

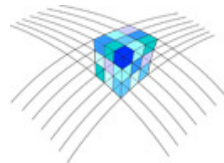
# National Report of the Netherlands

**EUREF 2011, Chisnau, 25 - 27 May 2011**

Hans van der Marel (Delft University of Technology)  
Joop van Buren (Kadaster)  
Anton Kösters (Rijkswaterstaat)

**27 May 2011**

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Rijkswaterstaat



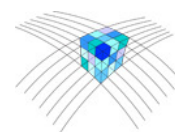
**TU Delft**

Delft University of Technology



# Geodetic Infrastructure of the Netherlands

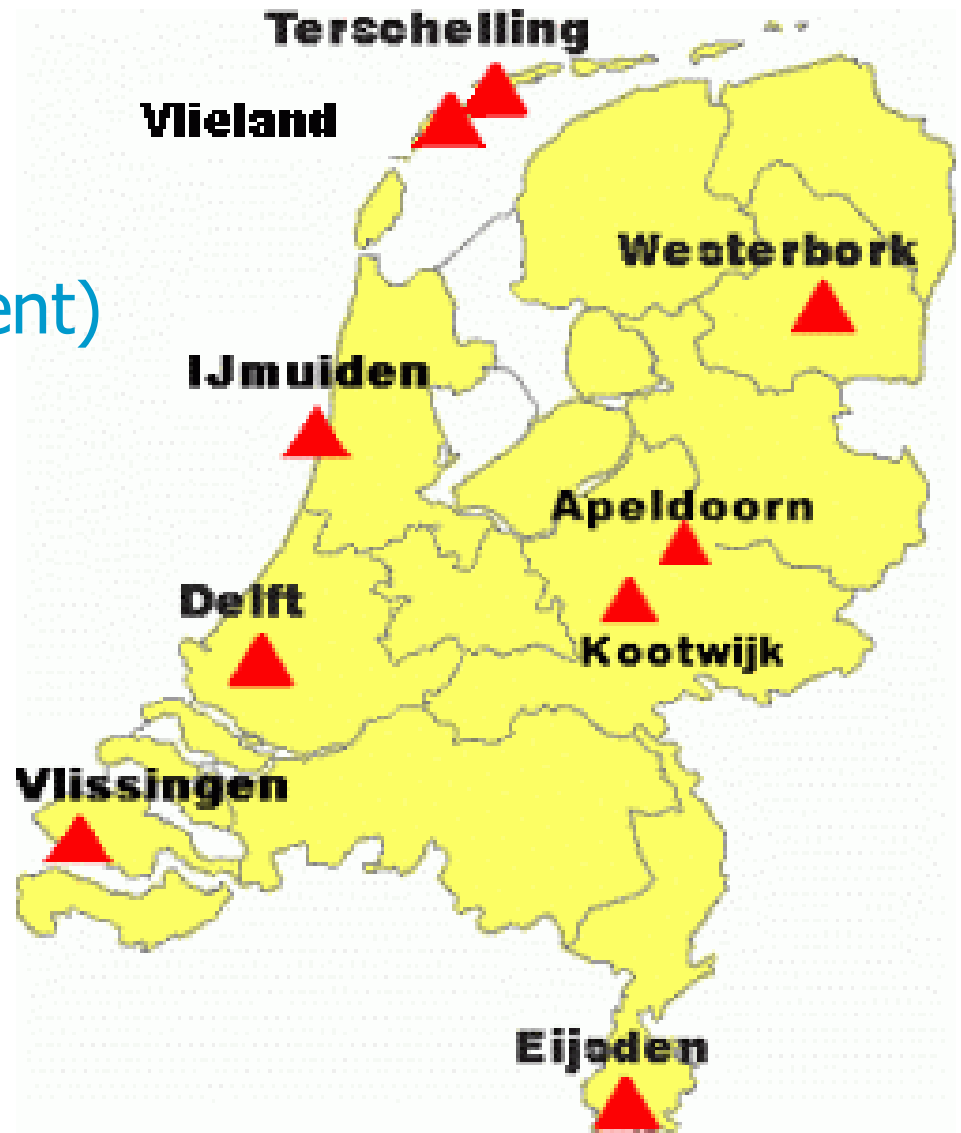
- Maintenance of the National Geodetic Infrastructure is fragmented and thus at risk; four (small) separate organisations for:
  - Horizontal control (Cadastre)
  - Vertical control (Min. of Infrastructure and Environment)
  - Hydrography (Navy)
  - Research (Delft University)
- Solution in
  - cooperation with obligation
  - commitment to contribute to a G.I.



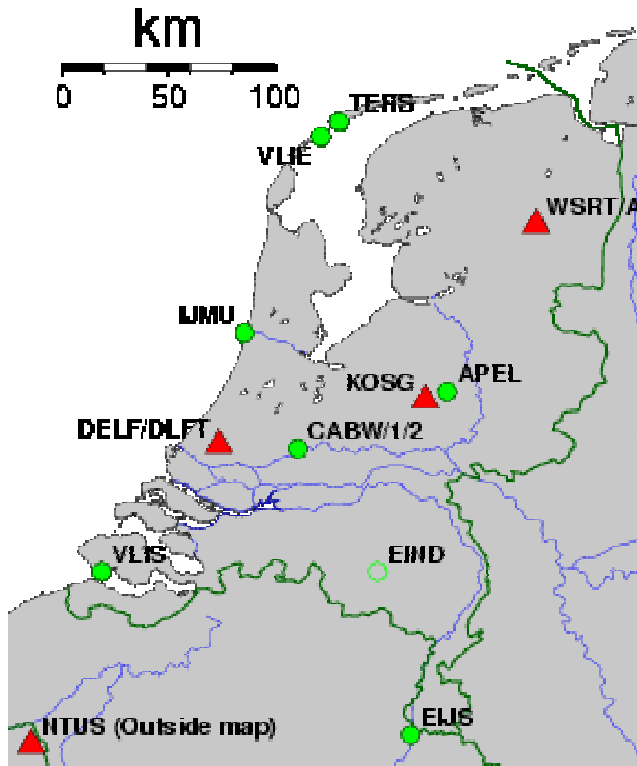
# 9 primary stations

Coordinate changes

- Terschelling (slight movement)
- Apeldoorn (storm damage)

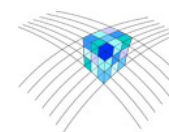


# Dutch Permanent GNSS Array data center renovated



- New servers at two separate sites for security
- Hot backup
- New address:

<http://gnss1.tudelft.nl/dpga>





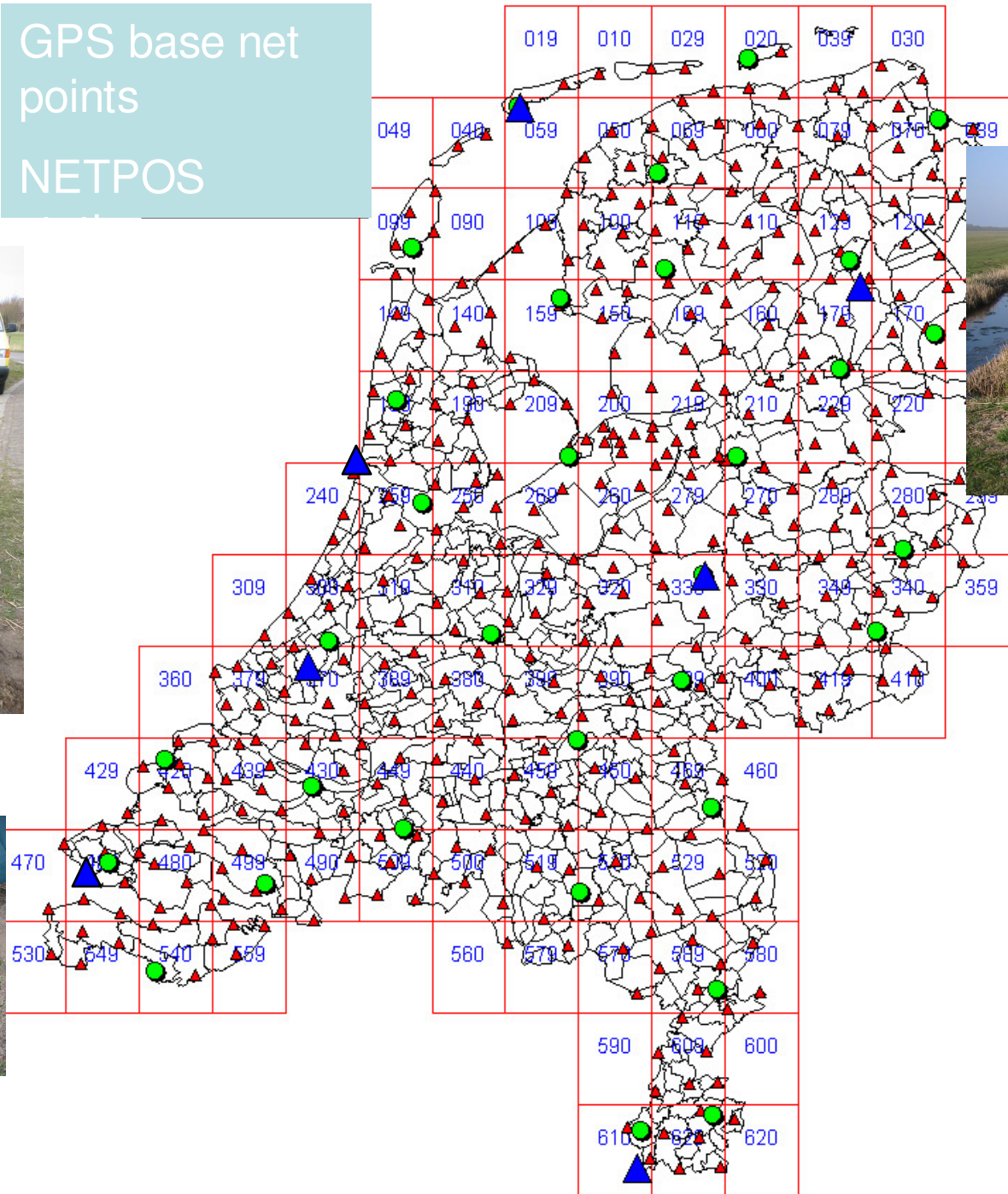
# Minimizing the number of GPS base net points



GPS base net  
points

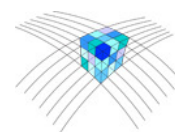


NETPOS



# National levelling NAP

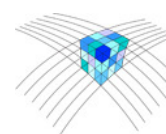
- Good experiences with crossing large waterways by means of total station.
- Continuing of absolute gravity measurements, in cooperation with TUDelft, for monitoring height reference changes.
- Significant differences are found between results of levelling and GPS measurements in the south of the country. Possible causes:
  - Not using orthometric corrections in levelling
  - Systematic errors at the border of the geoid
  - Changes in ETRS89 as a reference for GPS
  - Similar differences were found West of Rotterdam.



# Control of NAP

## results of the abs. gravity campaign 2010

	<b>Westerbork</b> 1997 - 2010		<b>Zundert</b> 1997 - 2010		<b>Epen</b> 1993 - 2010	
<b>Linear trend</b> [ $\mu\text{Gal}/\text{yr}$ ]	-0.32	$\pm 0.18$ (1 $\sigma$ )	-0.48	$\pm 0.21$ (1 $\sigma$ )	-0.39	$\pm 0.10$ (1 $\sigma$ )
		$\pm 0.36$ (2 $\sigma$ )		$\pm 0.42$ (2 $\sigma$ )		$\pm 0.20$ (2 $\sigma$ )
<b>Linear trend</b> [mm/yr]  Free-air gravity gradient is being used: 0.3086 [ $\mu\text{Gal}/\text{mm}$ ]	1.0	$\pm 0.6$ (1 $\sigma$ )	1.6	$\pm 0.7$ (1 $\sigma$ )	1.3	$\pm 0.3$ (1 $\sigma$ )
		$\pm 1.2$ (2 $\sigma$ )		$\pm 1.4$ (2 $\sigma$ )		$\pm 0.6$ (2 $\sigma$ )
<b>RMS residuals</b> [ $\mu\text{Gal}$ ]	2.7		3.1		1.7	





# NAP monument renovated



Situated in the  
Amsterdam City Hall  
and Opera building  
Visualisation of the  
vertical datum point  
of the Netherlands  
and Europe



27 May 2011

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# Thank you for your attention

