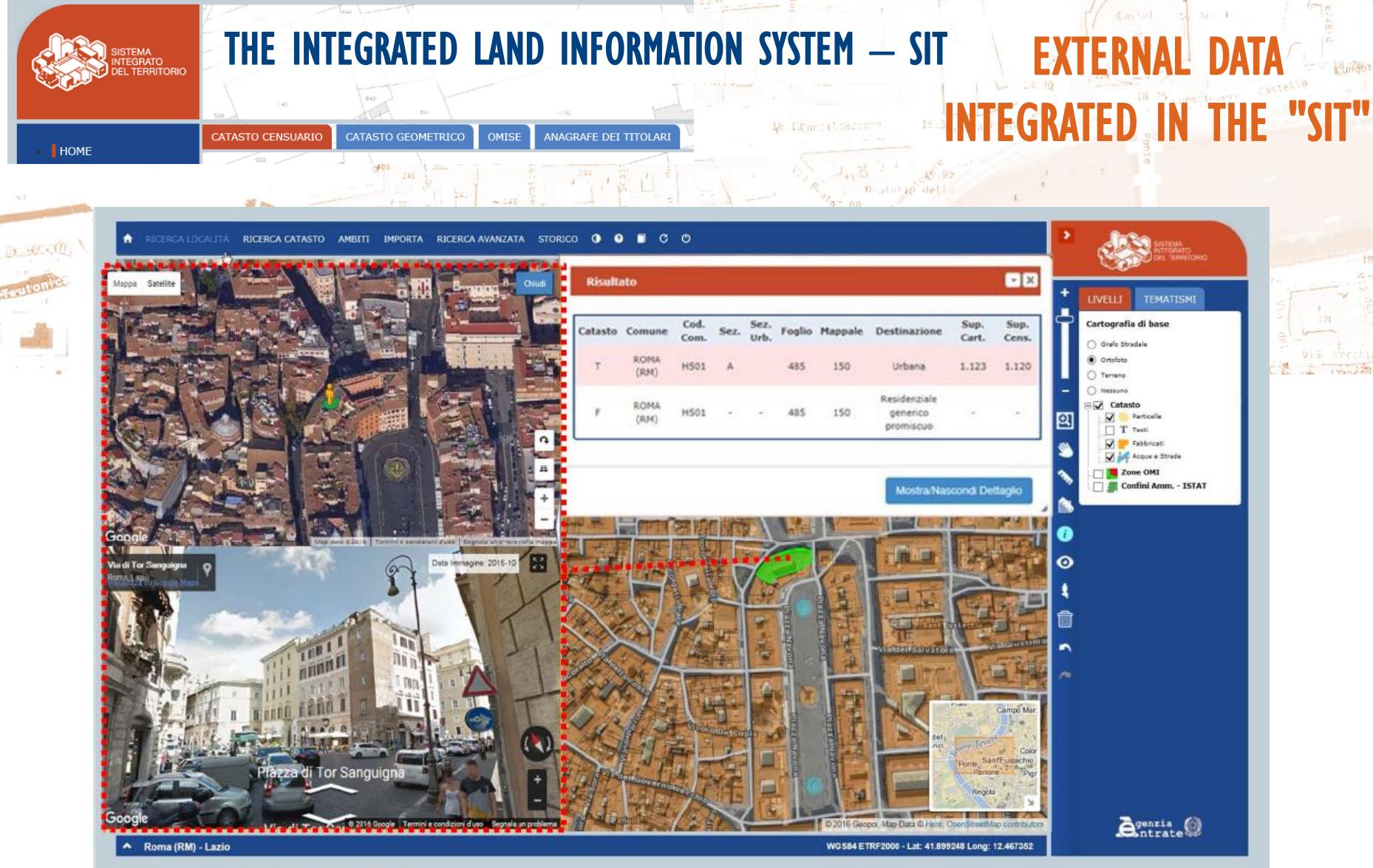
SURFING AND SEARCH

Exact searching by address (e.g. Rome – Venti Settembre street)

List of buildings

Elenco Fabbricati

#	Toponimo	N. CIV.
1	VIA VENTI SETTEMBRE	A
2	VIA VENTI SETTEMBRE	A94
3	VIA VENTI SETTEMBRE	B
4	VIA VENTI SETTEMBRE	D
5	VIA VENTI SETTEMBRE	DA90
6	VIA VENTI SETTEMBRE	E
7	VIA VENTI SETTEMBRE	G
8	VIA VENTI SETTEMBRE	SC
9	VIA VENTI SETTEMBRE	SNC
10	VIA VENTI SETTEMBRE	I
11	VIA VENTI SETTEMBRE	3
12	VIA VENTI SETTEMBRE	5
13	VIA VENTI SETTEMBRE	6



THE INTEGRATED LAND INFORMATION SYSTEM – SIT

**EXTERNAL DATA
INTEGRATED IN THE "SIT"**

The image shows the SIT (Integrated Land Information System) interface. At the top, there is a navigation bar with a red logo for "SISTEMA INTEGRATO DEL TERRITORIO" and a blue "HOME" button. Below the navigation bar, there are tabs for "CATASTO CENSUARIO", "CATASTO GEOMETRICO", "OMISE", and "ANAGRAFE DEI TITOLARI". The main content area displays a map of a city street with various data layers. On the left, there is a satellite view of the same area. Below the satellite view, there is a street view image of "Piazza di Tor Sanguigna" in Rome. On the right, there is a detailed map of the area with specific data layers highlighted. A sidebar on the right contains a legend for "LIVELLI" (Levels) and "TEMATISMI" (Thematics), showing various categories like "Cartografia di base", "Catasto", and "Zone OMIS". The bottom right corner of the interface features the "agenzia entrate" logo.

EVOLUTION OF THE ITALIAN CADASTRAL CARTOGRAPHIC SYSTEM:
the online dynamic search and surfing

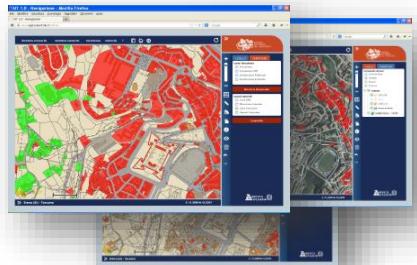


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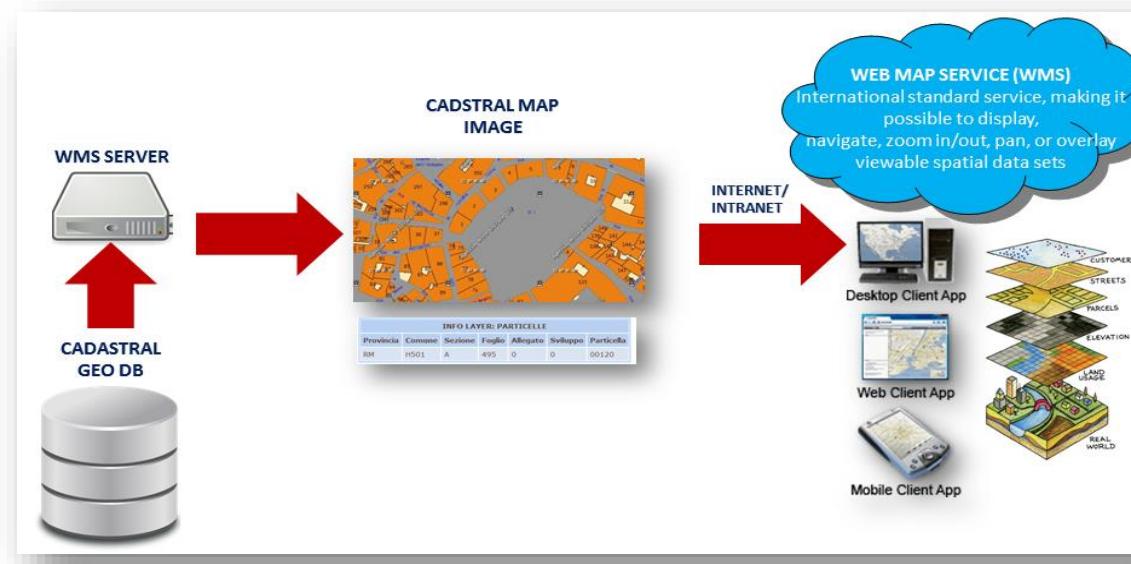
Interoperability services
concerning Cadastral Cartography

Evolution of the Italian Cadastral Cartographic System: WMS Service

Disposition of the General Director of AdE 23th November 2017 n. 271542



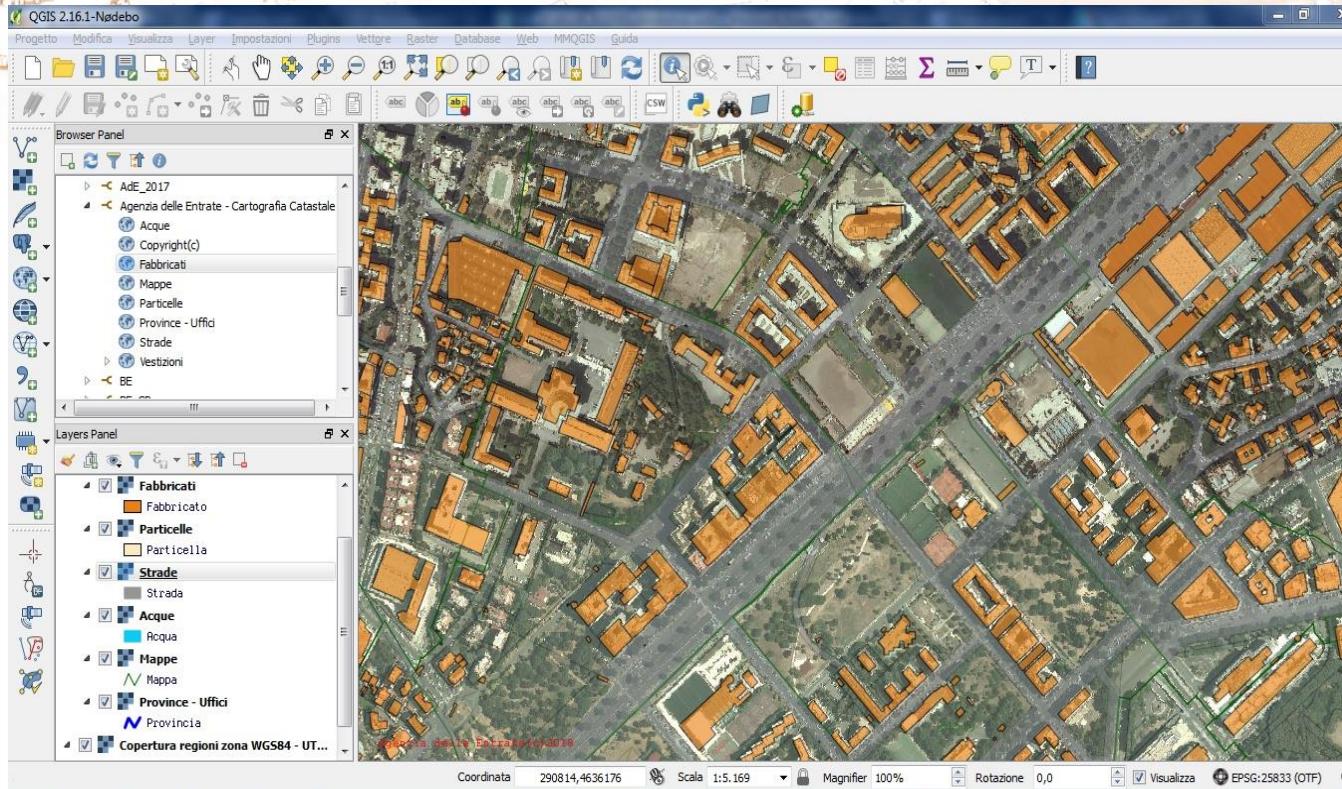
Implementation of the Italian Legislative Decree 27th January 2010 n. 32, concerning the establishment of an Infrastructure for Spatial Information in the European Community (INSPIRE). View services of parcels data sets.



INTEGRATED VIEW

Cadastral Maps (WMS Service – Agenzia delle Entrate)

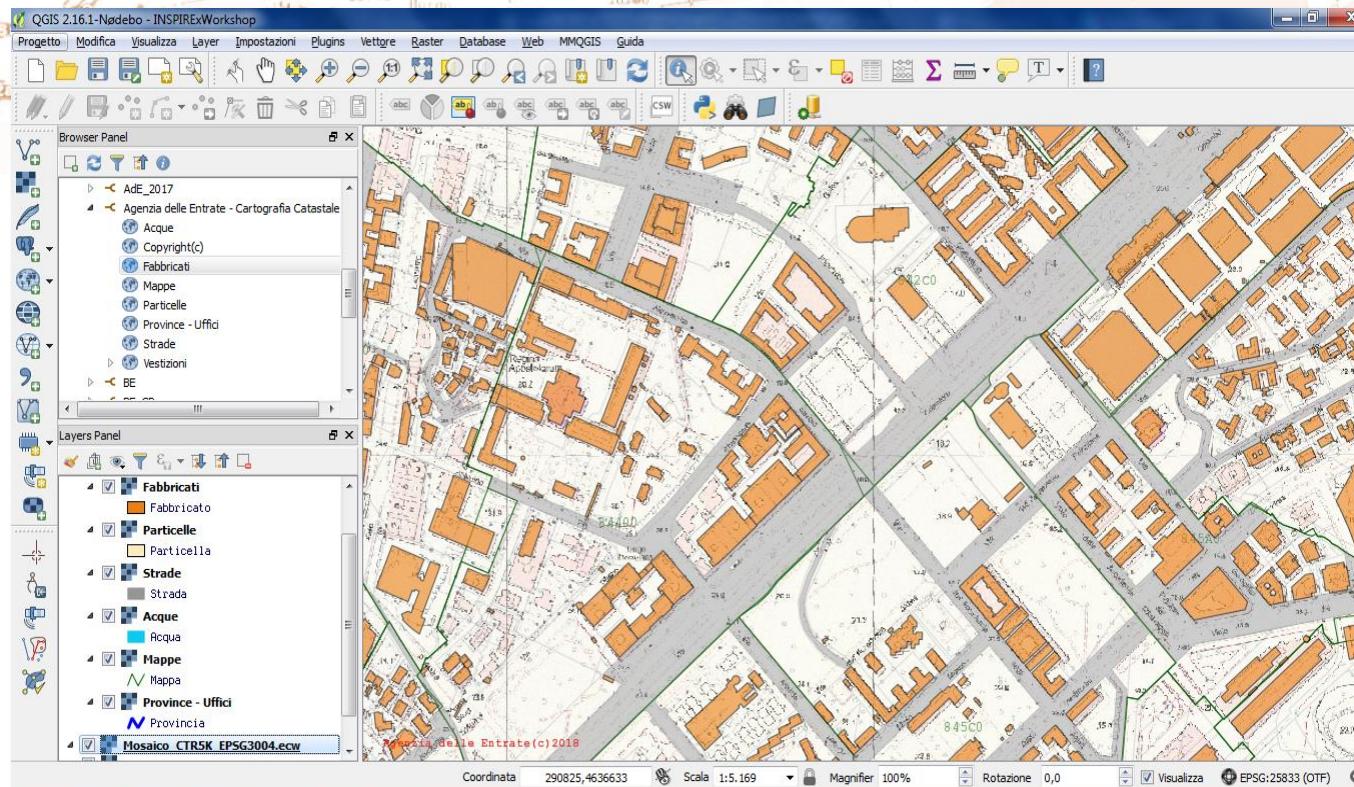
Ortho-Images (WMS Services - Ministry of the Environment and Protection of Land and Sea)



INTEGRATED VIEW

Cadastral Maps (WMS Service – Agenzia delle Entrate)

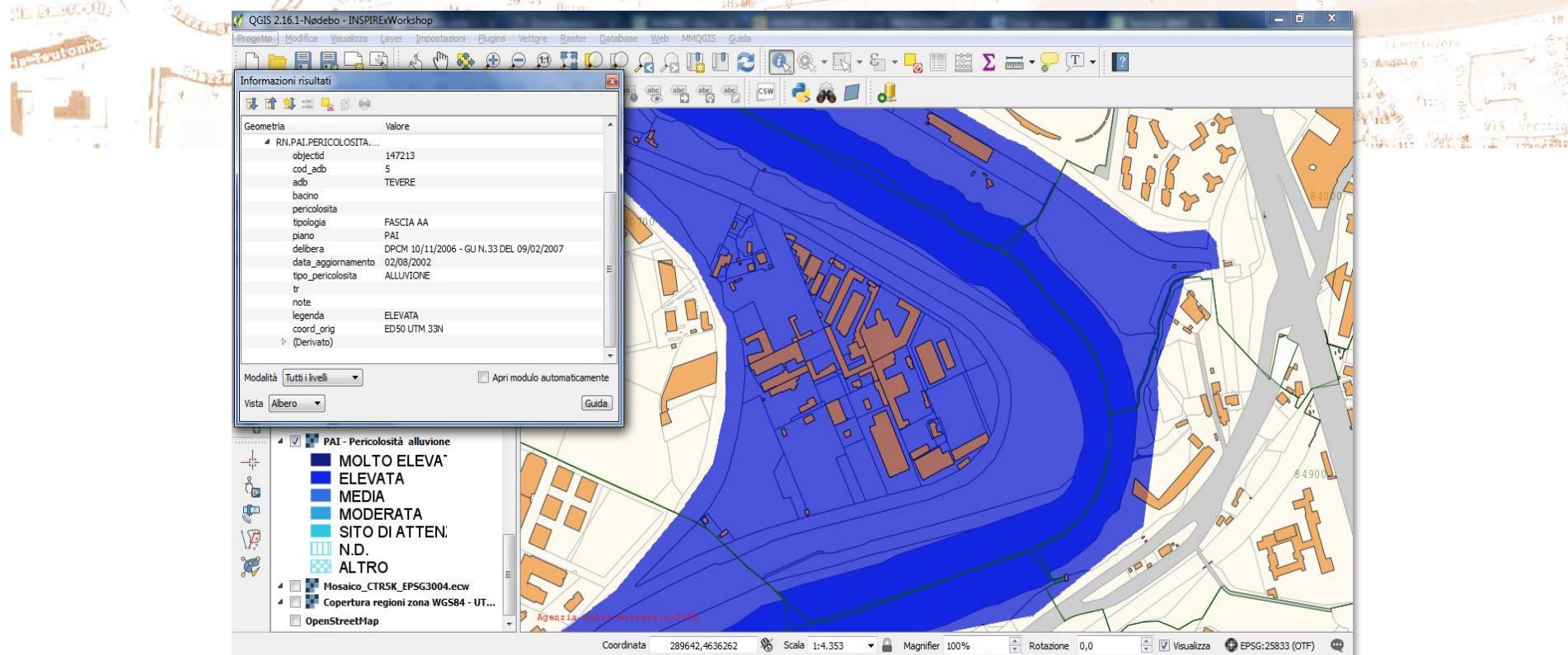
Regional Technical Maps (WMS Services – Lazio Region)



INTEGRATED VIEW

Cadastral Maps (WMS Service – Agenzia delle Entrate)

Flood dangerousness Maps (WMS Services - Ministry of the Environment and Protection of Land and Sea)



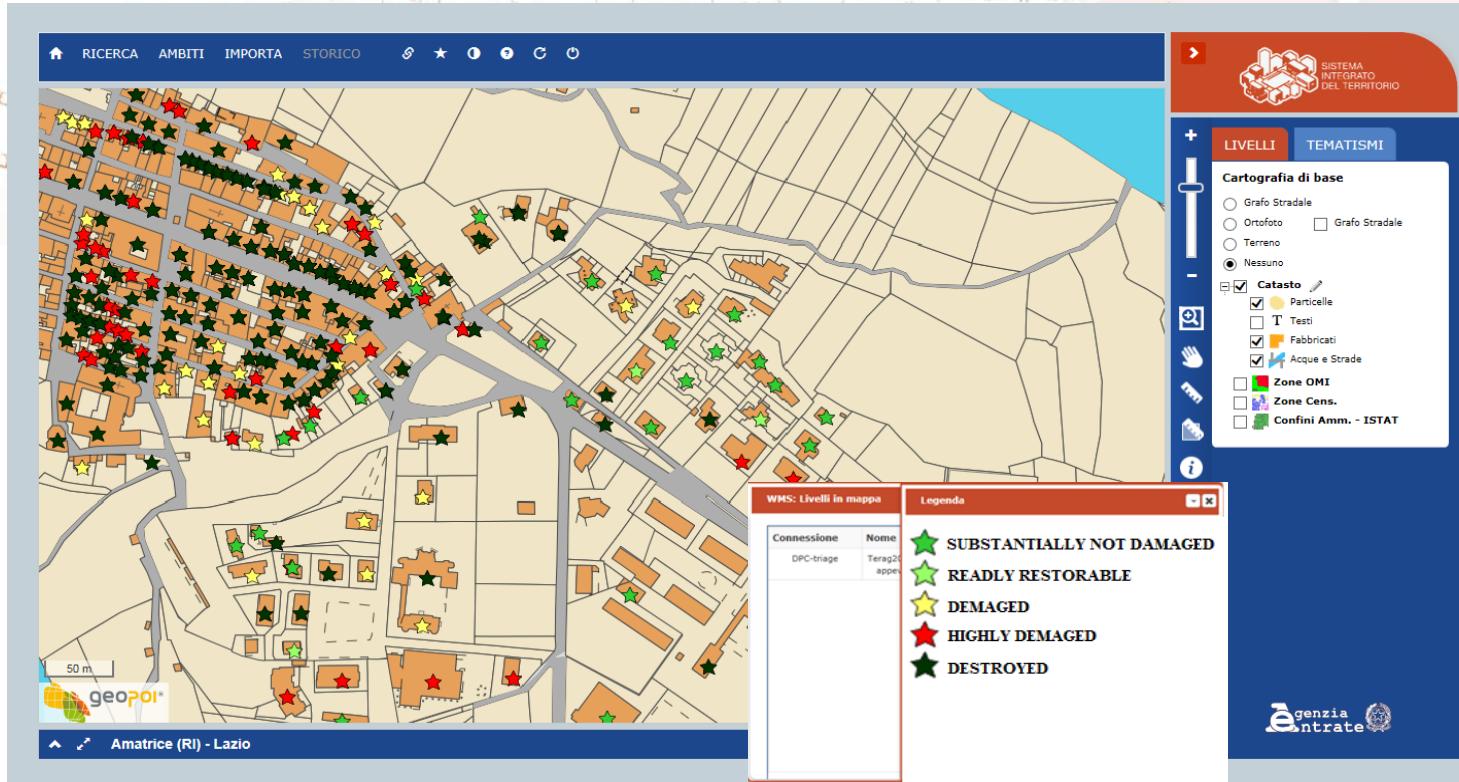
WMS SERVICES OF OTHER ADMINISTRATIONS IN THE "SIT"

The damages caused by the earthquake in Central Italy – The 2016 and 2017



WMS SERVICES OF OTHER ADMINISTRATIONS IN THE "SIT"

Thematic representation of damages caused by the earthquake in Central Italy – The 2016 and 2017 data coming from the Civil Protection



Service used to make more efficient the AdE cadastral activities



The Emergency Management Service «Copernicus» and the cadastral cartography of the Agency

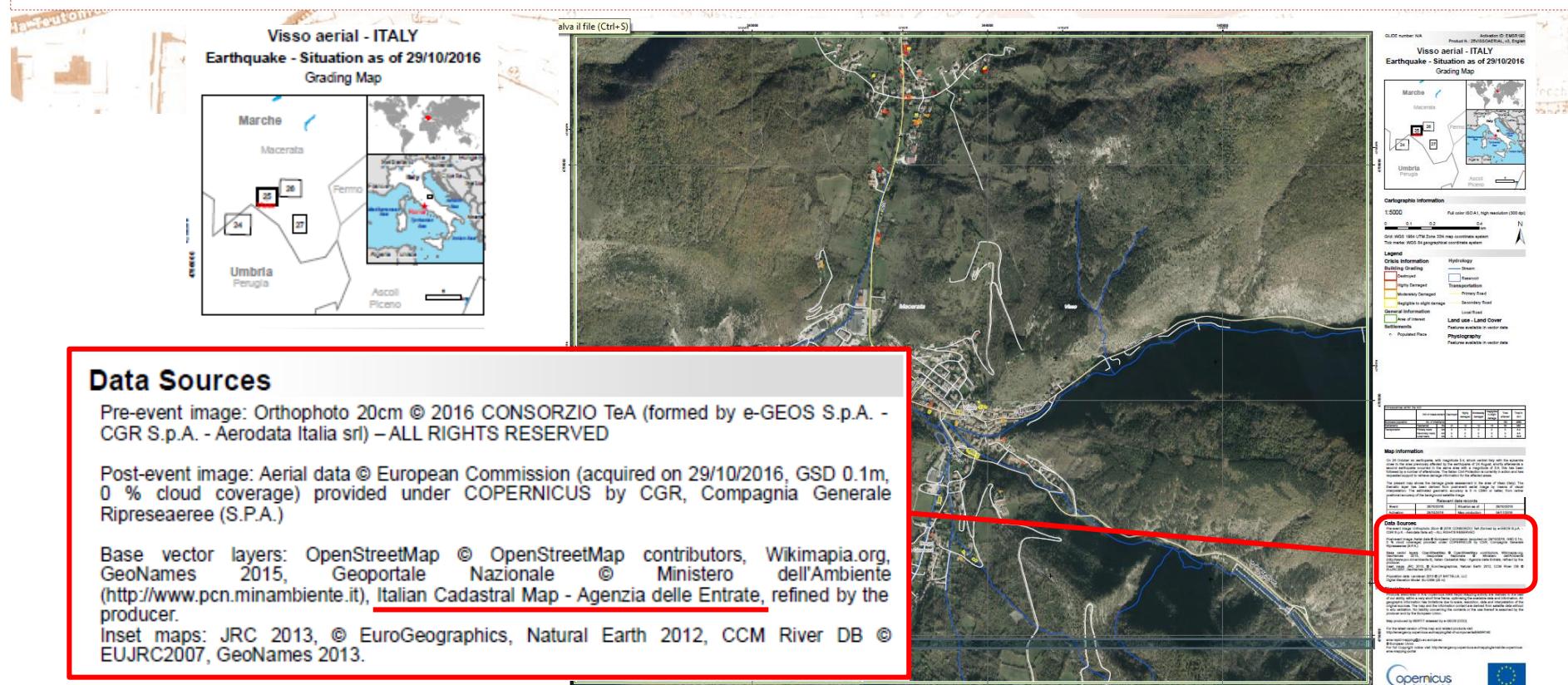
- After the **earthquakes in the Central Italy**, the **Civil Protection Department** has set up the «**Copernicus**» service making available the wrecked buildings maps to estimate the **damage** through satellite images
- The «**Copernicus**» programme has chosen the **cadastral cartography of Agenzia delle Entrate** for the thematic representation of damages caused by the earthquake. Information related to the **damages caused to the buildings** by the earthquake is reported directly **on the cadastral cartographic base** of the area affected by the event
- The Agency data base is, in fact, an **official large scale cartography**, continuously updated and immediately available in the whole national territory, also through interoperability services between Public Administrations
- The **damages estimate** service is carried out through the work of several operators who visually evaluate the **damage** and its **severity**, by watching the satellite images captured to this purpose

The Emergency Management Service «Copernicus» and the cadastral cartography of the Agency

Earthquake in Central Italy – 30th October 2016 – Visso Municipality (MC)

The images and data resulting from the processing can be consulted and downloaded free of charge from the website of Copernicus Emergency Management Service:

<http://emergency.copernicus.eu/mapping/list-of-components/EMSR190>



Data Sources

Pre-event image: Orthophoto 20cm © 2016 CONSORZIO TeA (formed by e-GEOS S.p.A. - CGR S.p.A. - Aerodata Italia srl) – ALL RIGHTS RESERVED

Post-event image: Aerial data © European Commission (acquired on 29/10/2016, GSD 0.1m, 0 % cloud coverage) provided under COPERNICUS by CGR, Compagnia Generale Riprese Aeree (S.p.A.)

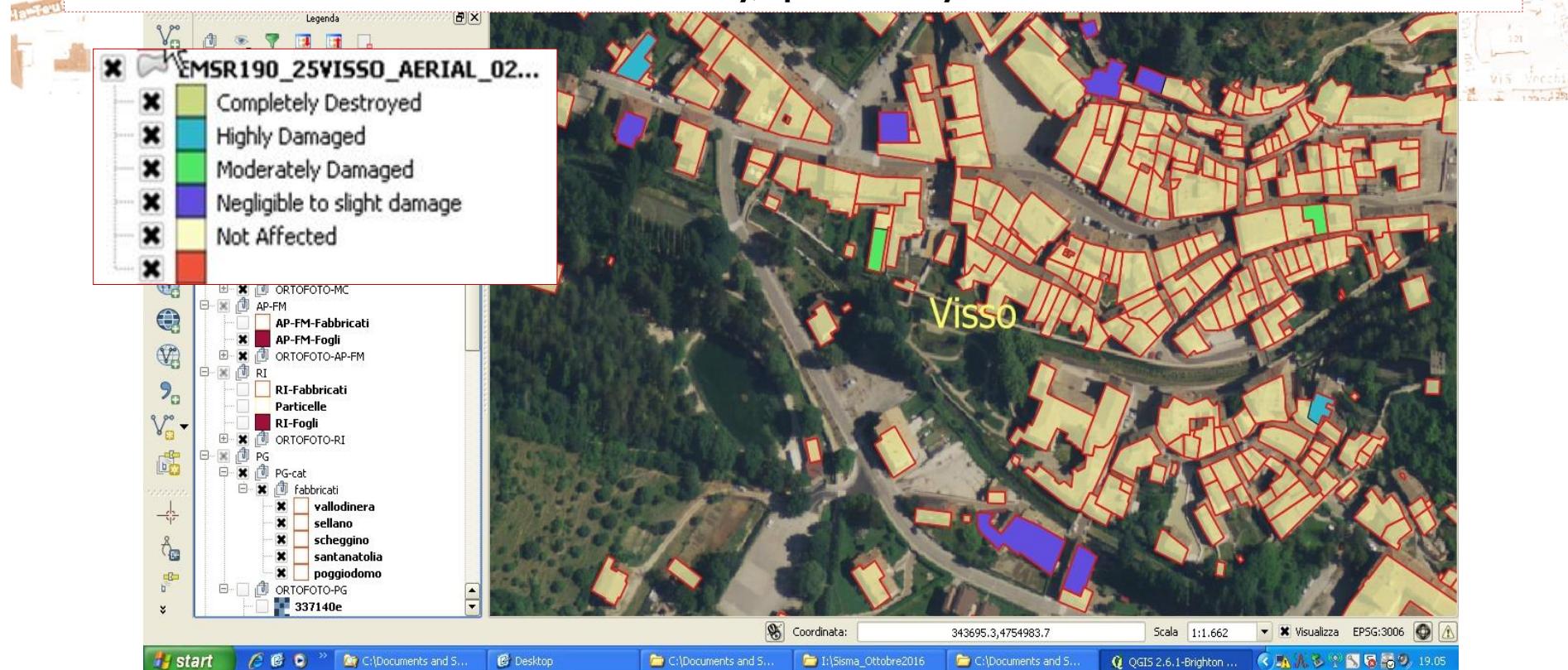
Base vector layers: OpenStreetMap © OpenStreetMap contributors, Wikimapia.org, GeoNames 2015, Geoportale Nazionale © Ministero dell'Ambiente (<http://www.pcn.minambiente.it>), Italian Cadastral Map - Agenzia delle Entrate, refined by the producer.

Inset maps: JRC 2013, © EuroGeographics, Natural Earth 2012, CCM River DB © EUJRC2007, GeoNames 2013.

The Emergency Management Service «Copernicus» and the cadastral cartography of the Agency

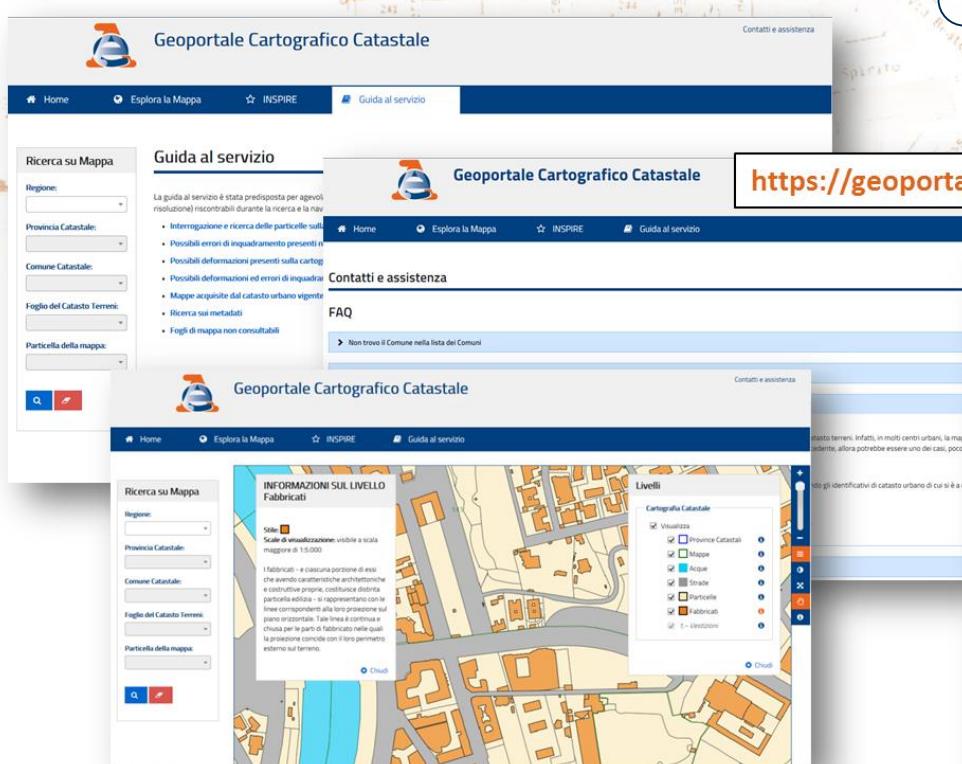
Earthquake in Central Italy – 30th October 2016 –Visso Municipality (MC)

«Copernicus» has chosen the cadastral cartography for the thematic representation of damages caused by the earthquake because it is accurate, large-scale, interoperable, available throughout the territory, updated daily



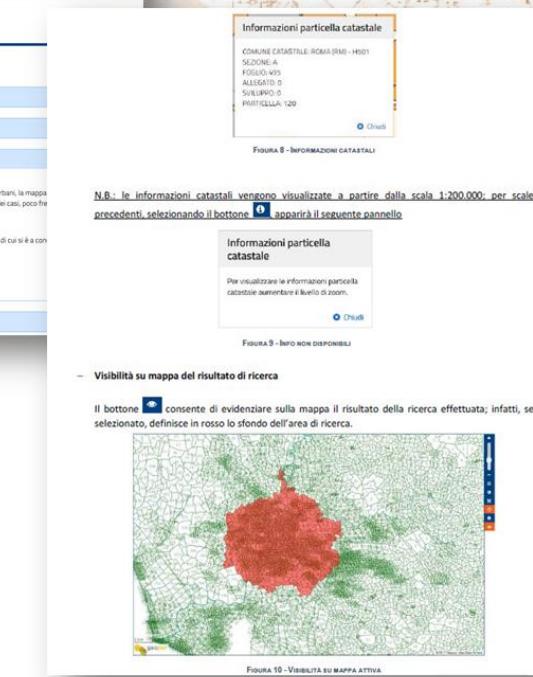
SEARCH AND SURFING SERVICES REGARDING CADASTRAL CARTOGRAPHY

The CADASTRAL CARTOGRAPHIC GEO-PORTAL



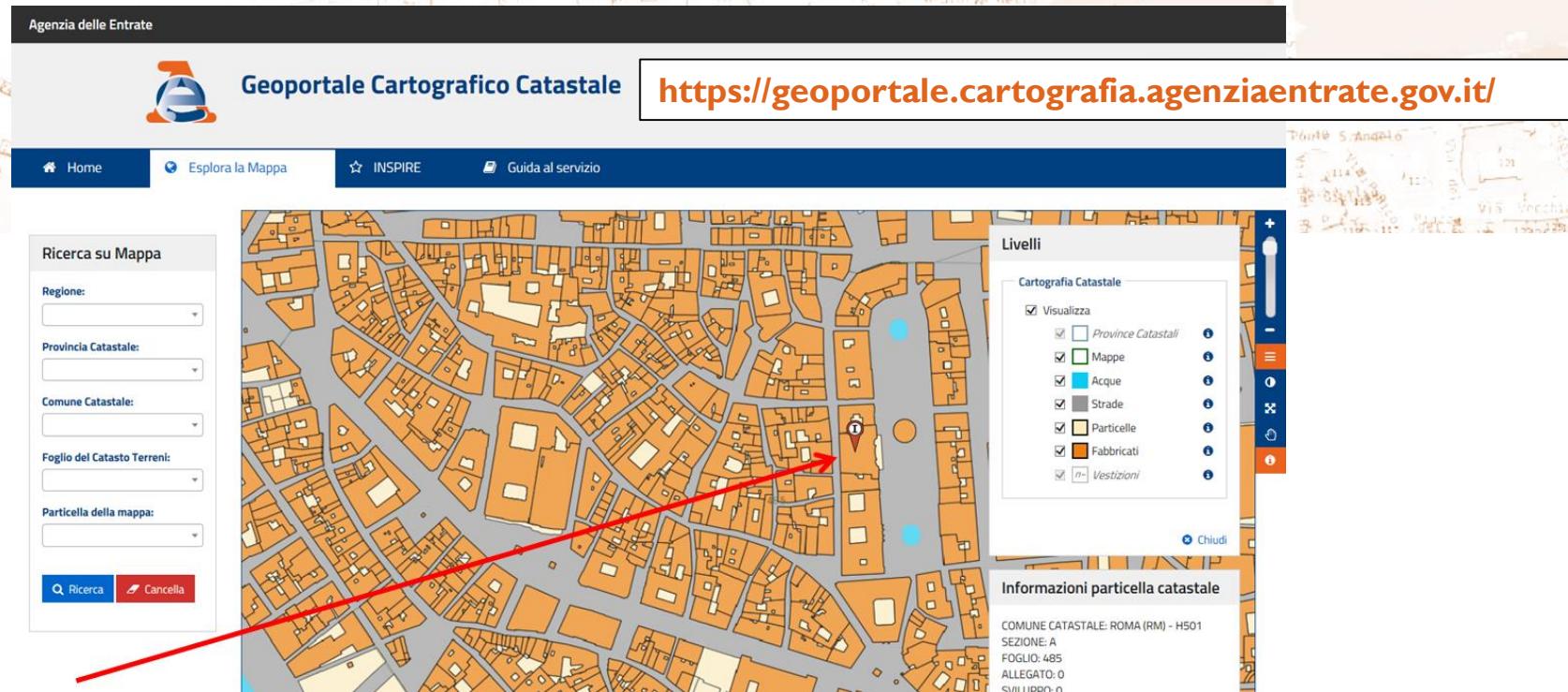
The CADASTRAL CARTOGRAPHIC GEO-PORTAL service is available for the whole national territory, except for the municipalities in which the cadastre is managed, by delegation of the State, by the autonomous provinces of Trento and Bolzano

<https://geoportale.cartografia.agenziaentrate.gov.it/>



SEARCH AND SURFING SERVICES REGARDING CADASTRAL CARTOGRAPHY

The CADASTRAL
CARTOGRAPHIC GEO-PORTAL



The geo-portal allows the search of a single cadastral parcel and its view on the cadastral map, for the whole national territory (except for the territory managed by the autonomous provinces of Trento and Bolzano)

EVOLUTION OF THE ITALIAN CADASTRAL CARTOGRAPHIC SYSTEM: *the online dynamic search and surfing*

Marco SELLERI

Director
for Cadastral, Cartographic and Land
Registration Services



Many thanks for
your kind attention