



22-25 May 2017

Rome Table Top Exercise

PACES: Preparedness for Appropriate Accommodation in Emergency Shelters

TTX Scenario

Agostino Goretti

*Italian Civil Protection Department
Seismic and Volcanic Risk Office*



Project co-funded by the EU Humanitarian Aid and Civil Protection



Outline of presentation

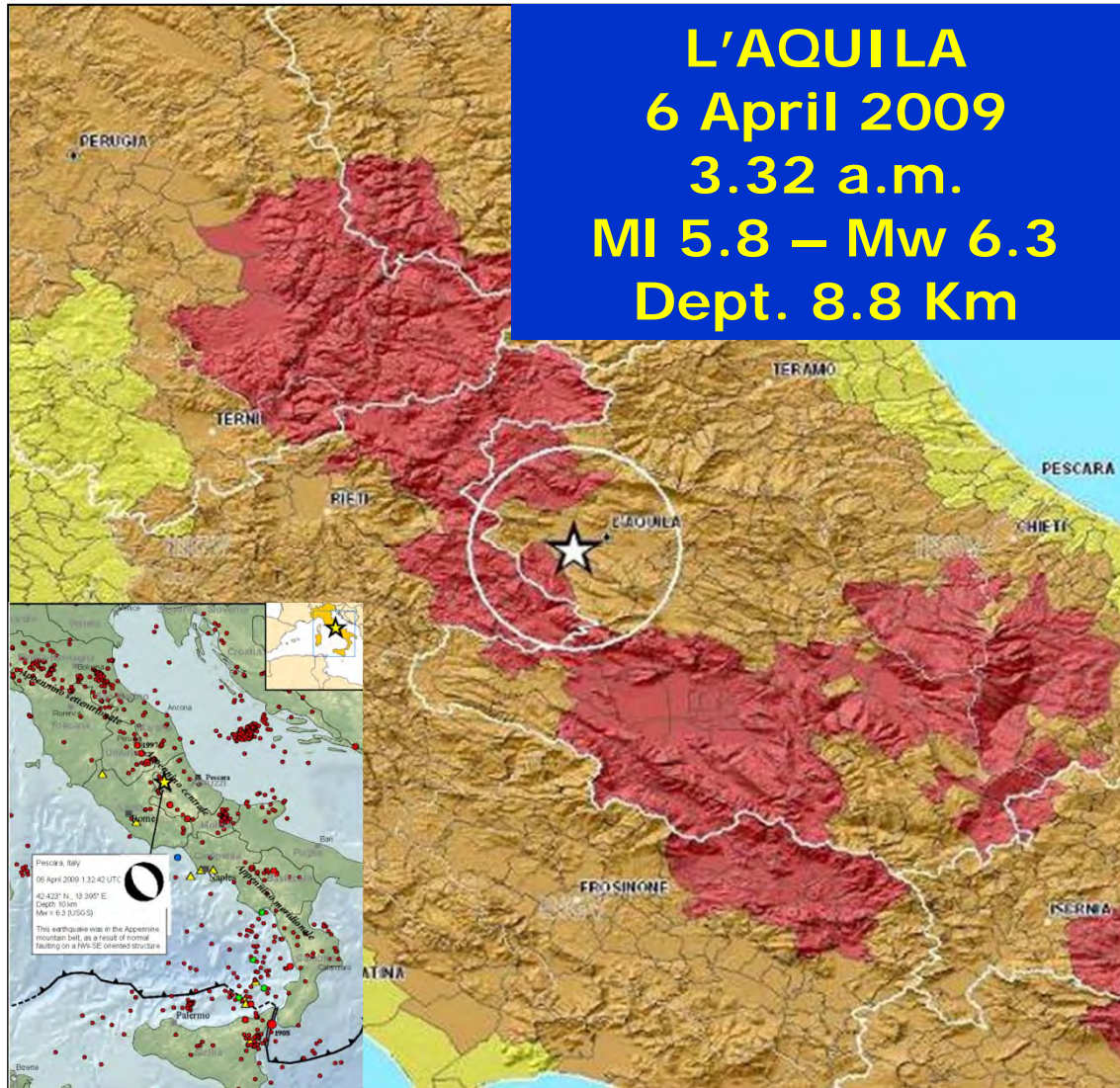
1. [The seismic event](#)
2. [The damage](#)
3. [Emergency management](#)



The seismic event



PACES: Preparedness for Appropriate accommodation in Emergency Shelters



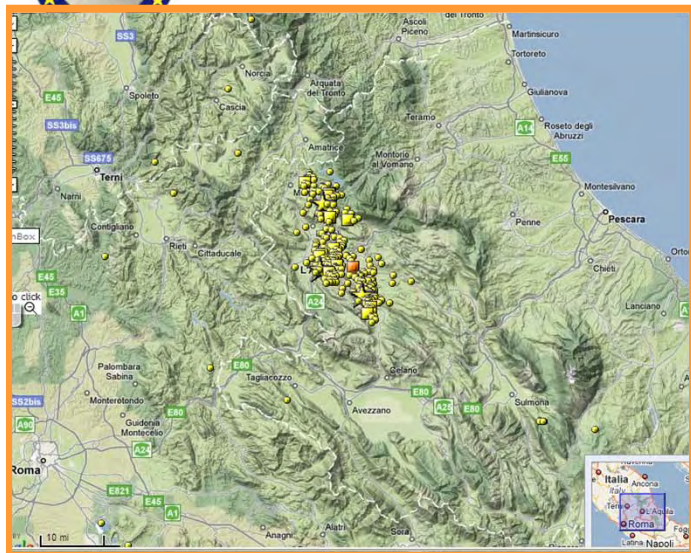
Victims	308
Injured	1,600
Homeless	65,000



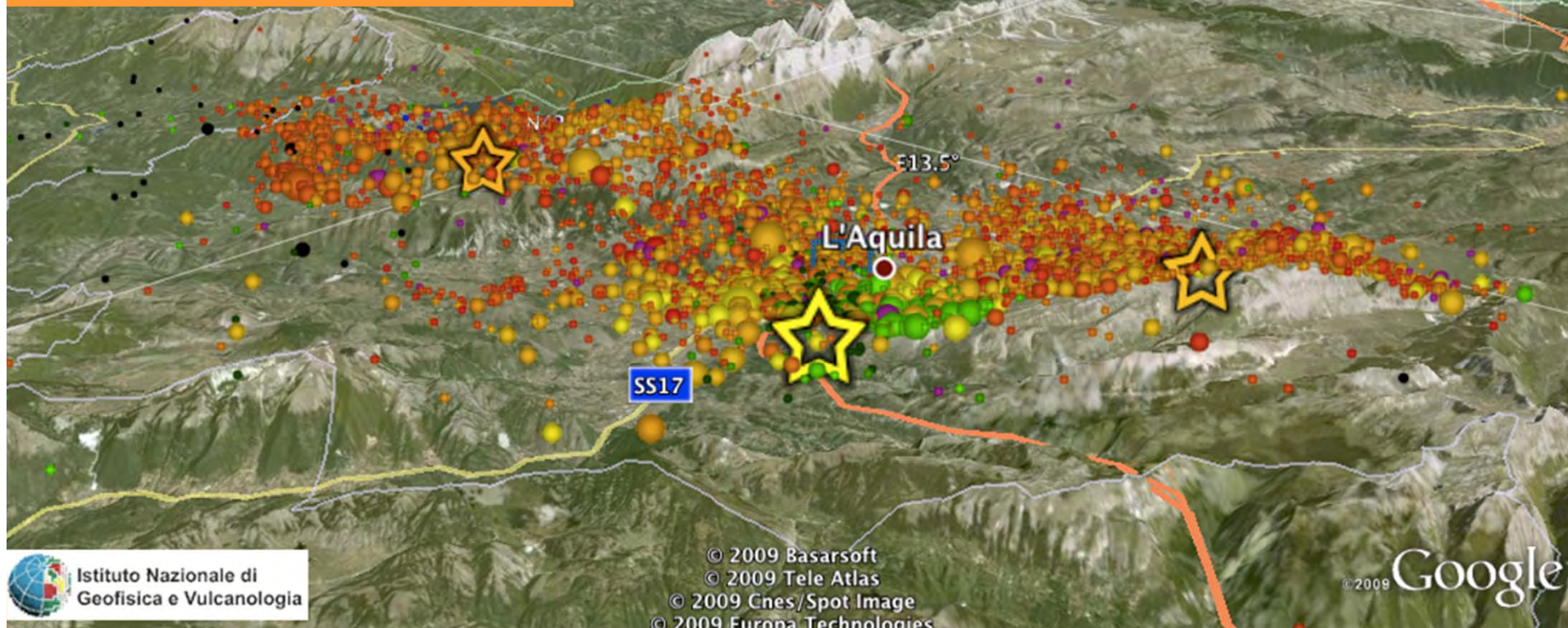
**National
emergency**

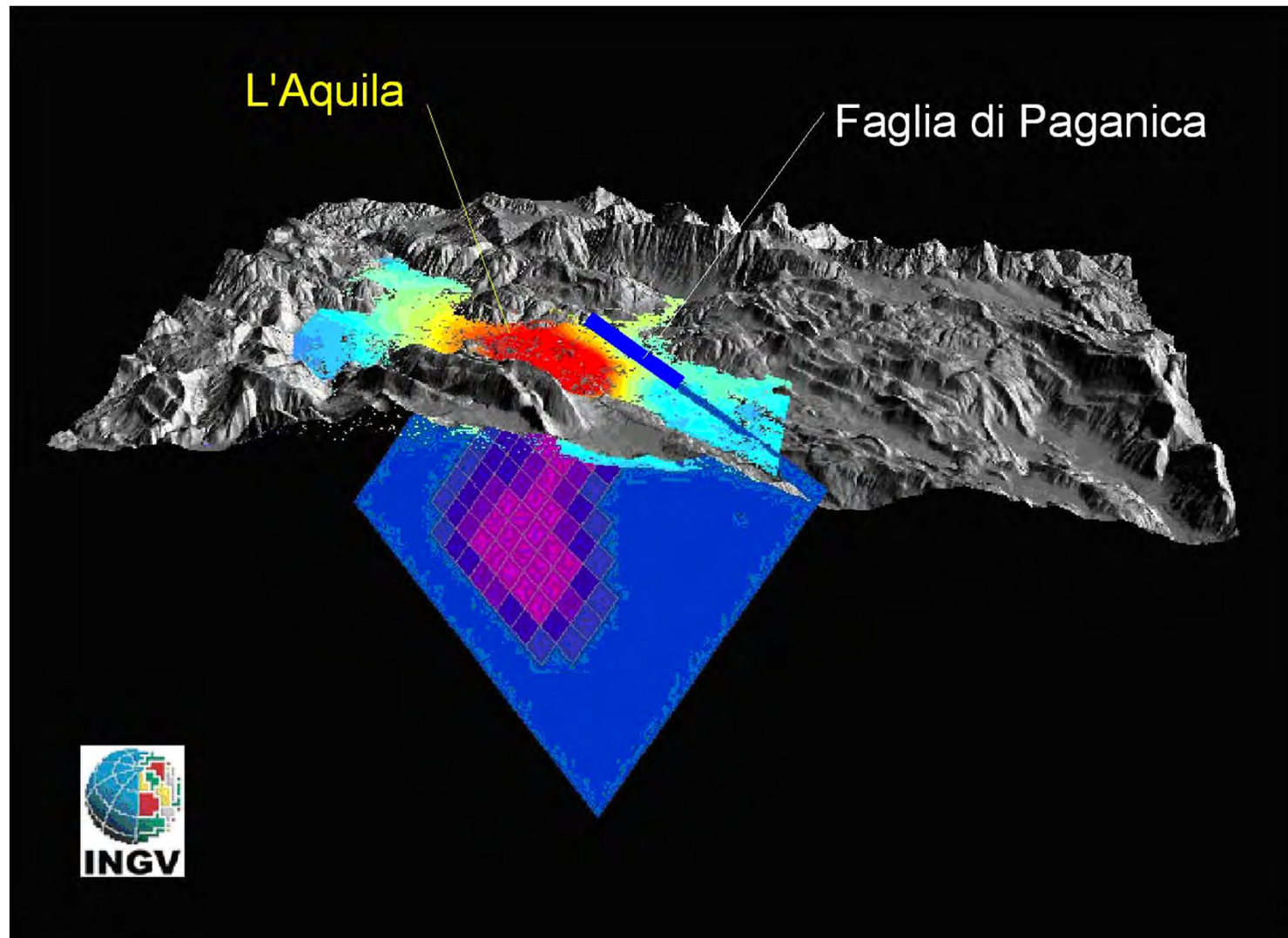


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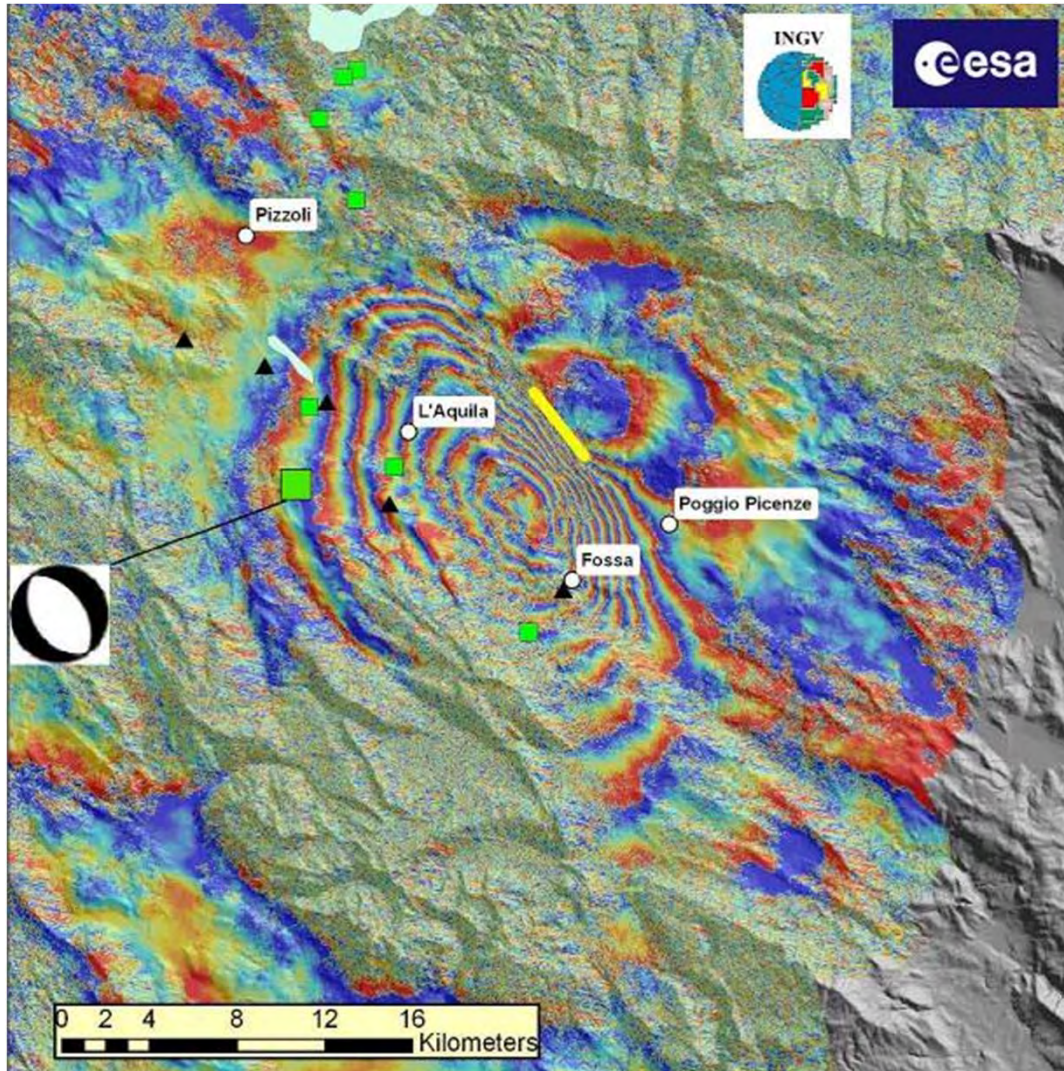


Number of aftershocks in 3 months	9532
$2.0 \leq M < 3.0$	1700
$3.0 \leq M < 4.0$	190
$4.0 \leq M < 5.0$	19
$M \geq 5.0$	6





Paganica fault



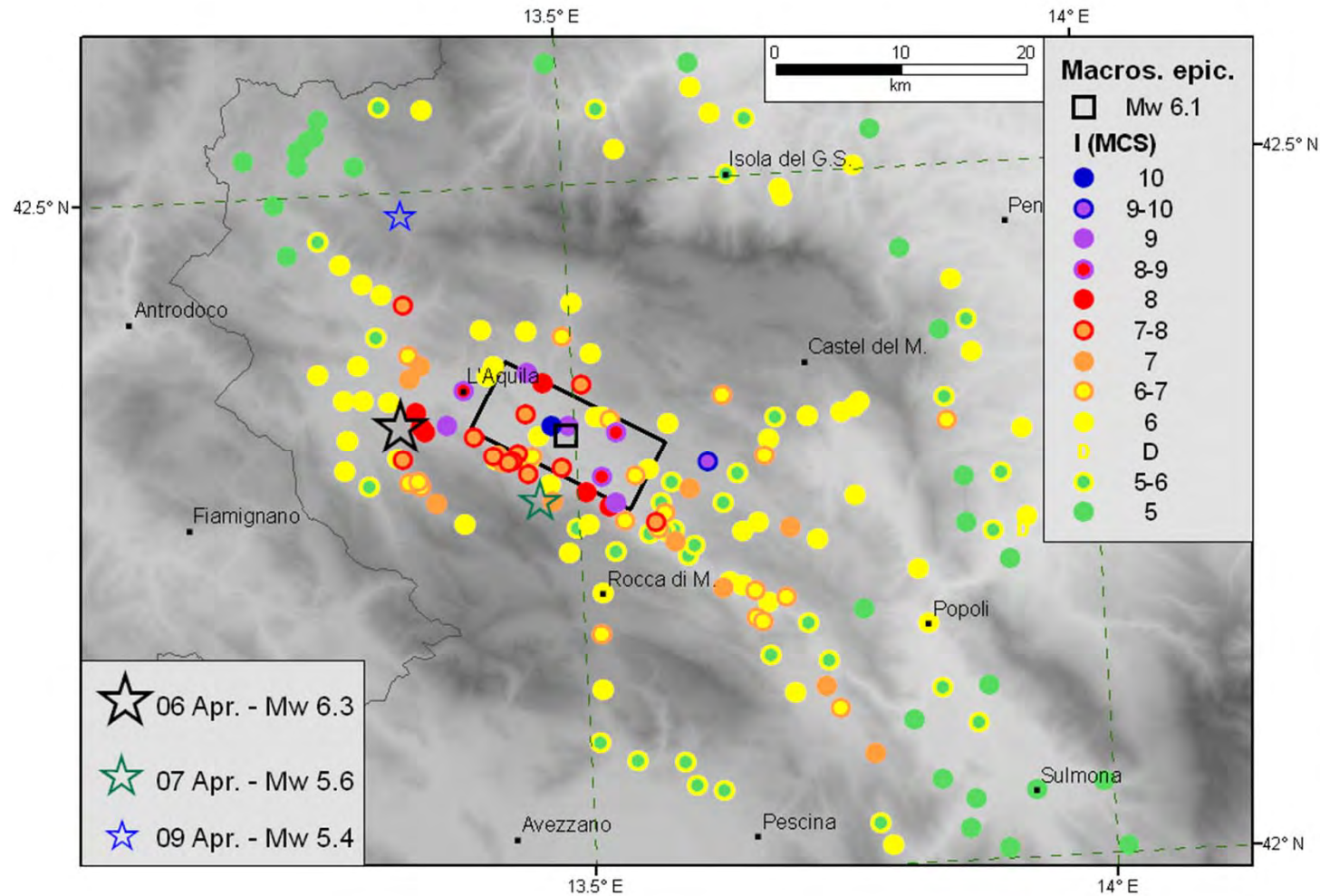
Interferometry,
2 satellite
images COSMO-
SkyMed, 4
(before) and 12
(after) April.
Each fringe
represents 1.5
cm of vertical
displacement.
Total vertical
displacement is
about 25 cm



Italian Accelerometric Network (RAN)

N.	Codice record	Codice stazione acc.	Località	Provincia	Regione	Lat N	Long E	PGA (cm/s ²)	Distanza epicentrale (Km)
1	GX066	aqv	L'Aquila - V. Aterno - Centro Valle	L'Aquila	ABRUZZO	42,377	13,344	662,599	1,80
2	FA030	aqg	L'Aquila - V. Aterno - Colle Grilli	L'Aquila	ABRUZZO	42,373	13,337	504,921	4,30
3	CU104	aqd	L'Aquila - V. Aterno - F. Aterno	L'Aquila	ABRUZZO	42,376	13,339	478,000	5,80
4	AM043	aqk	Aquil PARK ing.	L'Aquila	ABRUZZO	42,345	13,401	366,285	5,60
5	EF021	gsa	GRAN SASSO (Assergi)	L'Aquila	ABRUZZO	42,421	13,519	148,862	18,00
6	TK033	cln	CELANO	L'Aquila	ABRUZZO	42,085	13,521	89,381	31,60
7	BI106	avz	AVEZZANO	L'Aquila	ABRUZZO	42,027	13,426	67,687	34,90
8	CR008	orc	ORTUCCHIO	L'Aquila	ABRUZZO	41,954	13,642	64,399	49,40
9	BY048	mtr	MONTEREALE	L'Aquila	ABRUZZO	42,524	13,245	62,233	22,40
10	CR003	sul	SULMONA	L'Aquila	ABRUZZO	42,089	13,934	33,656	56,50
11	EK007	cht	CHIETI	Chieti	ABRUZZO	42,370	14,148	29,411	67,10
12	GE1463	gsq	GRAN SASSO (Lab. INFN galleria)	L'Aquila	ABRUZZO	42,460	13,550	29,165	22,60
13	BX007	fmg	FIAMIGNANO	Rieti	LAZIO	42,268	13,117	26,352	19,30
14	DF006	ant	ANTRODOCO	Rieti	LAZIO	42,418	13,079	25,939	23,10
15	BY003	cso1	CARSOLI 1	L'Aquila	ABRUZZO	42,101	13,088	18,295	33,00
16	EI160	boj	BOJANO	Campobasso	MOLISE	41,484	14,472	14,171	133,50
17	BH003	cds	CASTEL DI SANGRO	L'Aquila	ABRUZZO	41,787	14,112	9,956	88,50
18	BN048	tmo	TERMOLI	Campobasso	MOLISE	41,989	14,975	9,843	140,90
19	ZC002	lss	LEONESSA	Rieti	LAZIO	42,558	12,969	9,625	39,10
20	HB060	spo	SPOLETO	Perugia	UMBRIA	42,734	12,741	9,585	65,90
21	BS029	css	CASSINO	Latina	LAZIO	41,486	13,823	9,436	102,70
22	CU008	mmp1	MOMPEO 1	Rieti	LAZIO	42,249	12,748	8,855	49,20
23	BW024	spc	SPOLETO (cantina)	Perugia	UMBRIA	42,743	12,740	7,572	66,70

Macroseismic intensity



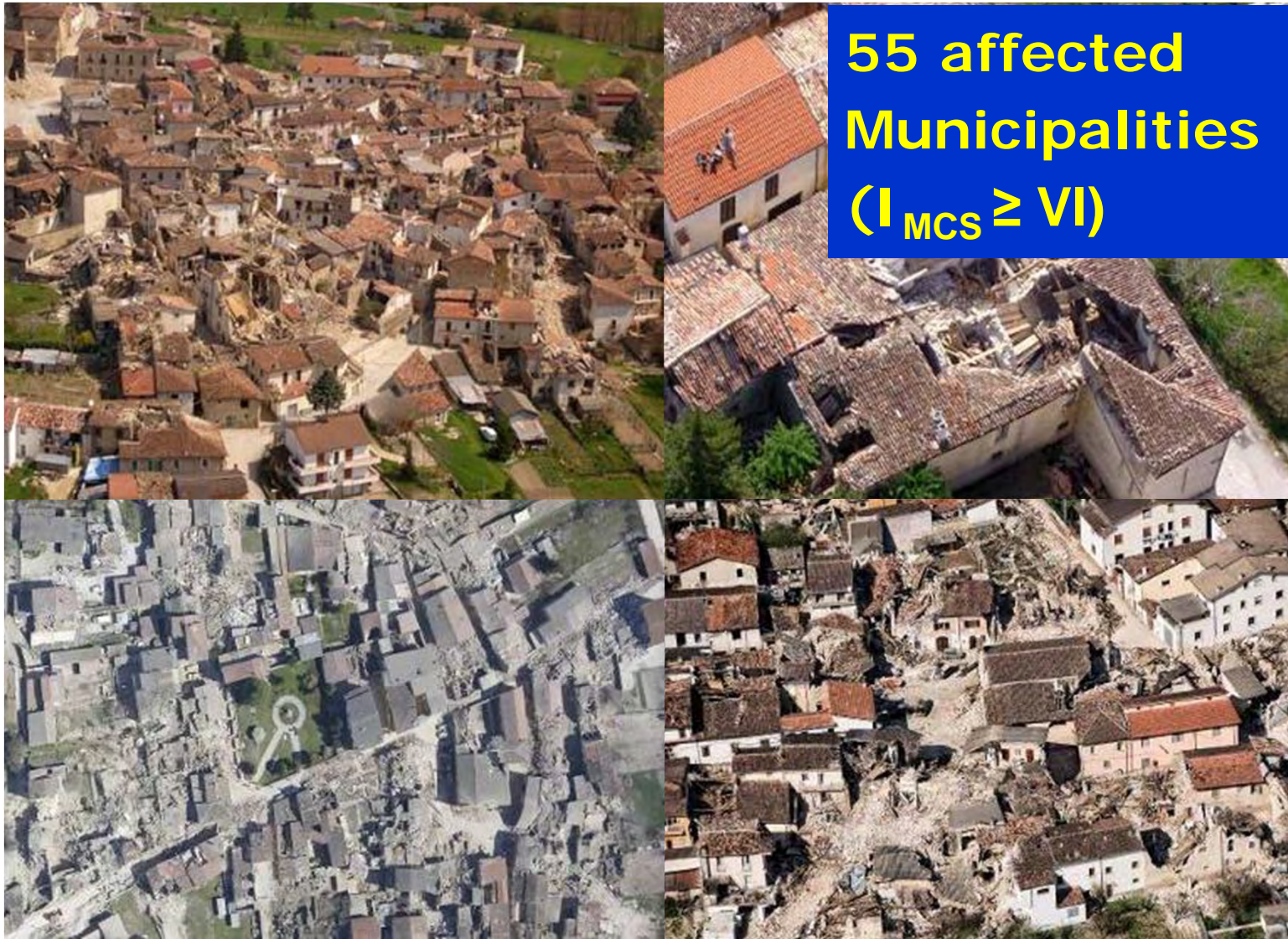
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The damage



PACES: Preparedness for Appropriate accommodation in Emergency Shelters





Damage to residential buildings in L'Aquila





PACES: Preparedness for Appropriate accommodation in Emergency Shelters





PACES: Preparedness for Appropriate accommodation in Emergency Shelters





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PACES: Preparedness for Appropriate accommodation in Emergency Shelters





PACES: Preparedness for **A**ppropriate accommodation in **E**mergency Shelters



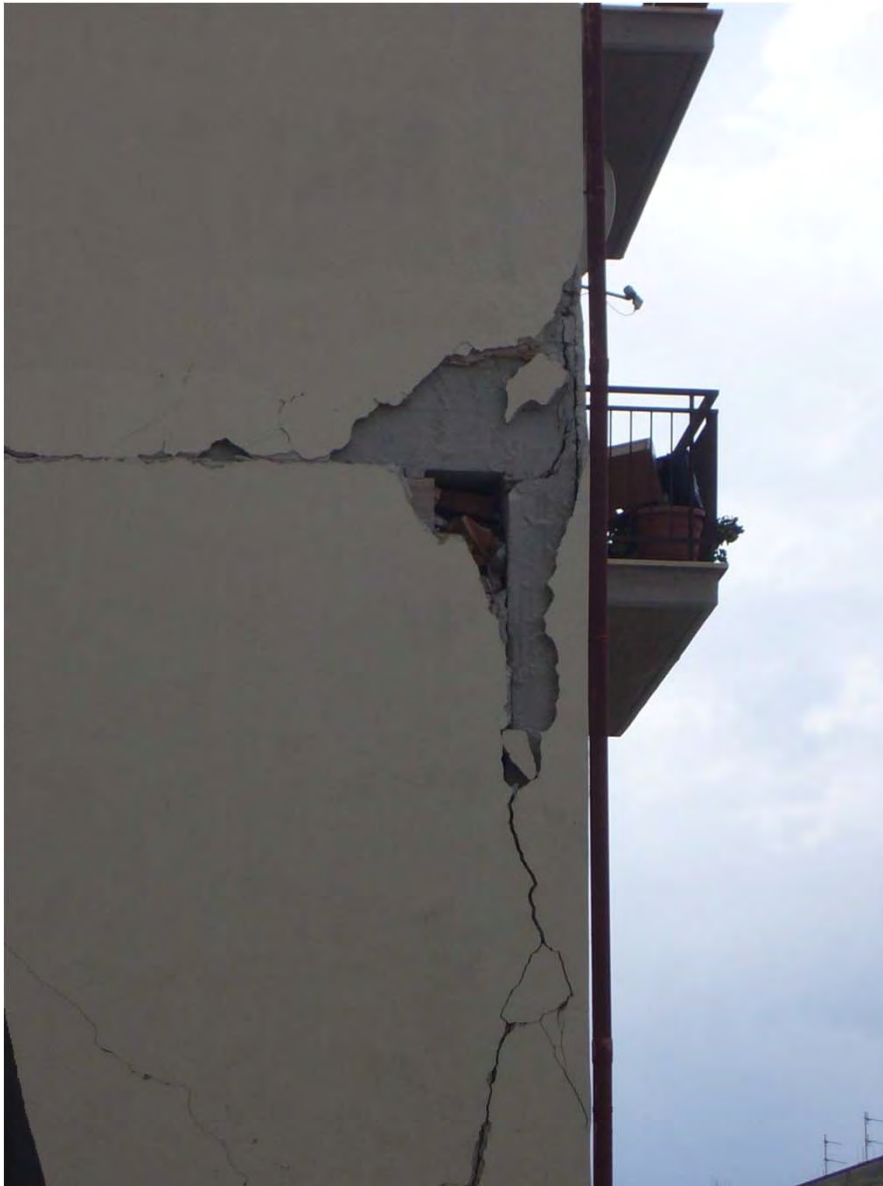


PACES: Preparedness for Appropriate accommodation in Emergency Shelters





PACES: Preparedness for Appropriate accommodation in Emergency Shelters





Damage to residential buildings in small villages close to L'Aquila: Onna





PACES: Preparedness for Appropriate accommodation in Emergency Shelters





PACES: Preparedness for **A**ppropriate accommodation in **E**mergency **S**helters





Damage to Government Buildings The L'Aquila Prefecture





Damage to critical buildings The San Salvatore Hospital





PACES: Preparedness for Appropriate accommodation in Emergency Shelters





Abruzzo Region
Government Building,
slightly damaged to
elevators. Unusable
at upper levels





Damage to churches and Cultural Heritage



Santa Maria in Paganica



PACES: Preparedness for Appropriate accommodation in Emergency Shelters





PACES: Preparedness for Appropriate accommodation in Emergency Shelters





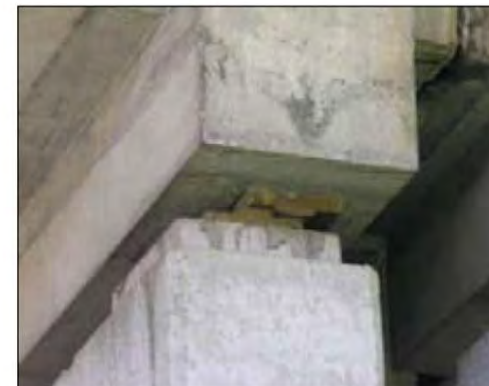
Damage to infrastructures



Bridge on the Aterno River



Motorway A24 Rome-L'Aquila.
Movements of bearings and deck
misalignments. Unfit for use for one week.
Only emergency vehicles were allowed to pass





Blocked streets





Damage to industrial buildings



[**Back**](#)



Emergency Management



Emergency management conditioned by

Peculiarity of the affected territory
100 Km far from Rome
L'Aquila, capital of Abruzzi Region
72.000 inhabitants
Vulnerable buildings



Lost of the local
government: the
collapse of the
prefecture





The administrative structure of both
L'Aquila and Abruzzi Region was
completely lost

National response and national
emergency management



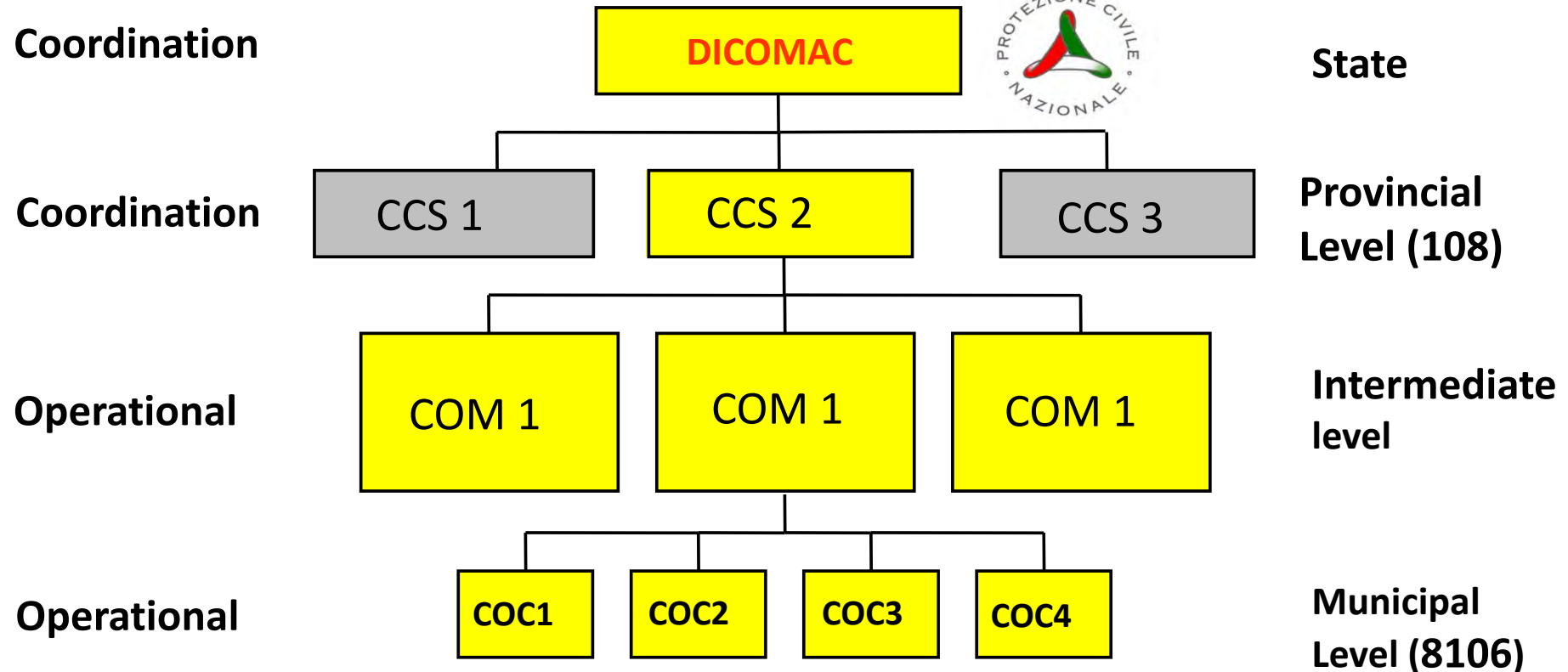
6th April, 2009

3.32

- **4.15** Crisis Unit of the Department of Civil Protection
- **4.40** Departure of Civil Protection teams
- **4.40** Meeting of the Operational Committee at DPC HQ
- **9:00** Setting up of the on-site Command & Control HQ



Italy Emergency Response Hierarchy



CCS=Rescue Coordination Center

COM=Mixed Operative Center

COC=Municipal Operative Center

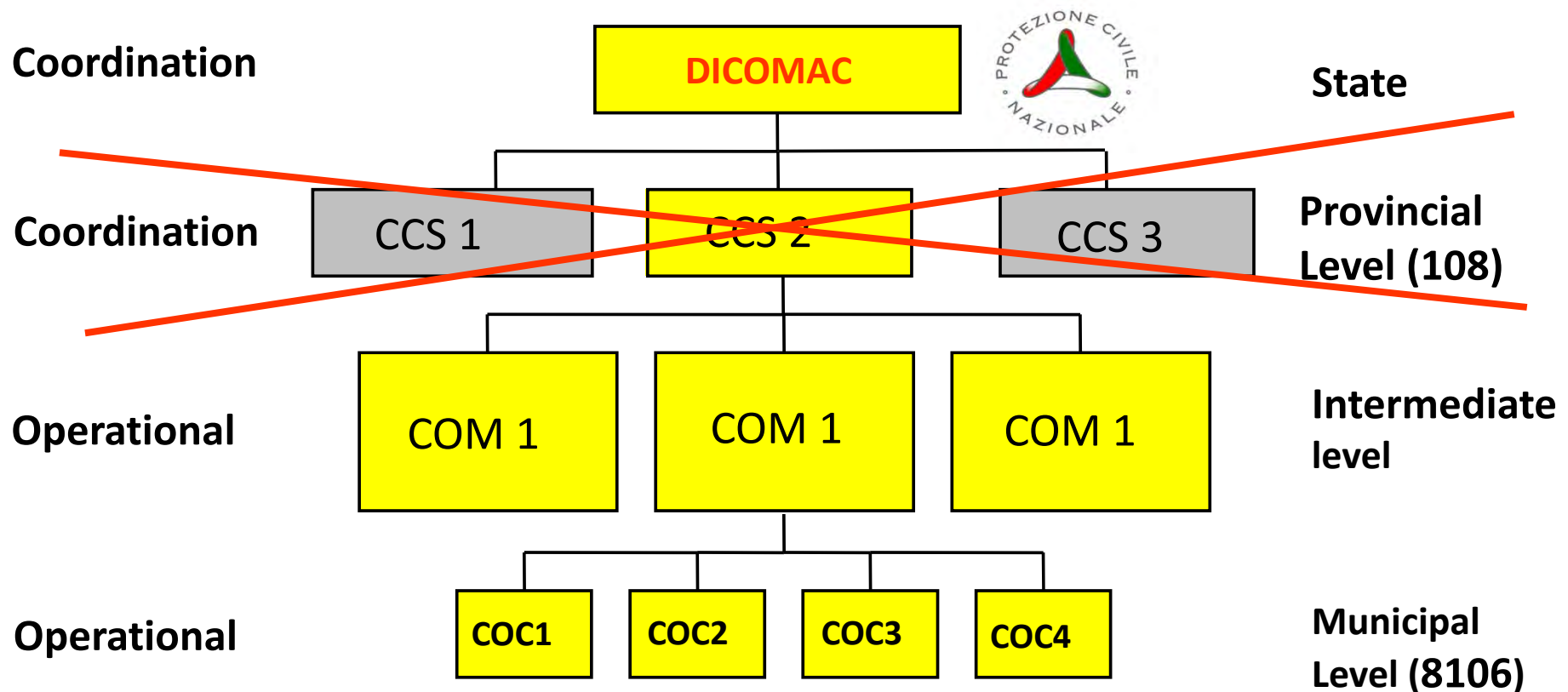


AUGUSTUS method (Flexible response)

COM	COC	Functions
1	(1)	Technical and Planning Support
2	(2)	Health and Social Assistance, Veterinary Assistance
3		Mass Media and Information
4	(3)	Volunteers
5	(4)	Materials and Resources (Logistics)
6		Transportation and Traffic Control
7	(5)	Telecommunications
8	(6)	Lifelines and Schools Assistance
9	(7)	Damage Assessment
10		Search and Rescue
11		Assistance to Local Authorities
12		Dangerous Materials
13	(8)	Population Logistics
14	(9)	Operational Coordination



Italy Emergency Response Hierarchy in L'Aquila



CCS=Rescue Coordination Center

COM=Mixed Operative Center

COC=Municipal Operative Center

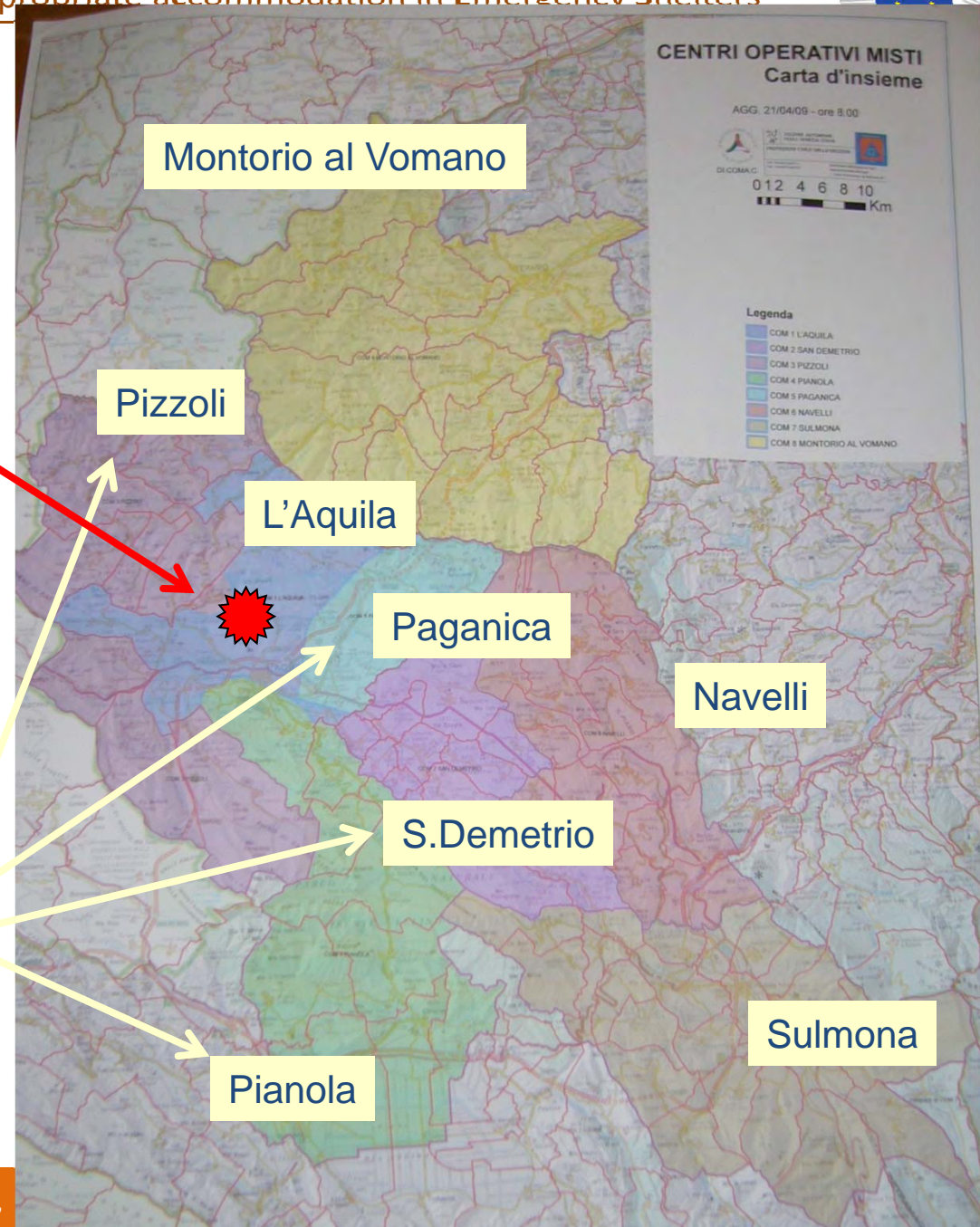


PACES: Preparedness for Appropriate accommodation in Emergency Shelters



DI.COMA.C
Command and
Control Center
(State)

8 Operatives
Centres (COM)



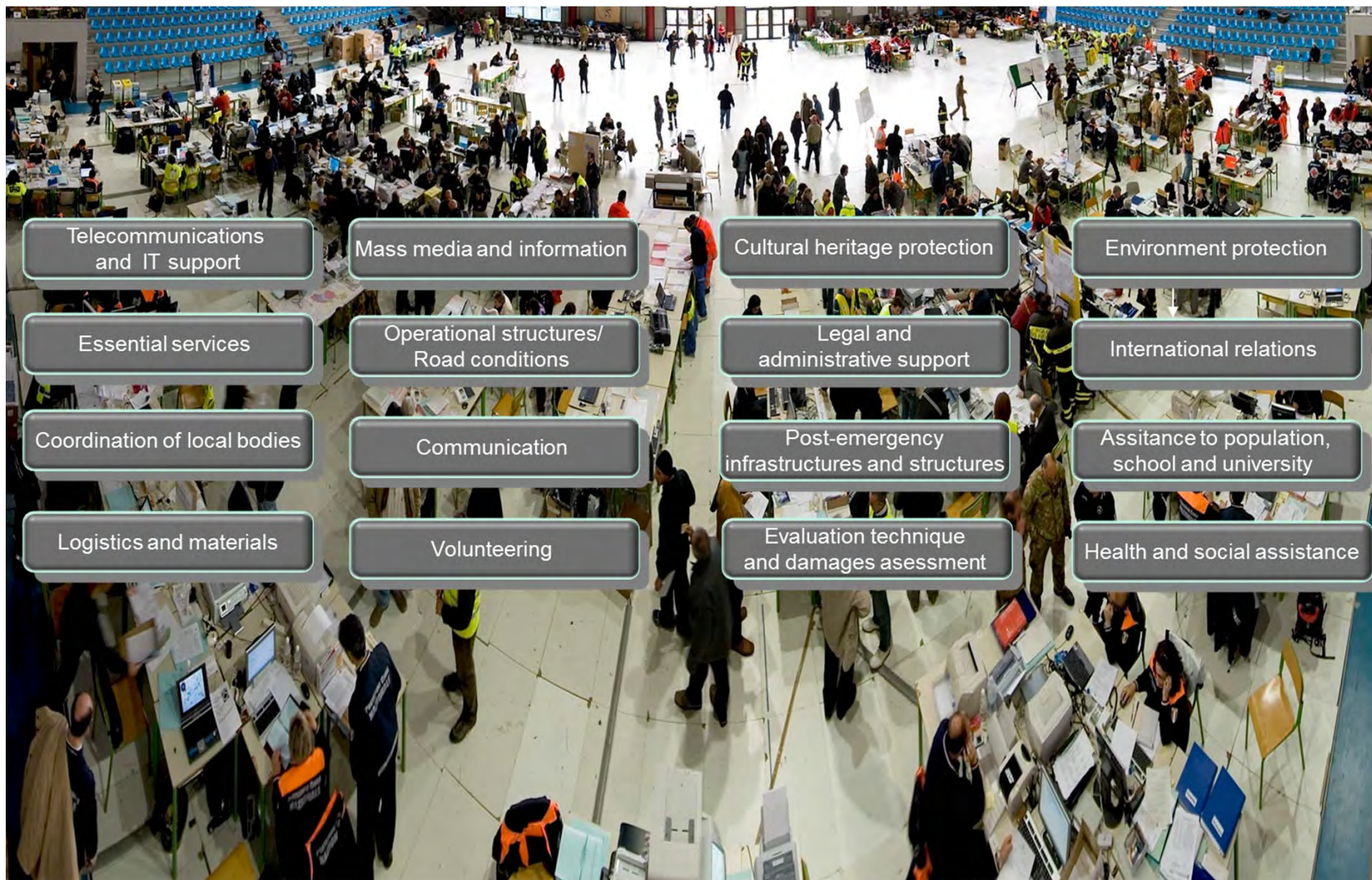


The Command and Control Center during the emergency





PACES: Preparedness for Appropriate accommodation in Emergency Shelters



Telecommunications
and IT support

Mass media and information

Cultural heritage protection

Environment protection

Essential services

Operational structures/
Road conditions

Legal and
administrative support

International relations

Coordination of local bodies

Communication

Post-emergency
infrastructures and structures

Assistance to population,
school and university

Logistics and materials

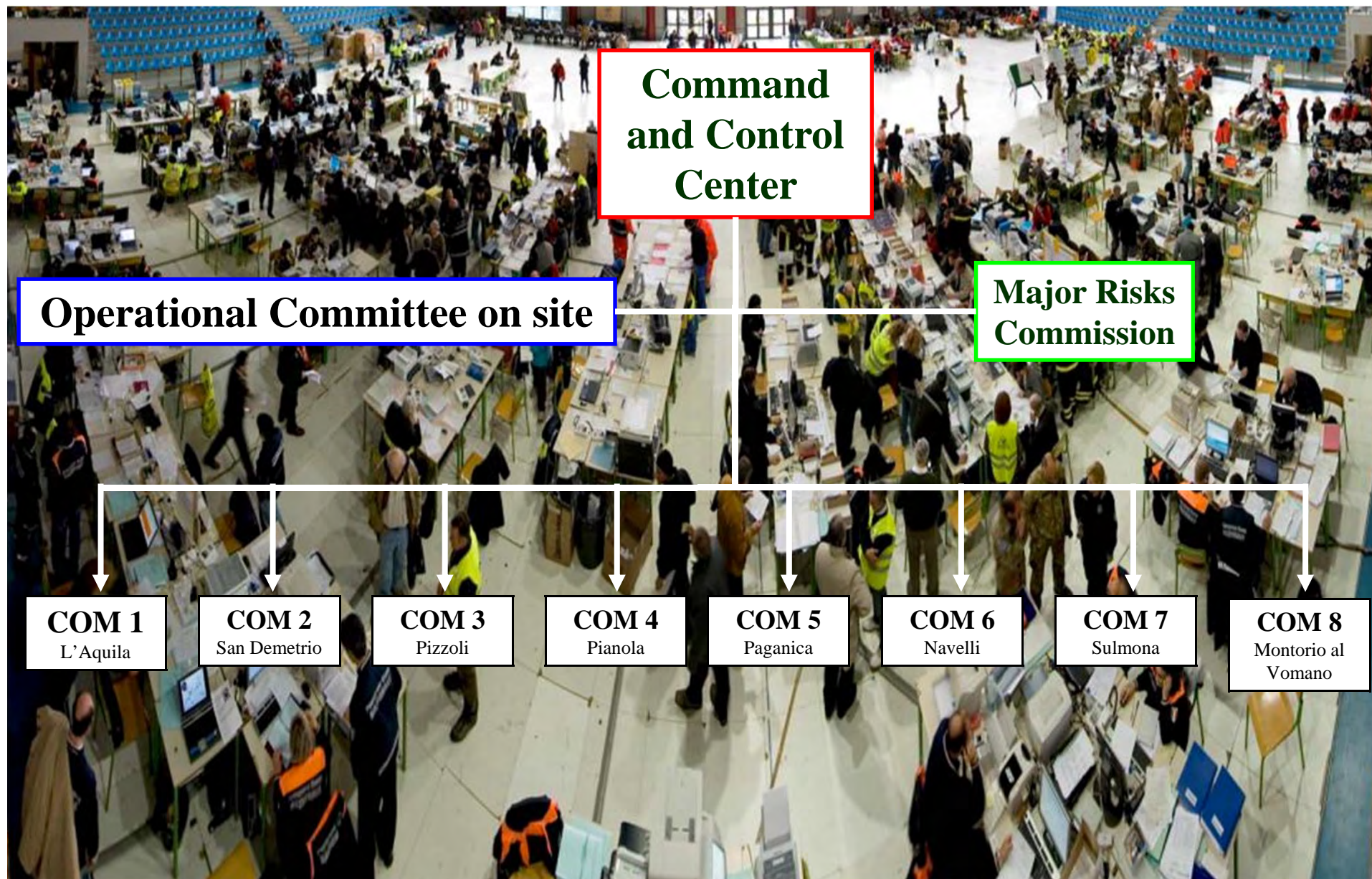
Volunteering

Evaluation technique
and damages assessment

Health and social assistance



PACES: Preparedness for Appropriate accommodation in Emergency Shelters





The Operatives Centres

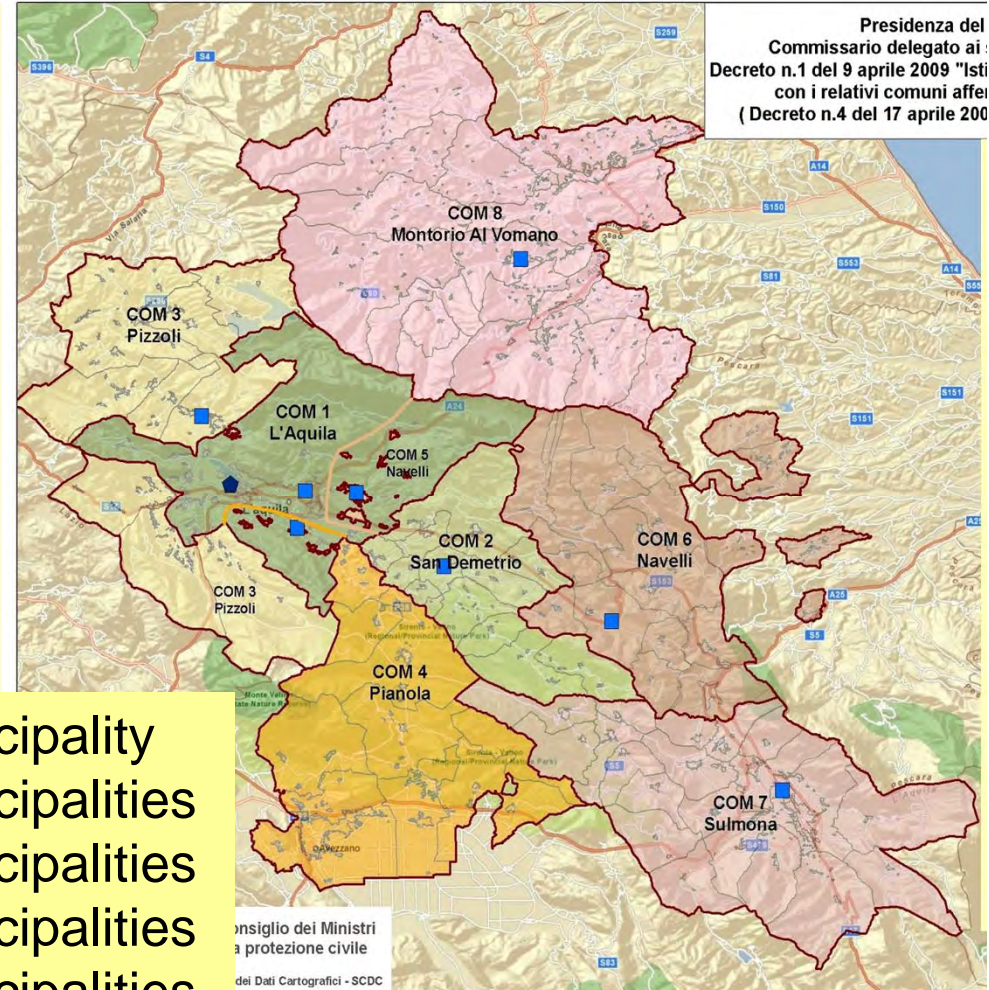
Sedi dei COM

- COM 1 - Scuola materna Via Scarfogli
- COM 2 - Scuola elementare San Demetrio
- COM 3 - Scuola elementare
- COM 4 - Centro sportivo
- COM 5 - Campo sportivo
- COM 6 - Istituto Comprensivo Scolastico
- COM 7 - Edificio Trasporti Comune
- COM 8 - Sede Vigili Urbani
- ◆ DI.COMA.C

Centri Operativi Misti (COM)

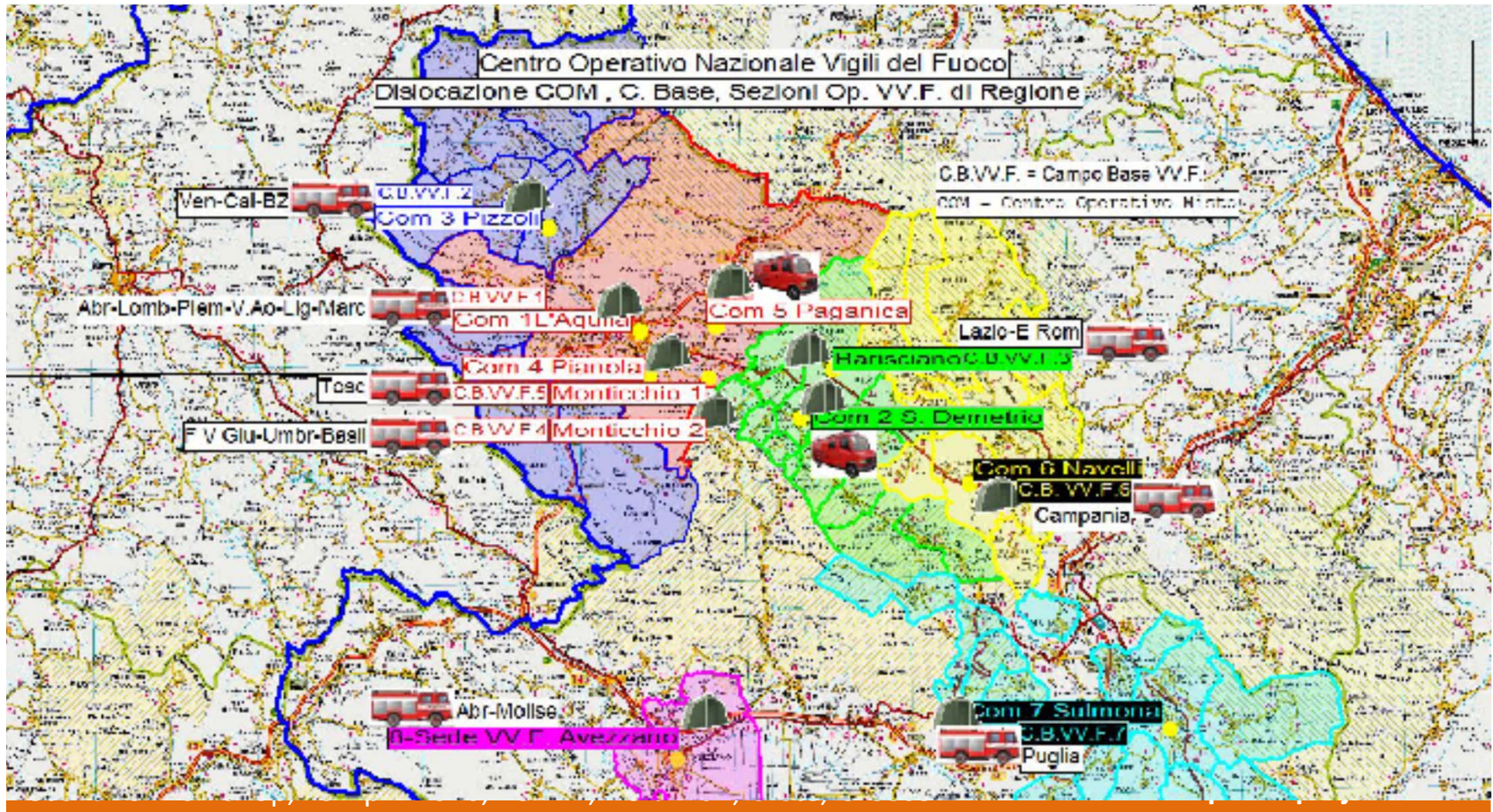
- COM 1 - L'Aquila
- COM 2 - San Demetrio
- COM 3 - Pizzoli
- COM 4 - Pianola
- COM 5 - Paganica
- COM 6 - Navelli
- COM 7 - Sulmona
- COM 8 - Montorio Al Vomano

- 1 Municipality
- 12 Municipalities
- 9 Municipalities
- 8 Municipalities
- 10 Municipalities
- 14 Municipalities
- 20 Municipalities
- 15 Municipalities



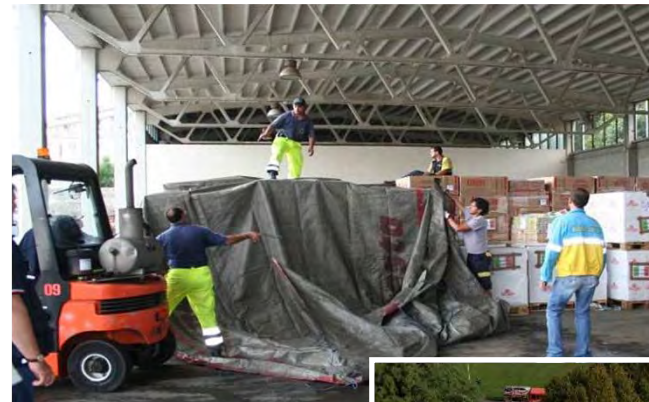


National Resources: Fire Brigade camps





Regional Resources





Relief operation

Civil Protection Dpt. Teams

Coordination of activities

Needs assessment

Location of area for tent camps

Resource management



Civil Protection Mobile Columns System

18 Regions

2 Autonomous
Provinces

Italian Red Cross
Non Governmental
Organizations and
public companies



Involved Personnel

	24 h	48 h	6/7/09	6/10/09	max	1 year
Fire Brig.	2,010	2,400	1,056	631	2,471	422
Army	1,520	1,825	957	1,118	1,825	345
Police	1,500	1,586	1,414	686	3,487	683
Red Cross	800	816	511	231	835	66
Volunteers	2,000	4,300	2,888	1,017	9	23



First response

Search and Rescue

**Operated by Italian Fire and Rescue Services
More than 150 people extracted alive from debris**







PACES: Preparedness for Appropriate accommodation in Emergency Shelters





PACES: Preparedness for Appropriate accommodation in Emergency Shelters



Table 2. Distribution of casualties

Nationality	Deaths	Injured
 Italian	286	1,173
 FYROM	6	
 Romanian	5	
 Czech	2	
 Palestinian	2	
 Ukrainian	2	
 Greek	1	5
 French	1	
 Israeli	1	
 Argentine	1	
 Peruvian	1	
Total	308	about 1,500



Assistance to population

Ordinance of the Mayor of L'Aquila:
Total Evacuation of L'Aquila city



L'Aquila becomes red area, guarded by the police
More than 65,000 homeless



48 hours after the event



30 Camps
2,962 Tents
28,000 people assisted
10 field kitchens
13 Advanced Medical Posts
1 Field hospital



PACES: Preparedness for Appropriate accommodation in Emergency Shelters



	48 h	6/7/09	6/10/09	Max	1 an
Population	27.772	52.251	31.378	67.459	5.418
Camps	30	143	73	171	-
Tents	2.962	5.201	2.360	5.957	-
Field Kitchen	10	89	45	107	-
Advanced Medical Post	13	24	13	47	-

Cost of population assistance: 456,3 million Euro



Tent camps





Criteria for selection of tent camp areas:
available, stable, close to buildings, easy access





Immediate Needs

Hot meals

Chemical toilets

Advanced medical post





Lack of

High quantity of gravel

Compact excavators/forklift

Electrician/plumbers/carpenter





Additional Services

Kindergarten,

School,

Church,

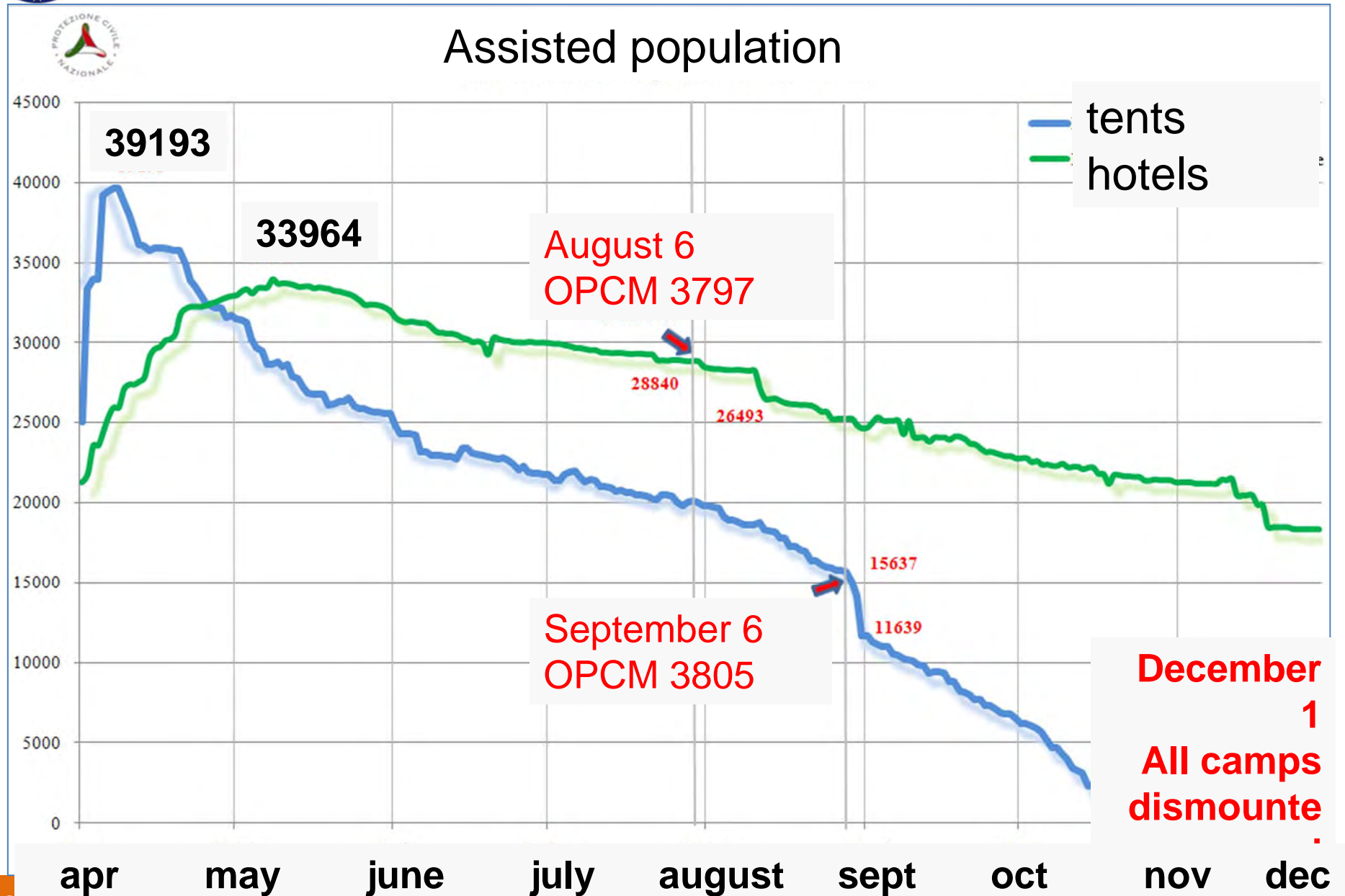
Movie,

Postal Office,

Local authority Office,

Baber shop, ...







Health System

San Salvatore field Hospital (in front of the damaged hospital)





Advanced Medical Post





Building Safety Assessment

About 85,000 inspected buildings

About 7,000 technicians

About 20,000 working days



Usable	Restricted Use	Unusable
52%	15%	33%



SEZIONE 1: Identificazione edificio

Provincia: _____ Comune: _____ Frazione/Loc. _____

Indirizzo: _____

SEZIONE 2: Descrizione edificio

N° piano	Superficie totale (m²)	Superficie utile (m²)	Volume (m³)	Altezza (m)	Tipologia	Stato	Stato precedente	Stato attuale
01	0-250	0-100	0-1000	0-10	01	01	01	01
02	250-500	100-200	1000-2000	10-20	02	02	02	02
03	500-750	200-300	2000-3000	20-30	03	03	03	03
04	750-1000	300-400	3000-4000	30-40	04	04	04	04
05	1000-1500	400-600	4000-6000	40-60	05	05	05	05
06	1500-2000	600-800	6000-8000	60-80	06	06	06	06
07	2000-2500	800-1000	8000-10000	80-100	07	07	07	07
08	2500-3000	1000-1200	10000-12000	100-120	08	08	08	08
09	3000-3500	1200-1500	12000-15000	120-150	09	09	09	09
10	3500-4000	1500-1800	15000-18000	150-180	10	10	10	10
11	4000-4500	1800-2000	18000-20000	180-200	11	11	11	11
12	4500-5000	2000-2200	20000-22000	200-220	12	12	12	12
13	5000-5500	2200-2400	22000-24000	220-240	13	13	13	13
14	5500-6000	2400-2600	24000-26000	240-260	14	14	14	14
15	6000-6500	2600-2800	26000-28000	260-280	15	15	15	15
16	6500-7000	2800-3000	28000-30000	280-300	16	16	16	16
17	7000-7500	3000-3200	30000-32000	300-320	17	17	17	17
18	7500-8000	3200-3400	32000-34000	320-340	18	18	18	18
19	8000-8500	3400-3600	34000-36000	340-360	19	19	19	19
20	8500-9000	3600-3800	36000-38000	360-380	20	20	20	20
21	9000-9500	3800-4000	38000-40000	380-400	21	21	21	21
22	9500-10000	4000-4200	40000-42000	400-420	22	22	22	22
23	10000-10500	4200-4400	42000-44000	420-440	23	23	23	23
24	10500-11000	4400-4600	44000-46000	440-460	24	24	24	24
25	11000-11500	4600-4800	46000-48000	460-480	25	25	25	25
26	11500-12000	4800-5000	48000-50000	480-500	26	26	26	26
27	12000-12500	5000-5200	50000-52000	500-520	27	27	27	27
28	12500-13000	5200-5400	52000-54000	520-540	28	28	28	28
29	13000-13500	5400-5600	54000-56000	540-560	29	29	29	29
30	13500-14000	5600-5800	56000-58000	560-580	30	30	30	30
31	14000-14500	5800-6000	58000-60000	580-600	31	31	31	31
32	14500-15000	6000-6200	60000-62000	600-620	32	32	32	32
33	15000-15500	6200-6400	62000-64000	620-640	33	33	33	33
34	15500-16000	6400-6600	64000-66000	640-660	34	34	34	34
35	16000-16500	6600-6800	66000-68000	660-680	35	35	35	35
36	16500-17000	6800-7000	68000-70000	680-700	36	36	36	36
37	17000-17500	7000-7200	70000-72000	700-720	37	37	37	37
38	17500-18000	7200-7400	72000-74000	720-740	38	38	38	38
39	18000-18500	7400-7600	74000-76000	740-760	39	39	39	39
40	18500-19000	7600-7800	76000-78000	760-780	40	40	40	40
41	19000-19500	7800-8000	78000-80000	780-800	41	41	41	41
42	19500-20000	8000-8200	80000-82000	800-820	42	42	42	42
43	20000-20500	8200-8400	82000-84000	820-840	43	43	43	43
44	20500-21000	8400-8600	84000-86000	840-860	44	44	44	44
45	21000-21500	8600-8800	86000-88000	860-880	45	45	45	45
46	21500-22000	8800-9000	88000-90000	880-900	46	46	46	46
47	22000-22500	9000-9200	90000-92000	900-920	47	47	47	47
48	22500-23000	9200-9400	92000-94000	920-940	48	48	48	48
49	23000-23500	9400-9600	94000-96000	940-960	49	49	49	49
50	23500-24000	9600-9800	96000-98000	960-980	50	50	50	50
51	24000-24500	9800-10000	98000-100000	980-1000	51	51	51	51
52	24500-25000	10000-10200	100000-102000	1000-1020	52	52	52	52
53	25000-25500	10200-10400	102000-104000	1020-1040	53	53	53	53
54	25500-26000	10400-10600	104000-106000	1040-1060	54	54	54	54
55	26000-26500	10600-10800	106000-108000	1060-1080	55	55	55	55
56	26500-27000	10800-11000	108000-110000	1080-1100	56	56	56	56
57	27000-27500	11000-11200	110000-112000	1100-1120	57	57	57	57
58	27500-28000	11200-11400	112000-114000	1120-1140	58	58	58	58
59	28000-28500	11400-11600	114000-116000	1140-1160	59	59	59	59
60	28500-29000	11600-11800	116000-118000	1160-1180	60	60	60	60
61	29000-29500	11800-12000	118000-120000	1180-1200	61	61	61	61
62	29500-30000	12000-12200	120000-122000	1200-1220	62	62	62	62
63	30000-30500	12200-12400	122000-124000	1220-1240	63	63	63	63
64	30500-31000	12400-12600	124000-126000	1240-1260	64	64	64	64
65	31000-31500	12600-12800	126000-128000	1260-1280	65	65	65	65
66	31500-32000	12800-13000	128000-130000	1280-1300	66	66	66	66
67	32000-32500	13000-13200	130000-132000	1300-1320	67	67	67	67
68	32500-33000	13200-13400	132000-134000	1320-1340	68	68	68	68
69	33000-33500	13400-13600	134000-136000	1340-1360	69	69	69	69
70	33500-34000	13600-13800	136000-138000	1360-1380	70	70	70	70
71	34000-34500	13800-14000	138000-140000	1380-1400	71	71	71	71
72	34500-35000	14000-14200	140000-142000	1400-1420	72	72	72	72
73	35000-35500	14200-14400	142000-144000	1420-1440	73	73	73	73
74	35500-36000	14400-14600	144000-146000	1440-1460	74	74	74	74
75	36000-36500	14600-14800	146000-148000	1460-1480	75	75	75	75
76	36500-37000	14800-15000	148000-150000	1480-1500	76	76	76	76
77	37000-37500	15000-15200	150000-152000	1500-1520	77	77	77	77
78	37500-38000	15200-15400	152000-154000	1520-1540	78	78	78	78
79	38000-38500	15400-15600	154000-156000	1540-1560	79	79	79	79
80	38500-39000	15600-15800	156000-158000	1560-1580	80	80	80	80
81	39000-39500	15800-16000	158000-160000	1580-1600	81	81	81	81
82	39500-40000	16000-16200	160000-162000	1600-1620	82	82	82	82
83	40000-40500	16200-16400	162000-164000	1620-1640	83	83	83	83
84	40500-41000	16400-16600	164000-166000	1640-1660	84	84	84	84
85	41000-41500	16600-16800	166000-168000	1660-1680	85	85	85	85
86	41500-42000	16800-17000	168000-170000	1680-1700	86	86	86	86
87	42000-42500	17000-17200	170000-172000	1700-1720	87	87	87	87
88	42500-43000	17200-17400	172000-174000	1720-1740	88	88	88	88
89	43000-43500	17400-17600	174000-176000	1740-1760	89	89	89	89
90	43500-44000	17600-17800	176000-178000	1760-1780	90	90	90	90
91	44000-44500	17800-18000	178000-180000	1780-1800	91	91	91	91
92	44500-45000	18000-18200	180000-182000	1800-1820	92	92	92	92
93	45000-45500	18200-18400	182000-184000	1820-1840	93	93	93	93
94	45500-46000	18400-18600	184000-186000	1840-1860	94	94	94	94
95	46000-46500	18600-18800	186000-188000	1860-1880	95	95	95	95
96	46500-47000	18800-19000	188000-190000	1880-1900	96	96	96	96
97	47000-47500	19000-19200	190000-192000	1900-1920	97	97	97	97
98	47500-48000	19200-19400	192000-194000	1920-1940	98	98	98	98
99	48000-48500	19400-19600	194000-196000	1940-1960	99	99	99	99
100	48500-49000	19600-19800	196000-198000	1960-1980	100	100	100	100





Monumental buildings



, Greece





Santa Maria di Collemaggio



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