



Look Ahead:  
2019 General Assembly



## EuroGeographics General Assembly 2019 “The National Response”

Manchester, Great Britain, 7<sup>th</sup> October 2019



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

**Marco SELLERI**

Director

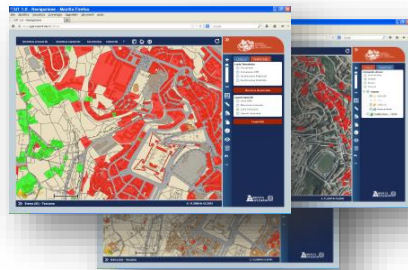
for Cadastral, Cartographic and Land Registration Services



[www.agenziaentrate.gov.it](http://www.agenziaentrate.gov.it)  
[dc.sccpi@agenziaentrate.it](mailto:dc.sccpi@agenziaentrate.it)

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

## Agenda



**The Italian Cadastral  
Cartography**

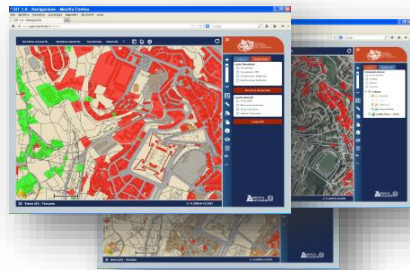


**Interoperability services  
concerning Cadastral Cartography**



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

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**The Italian Cadastral  
Cartography**



**Interoperability services  
concerning Cadastral Cartography**

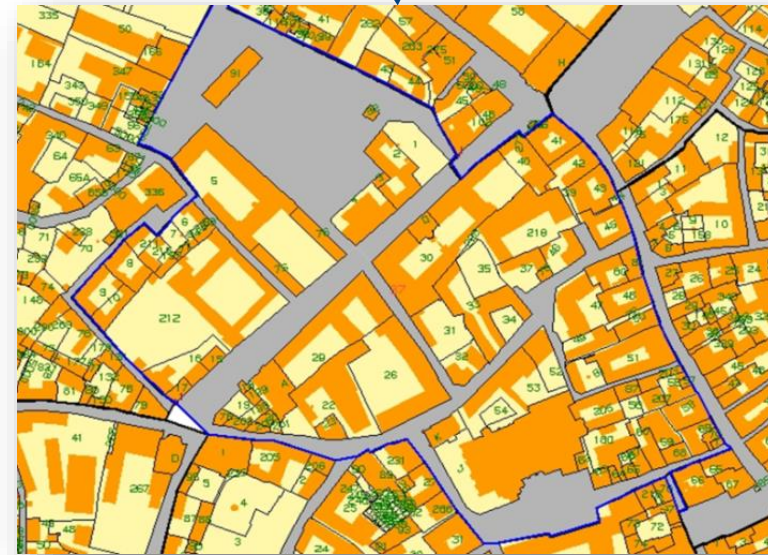
## The Italian Cadastral Cartography



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

1	I.G.M.	Military Geographic Institute	Small scale cartography	1:25.000 – 1:1.000.000	Military bodies
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.

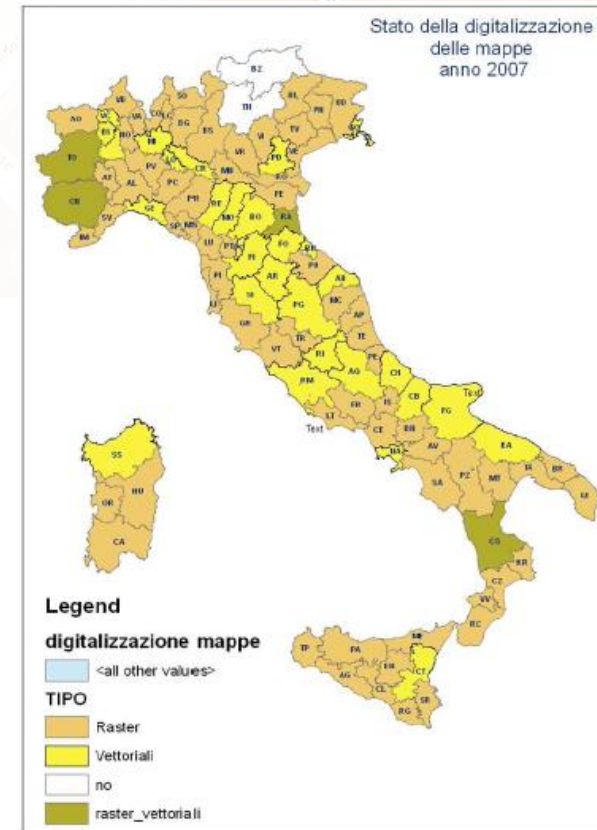
(Agency for agricultural subsidies)

provides aerial images (GSD 20 cm) – updating every 3 years over 1/3 national territory

GSD: Ground Sampling Distance

### THE COMPUTERIZATION OF CADASTRAL CARTOGRAPHY

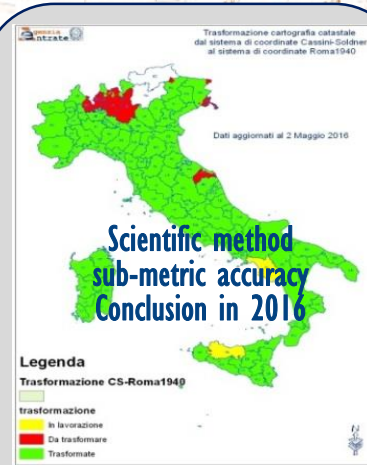
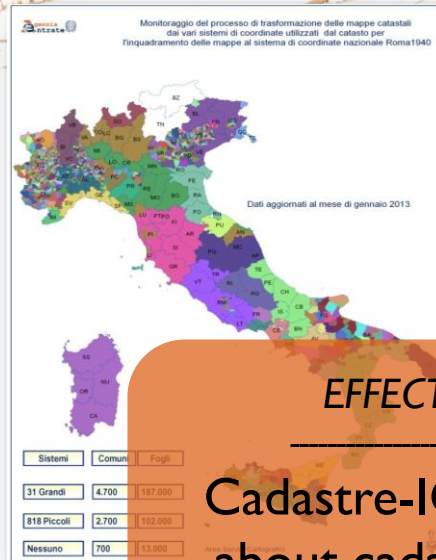
- **Starting from 80's** processes and rules for the digitalization of the maps were realized; precisely the digitalization of transparent plastic templates with prior updating from the paper copies
- **At the end of 90's** the situation was as shown in the picture beside: 30 provincial offices with 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 Italian Cadastral Cartography

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

1° Step:  
From cadastral systems  
to the national system  
Roma1940

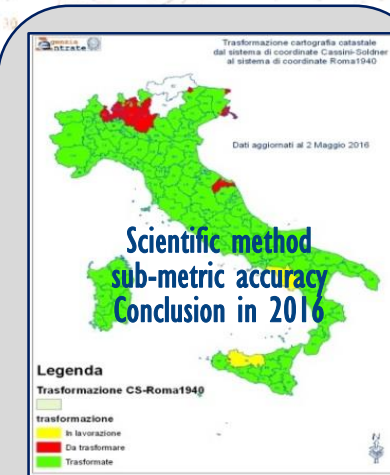


Roma1940  
coordinate system

*EFFECTS for Institutions*

Cadastral-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





# THE CARTOGRAPHIC SYSTEM OF ITALIAN CADASTRE TODAY

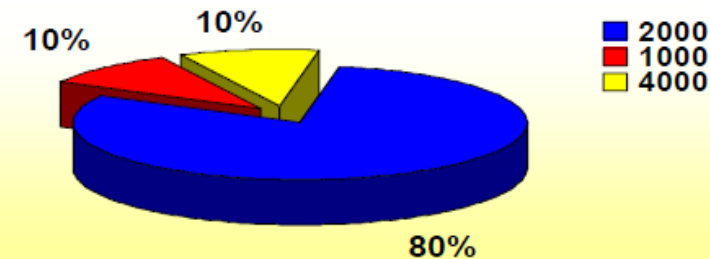


**It is complete and homogeneous  
all over the nation**



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

**It is totally managed in  
vector format**



**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**

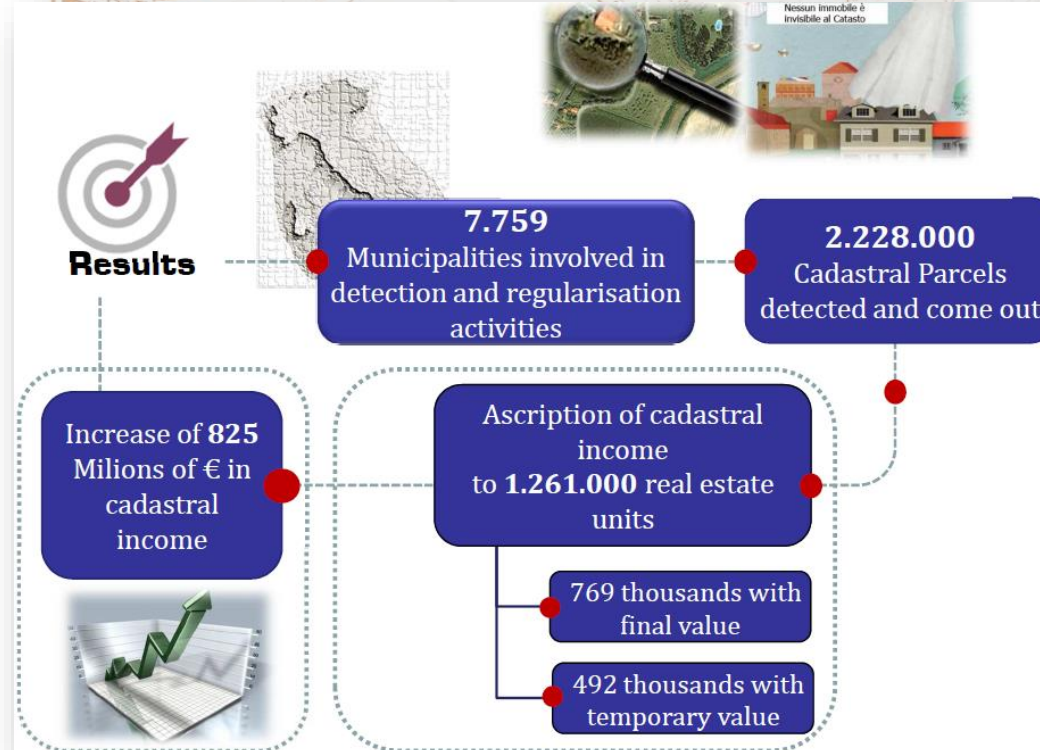


**It is integrated with a high resolution ortho imagery (GSD 20 cm) and National  
road maps**



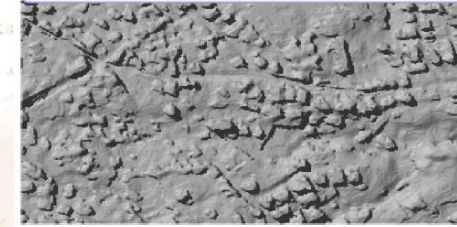
## STRATEGICAL PROJECT BASED ON CADASTRAL CARTOGRAPHY FOR THE FIGHT AGAINST TAX EVASION

Automatic identification of buildings not declared to cadastre



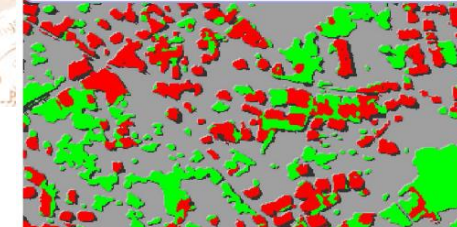
1

Elevation Surface Model (ESM)



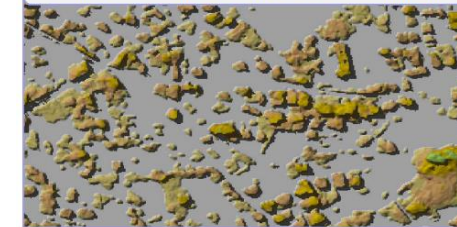
2

Classification of buildings (red) and vegetation (green) with infrared images



3

Classification of objects aboveground based on height



4

Automatic identification of buildings not present on the cadastral map



## 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 - PITTÌ - SAN NICCOLO)

Codice zona: B5

Microzona: 0

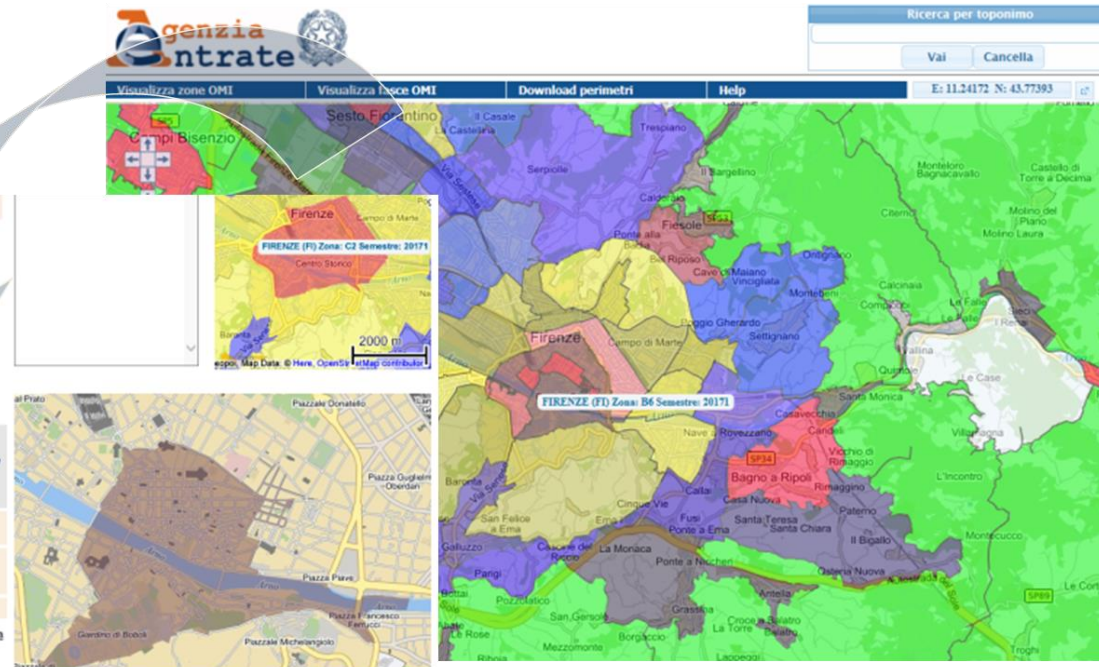
Tipologia prevalente: Abitazioni civili

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	2800	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 CENSUARIO CATASTO GEOMETRICO OMISE ANAGRAFE DEI TITOLARI

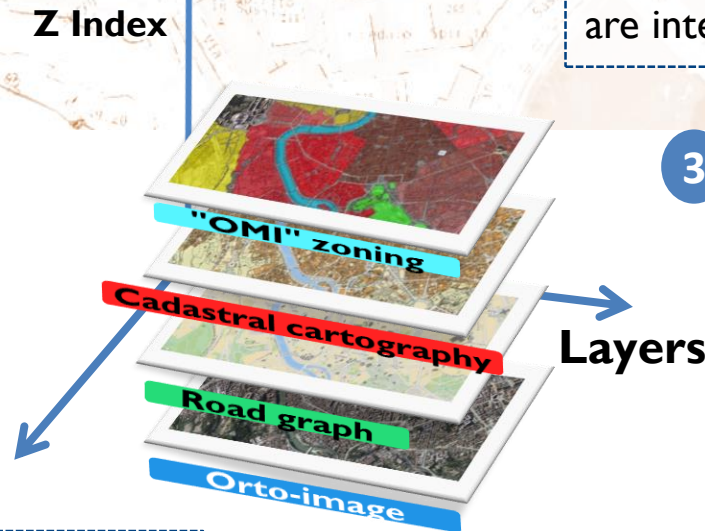
1 **SIT** is an evolution of the current cadastral cartographic system, a modern web GIS

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

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

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

CATASTO CENSUARIO

CATASTO GEOMETRICO

OMISE

ANAGRAFE DEI TITOLARI

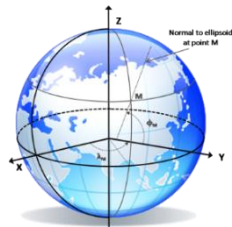
HOME



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



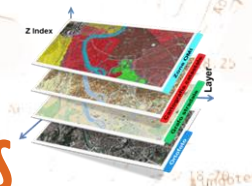
- **Management of the building** as an **autonomous cadastral entity**, represented by its attributes and its life cycle, subject to specific updating rules



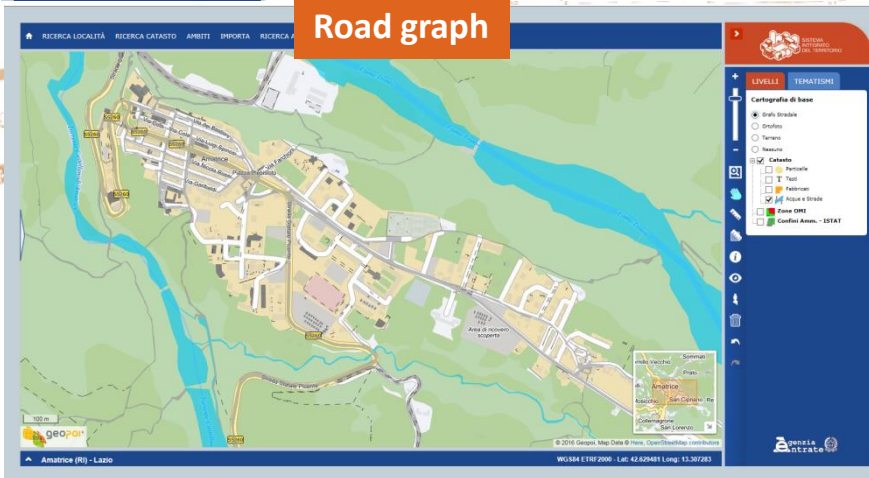
- **Cadastral entities** also represented in a single reference system, the **WGS84-ETRF2000**, in compliance with the European directives
- **Cadastral cartography** structured in the data model of the **persistent topology** (topological relationships between the territorial objects stored directly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



**LAYERS**



**Road graph**



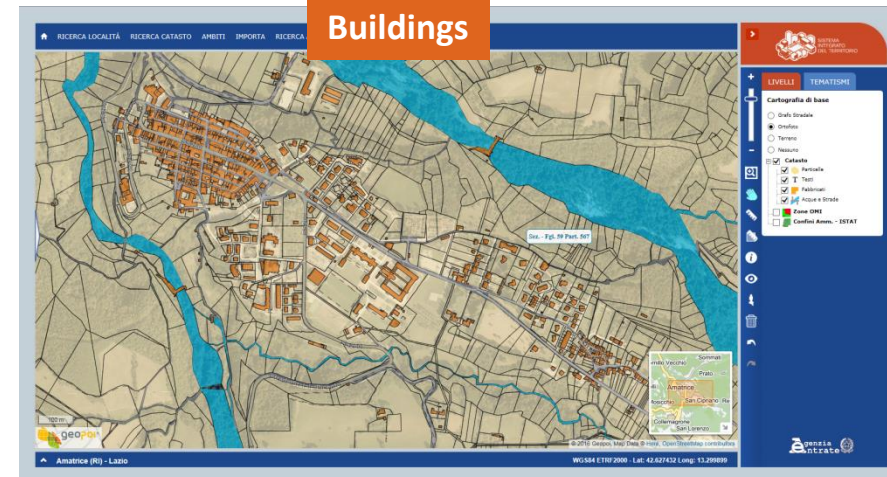
**Parcels**



**Ortophoto**



**Buildings**







## THE INTEGRATED LAND INFORMATION SYSTEM — SIT

**SURFING AND  
SEARCH**

HOME CATASTO CENSUARIO CATASTO GEOMETRICO OMISE ANAGRAFE DEI TITOLARI

https://sit.agenziaentrate.it/sit/nav SIT - Navigazione

File Modifica Visualizza Preferiti Strumenti ?

RICERCA LOCALITÀ **RICERCA CATASTO** AMBITI IMPORTA RICERCA AVANZATA STORICO

ROMA (RM) ROMA VIA VIA VENTI SETTEMBRE VAI

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	1
11	VIA VENTI SETTEMBRE	3
12	VIA VENTI SETTEMBRE	5
13	VIA VENTI SETTEMBRE	6

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

WG584 ETRF2000 - Lat: 41.904308 Long: 12.508304





## THE INTEGRATED LAND INFORMATION SYSTEM — SIT

EXTERNAL DATA  
INTEGRATED IN THE "SIT"

HOME CATASTO CENSUARIO CATASTO GEOMETRICO OMISE ANAGRAFE DEI TITOLARI

Ricerca Località Ricerca Catasto Ambiti Importa Ricerca Avanzata Storico

Mappe Satellite

**Risultato**

Catasto	Comune	Cod. Com.	Sez.	Sez. Urb.	Foglio	Mappale	Destinazione	Sup. Cart.	Sup. Cens.
T	ROMA (RM)	HS01	A		485	150	Urbana	1.123	1.120
F	ROMA (RM)	HS01	-	-	485	150	Residenziale generico promiscuo	-	-

Mostra/Nascondi Dettaglio

Google

Via di Tor Sanguigna  
Roma, Lazio  
Data immagine: 2015-10

Piazza di Tor Sanguigna

Google

© 2016 Google. Termini e condizioni d'uso. Segnala un problema.

Roma (RM) - Lazio

WG584 ETRF2000 - Lat: 41.899248 Long: 12.467382

**LIVELLI** **TEMATISMI**

Cartografia di base

- ☐ Griglia Stradale
- ☒ Ortofoto
- ☐ Terreno
- ☐ Nessuno

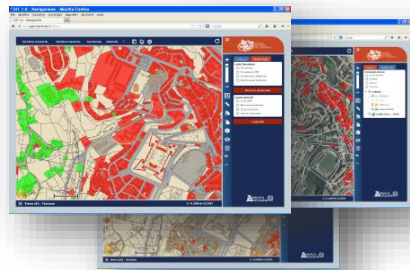
**Catasto**

- ☒ Particelle
- ☒ T. Tetti
- ☒ Fabbricati
- ☒ Acque e Strade
- ☐ Zone OMI
- ☐ Confini Amm. - ISTAT

agenzia entrate

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

## Agenda



### The Italian Cadastral Cartography



### Interoperability services concerning Cadastral Cartography

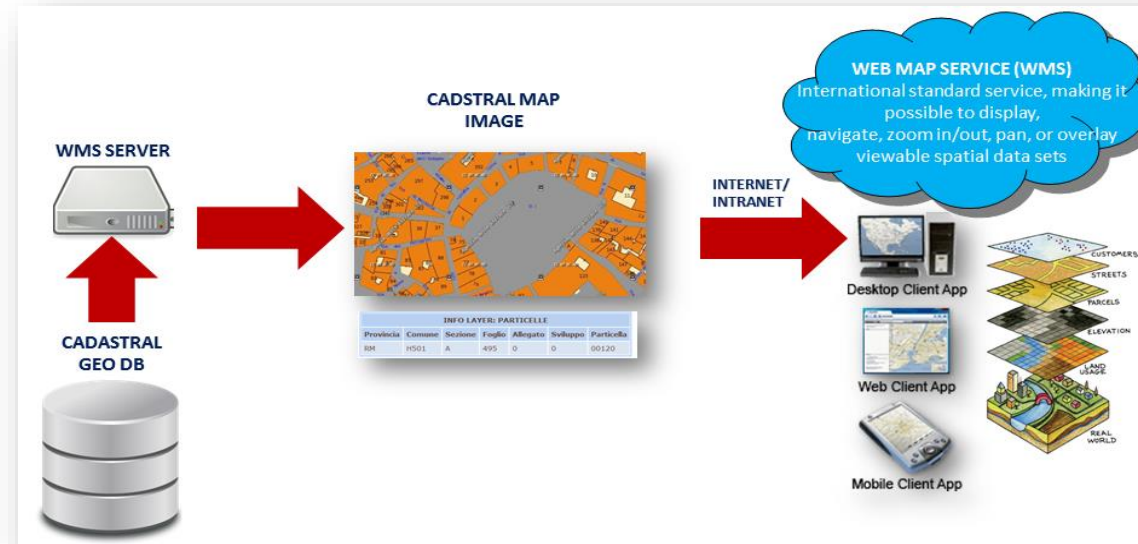


# Evolution of the Italian Cadastral Cartographic System: WMS Service

**Disposition of the General Director of AdE 23<sup>th</sup> November 2017 n. 271542**



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

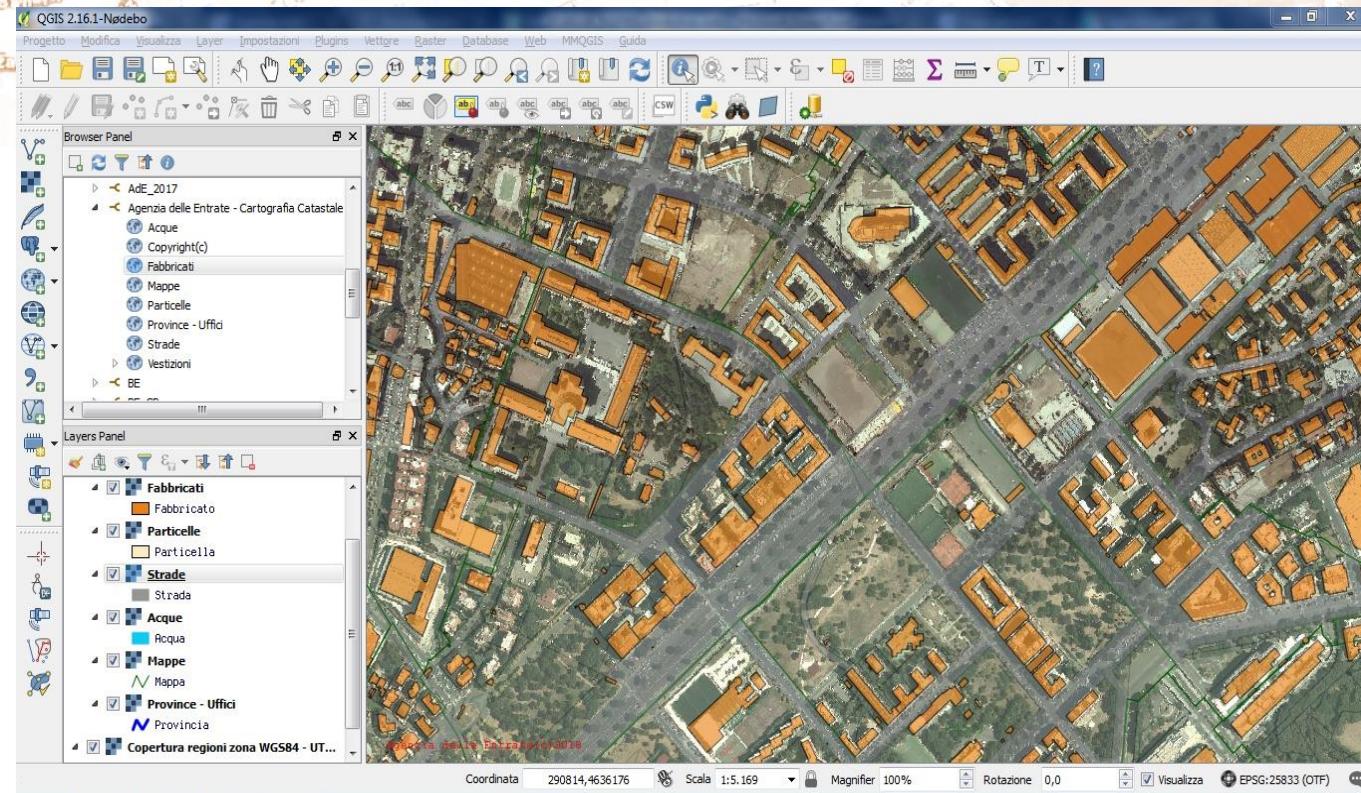




## INTEGRATED VIEW

**Cadastral Maps** (WMS Service – Agenzia delle Entrate)

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

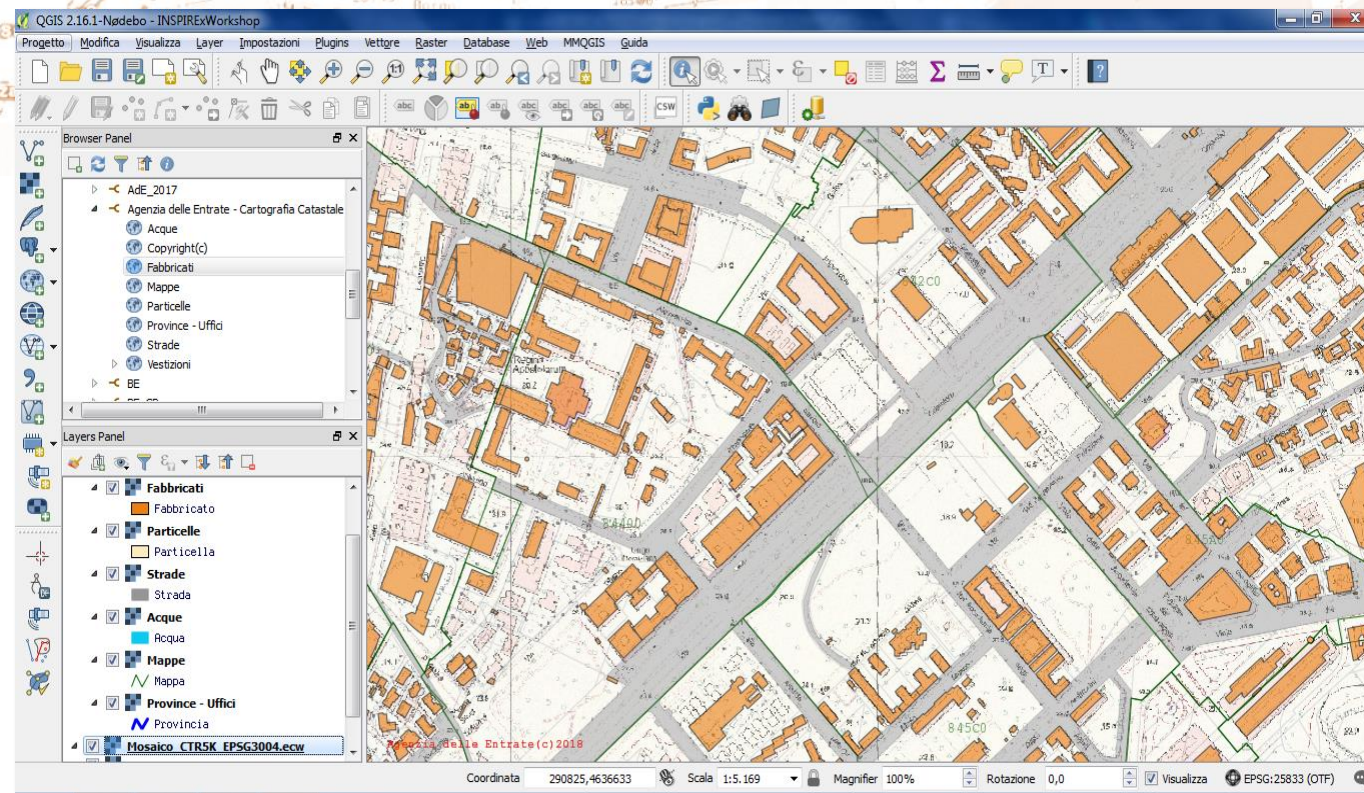




## INTEGRATED VIEW

**Cadastral Maps** (WMS Service – Agenzia delle Entrate)

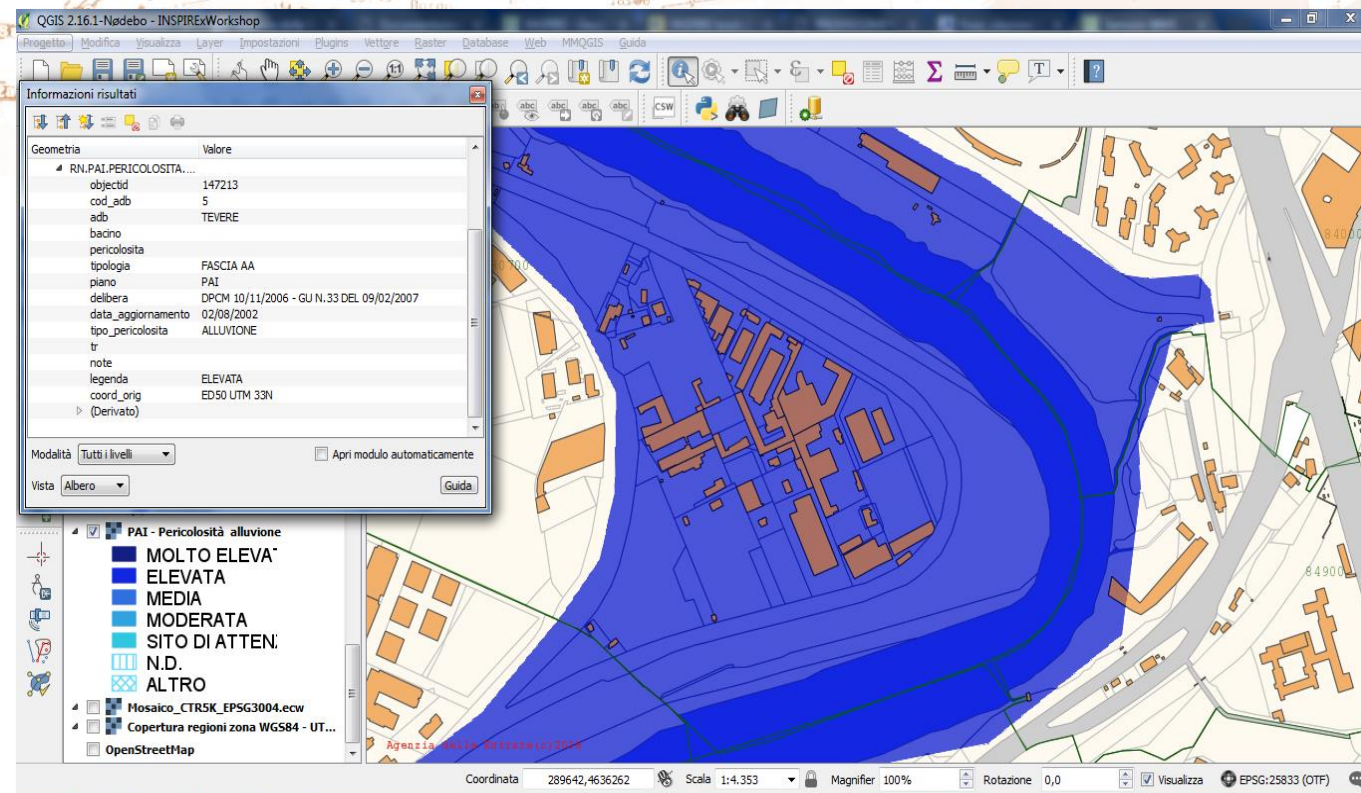
**Regional Technical Maps** (WMS Services – Lazio Region)



## INTEGRATED VIEW

**Cadastral Maps** (WMS Service – Agenzia delle Entrate)

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



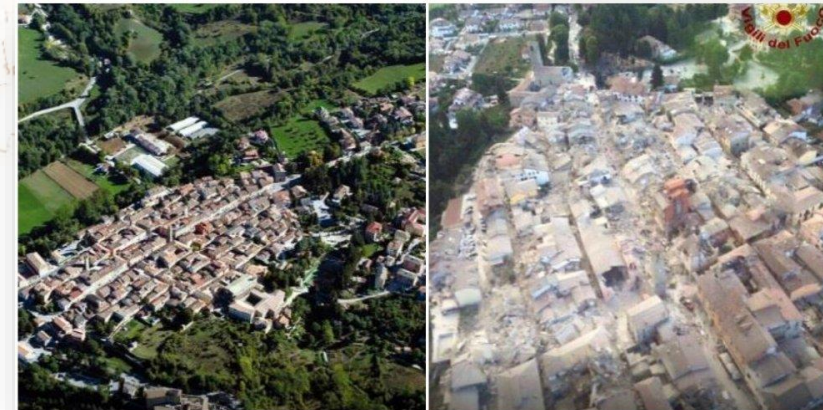


## WMS SERVICES OF OTHER ADMINISTRATIONS IN THE "SIT"

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



The destruction of Amatrice



BEFORE

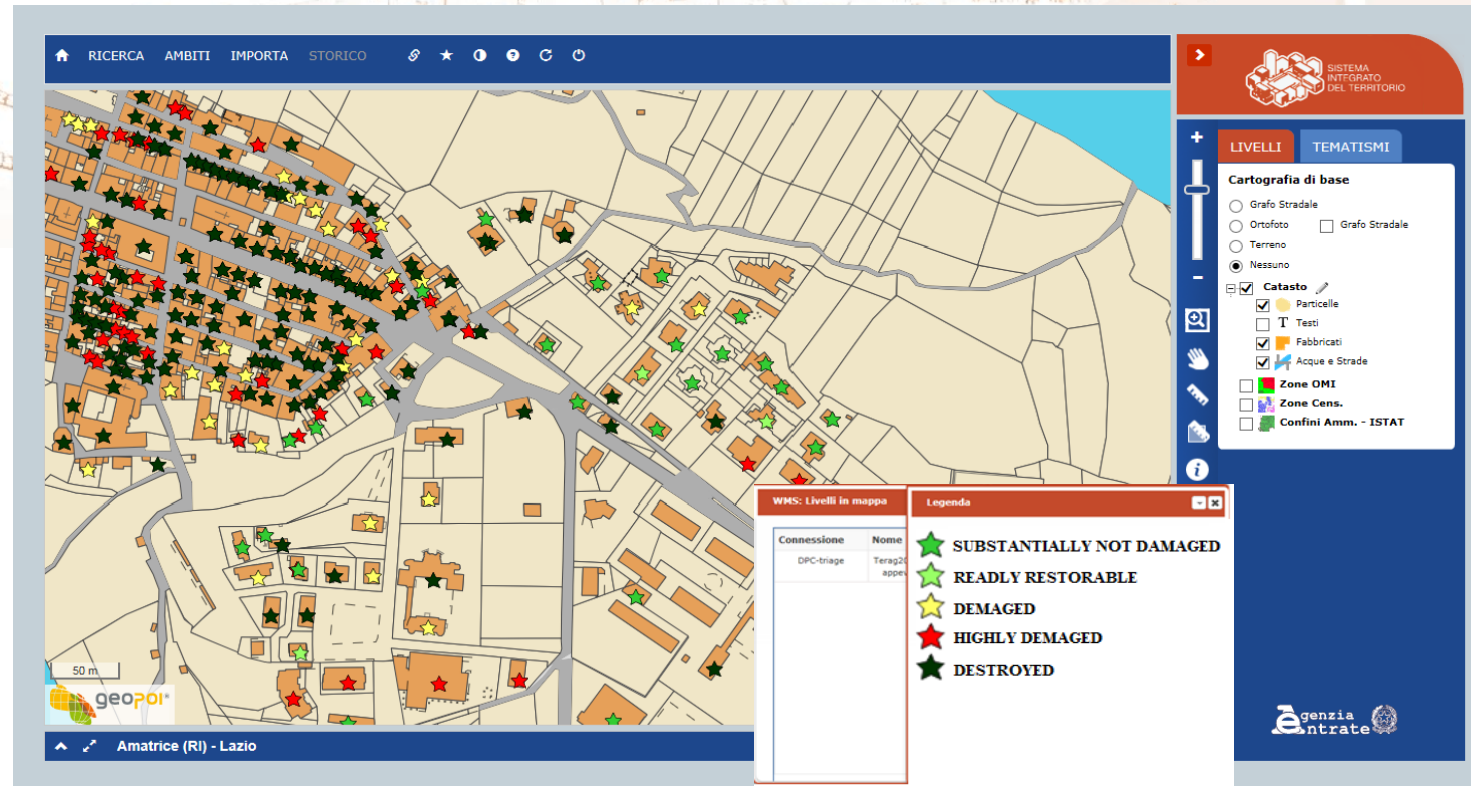


AFTER



## 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

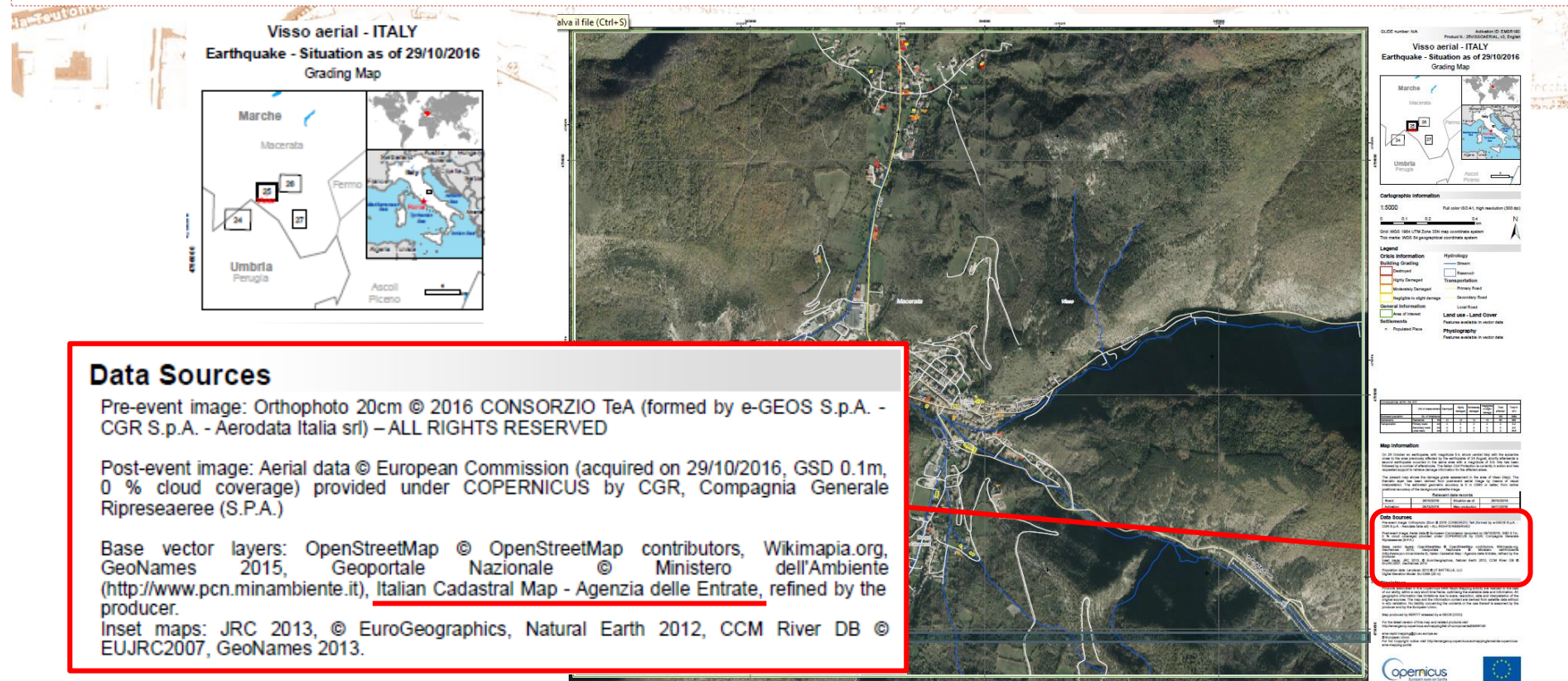


## The Emergency Management Service «Copernicus» and the cadastral cartography of the Agency

### 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>



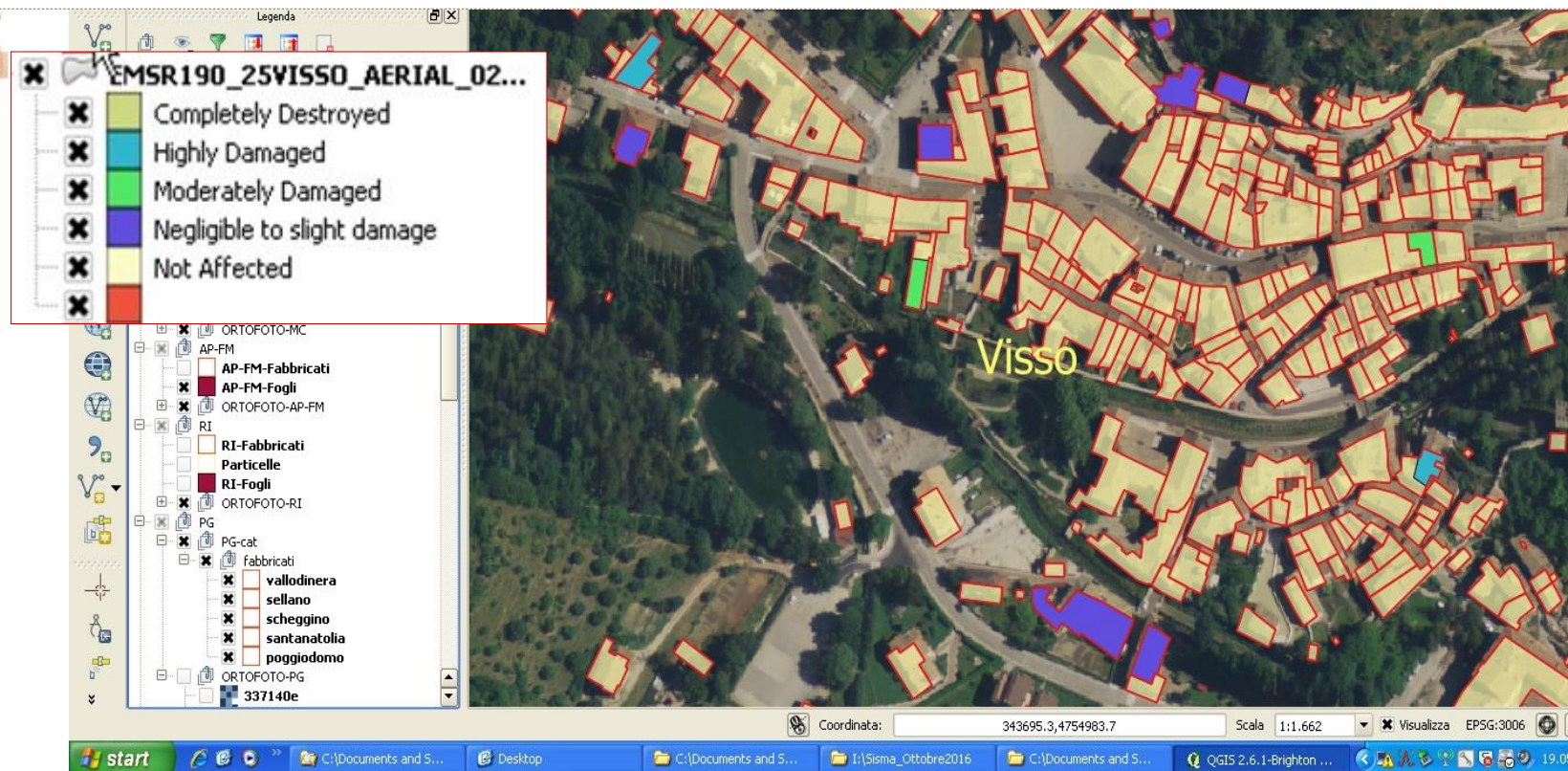




# The Emergency Management Service «Copernicus» and the cadastral cartography of the Agency

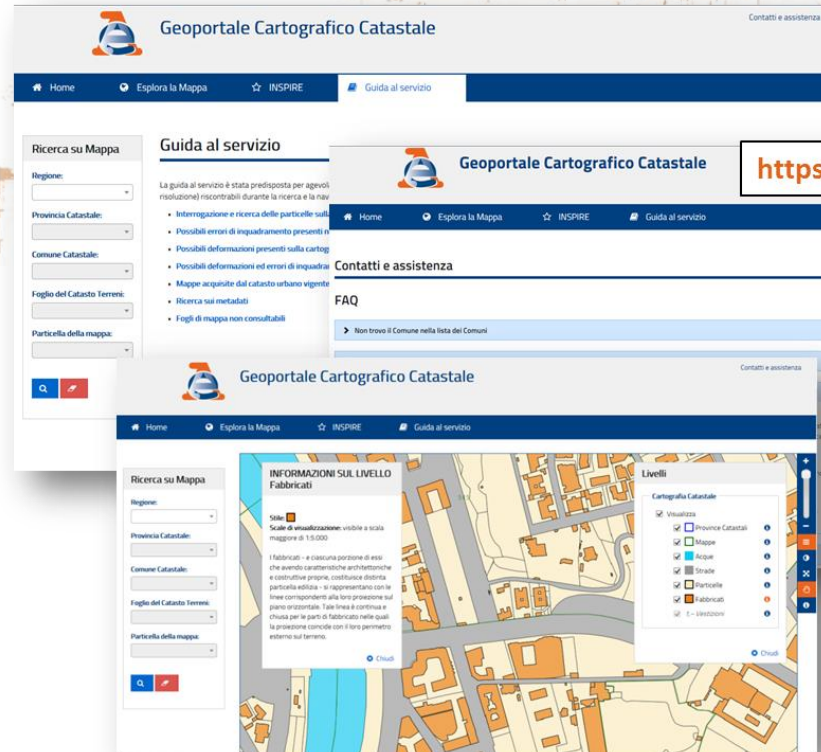
### Earthquake in Central Italy – 30th October 2016 –Visso Municipality (MC)

«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



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

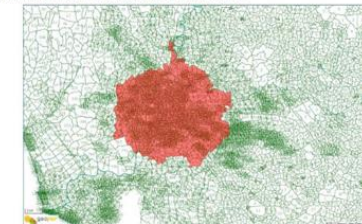


N.B.: le informazioni catastali vengono visualizzate a partire dalla scala 1:200.000; per scale precedenti, selezionando il bottone [Z], apparirà il seguente pannello:



#### Visibilità su mappa del risultato di ricerca

Il bottone [V] consente di evidenziare sulla mappa il risultato della ricerca effettuata; infatti, se selezionato, definisce in rosso lo sfondo dell'area di ricerca.

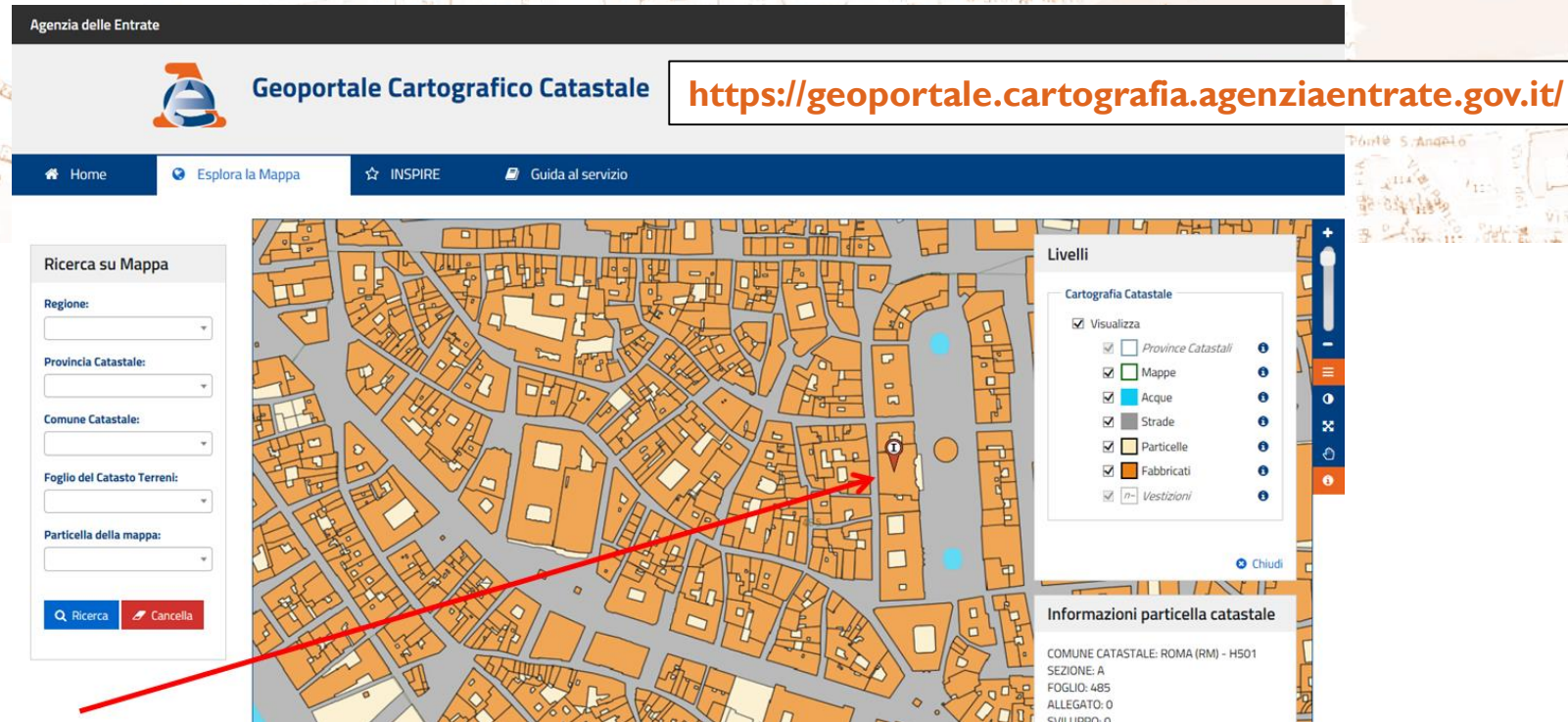


The CADASTRAL CARTOGRAPHIC GEO-PORTAL service is available for the whole national territory, except for the municipalities in which the cadastre is managed, by delegation of the State, by the autonomous provinces of Trento and Bolzano



## 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