

ReNEP

The Portuguese Network of Continuously Operating Reference Stations

Status, Products and Services

Manuela Vasconcelos (mvasconcelos@dgterritorio.pt)

Ana Carla Bernardes (abernardes@dgterritorio.pt)

Carla Martins (cmartins@dgterritorio.pt)

Outline

- **Some History**
- **Present Status**
- **Products & Services**
- **Users**
- **Accuracy**
- **ReNEP & International Networks**
- **Data Access**



Some History

1997: First GPS Reference Station (CORS), installed in Cascais, near the Tide Gauge

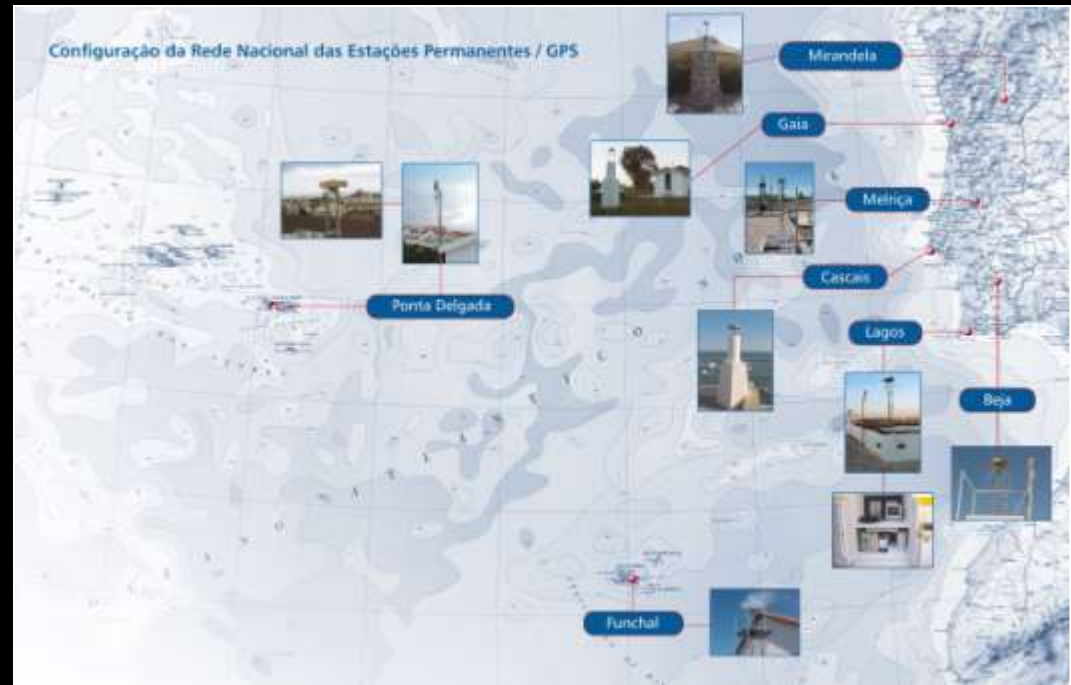


2000 - 2006: 7 new CORS

Operation:

Post-processing

Daily RINEX files at 30s rate



Goals:

Maintenance of the Geodetic Reference Frames

Support to Positioning works

Some History

Nov 2006: beginning of the distribution of RTK corrections



Jul 2007: First station from a partner



2007 - 2009:
28 CORS Installed
4 CORS from partners

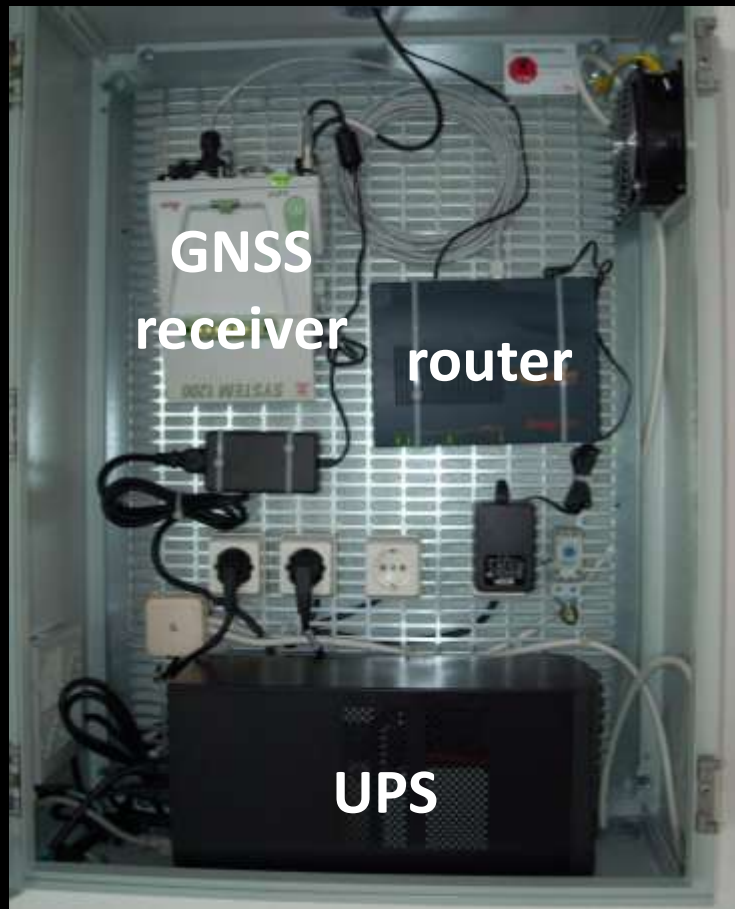


Apr 2007: Hourly files at 5s rate

Mar 2009: New RTK Products

2015: Conclusion of the Network

Aspect of a CORS



GNSS antenna



Present Status of the Network



Present Status of the Network



48 CORS: 42 Mainland + 4 Azores + 2 Madeira

42 DGT + 6 Partners

GPS&GLONASS



RTK Network Mode

Streaming Continuously

**Message Types: RTCM (*Radio Technical Commission for Maritime Services*) over NTRIP
(*Networked Transport of RTCM via Internet Protocol*)**

Files: RINEX (*Receiver Independent Exchange Format*) at 5s rate



Reference Systems:

Mainland: ETRS89

Azores and Madeira: ITRF93



Products

Management	Product Name	Site ...	Pro...	Data Source	Product Contents	Produc...	Observ...	Archive Type	Root Path	Clean up	FTP Destinations
See Server	In_brag	BRAG	RINEX	Downloaded MDB file	Obs.Nav,SNR	1 h	5.0 s	Zip	D:\GPS Spider\Data	Never	IGP_Server_BRAG
Sites	brag_24h	BRAG	RINEX	Downloaded MDB file	Obs.Nav,SNR,Doppler,QC Report	1 day	30.0 s	Zip	C:\GPS Spider\Data	Never	FCUL
AGUEDA	Is_brag	BRAG	RINEX	Downloaded MDB file	Obs.Nav	1 h	1.0 s	Zip	D:\GPS Spider\Data	Never	
AMARELEJA	brgn_24h	BRGN	RINEX	Downloaded MDB file	Obs.Nav,SNR,Doppler,QC Report	1 day	30.0 s	Zip	C:\GPS Spider\Data	Never	FCUL
ARRUDA VINHOS	In_brgn	BRGN	RINEX	Downloaded MDB file	Obs.Nav,SNR	1 h	5.0 s	Zip	D:\GPS Spider\Data	Never	IGP_Server_BRGN
AVIS	Is_brgn	BRGN	RINEX	Downloaded MDB file	Obs.Nav	1 h	1.0 s	Zip	D:\GPS Spider\Data	Never	
BAUÃO	In_casc	CASC	RINEX	Downloaded MDB file	Obs.Nav,SNR	1 h	5.0 s	Zip	D:\GPS Spider>Data	Never	IGP_Server_CASC
BEIA	Is_casc	CASC	RINEX	Downloaded MDB file	Obs.Nav	1 h	1.0 s	Zip	D:\GPS Spider>Data	Never	
BENAFIM	casc_EUREF_1h	CASC	RINEX	Downloaded MDB file	Obs.(Compact).Nav, Met	1 h	30.0 s	UNIX compress (.Z)	C:\GPS Spider\Data	After 1 week	BKG_EUREF_put, OLG_EUREF_put
BORBA	casc_EUREF_24h	CASC	RINEX	Downloaded MDB file	Obs.(Compact).Nav, Met	1 day	30.0 s	UNIX compress (.Z)	C:\GPS Spider>Data	Never	BKG_EUREF_put, OLG_EUREF_put
BOTICAS	casc_24h	CASC	RINEX	Downloaded MDB file	Obs.Nav,SNR,Doppler, Met,QC ...	1 day	30.0 s	Zip	C:\GPS Spider>Data	Never	
BRAGA	In_cbra	CBRA	RINEX	Downloaded MDB file	Obs.Nav,SNR	1 h	5.0 s	Zip	D:\GPS Spider>Data	Never	IGP_Server_CBRA
BRAGANÇA	Is_cbra	CBRA	RINEX	Downloaded MDB file	Obs.Nav	1 h	1.0 s	Zip	D:\GPS Spider>Data	Never	
CALDAS DA RAÍMHA	cbra_24h	CBRA	RINEX	Downloaded MDB file	Obs.Nav,SNR,Doppler,QC Report	1 day	30.0 s	Zip	C:\GPS Spider>Data	Never	FCUL
CASCAIS	In_crat	CRAT	RINEX	Downloaded MDB file	Obs.Nav,SNR	1 h	5.0 s	Zip	D:\GPS Spider>Data	Never	IGP_Server_CRAT
CASTELO BRANCO	Is_crat	CRAT	RINEX	Downloaded MDB file	Obs.Nav	1 h	1.0 s	Zip	D:\GPS Spider>Data	Never	
EDY-SÃO DOMINGOS	edvd	EDVD	RINEX	Raw data stream	Obs.Nav	1 h	1.0 s	Zip	D:\GPS Spider>Data	Never	
ENTRONCAMENTO	edvd_24h	EDVD	RINEX	Raw data stream	Obs.Nav	1 h	5.0 s	Zip	D:\GPS Spider>Data	Never	IGP_Server_EDVD
F VALE FIQUEIRA	ent_24h	ENTR	RINEX	Downloaded MDB file	Obs.Nav,SNR,Doppler,QC Report	1 day	30.0 s	Zip	C:\GPS Spider>Data	Never	FCUL
FALADO	Is_entr	ENTR	RINEX	Downloaded MDB file	Obs.Nav,SNR	1 h	1.0 s	Zip	D:\GPS Spider>Data	Never	
FLORES	ent_1h	ENTR	RINEX	Downloaded MDB file	Obs.Nav,SNR	1 h	5.0 s	Zip	D:\GPS Spider>Data	Never	IGP_Server_FAJA
FUNCHAL	Is_faia	FAIA	RINEX	Downloaded MDB file	Obs.Nav,SNR,Doppler,QC Report	1 day	30.0 s	Zip	C:\GPS Spider>Data	Never	
FURNAS	faia_24h	FAIA	RINEX	Downloaded MDB file	Obs.Nav,SNR,Doppler,QC Report	1 day	30.0 s	Zip	C:\GPS Spider>Data	Never	FCUL
GAIA	Is_faia	FAIA	RINEX	Downloaded MDB file	Obs.Nav,SNR,Doppler,QC Report	1 day	30.0 s	Zip	C:\GPS Spider>Data	Never	IGP_Server_FCOA
GLÓRIA RIBATEJO	func_24h	FUNC	RINEX	Downloaded MDB file	Obs.Nav,SNR,Doppler,QC Report	1 day	30.0 s	Zip	C:\GPS Spider>Data	Never	
GUARDA	In_fns	FRNS	RINEX	Downloaded MDB file	Obs.(Compact).Nav	1 h	30.0 s	UNIX compress (.Z)	C:\GPS Spider>Data	After 1 week	OLG_EUREF_put_24h, BKG_IGS_p
IGP	Is_fns	FRNS	RINEX	Downloaded MDB file	Obs.(Compact).Nav	1 h	1.0 s	Zip	D:\GPS Spider>Data	Never	IGP_Server_FRNS
LAGOS	func_EUREF_1h	FUNC	RINEX	Downloaded MDB file	Obs.(Compact).Nav, Met	1 h	30.0 s	UNIX compress (.Z)	C:\GPS Spider>Data	After 1 week	OLG_EUREF_put_1h, BKG_IGS_pu
LEIRIA	func_EUREF_24h	FUNC	RINEX	Downloaded MDB file	Obs.(Compact).Nav, Met	1 day	30.0 s	UNIX compress (.Z)	C:\GPS Spider>Data	Never	OLG_EUREF_put_24h, BKG_IGS_p
MELRICA	Is_func	FUNC	RINEX	Downloaded MDB file	Obs.Nav	1 h	1.0 s	Zip	D:\GPS Spider>Data	Never	
MÉTOULA	In_func	FUNC	RINEX	Downloaded MDB file	Obs.Nav,SNR	1 h	5.0 s	Zip	D:\GPS Spider>Data	Never	IGP_Server_FUNC
MESSEJAMA	func_24h	FUNC	RINEX	Downloaded MDB file	Obs.Nav,SNR,Doppler, Met,QC ...	1 day	30.0 s	Zip	C:\GPS Spider>Data	Never	
MIRANDELA	func_24h_5H	FUNC	RINEX	Raw data stream	Obs.Nav	1 day	5.0 s	Zip	C:\GPS Spider>Data	After 1 week	
MOGADOURO	Fvfi_24h	FVFI	RINEX	Downloaded MDB file	Obs.Nav,SNR,Doppler,QC Report	1 day	30.0 s	Zip	C:\GPS Spider>Data	Never	FCUL
MONTEPORO VELHO	In_fvf	FVFI	RINEX	Downloaded MDB file	Obs.Nav,SNR	1 h	5.0 s	Zip	D:\GPS Spider>Data	Never	IGP_Server_FVFI
	Is_fvf	FVFI	RINEX	Downloaded MDB file	Obs.Nav	1 h	1.0 s	Zip	D:\GPS Spider>Data	Never	
	gaa_24h	GAIA	RINEX	Downloaded MDB file	Obs.Nav,SNR,Doppler, Met,QC ...	1 day	30.0 s	Zip	C:\GPS Spider>Data	Never	

➤ **Post-processing:**

- 5s rate hourly files
- RINEX 2.11
- Other observation rates by request
- EPN & IGS Stations: hourly and daily files with 30s observation rate

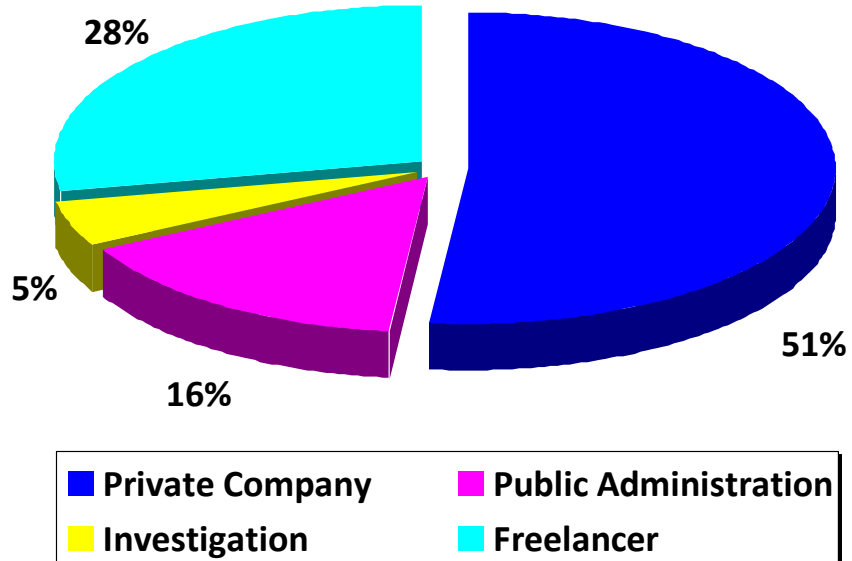
Products

Management	RT Product name	RT Product type	Cells/Sites/Rover User	Message Type	Send to	Connection Settings	Ntrip Mou...	Target...	Ch...	RTCM Version
Network Server	AC RTCM 3	Automatic cells	-	MAX RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2108	ACRT	PTTM06	On	3.1
	AC RTCM 3 D73	Automatic cells	-	MAX RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2108	ACR1	Dt73	On	3.1
	AC RTCM 3 GPS	Automatic cells	-	MAX RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2108	AGPS	PTTM06	On	3.1
	AC RTCM 3 TRIM	Automatic cells	-	MAX RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2108	ACR2	-	On	3.1
	ACRT23	Automatic cells	-	MAX RTCM 2.x (Type 1,2,18,19)	NTRIP-Client	RNEP-SRV03:2108	ACRT23	-	On	2.3
	EUREF_CASC	Single site	CASCAIS - CASC	RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2101	CASC0	-	Off	3.1
	EUREF_FLRS	Single site	FLORES - FLRS	RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2101	FLRS0	-	Off	3.1
	EUREF_FUNVC	Single site	FUNCHAL - FUNVC	RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2101	FUNVC0	-	Off	3.1
	EUREF_GAIA	Single site	GAIA - GAIA	RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2101	GAIA0	-	Off	3.1
	EUREF_LAGO	Single site	LAGOS - LAGO	RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2101	LAGO0	-	Off	3.1
	EUREF_PDEL	Single site	PONTA DELGADA - PDEL	RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2101	PDEL0	-	Off	3.1
	EUREF_TERC	Single site	TERCEIRA - TERC	RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2101	TERC0	-	Off	3.1
	Leica FLORES	Single site	FLORES - FLRS	Original raw data	NTRIP-Client	RNEP-SRV03:2104	FLOR	-	Off	-
	Leica ORIGINAL DATA RAW	Nearest site	-	Original raw data	NTRIP-Client	RNEP-SRV03:2104	PDEL	-	Off	-
	MAC_AUTO	Automatic cells	-	MAX RTCM 3.x (Extended; 1015; 1016)	NTRIP-Client	RNEP-SRV03:2105	RMAC	-	On	3.1
	NS RTCM 3 GPS	Nearest site	-	CMR 4	NTRIP-Client	RNEP-SRV03:2106	NSCM	-	On	-
	NS RTCM 3 D73	Nearest site	-	Leica	NTRIP-Client	RNEP-SRV03:2106	NSLE	-	On	-
	NS RTCM 3	Nearest site	-	Leica	NTRIP-Client	RNEP-SRV03:2106	NSOR	-	On	-
	NS RTCM 3 D73	Nearest site	-	RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2106	NSRT	PTTM06	On	3.1
	NSRT23	Nearest site	-	RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2106	NSR1	Dt73	On	3.1
	RTCM 2.3 FUNCHAL	Single site	-	RTCM 2.x (Type 1,2,18,19)	NTRIP-Client	RNEP-SRV03:2101	FUN2	-	Off	2.3
	RTCM 1004 AMARLEJA	Single site	AMARLEJA - AMAR	RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2101	AMAR	-	Off	3.1
	RTCM 1004 ARRUDA VIMHOS	Single site	ARRUDA VIMHOS - AVIH	RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2101	AVIH	-	Off	3.1
	RTCM 1004 AVES	Single site	AVES - AVES	RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2101	AVES	-	Off	3.1
	RTCM 1004 BAIJA	Single site	BAIJA - BAIJA	RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2101	BAJA	-	Off	3.1
	RTCM 1004 BEJA	Single site	BEJA - BEJA	RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2101	BEJA	-	Off	3.1
	RTCM 1004 BENAFIM	Single site	BENAFIM - BENA	RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2101	BENA	-	Off	3.1
	RTCM 1004 BORBIA	Single site	BORBIA - BORS	RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2101	BORS	-	Off	3.1
	RTCM 1004 BOTE	Single site	BOTE - BOTE	RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2101	BOTE	-	Off	3.1
	RTCM 1004 BRAGA	Single site	BRAGA - BRAG	RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2101	BRAG	-	Off	3.1
	RTCM 1004 BRAGANCA	Single site	BRAGANCA - BRGN	RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2101	BRGN	-	Off	3.1
	RTCM 1004 CALDAS RAIPIHA	Single site	CALDAS DA RAIPIHA - C...	RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2101	CRAI	-	Off	3.1
	RTCM 1004 CASCAIS	Single site	CASCAIS - CASC	RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2101	CASC	-	Off	3.1
	RTCM 1004 CASTELHANO	Single site	CASTELHANO - CAST	RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2101	CERA	-	Off	3.1
	RTCM 1004 ENTRONCAMENTO	Single site	ENTRONCAMENTO - ENTR	RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2101	ENTR	-	Off	3.1
	RTCM 1004 FALGADO	Single site	FALGADO - FALG	RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2101	FALG	-	Off	3.1
	RTCM 1004 FAJAO	Single site	FAJAO - FAJA	RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2101	FAJA	-	Off	3.1
	RTCM 1004 FLORES	Single site	FLORES - FLRS	RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2101	FLRS	-	Off	3.1
	RTCM 1004 FUNCHAL	Single site	FUNCHAL - FUNVC	RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2101	FUNVC	-	Off	3.1
	RTCM 1004 FURNAS	Single site	FURNAS - FRNS	RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2101	FRNS	-	Off	3.1
	RTCM 1004 GAIA	Single site	GAIA - GAIA	RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2101	GAIA	-	Off	3.1
	RTCM 1004 GLORIA RIBATEJO	Single site	GLORIA RIBATEJO - GRIB	RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2101	GRIB	-	Off	3.1
	RTCM 1004 GUARDA	Single site	GUARDA - GUAR	RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2101	GUAR	-	Off	3.1
	RTCM 1004 IGP	Single site	IGP - IGP0	RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2101	IGR0	-	Off	3.1
	RTCM 1004 LAGOS	Single site	LAGOS - LAGO	RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2101	LAGO	-	Off	3.1
	RTCM 1004 LEIRIA	Single site	LEIRIA - LEIR	RTCM 3.x (Extended)	NTRIP-Client	RNEP-SRV03:2101	LEIR	-	Off	3.1

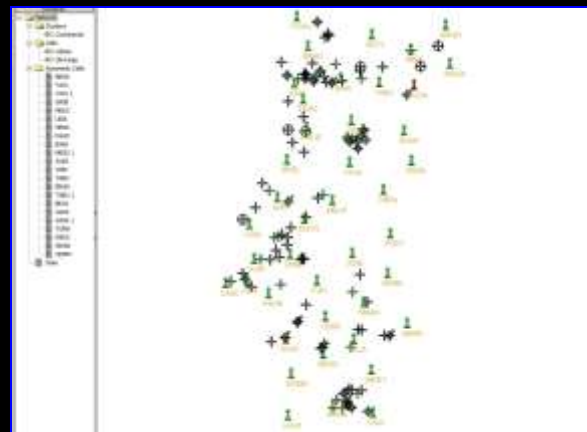
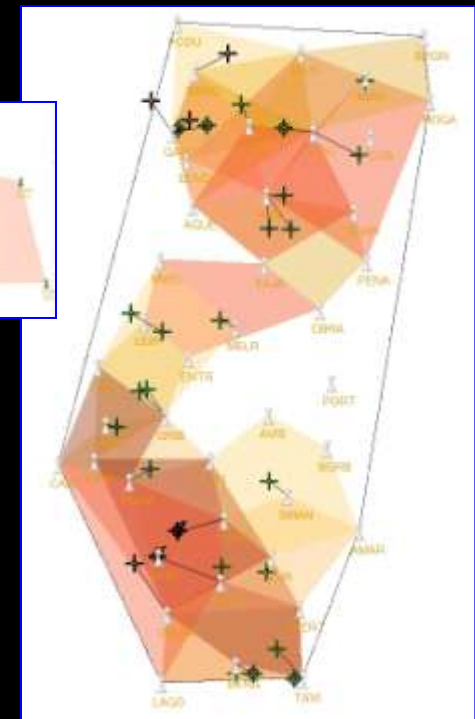
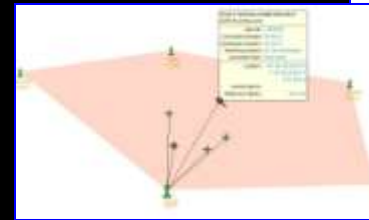
Real Time:

- Single Base
- Nearest Station
- Network
- RTCM 3.1 (and 2.3)

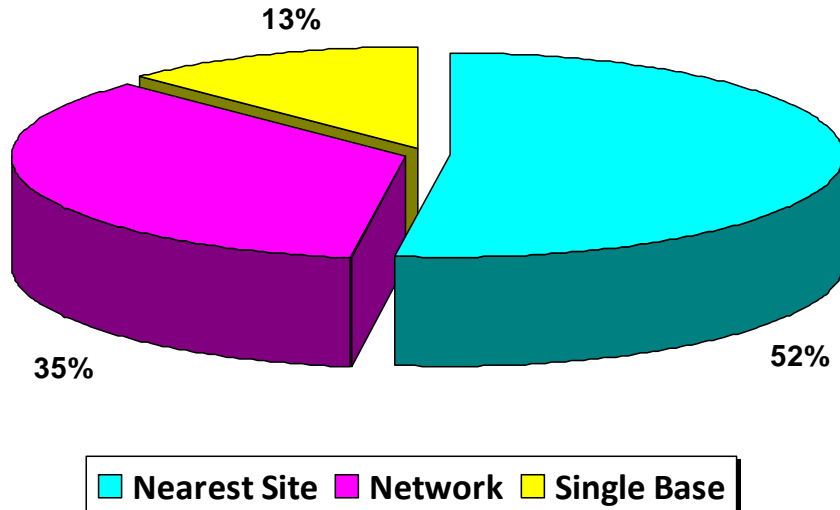
Users



More than 1600
RTK users



Some Statistics: 2014 - 2015



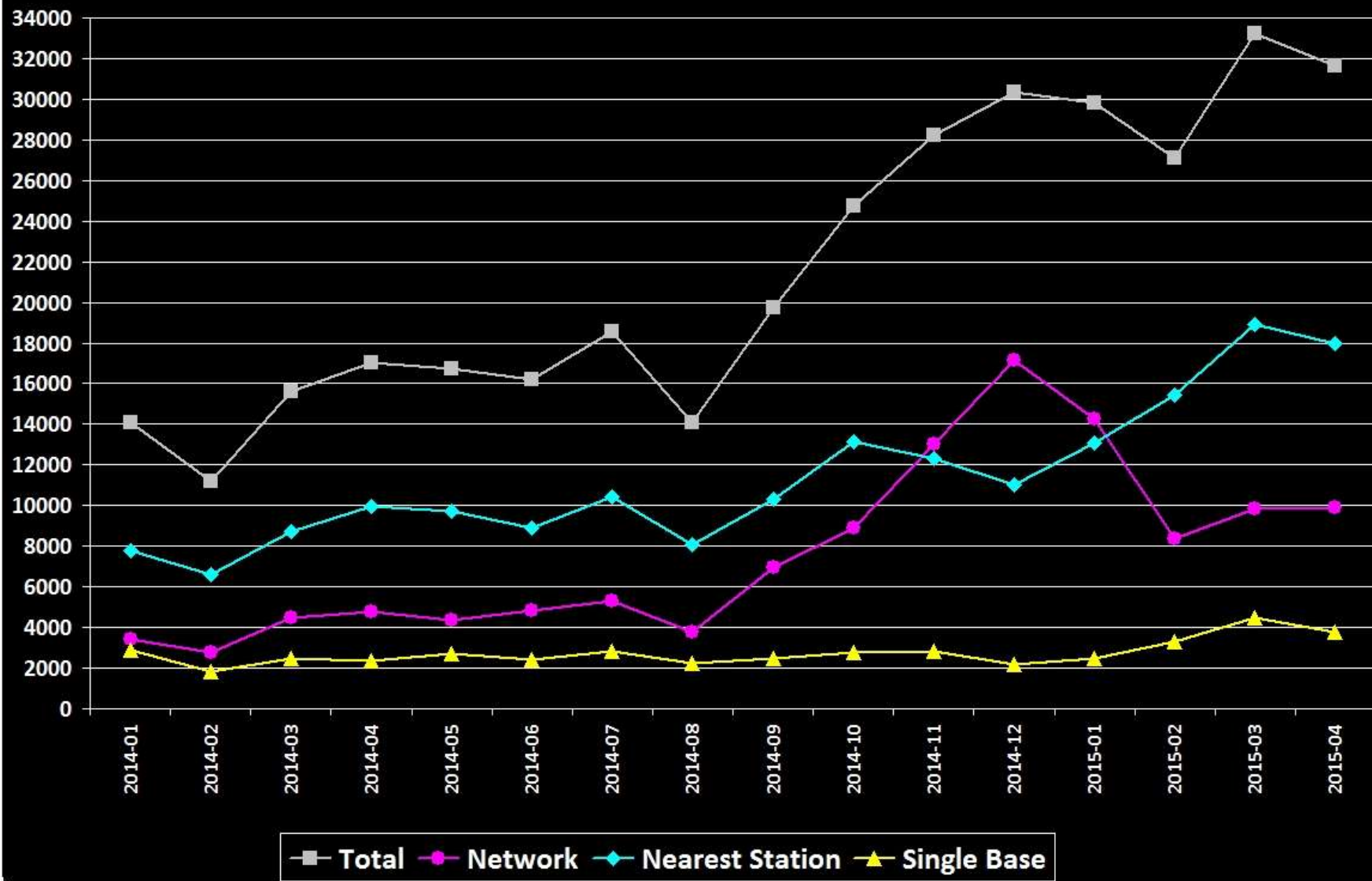
More than 40000 monthly connections to the server
 \approx 1350 daily connections
 \approx 700 daily “active” connections



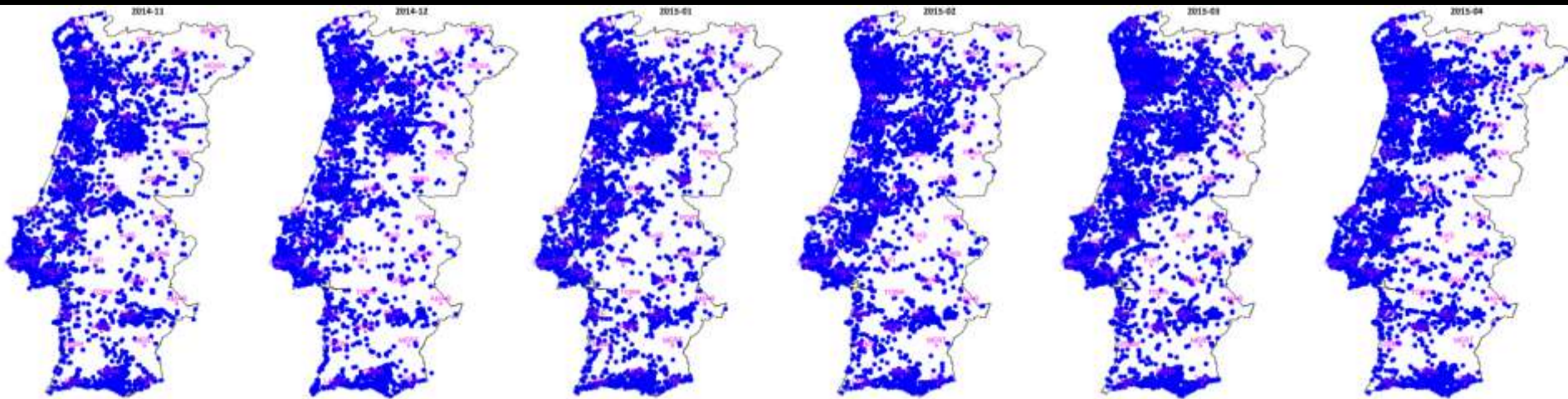
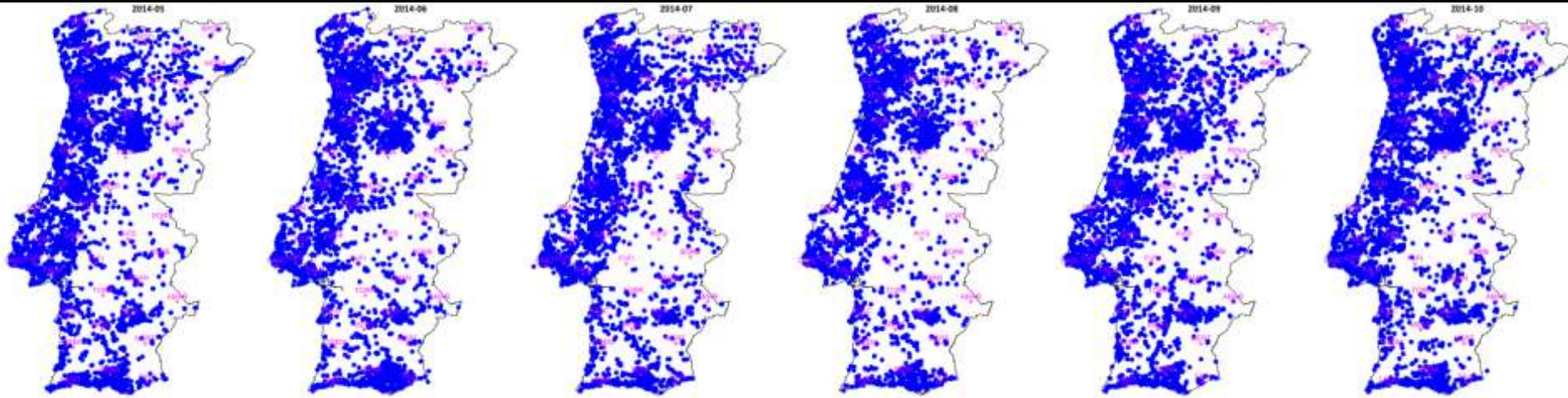
average connection:
26m 02s



Monthly Connections to the Server



Users: 2014-05 – 2015-04



RTK Accuracy



RTK Measurements on Geodetic Trig Points

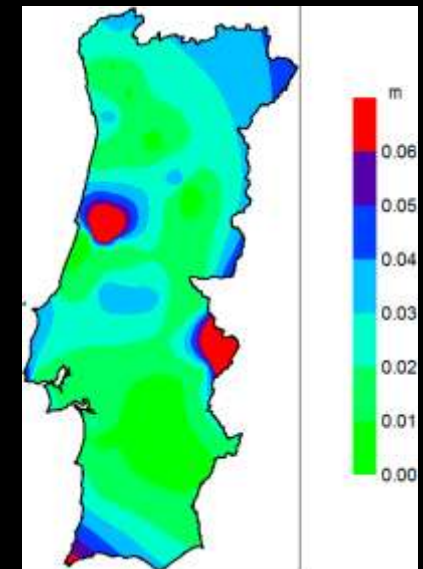
Residuals (m)	Easting	Northing	2D	Height
Maximum	0.172	0.201	0.204	0.257
Average	-0.002	0.006	0.027	0.001
Minimum	-0.079	-0.134	0.002	-0.211
r.m.s.	0.025	0.034	0.042	0.063



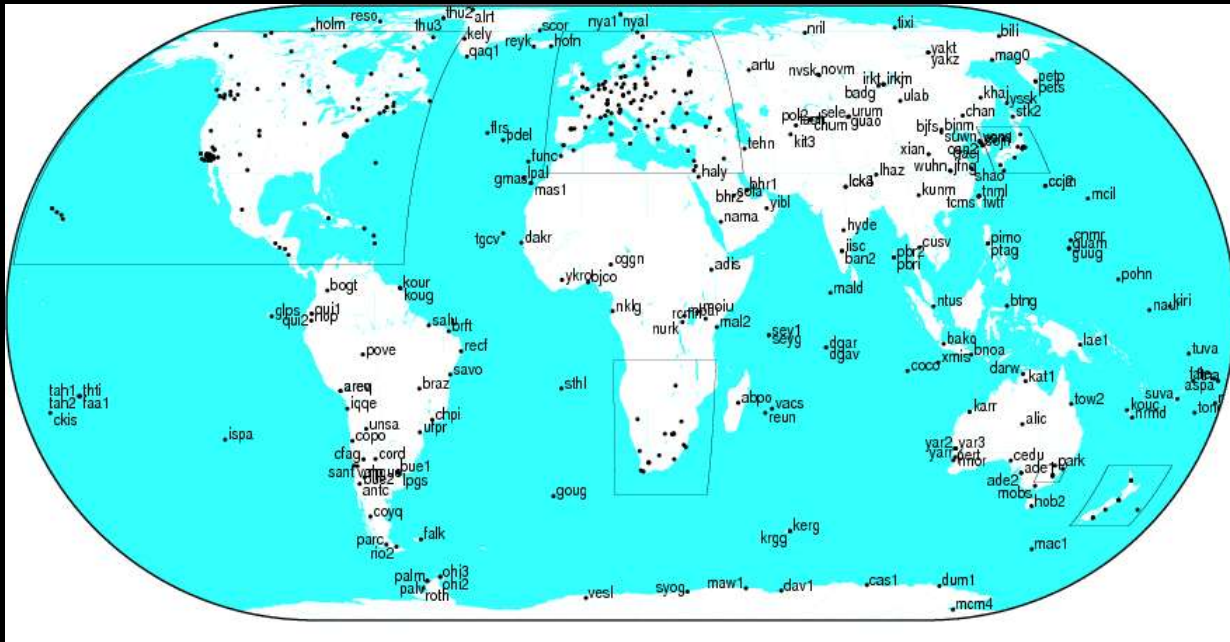
For 90% of the points

$\text{dif } 2D < 5 \text{ cm}$

$|\text{dif } h| < 10 \text{ cm}$



ReNEP & International Networks



GMT 2015 May 14 16:45:33



GMT 2015 May 15 02:26:07

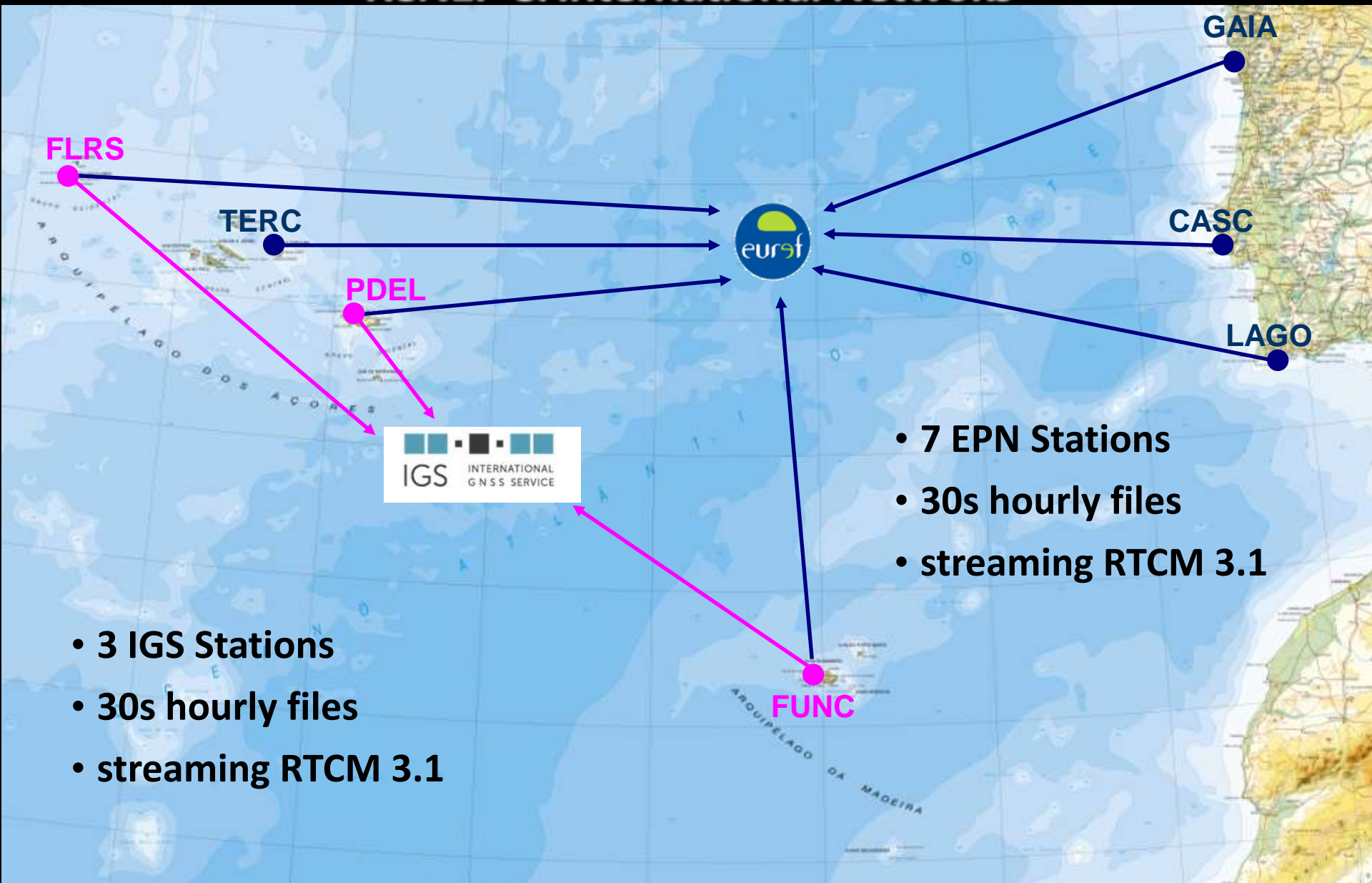
<http://www.epncb.com/en>



renep@dgterritorio.pt



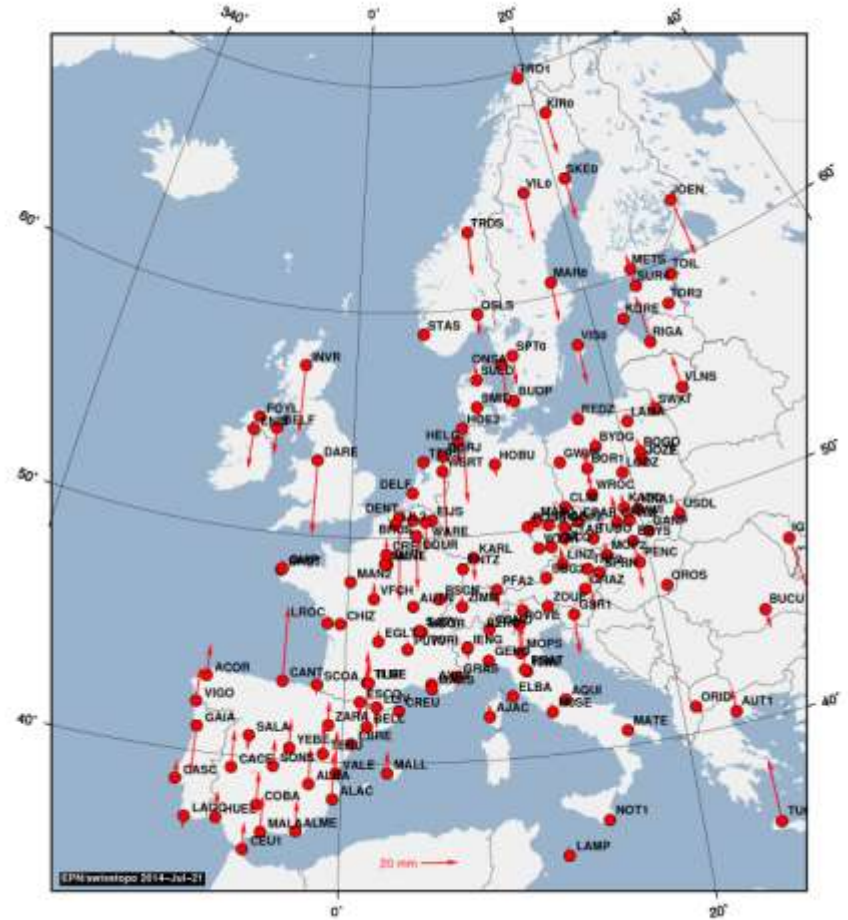
ReNEP & International Networks



EUREF – Monitoring of official national ETRF coordinates on EPN web



Horizontal



Vertical

EUREF – Monitoring of official national ETRF coordinates on EPN web

DGT Coordinates					
Station	frame	epoch	X (m)	Y (m)	Z (m)
CASC	ETRF97	146/1995	4917537.141	-815726.486	3965857.121
GAIA	ETRF97	146/1995	4759095.634	-718818.883	4171491.104
LAGO	ETRF97	146/1995	5035246.705	-767657.369	3826194.061

EUREF Coordinates								
Station	frame	epoch	X (m)	Y (m)	Z (m)	vX (m/y)	vY (m/y)	vZ (m/y)
CASC	ETRF2000	001/2005	4917537.103	-815726.486	3965857.130	-0.0012	-0.0010	-0.0002
GAIA	ETRF2000	001/2005	4759095.636	-718818.892	4171491.128	-0.0015	-0.0007	-0.0007
LAGO	ETRF2000	001/2005	5035246.684	-767657.376	3826194.071	-0.0017	-0.0025	0.0001

Diferences			
Station	X (m)	Y (m)	Z (m)
CASC	-0.020	0.012	-0.005
GAIA	0.022	-0.002	0.016
LAGO	0.001	0.020	-0.007

CARTOGRAFIA

GEODESIA

Sistemas de Referência

Redes Geodésicas

ReNEP

Estações da ReNEP

Rede Geodésica Nacional

Rede de Nivelamento Geométrico de Alta Precisão

Rede Nacional de Gravimetria

Rede Maregráfica

Transformação de Coordenadas

REGULAÇÃO

MAPAS ON-LINE

PROJETOS EM CURSO

VOCÊ ESTÁ EM: [Página inicial](#) > [Cartografia e Geodesia](#) > [Geodesia](#) > [Redes Geodésicas](#) > [ReNEP](#)

ReNEP

A ReNEP é um serviço público de geo-posicionamento prestado pela DGT que, no âmbito das suas atribuições de manutenção do Referencial Geodésico Nacional, disponibiliza aos utilizadores de equipamentos GPS dados que facultam a determinação de coordenadas geográficas com precisão melhor que 10 cm.

É constituída por Estações GPS/GNSS, de observação contínua, que difundem observações nos Sistemas de Referência ETRS89 (continente) e ITRF93 (regiões autónomas), para posicionamento em tempo-real, utilizando a técnica RTK, ou para pós-processamento com ficheiros RINEX.

Visualise o [mapa das Estações da ReNEP](#).

Novidade: A nova EP das Caldas da Rainha já se encontra em funcionamento.

Nota: A EP de Mirandela já se encontra reparada e em funcionamento.

Aceda [aqui](#) aos ficheiros RINEX.

Registe-se [aqui](#) para acesso ao serviço RTK.

Contacto: renep@dgterritorio.pt

Última atualização: quarta-feira, 13 de maio de 2015

[Partilhar Informação](#) | [Voltar ao topo](#)



Aceder



Legislação



Documentação



Glossário



Formulários



Contactos

[Clique Aqui](#) →

Data Access

Estações da ReNEP

Coordenadas da base da antena ETRS89 (continente) e ITRF93 (regiões autónomas).
Consulte a [Nomenclatura dos ficheiros RINEX horários](#) e o [Dia Juliano](#).

Novidade: A nova EP das Caldas da Rainha já entrou em funcionamento.
A EP de Mirandela já se encontra reparada e em funcionamento.

Código	Local	Latitude	Longitude	Altitude Elipsoidal
AGUE	Águeda	40° 34' 32.08979" N	8° 26' 48.81599" W	102.94
AMAR	Amareleja	38° 12' 31.30250" N	7° 13' 40.37843" W	266.27
AVIN	Arruda dos Vinhos	38° 58' 58.40827" N	9° 04' 45.99055" W	176.56
AVIS	Avis	39° 03' 23.79250" N	7° 53' 22.16083" W	270.08
BAIA	Baião	41° 09' 51.35962" N	8° 02' 02.55969" W	626.35
BEJA	Beja	38° 00' 46.37317" N	7° 52' 22.27096" W	305.90
BENA	Benafim	37° 13' 56.53192" N	8° 07' 36.10238" W	333.15
BORB	Borba	38° 48' 37.14826" N	7° 27' 45.06457" W	496.02
BOTI	Boticas	41° 41' 34.45649" N	7° 39' 29.12900" W	585.68
BRAG	Braga	41° 33' 11.98052" N	8° 25' 44.09541" W	250.67
BRGN	Bragança	41° 48' 26.65411" N	6° 45' 49.92028" W	789.73
CASC	Cascais	38° 41' 36.28293" N	9° 25' 06.68509" W	76.04
CBRA	Castelo Branco	39° 49' 08.36631" N	7° 30' 43.84628" W	436.56
CRAI	Caldas da Rainha	39° 24' 25.23351" N	9° 08' 07.49303" W	123.28
EDVD	São João da Madeira	40° 54' 45.63471" N	8° 29' 03.49012" W	299.00
ENTR	Entroncamento	39° 28' 16.26475" N	8° 28' 26.07225" W	98.96
FAJA	Fajão	40° 08' 56.73185" N	7° 55' 18.00534" W	789.09
FCOA	Vila Nova de Foz Côa	41° 04' 54.85730" N	7° 08' 39.21906" W	487.03
FLBS	Santa Cruz das Flores	39° 27' 13.79713" N	31° 07' 35.00117" W	79.92
ERNS	Furnas	37° 46' 09.59755" N	25° 18' 29.56028" W	275.33
FUNC	Funchal	32° 38' 52.60577" N	16° 54' 27.41982" W	78.50
EVEI	Foros de Vale Figueira	38° 43' 13.80997" N	8° 19' 13.82862" W	237.56
GAIA	Vila Nova de Gaia	41° 06' 21.67048" N	8° 35' 20.73434" W	287.63
GRIE	Glória do Ribatejo	39° 02' 25.61409" N	8° 38' 30.24463" W	135.88
GUAR	Guarda	40° 32' 11.34152" N	7° 15' 59.10670" W	1082.28
IGPO	Lisboa	38° 43' 33.68565" N	9° 09' 30.67948" W	178.86
LAGO	Lagos	37° 05' 56.16677" N	8° 40' 06.16780" W	62.74
LEIR	Leiria	39° 43' 53.51718" N	8° 47' 41.28933" W	111.63
MELR	Melriça (Vila de Rei)	39° 41' 41.43396" N	8° 07' 49.49847" W	645.66
MERT	Mértola	37° 38' 47.53941" N	7° 39' 36.17880" W	133.96
MESS	Messejana	37° 50' 04.65669" N	8° 14' 40.88909" W	258.93



BRAGA (BRAG)



Gestor: Direção-Geral do Território

Coordenadas ETRS89 (base da antena)

Latitude	41° 33' 11.98052" N	M	-24678.497 m
Longitude	8° 25' 44.09541" W	P	+209372.465 m
Altitude elipsoidal	250.666 m	Altitude ortométrica	195.404 m

Equipamento

Recetor	Leica GRX1200+GNSS
Antena	Leica AS10
Dados	GPS+GLONASS
Data de instalação	Dezembro 2014
Data de atualização	-
Máscara	5"

Aceda [aqui](#) aos ficheiros RINEX e à [ficha](#) das características técnicas desta Estação Permanente.

Selecione o dia pretendido. Cada ficheiro respeita ao período de 1 hora com intervalo de 5 segundos entre observações.

Para informações adicionais contacte a [equipa técnica](#) da ReNEP.

Direção-Geral do Território, jun-15

Thank You!!

