

Italian strong motion network - RAN



- Italian Civil protection organization and mandate
- DPC 's general strategy of seismic monitoring
- Project RAN – technical aspects
- Use of RAN strong motion recordings during seismic emergency
- Future developments

Civil protection organization and mandate

The Italian civil protection is organized in a
"National Service of Civil Protection"



Components:

- State administrations
- Provincial councils
- Municipalities
- Mountain communities
- Public boards
- Institutes and scientific research groups with civil protection purposes
- Any institution or organization, also private Citizens
- Associated groups of volunteers
- Professional associations and boards

Operative structures:

- Voluntary service
- Fire Department
- Armed Forces
- Forestry commission
- National groups of scientific research
- Police Forces
- Italian Red Cross
- National Health Service
- the National Mountain rescue and speleological corps

Civil protection organization and mandate



The **National Service of Civil Protection** aims at safeguarding human life and health, goods, national heritage, human settlements and the environment from all natural or man-made disasters

Activities:

- Forecasting and Warning
- Prevention and Mitigation
- Rescue and Assistance
- Emergency Overcoming

The **Department of Civil Protection (DPC)** is a structure of the Prime Minister's Office and has the function of coordinating and directing the National Service of Civil Protection

DPC' s General strategy for seismic monitoring



DPC's seismic monitoring activities:

- seismic surveillance and warning

DPC has a monetary agreement with INGV for seismic monitoring and warning.

After few minutes a seismic event INGV send earthquake localization parameters and magnitude value to DPC

structure monitoring

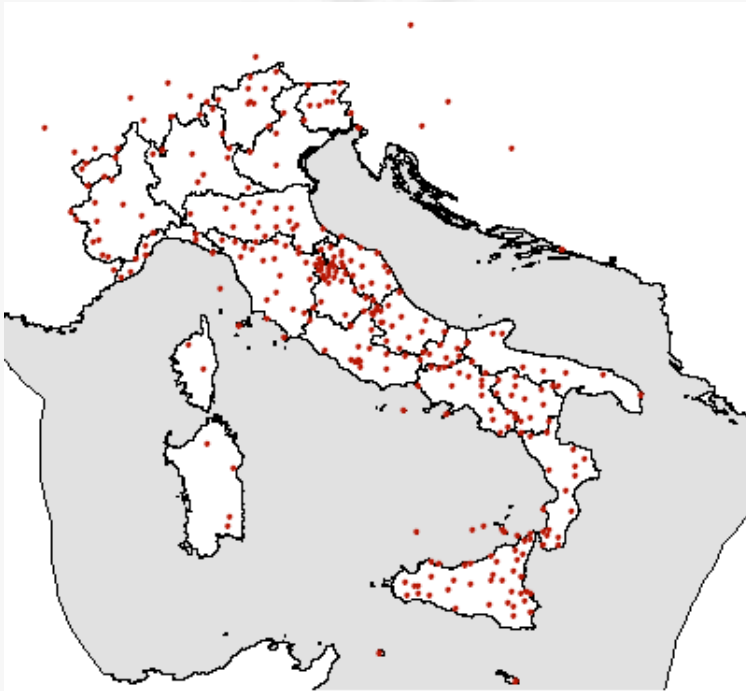
- OSS – main permanent network (124 structures)
- RAMSES – simplified system network (14 buildings)
- OSM – mobile network

- ground motion monitoring

- RAN – permanent network (464 stations)
- RAN – mobile network

° DPC' s General strategy for seismic monitoring

- seismic surveillance and warning



**INGV seismic network
(310 stations)**

SMS

INGV Man 27/01/12 To=14:53:13 MI=5.4 IPO
44.48 10.03 60.8 Eh=0.96 Ez=1.87 G=75

- > Q=AA D=Frignano P=PARMA C=*,Corniglio,
Berceto**,Monchio delle Corti*,Palanzano,T

INGV web page dedicated to DPC

Calendario: gennaio 2012

lun	mar	mer	gio	ven	sab	dom
26	27	28	29	30	31	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	1	2	3	4	5

Lista degli eventi della data selezionata 27/01/2012

Time	Mag	Locality
14:53:13.95	5.4	Frignano **
14:52:59.84	5.1	Pianura padana lombarda **
11:52:57.31	2.1	Monte Alpi-Sirino
11:31:52.66	1.6	Colline Metallifere
11:29:14.28	1.8	Colline Metallifere
11:12:24.11	1.9	Colfiorito
11:07:11.86	1.3	Colfiorito-NOBERA Umbra
11:06:22.62	1.3	Pollino
10:57:12.24	1.3	Maresma
08:34:32.39	1.2	Zona Macerata
07:39:52.33	2.6	Alpi Retiche **
07:36:44.58	2.4	Bacino di Gubbio
06:45:25.23	1.4	Valle del Topino

Evento su terraferma

Informazioni su: ITALIA

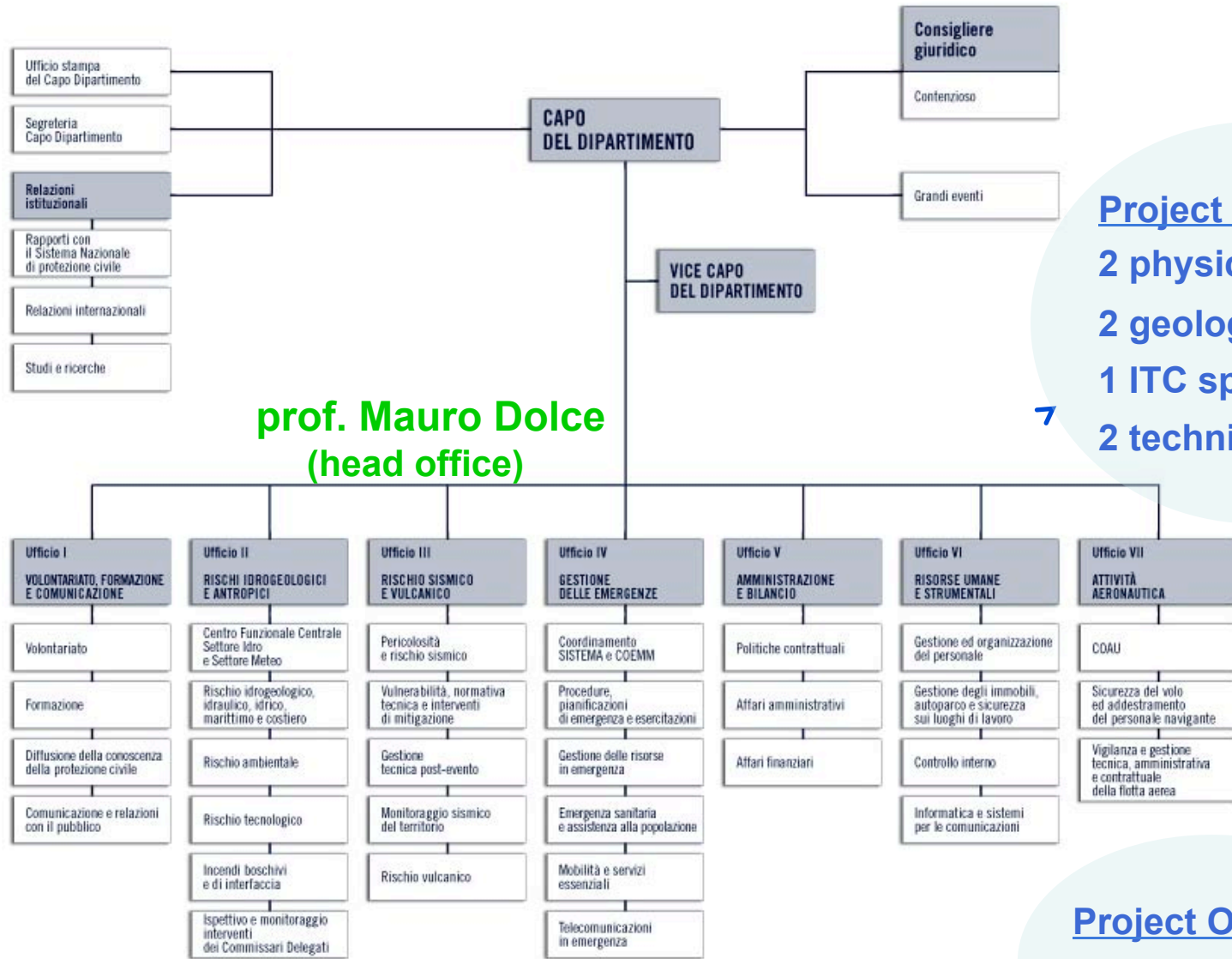
Informazioni su: EMILIA-ROMAGNA

Evento non comunicato, mappa non disponibile sul WEB

Dettagli sulla localizzazione

Comune	Abitanti
PONTREMOLI (MS)	5412
BERCETO (PR)	1193
FILATTIERA (MS)	868
CALESTANO (PR)	816
SOLIGNANO (PR)	780
BAGNONE (MS)	644
TIZZANO VAL PARMA (PR)	362
PALANZANO (PR)	352
MONCHIO DELLE CORTI (PR)	306
CORNIGLIO (PR)	261

'DPC' s General strategy for seismic monitoring



prof. Mauro Dolce
(head office)

Project RAN staff:
2 physicists
2 geologists
1 ITC specialist
2 technicians

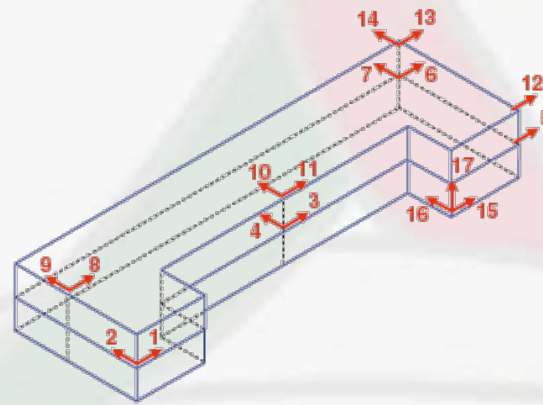
eng. Mario Nicoletti
(head service)

Project OSS staff:
5 engineers
4 technicians

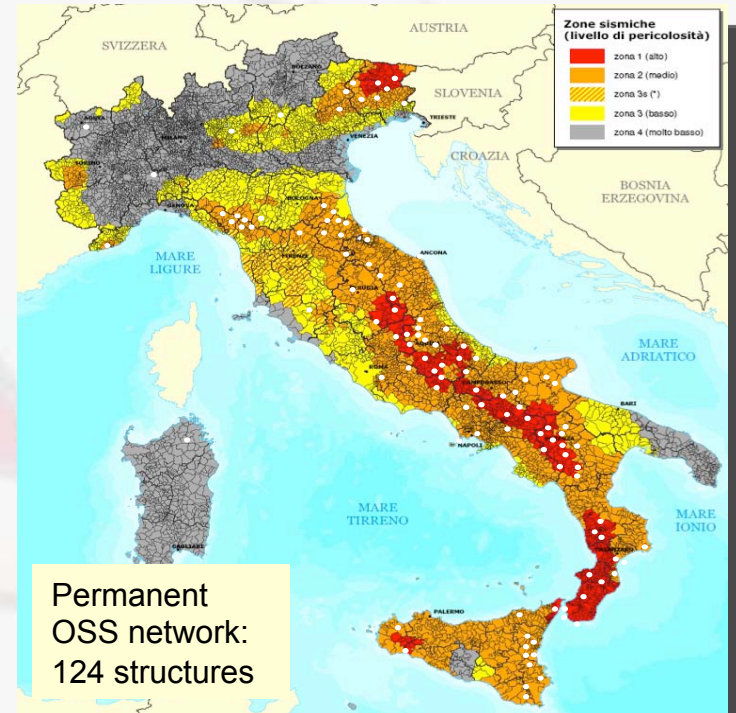
DPC' s General strategy for seismic monitoring



OSS buildings of social importance are kept under control, and the capacity of the structure to withstand earthquakes is estimated, also through structural modeling and analysis.



Sensors layout



OSS data reach a central server, which processes them to describe both **local ground shaking** and **structural dynamic response**. **Seismic damage** is assessed, and a comprehensive **Report** is automatically produced and delivered via e-mail. **Damage can be extrapolated to nearby similar structures.**

Project RAN - to increase the number of monitoring stations
- to acquire data from other strong motion networks



- in **14 years**, from 1997, the DPC has:
- ✓ **realized 284** new digital stations (**31** of these will be active within 2012)
- ✓ **replaced 192** analog instruments with **digital** ones
- ✓ **acquired 19** digital stations from Calabria Region

total active stations= 464

Thanks to **inter-institutional agreements between DPC and the regional governments and municipalities** who cooperate to locate the sites and ensure access to it and electrical supply.

- **nowadays**
- ✓ **data from** other local accelerometer networks (**ISNET, RAF**) flow into the **RAN database**

total active stations = 46

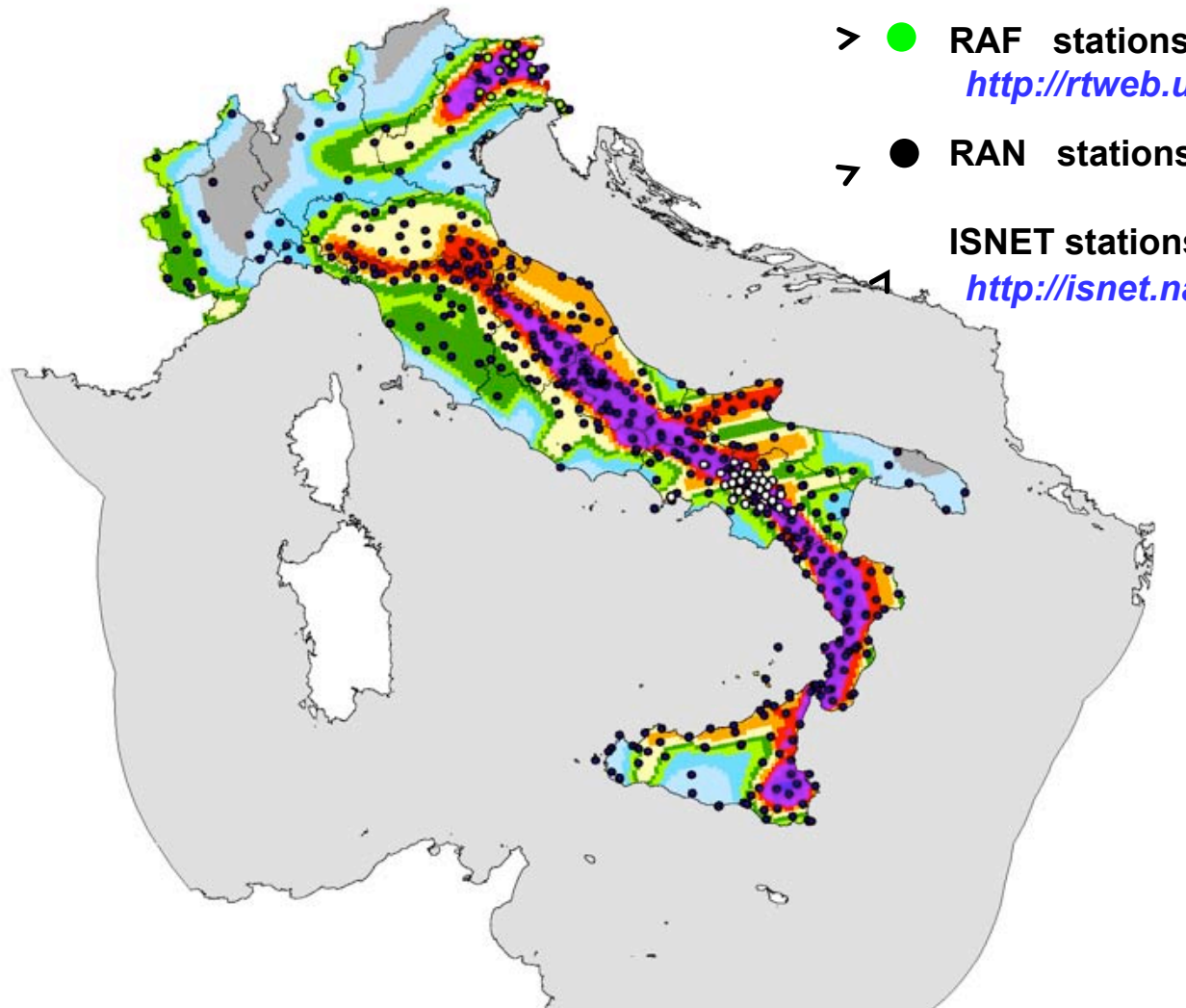
Thanks to **monetary agreements between DPC, Universities and Research Institutes**

- Project RAN** - to increase the number of monitoring stations
- to acquire data from other strong motion networks



Hazard (PGA)

- < 0,025 g
- 0,025 - 0,050
- 0,050 - 0,075
- 0,075 - 0,100
- 0,100 - 0,125
- 0,125 - 0,150
- 0,150 - 0,175
- 0,175 - 0,200
- 0,200 - 0,225
- 0,225 - 0,250
- 0,250 - 0,275
- 0,275 - 0,300



> ● **RAF stations: 15**
<http://rtweb.units.it/>

> ● **RAN stations: 464**

ISNET stations: 31
<http://isnet.na.infn.it/>

- the underlying base map is the Italian seismic hazard map (Working Group MPS 2004 <http://zonesismiche.mi.ingv.it/>)
- different colors depict PGA with a 10% chance of exceedance in 50 years

Project RAN - technical innovations in - strong-motion instrumentation

- data transmission
- data acquisition system



	kinematics	Reftek	Solgeo	Agecodagis
	Etna/Makalu /K2/Basalt	RT-130	Edax	Osiris6
RAN	253			
RAN		192		
RAN			19	
ISNet				31
RAF	15			

	kinematics	Syscom	CFX	Guralp
	Episensor /Fba23	MS2007	US4	CMG5T
RAN	253			
RAN		192		
RAN			19	
ISNet	3			28
RAF	15			

Characteristics of RAN instruments

- 3 channels sensor
- sensor full scale range 1g/2g
- resolution 18bit - 24 bit
- triggered data (200 sps)
- continuous data (100 sps)
- GPS time synchronization
- freq. response \geq DC-80Hz @200Hz
- local memory up to 2 GB
- triggered data transmission through the GSM and GPRS systems



Project RAN

Main goal:

- to collect high data quality
 - increasing the number of monitoring stations and/or acquiring data from other strong motion networks
 - adopting technical innovations in strong-motion instrumentation, data transmission and data acquisition system
 - adopting good level for stations and data acquisition system maintenance services.

Objective:

- to use strong motion data
 - to optimize the effectiveness regarding the delivery of emergency response services
 - to take a step forward in the evaluation, prevention and mitigation of seismic risk

Project RAN - technical innovations in - strong-motion instrumentation

- data transmission
- data acquisition system



RAN includes the stations of the historical network, located inside ENEL electric transformer substations.

> *GPS and high gain GPRS antennas*

GPRS router (VPN client)



Linux processor <

RT_130 <

ms2007 <

Project RAN - technical innovations in - strong-motion instrumentation

- data transmission
- data acquisition system



The new RAN stations are realized near to urban areas, mostly in free field on land owned by municipality

- > *high gain GSM/GPRS antenna*



- > *GPS antenna*
- > *GPRS/GSM modem*
- > *Power line protection*
- > *Etna/K2/Makalu FBA23/Episensor*

Project RAN - technical innovations in - strong-motion instrumentation

- data transmission
- data acquisition system



RAN includes also several stations funded by other public administration as 19 stations in Calabria Region.

GPS antenna



GSM antenna

GSM modem

EDAX

US4



Project RAN - technical innovations in - strong-motion instrumentation

- data transmission
- data acquisition system



	Kinematics	Reftek/Syscom	Solgeo/CFX
Modem GSM Siemens/APSystems	126		19
Modem GPRS APSystems	104		
Router GPRS NB2240		192	
Analog modem US Robotics	2		

The public dynamic IP addresses associated to GPRS SIM card by APN are managed with :

- VPN client configured in Router GPRS
- Monitoring IP addresses sent by modem GPRS

To improve strength of GSM/GPRS signal high gain antennas, Omni-directional or directive, are installed at stations

21 Basalt will be equipped with router in short time.

Project RAN - technical innovations in

- strong-motion instrumentation
- data transmission
- data acquisition system



dimon

dsname	cam	modem	icon	cha	sta	bitn	evfl	evop	evcr	dr	drva	drvb	size	temp	vol	bcfg	lat	lon	elev	gprc	gprs	pll	ctacy	dtacy
AQA	ds	i-si_AQA	blk	04h	04h	04h	5	0	0	0	244M	ur	0	9C	13.6V	C	42.376	13.339	682m	off	off	IG	82m96s	76416a25m56s
AQF	ds	i-si_AQF	modm	00h	18:09-0h	18:09-0h	27	0	0	0	240M	ur	0	1C	11.9V	0	42.381	13.355	798m	off	off	IG	84m35s	49422b12m41s
AQG	ds	i-si_AQG	blk	04h	04h	04h	22	0	0	0	241M	ur	0	9C	13.6V	C	42.374	13.337	742m	off	off	IG	83m49s	17b29m48s
AQK	ds	i-si_AQK	blk	04h	04h	04h	5	0	0	0	244M	ur	0	6C	13.0V	C	42.345	13.401	726m	off	off	IG	81m29s	82d19b39m29s
AQP	ds	i-si_AQP	modm	00h	23h	23h	14	0	0	0	239M	ur	0	-2C	13.7V	C	42.384	13.369	1195m	off	off	IG	87m20s	58d20b3m45s
AQV	ds	i-si_AQV	blk	04h	04h	04h	27	0	0	0	241M	ur	0	-6C	13.0V	C	42.377	13.344	891m	on	L	IG	11m09s	28d16b55m21s
ARQ	ds	i-si_ARQ	blk	04h	04h	04h	14	4	0	0	226M	ur	0	-3C	13.3V	C	44.631	11.825	44m	off	off	IG	18m11s	19b38m25s
ASR	ds	i-si_ASR	blk	04h	04h	04h	29	0	0	0	244M	ur	0	19C	13.6V	C	41.199	15.563	485m	off	off	IG	86m58s	1d18b47m48s
AVZ	ds	i-si_AVZ	blk	13:00h	13:00h	13:00h	9	0	0	0	19M	ur	0	18C	13.4V	C	42.828	13.426	743m	on	L	IG	18m40s	76d16b43m33s
BSA	ds	i-si_BSA	blk	04h	04h	04h	14	0	0	0	246M	ur	0	7C	11.5V	0	41.809	15.358	934m	off	off	IG	13m11s	3d20b52m53s
CAH	ds	i-si_CAH	blk	04h	04h	04h	2	0	0	0	248M	ur	0	3C	12.9V	0	41.283	15.475	295m	off	off	IG	11m39s	21d15b53m45s
CDS	ds	i-si_CDS	blk	04h	04h	04h	18	0	0	0	14M	ur	0	-1C	13.9V	C	41.787	14.112	938m	off	off	IG	86m53s	8d20b32m47s
CER	ds	i-si_CER	blk	04h	04h	04h	4	0	0	0	248M	ur	0	6C	13.6V	C	41.268	15.918	171m	off	off	IG	83m53s	28d21b04m22s
CES	blk	i-si_CES	blk	00h	00h	00h	48	3	0	10k	243M	ur	0	-2C	13.2V	C	44.218	12.387	49m	on	L	IG	82m45s	17b44m83s
CHT	ds	i-si_CHT	blk	04h	04h	04h	16	0	0	0	242M	ur	0	19C	13.6V	C	42.378	14.148	187m	off	off	IG	38s	4d14b24m38s
CLJ	ds	i-si_CLJ	blk	04h	04h	04h	4	0	0	0	244M	ur	0	-8C	13.0V	C	42.885	13.521	800m	off	off	IG	84m33s	83d19b26m59s
CHG	ds	i-si_CHG	blk	04h	04h	04h	2	0	0	0	248M	ur	0	9C	13.4V	C	40.678	15.182	426m	on	L	IG	18m07s	68d20b29m38s
CHM	ds	i-si_CHM	modm	0:01-0h	3:01-0h	3:01-0h	5	0	0	0	243M	ur	0	-2C	11.1V	C	41.868	14.458	1116m	on	L	IG	18m07s	83d19b53m48s
CHR	ds	i-si_CHR	blk	04h	04h	04h	8	0	0	0	247M	ur	0	2C	13.4V	C	41.833	14.712	707m	off	off	IG	83m89s	9d23b36m38s
COP	ds	i-si_COP	blk	04h	04h	04h	2	0	0	0	248M	ur	0	3C	12.7V	C	40.378	16.041	775m	on	L	IG	11m31s	68d14b26m44s
CPS	ds	i-si_CPS	blk	04h	04h	04h	13	0	0	0	241M	ur	0	-1C	13.1V	C	42.272	13.759	581m	on	U	IG	12d17m37s	83d17m07m55s
CS01	ds	i-si_CS01	blk	04h	04h	04h	7	0	0	0	244M	ur	0	-6C	13.1V	C	42.181	13.888	857m	on	U	IG	11m43s	9d21b05m34s
CTL	ds	i-si_CTL	blk	04h	04h	04h	3	0	0	0	248M	ur	0	-1C	13.4V	C	43.955	12.736	62m	off	off	IG	83m14s	4d15b38m47s
GAI	ds	i-si_GAI	modm	04h	19h	19h	5	0	0	0	247M	ur	0	19C	12.7V	C	45.658	18.616	399m	on	U	IG	12m56s	17d16b31m15s
GRD	ds	i-si_GRD	blk	04h	04h	04h	5	0	0	0	244M	ur	0	5C	12.8V	C	42.178	14.188	782m	off	off	IG	84m46s	83d19b15m57s
GSA	ds	i-si_GSA	blk	00h	00h	00h	14	0	0	0	243M	ur	0	-1C	13.0V	C	42.421	13.519	1061m	on	L	IG	12m14s	18d8b46m58s
ISR	ds	i-si_ISR	blk	04h	04h	04h	2	0	0	0	248M	ur	0	3C	12.7V	C	41.621	14.229	598m	on	U	IG	13m41s	24d13b52m33s
LEC	ds	i-si_LEC	blk	04h	04h	04h	4	0	0	0	248M	ur	0	3C	13.7V	C	45.861	9.411	339m	ab	ab	IG	38m57s	19d23b18m44s
MAR	ds	i-si_MAR	blk	04h	04h	04h	4	0	0	0	248M	ur	0	5C	12.9V	C	40.676	16.583	413m	off	off	IG	81m03s	17d15b53m53s
MCT	ds	i-si_MCT	blk	04h	04h	04h	4	0	1	0	248M	ur	0	6C	13.3	0	47m	on	L	IG	18m15s	31d22b29m82s		
MEN	ds	i-si_MEN	blk	04h	04h	04h	24	0	0	0	248M	ur	0	6C	13.3	0	79m	on	off	IG	82m83s	48d2b8m45s		
MEF	ds	i-si_MEF	blk	00h	00h	00h	4	0	0	0	248M	ur	0	9C	12.5	10k	688m	off	IF	IG	83m31s	17b51m85s		
MNG	ds	i-si_MNG	blk	04h	04h	04h	1	0	0	0	248M	ur	0	6C	13.3	0	107m	on	off	IG	18m07s	13d16b17m48s		
MNI	ds	i-si_MNI	blk	04h	04h	04h	4	0	0	0	248M	ur	0	6C	13.6	0	76m	on	U	IG	18m11s	6d21b26m53s		
MRA	ds	i-si_MRA	modm	9:00-0h	11:00-0h	11:00-0h	3	0	0	0	248M	ur	0	19C	18.5	0	33m	on	off	IG	85m34s	14d15b53m52s		
MRZ	blk	i-si_MRZ	blk	00h	00h	00h	19	1	0	10k	245M	ur	0	6C	12.7	0	63m	on	L	IG	88m04s	8d19b12m53s		
MTR	ds	i-si_MTR	blk	04h	04h	04h	5	0	0	0	248M	ur	0	-3C	13.3	8.5k	172m	on	L	IG	11m58s	28d21b15m21s		
ORC	ds	i-si_ORC	blk	00h	00h	00h	7	0	0	0	19M	ur	0	7C	13.4	0	79m	on	U	IG	86m48s	75d21b21m38s		
ORP	blk	i-si_ORP	blk	00h	00h	00h	28	1	0	8.5k	244M	ur	0	12C	13.5	0	177m	on	off	IG	48s	19b15m57s		
PAR	ds	i-si_PAR	blk	23h	23h	23h	28	0	4	0	245M	ur	0	-3C	12.7V	C	44.829	18.279	90m	on	L	IG	18m29s	11d16b58m27s
PRM	ds	i-si_PRM	blk	04h	04h	04h	13	0	0	0	246M	ur	0	9C	13.4V	C	44.388	9.882	339m	off	IF	IG	87m42s	17d16b31m48s

The whole network will be upgraded to GPRS system within 2012 and an APN dedicated to DPC will be used to manage GPRS connections.

Dimon for Etna/K2/Everest with GPRS modem

Project RAN - technical innovations in

- strong-motion instrumentation
- data transmission
- data acquisition system



Dynamic IP address
updated every 60 secs

SIM s/n

STAZ	IPnumber	last packet	packet delay	#lost	last reset	reset delay	#reset	SIM s/n
AQA	95.74.16.33	2012/02/20 11:31	0:0:35	5724	2012/02/20 10:50	0:41:34	476	CCID: 89390100001313254621
AQF	95.75.192.198	2012/02/20 11:31	0:0:5	6192	2012/02/20 01:43	9:47:52	40	CCID: 89390100001313254761
AQG	95.75.197.184	2012/02/20 11:30	0:0:52	2322	2012/02/20 01:44	9:47:38	40	CCID: 89390100001313254654
AQH	95.75.242.218	2012/02/19 09:18	26:12:47	47330	2012/02/19 09:18	26:12:47	312	CCID: 89390100001313254662
AQP	95.75.113.218	2012/02/20 11:31	0:0:11	25362	2012/02/20 06:01	5:30:11	154	CCID: 89390100001313254779
AQV	95.75.180.119	2012/02/20 11:31	0:0:22	6791	2012/02/20 10:33	0:58:20	475	CCID: 89390100001313254696
ARG	217.202.43.92	2012/02/20 07:06	4:24:52	18063	2012/02/20 07:03	4:28:32	464	CCID: 89390100001313254977
ASR	2.192.209.91	2012/02/20 11:31	0:0:44	5031	2012/02/20 02:35	8:56:29	43	CCID: 89390100001313254928
AVZ	95.74.6.45	2012/02/01 11:56	455:35:20	89099	2012/02/01 10:58	456:33:18	19	CCID: 89390100001313255057
BSA	95.75.247.155	2012/02/20 11:31	0:0:43	1281	2012/02/20 08:33	2:58:38	41	CCID: 89390100001313255172
CAN	2.193.4.88	2012/02/20 11:31	0:0:9	2142	2012/02/20 05:57	5:33:58	43	CCID: 89390100001313255123
CBI	95.75.185.27	2012/02/20 10:14	1:16:45	87	2012/02/20 09:20	2:11:44	0	CCID: 89390100001313255321
CDS	95.75.203.229	2012/02/20 11:31	0:0:3	9072	2012/02/20 01:41	9:49:50	41	CCID: 89390100001313255107
CER	95.74.252.163	2012/02/20 11:31	0:0:2	504	2012/02/20 11:30	0:1:1	44	CCID: 89390100001313254993
CES	109.53.148.223	2012/02/20 11:31	0:0:17	376	2012/02/20 01:34	9:57:4	41	CCID: 89390100001313254944
CHT	217.203.136.222	2012/02/20 11:31	0:0:4	5202	2012/02/20 06:43	4:48:1	39	CCID: 89390100001313254803
CLN	95.75.112.78	2012/02/20 11:30	0:0:53	4235	2012/02/20 00:35	10:56:38	40	CCID: 89390100001313254753
CMG	2.196.31.94	2012/02/20 11:31	0:0:30	323	2012/02/20 10:43	0:48:28	40	CCID: 89390100001313255248
CMW	95.75.108.143	2012/02/06 02:22	345:14:22	76013	2012/02/06 02:17	345:14:22	65	CCID: 89390100001313255099
CMR	95.75.48.214	2012/02/20 11:30	0:0:53	2594	2012/02/20 10:58	0:32:52	41	CCID: 89390100001313255271
COP	109.54.126.35	2012/02/20 11:31	0:0:40	229	2012/02/20 04:44	6:47:30	41	CCID: 89390100001313254878
CPS	95.75.195.33	2012/02/20 11:31	0:0:4	6542	2012/02/20 01:43	9:47:50	40	CCID: 89390100001313254795
CSO1	95.75.227.91	2012/02/20 11:30	0:0:59	8594	2012/02/20 06:08	5:22:51	41	CCID: 89390100001313255065
CTL	2.193.65.159	2012/02/20 11:30	0:0:44	276	2012/02/20 05:28	6:3:36	40	CCID: 89390100001313255289
GAI	2.198.9.74	2012/02/20 11:30	0:0:57	8351	2012/02/19 23:37	11:54:42	44	CCID: 89390100001313255164
GRD	2.192.89.228	2012/02/20 11:31	0:0:17	6729	2012/02/20 08:12	3:19:12	40	CCID: 89390100001313254746
GSA	95.75.54.41	2012/02/20 11:31	0:0:19	3803	2012/02/20 05:44	5:47:10	41	CCID: 89390100001313254738
GSM	95.75.122.164	2012/02/20 11:31	0:0:15	8	2012/02/20 07:36	3:55:9	1	CCID: 89390100001313255446
ISR	95.75.124.197	2012/02/20 08:38	2:53:36	1033	2012/02/20 01:31	10:0:24	42	CCID: 89390100001313254811
LEC	109.53.233.121	2012/02/20 11:30	0:0:49	253	2012/02/20 07:32	3:59:43	41	CCID: 89390100001313255214
done	next	previous	disconnected	all	refresh	Last update: 2012/02/20 11:31:44.663		
XXXX	Station	Search						

APmon program allows continuous monitoring of GPRS connections

Project RAN - technical innovations in

- strong-motion instrumentation
- data transmission
- data acquisition system



MultiTech Modem Bank :
 \ CC1600 -11 L Modem
 Rack for 16 modems
 \ PS 1600 Hot-Swappable
 Power Supply
 \ MT5600BR - V92
 Rackmount Data Modem
 Card

2x

Sun SPARC Enterprise M4000 Server :
 \ 4x2.15GHz SPARC 64 VI
 64GB RAM
 \ 2x146 @ 10k SAS HDD
 \ 2xGbE ports

Software ANTELOPE
 OS Solaris

1x

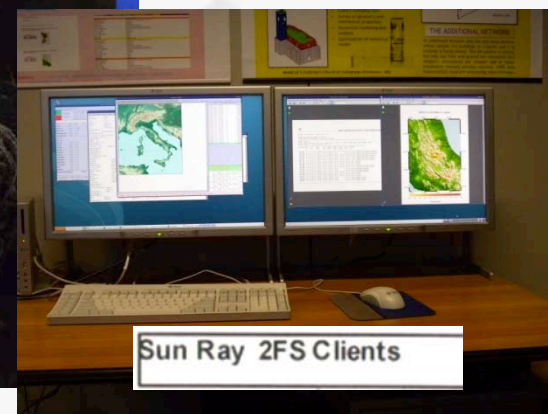
Sun SPARC Enterprise T5220 Server :
 \ 1x8-core T2 @ 1.2GHz
 \ 32GB RAM
 \ 2x146 GB @ 10k SAS
 \ HDD
 \ 4xGbE ports

Software ANTELOPE
 OS Solaris

2x

NexSan SATAbeast :
 \ 1TB @ 7200 HDD
 \ 2x iSCSI
 \ 2xFiber Channel port

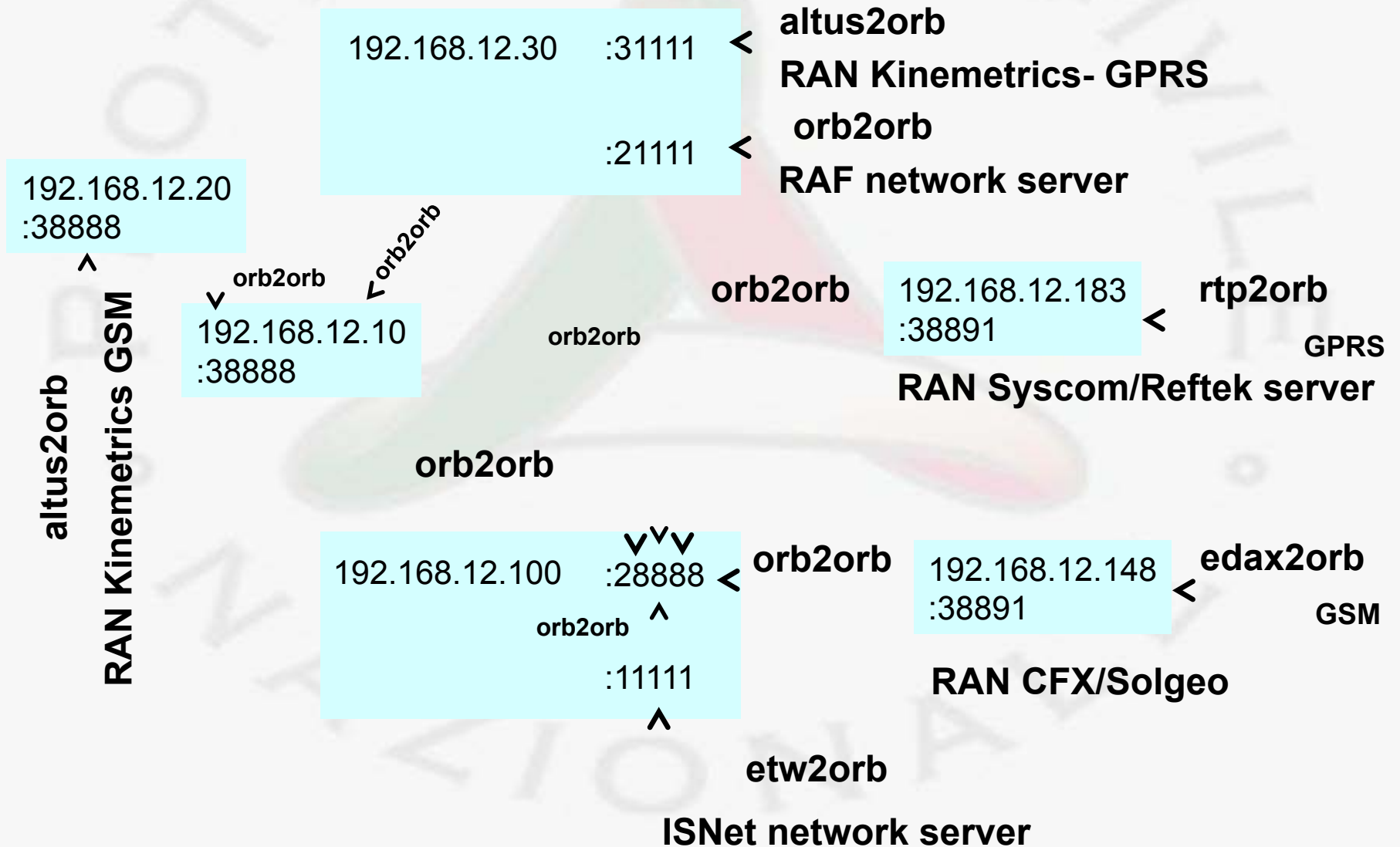
1x



Sun Ray 2FS Clients

Project RAN - technical innovations in

- strong-motion instrumentation
- data transmission
- data acquisition system



Project RAN - good level for stations and data acquisition system maintenance



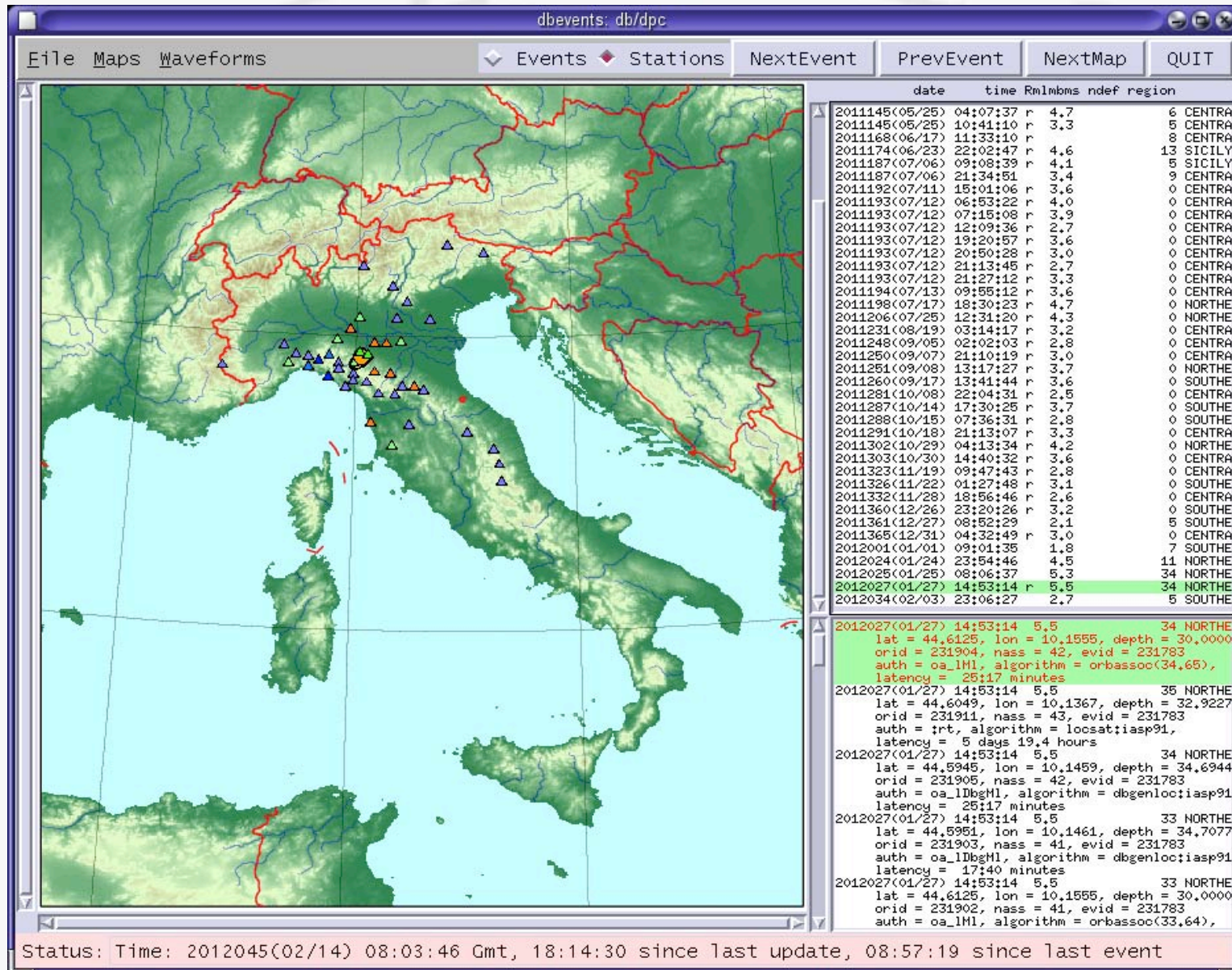
A good level of maintenance service for RAN stations and for the RAN data acquisition center is necessary.

This in order to acquire and retrieve data from the network in case of seismic event.

DPC requires:

- the 95% of the stations works properly
- the single station cannot be out of service for more than 5 days
- the support in installing temporary stations in epicentral area during seismic emergency

Project RAN – use of RAN recordings during seismic emergency



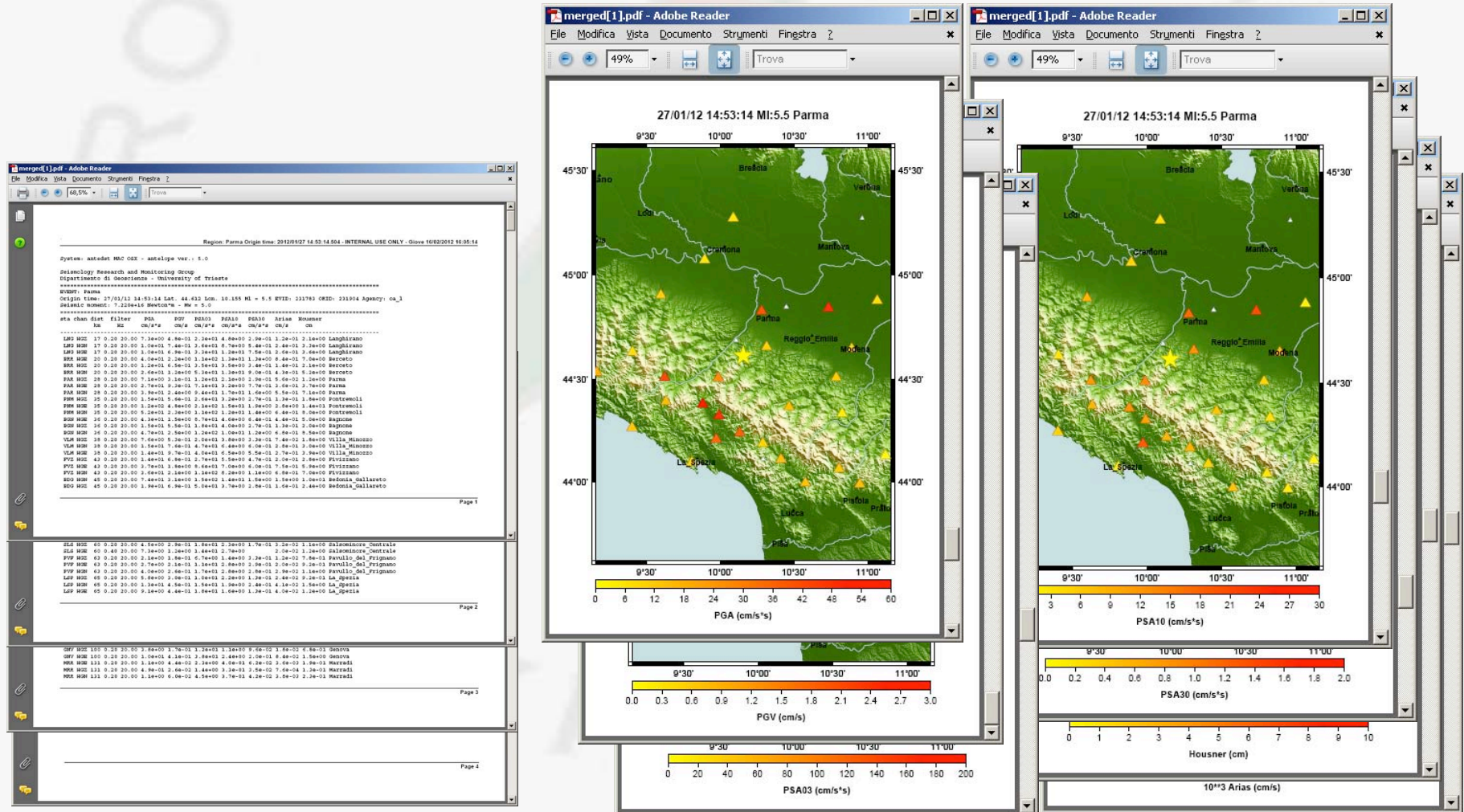
>MI=5.5

>nass=42

Project RAN – use of RAN recordings during seismic emergency



REPORT generated by automatic procedure developed by University of Trieste – Seismological Research and monitoring group



Project RAN – use of RAN recordings during seismic emergency



new_report[1].pdf - Adobe Reader

File Modifica Vista Documento Strumenti Finestra ?

68,5% Trova

Region: Parma Origin time: 2012/01/27 14:53:14.504 - INTERNAL USE ONLY - Giove 16/02/2012 16:05:14

System: antedst MAC OSX - antelope ver.: 5.0

Seismology Research and Monitoring Group
Dipartimento di Geoscienze - University of Trieste

=====

EVENT: Parma
Origin time: 27/01/12 14:53:14 Lat. 44.612 Lon. 10.155 Ml = 5.5 EVID: 231783 ORID: 231904 Agency: ca_1
Seismic moment: 7.220e+16 Newton*m - Mw = 5.0

=====

sta	chan	dist	filter	PGA	PGV	PSA03	PSA10	PSA30	Arias	Housner		
		km	Hz	cm/s*s	cm/s	cm/s*s	cm/s*s	cm/s*s	cm/s	cm		
LNG	HGZ	17	0.20	20.00	7.3e+00	4.8e-01	2.3e+01	4.8e+00	2.9e-01	1.2e-01	2.1e+00	Langhirano
LNG	HGN	17	0.20	20.00	1.0e+01	7.4e-01	3.6e+01	8.7e+00	5.4e-01	2.4e-01	3.3e+00	Langhirano
LNG	HGE	17	0.20	20.00	1.0e+01	6.9e-01	3.3e+01	1.2e+01	7.5e-01	2.6e-01	3.6e+00	Langhirano
BRR	HGE	20	0.20	20.00	4.0e+01	2.2e+00	1.1e+02	1.3e+01	1.3e+00	8.4e-01	7.0e+00	Berceto
BRR	HGZ	20	0.20	20.00	1.2e+01	6.5e-01	3.5e+01	3.5e+00	3.4e-01	1.4e-01	2.1e+00	Berceto
BRR	HGN	20	0.20	20.00	2.6e+01	1.2e+00	5.3e+01	1.3e+01	9.0e-01	4.3e-01	5.2e+00	Berceto
PAR	HGZ	28	0.20	20.00	7.1e+00	3.1e-01	1.2e+01	2.1e+00	2.9e-01	5.6e-02	1.2e+00	Parma
PAR	HGE	28	0.20	20.00	2.7e+01	9.3e-01	7.1e+01	3.2e+00	7.7e-01	3.6e-01	3.7e+00	Parma
PAR	HGN	28	0.20	20.00	3.9e+01	2.4e+00	9.4e+01	1.7e+01	1.6e+00	5.5e-01	7.1e+00	Parma
PNM	HGZ	35	0.20	20.00	1.5e+01	5.6e-01	2.6e+01	3.2e+00	2.7e-01	1.3e-01	1.8e+00	Pontremoli
PNM	HGE	35	0.20	20.00	1.2e+02	4.8e+00	2.1e+02	1.5e+01	1.9e+00	2.8e+00	1.4e+01	Pontremoli
PNM	HGN	35	0.20	20.00	5.2e+01	2.3e+00	1.1e+02	1.2e+01	1.4e+00	6.4e-01	8.0e+00	Pontremoli
BGN	HGE	36	0.20	20.00	4.3e+01	1.5e+00	8.7e+01	4.6e+00	6.4e-01	4.4e-01	5.0e+00	Bagnone
BGN	HGZ	36	0.20	20.00	1.5e+01	5.5e-01	1.8e+01	4.0e+00	2.7e-01	1.3e-01	2.0e+00	Bagnone
BGN	HGN	36	0.20	20.00	4.7e+01	2.5e+00	1.2e+02	1.0e+01	1.2e+00	6.8e-01	8.5e+00	Bagnone
VLM	HGZ	38	0.20	20.00	7.6e+00	5.3e-01	2.0e+01	3.8e+00	3.3e-01	7.4e-02	1.8e+00	Villa_Minozzo
VLM	HGE	38	0.20	20.00	1.5e+01	7.6e-01	4.7e+01	6.4e+00	6.0e-01	2.8e-01	3.0e+00	Villa_Minozzo
VLM	HGN	38	0.20	20.00	1.4e+01	9.7e-01	4.0e+01	6.5e+00	5.5e-01	2.7e-01	3.9e+00	Villa_Minozzo
FVZ	HGZ	43	0.20	20.00	1.4e+01	6.8e-01	2.7e+01	5.5e+00	4.7e-01	2.0e-01	2.8e+00	Fivizzano
FVZ	HGE	43	0.20	20.00	3.7e+01	1.8e+00	8.6e+01	7.0e+00	6.0e-01	7.5e-01	5.9e+00	Fivizzano
FVZ	HGN	43	0.20	20.00	3.6e+01	2.1e+00	1.1e+02	8.2e+00	1.1e+00	6.8e-01	7.0e+00	Fivizzano
BDG	HGN	45	0.20	20.00	7.4e+01	3.1e+00	1.5e+02	1.4e+01	1.5e+00	1.5e+00	1.0e+01	Bedonia_Gallareto
BDG	HGZ	45	0.20	20.00	1.9e+01	6.9e-01	5.0e+01	3.7e+00	2.8e-01	1.6e-01	2.4e+00	Bedonia_Gallareto

Page 1

If information from INGV ftp site are available, localization parameters and magnitude value calculated by automatic procedure are overwritten and the dist parameter is calculated using the INGV ipocentral parameters.

Project RAN – use of RAN recordings during seismic emergency



The REPORT contains

- an estimation of seismic moment and M_w for the associated event
- epicentral distance for recording stations
- PGA, PGV, PSA03, PSA10, PSA30, Arias and Housner intensities for recorded waveforms

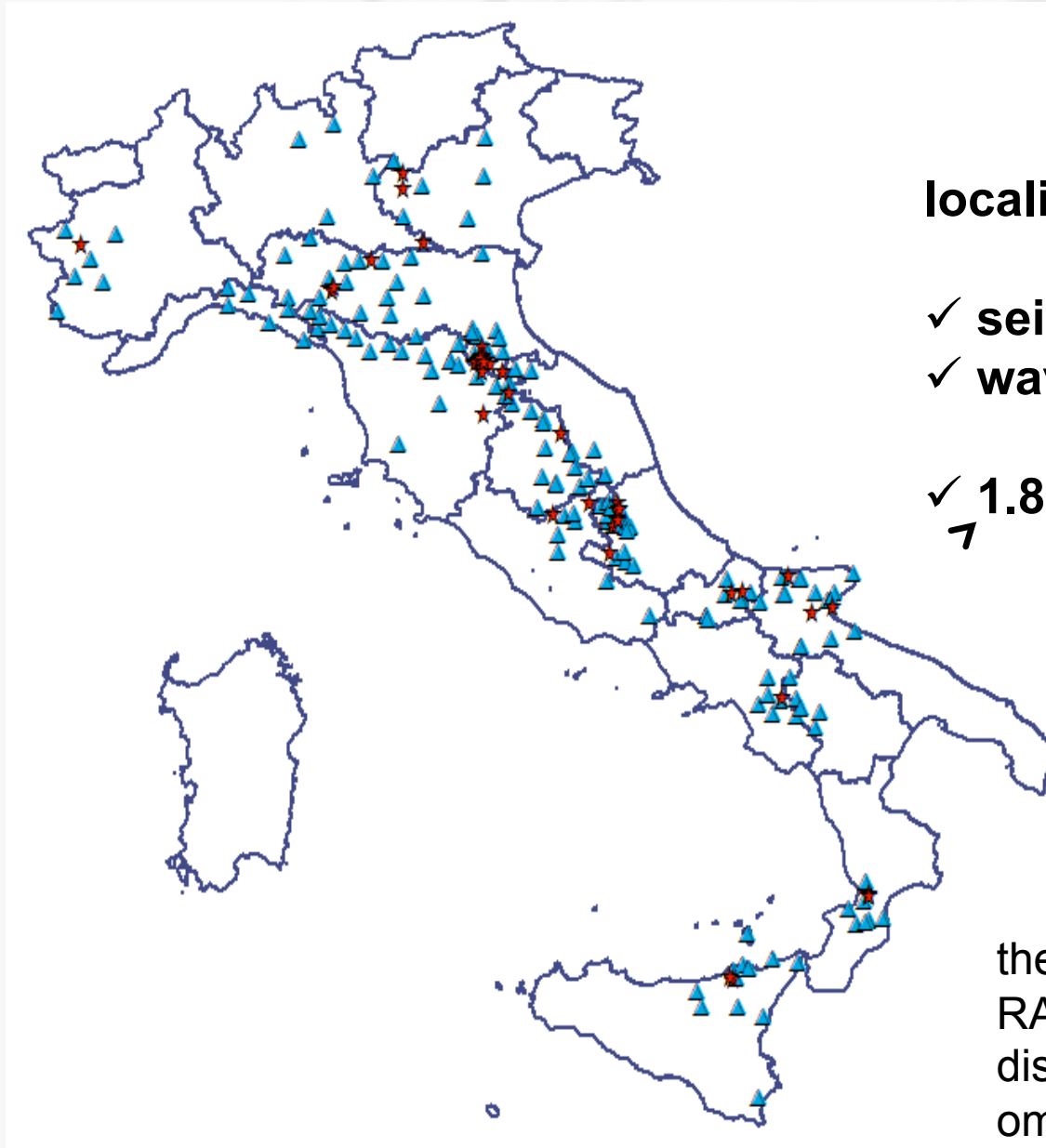
The REPORT is sent by e_mail automatically.

Critical point: Metadata management

The automatic procedure use dbmaster tables that must be updated in real time.

Real time information about changes in metadata of “external” networks (ISNet and RAF) are necessary as well.

Project RAN – data acquisition systems products



localizations from 2011

✓ seismic events = 48

✓ waveforms (3 cha) = 693

✓ $1.8 < M_I < 5.4$

the detection capability of the RAN network depends on spatial distribution of stations that is not omogeneous

Project RAN – future developments



- The automatic procedure will be implemented and the report will contain more ground motion and response parameters according to:
Cosenza E., Manfredi G., " Damage indices and damage measure Prog. Struct. Engng Mater. 2000; 2: 50–59. Ed. John Wiley & Sons
- The REPORT will contain information on the site where the station is locate. We will start with EC8 classification.
- Web pages will be generated in real time.
- Antelope database will be populated with RAN data recorded in past years. This database could be used to optimize automatic procedures, event location and local magnitude calculation.
- New stations will be realized in seismic urban area sparsely monitored.