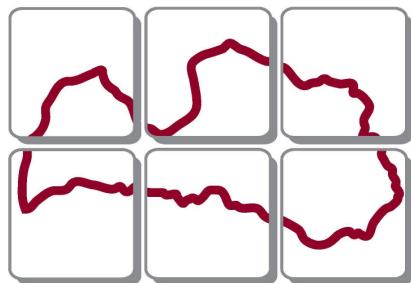


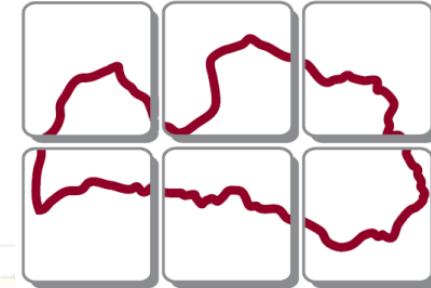
RTK Network LatPos in Latvia



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Latvia Geospatial Information Agency, Latvia
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LATVIJAS GEOTELPISKĀS
INFORMĀCIJAS AĢENTŪRA

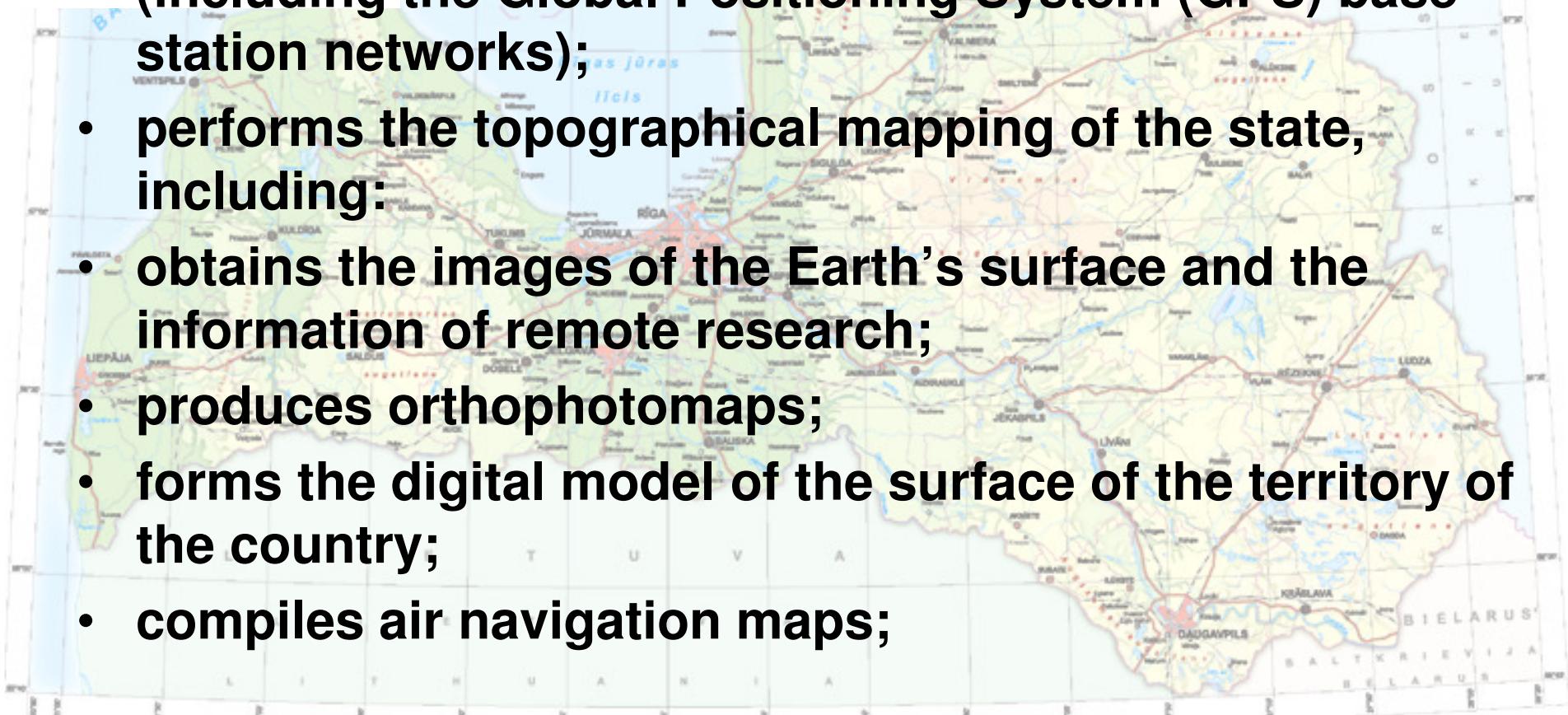


LATVIAN GEOSPATIAL
INFORMATION AGENCY

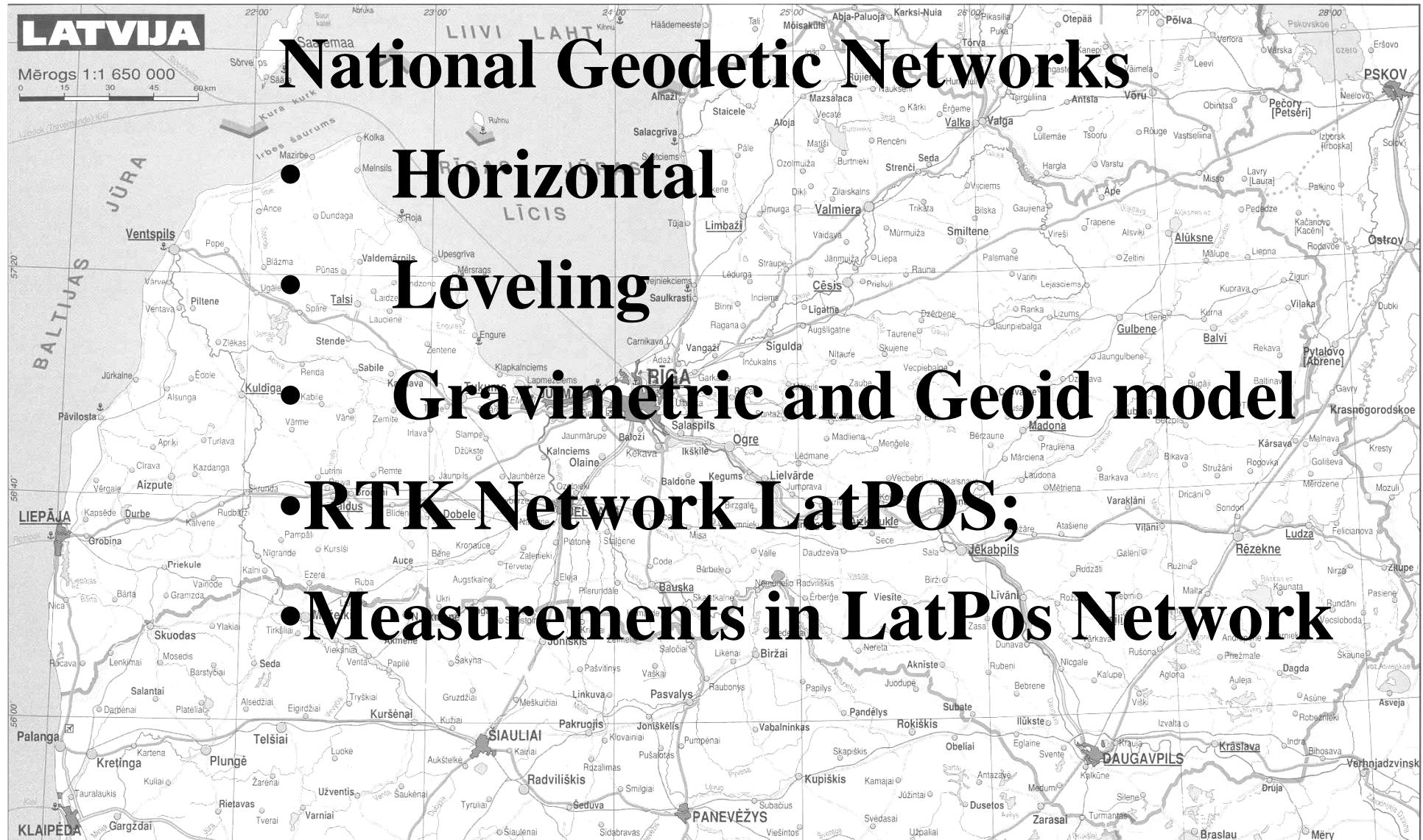
Agency main tasks

arranges and maintains the National Geodesic Network (including the Global Positioning System (GPS) base station networks);

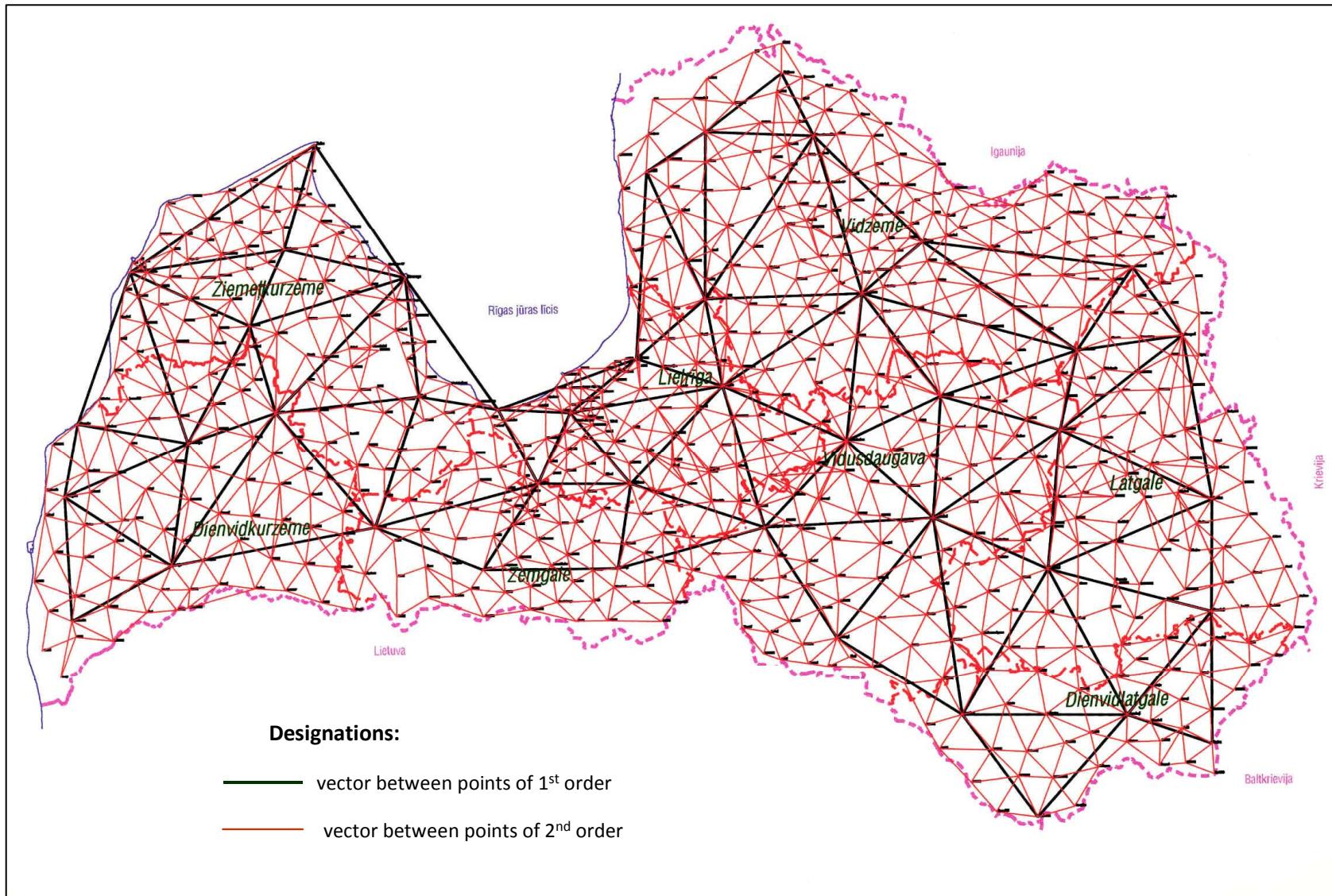
- performs the topographical mapping of the state, including:
 - obtains the images of the Earth's surface and the information of remote research;
 - produces orthophotomaps;
 - forms the digital model of the surface of the territory of the country;
 - compiles air navigation maps;



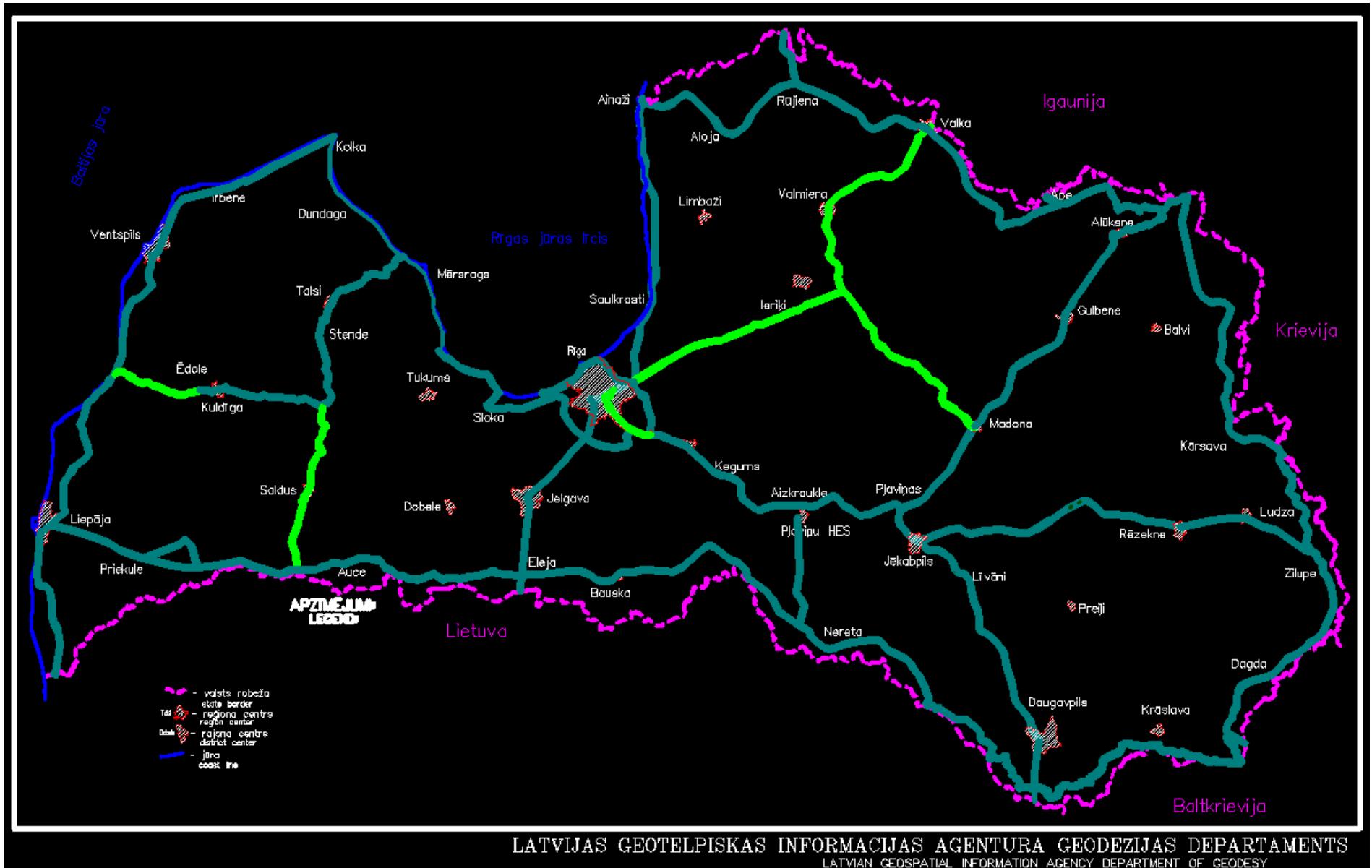
Outline:



National Geodetic Network



National Leveling Network

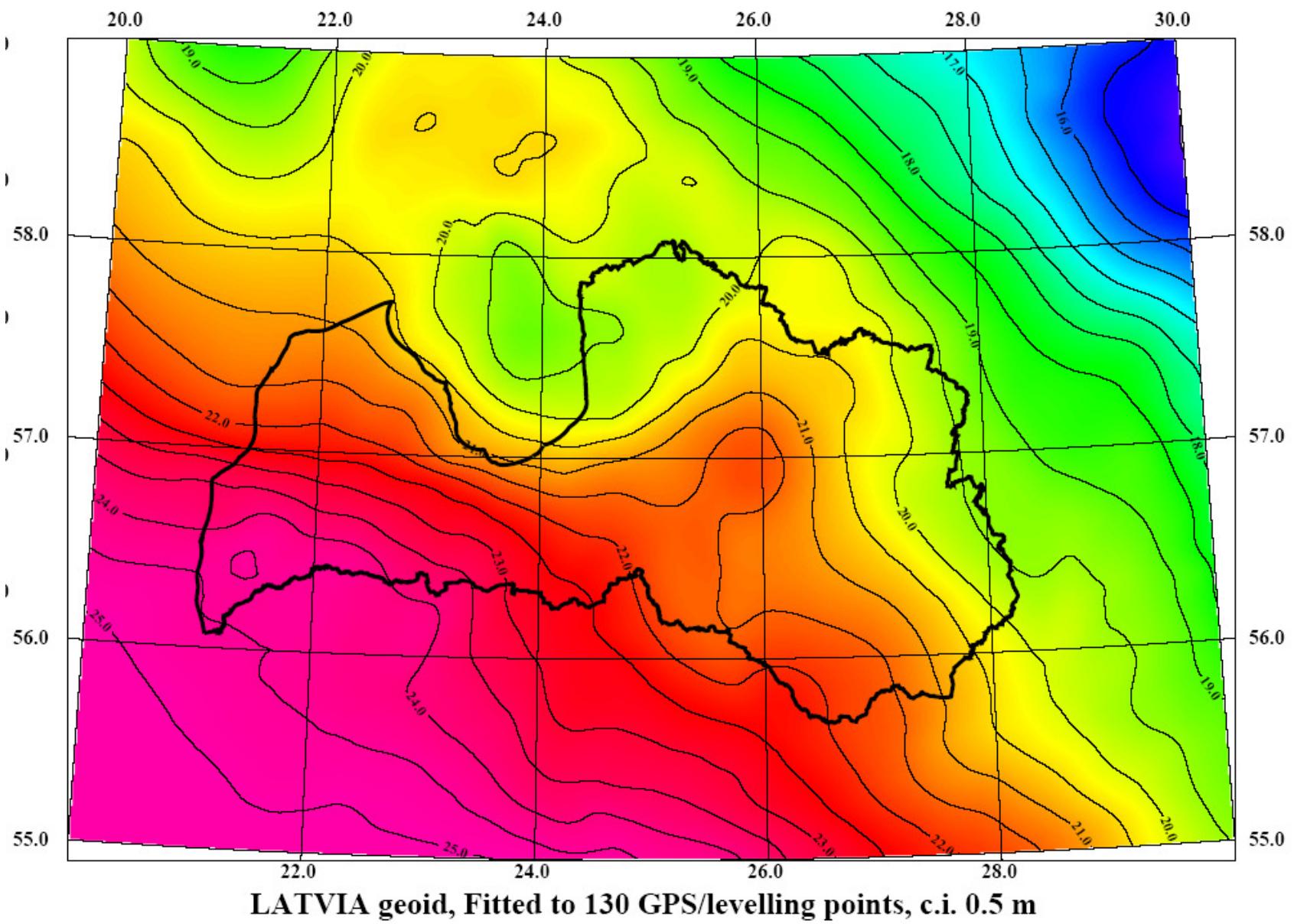


Gravimetric measurements;

- Absolute gravimetric measurements in 1995 (EE, LT, LV);
- Gravimetric measurements is carried out by one observer;
- We are using 2 gravimeters CG-5;
- We carry out regular gravimetric measurements also in our absolute gravimetric point in Rīga, in the territory of the Botanic Garden;
- We intend to continue joint gravimetric measurements with Estonian, Lithuanian and Danish colleagues.



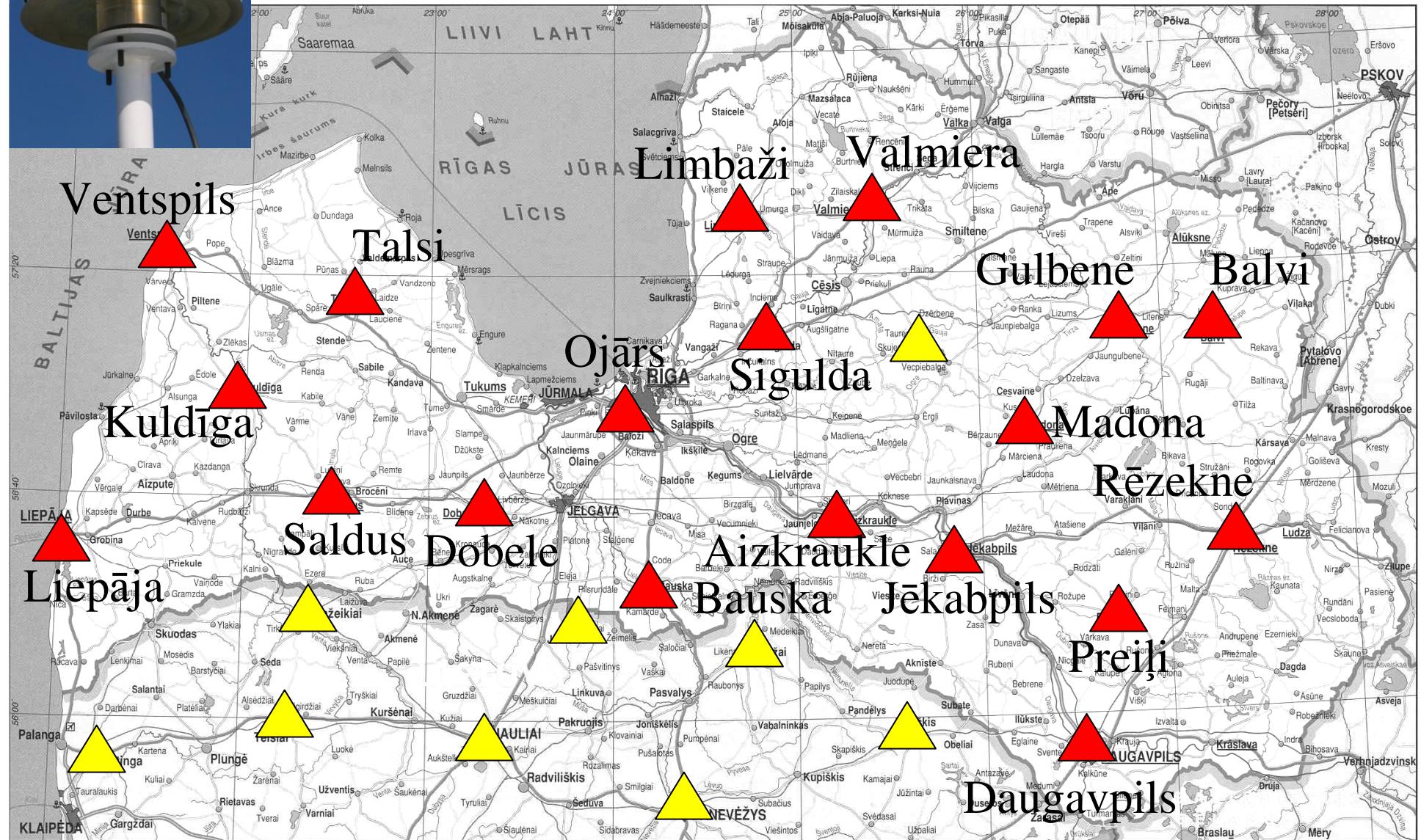
GEOID LV98





LATPOS

▲ LatPos GPS stations



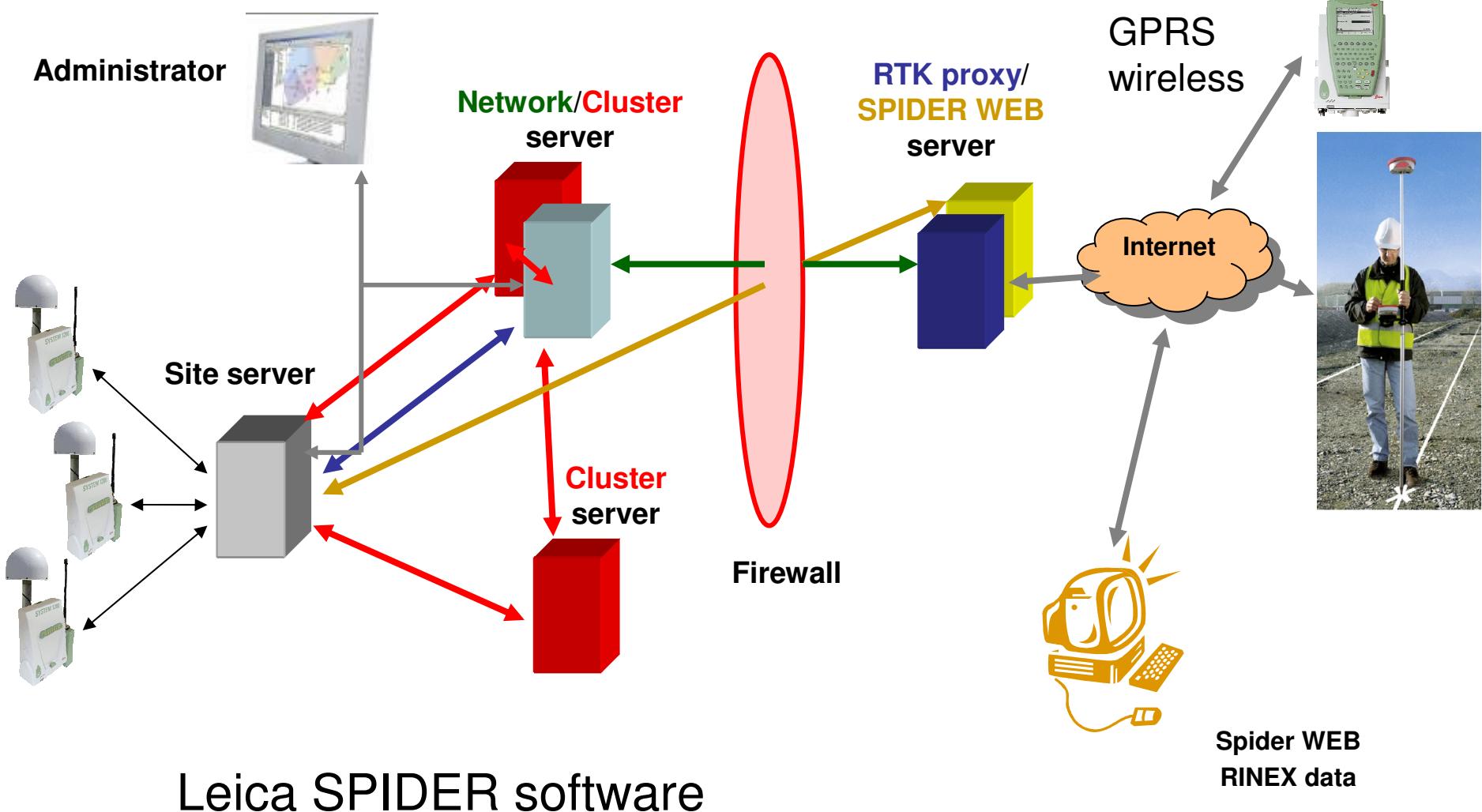


DOBELE



LATPOS

- 19 stations 4 server computers



LATVIJA

Mērogs 1:1 650 000

0 15 30 45 60 km

Administrator work space

System monitoring
computer

Text and e-mail
computer

Phone for
customers



81.198.170.194 - 81.198.170.194 - Remote Desktop

10.192.0.4

File View Management Raw Data Status Tools Window Help

Management

	Site code	Co...	Da...	GL...	F...	D...	La...	...	M...	Age [sec.]	Avg. age [sec.]
SITE	Saldus	Sald	rec...	99.3	No	2...	...	2...	49	1...	0.01
Sites	Rezekne	Reze	rec...	99.3	No	1...	...	2...	48	4...	-0.13
Aizkraukle	Vamiera	Valm	rec...	99.3	No	2...	...	2...	45	1...	0.20
Balvi	Kuldiga	Kuld	rec...	99.3	No	2...	...	2...	44	4...	-0.13
Bauska	Madona	Mado	rec...	99.3	No	0...	...	2...	45	1...	-0.09
Daugavpils	Preili	Prei	rec...	99.3	No	2...	...	2...	46	4...	-0.06
Dobele	Gulbene	Gulb	rec...	99.2	No	2...	...	2...	53	1...	0.06
Jekabpils	Balvi	Balv	rec...	99.3	No	2...	...	2...	49	1...	-0.13
Ojars	Jekabpils	Jeka	rec...	99.3	No	1...	...	2...	41	1...	0.13
Ojars	Aizkraukle	Aizk	rec...	99.3	No	2...	...	2...	39	1...	0.19
Ojars	Talsi	Tals	rec...	99.3	No	2...	...	2...	44	1...	-0.26
Ojars	Bauska	Baus	rec...	57.5	No	2...	...	2...	71	3...	0.14
Ojars	Dobele	Dobe	rec...	99.3	No	2...	...	2...	53	1...	-0.08
Ojars	Ventspils	Vent	rec...	99.3	No	2...	...	2...	47	2...	-0.02
Ojars	Liepaja	Liep	rec...	99.0	No	2...	...	2...	43	1...	0.14
Ojars	Sigulda	Sigu	rec...	99.3	No	0...	...	2...	37	1...	-0.09
Ojars	Limbazi	Limb	rec...	99.3	No	0...	...	2...	57	1...	0.31
Ojars	SIAU	SIAU	rec...	75.5	Yes	1...	...	2...	1...	6...	0.34
Ojars	MAZA	MAZA	rec...	97.3	Yes	1...	...	2...	2...	4...	0.01
Ojars	Daugavpils	Daug	rec...	99.0	No	2...	...	2...	61	2...	0.05
Ojars	VILN	VILN	dis...	-	No	-	-	-	-	-	-
Ojars	KRET	KRET	rec...	97.3	Yes	0...	...	2...	81	7...	0.33
Ojars	PAND	PAND	rec...	97.3	Yes	0...	...	2...	1...	4...	0.14
Ojars	UTEN	UTEN	rec...	97.3	Yes	0...	...	2...	2...	4...	0.03
Ojars	PNVZ	PNVZ	rec...	96.7	Yes	2...	...	2...	1...	4...	0.03
Ojars	JNSK	JNSK	rec...	96.9	No	1...	...	2...	19	1...	0.66
Ojars	MAZK	MAZK	rec...	94.4	No	1...	...	2...	18	3...	3600.73
Ojars											3600.66

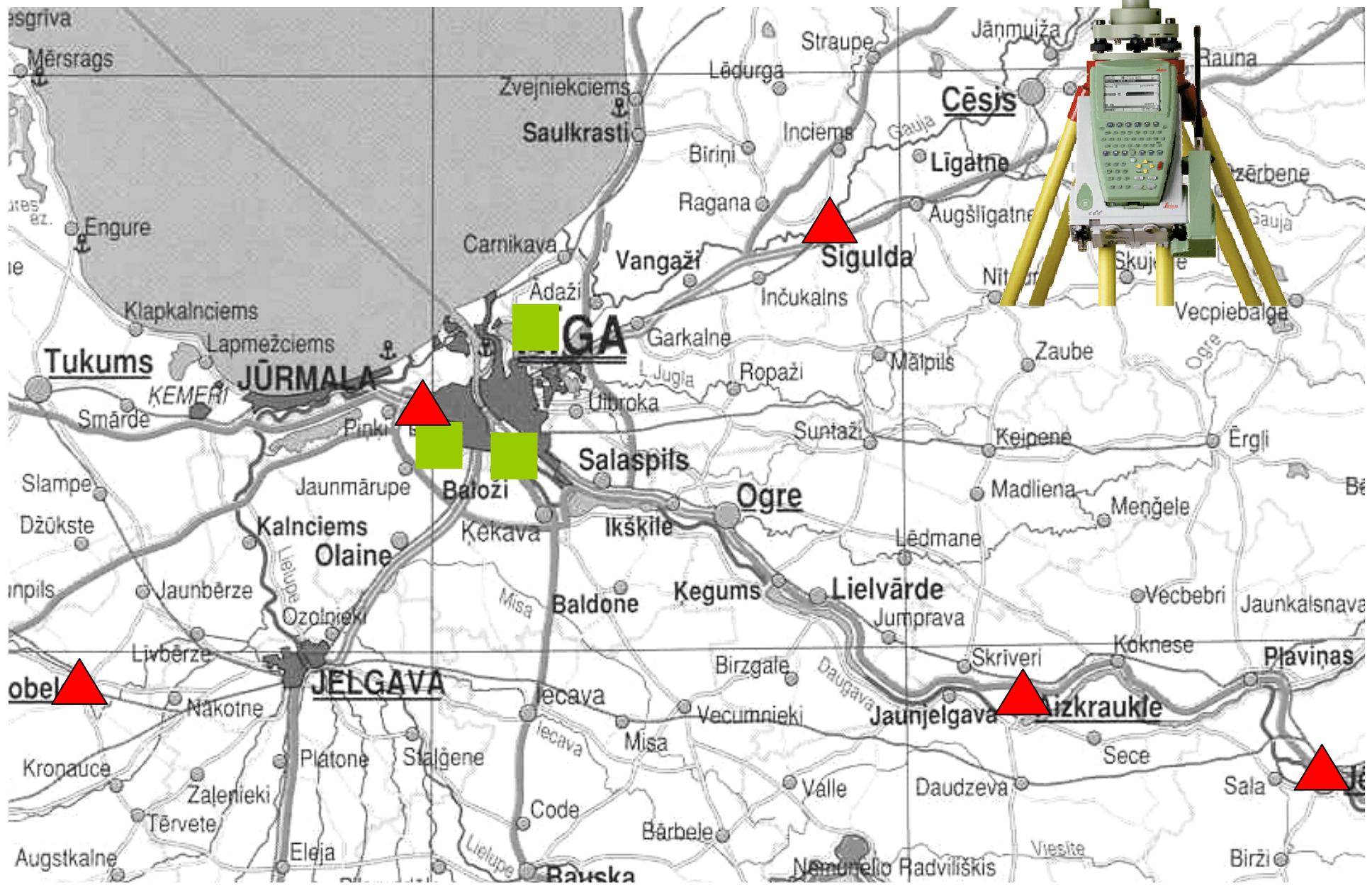
LatPos latency – average 10 ms

From Lithuania:

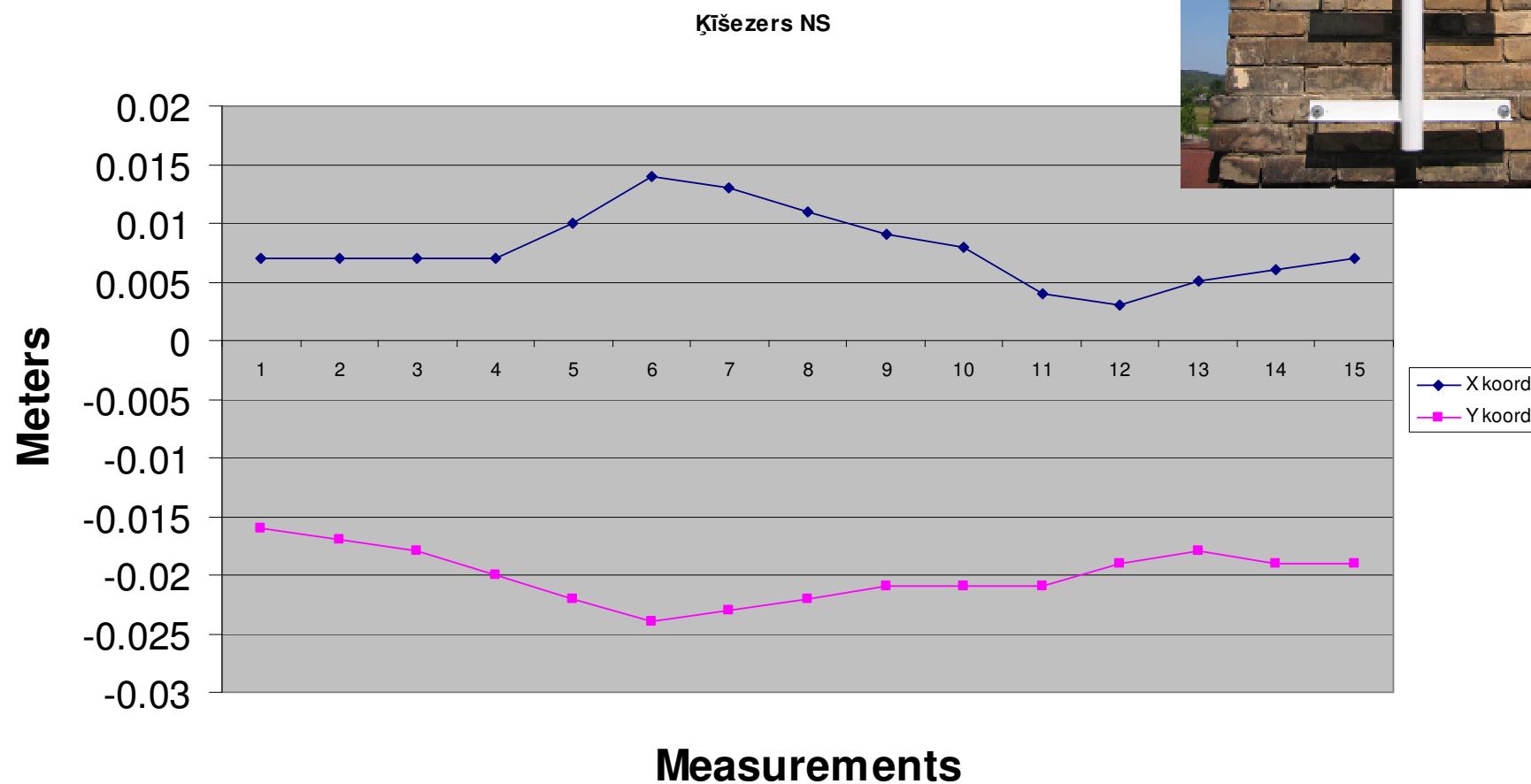
Leica network - from 0 to 25 ms

Trimble network - 68 ms

Measurements at RIGA region



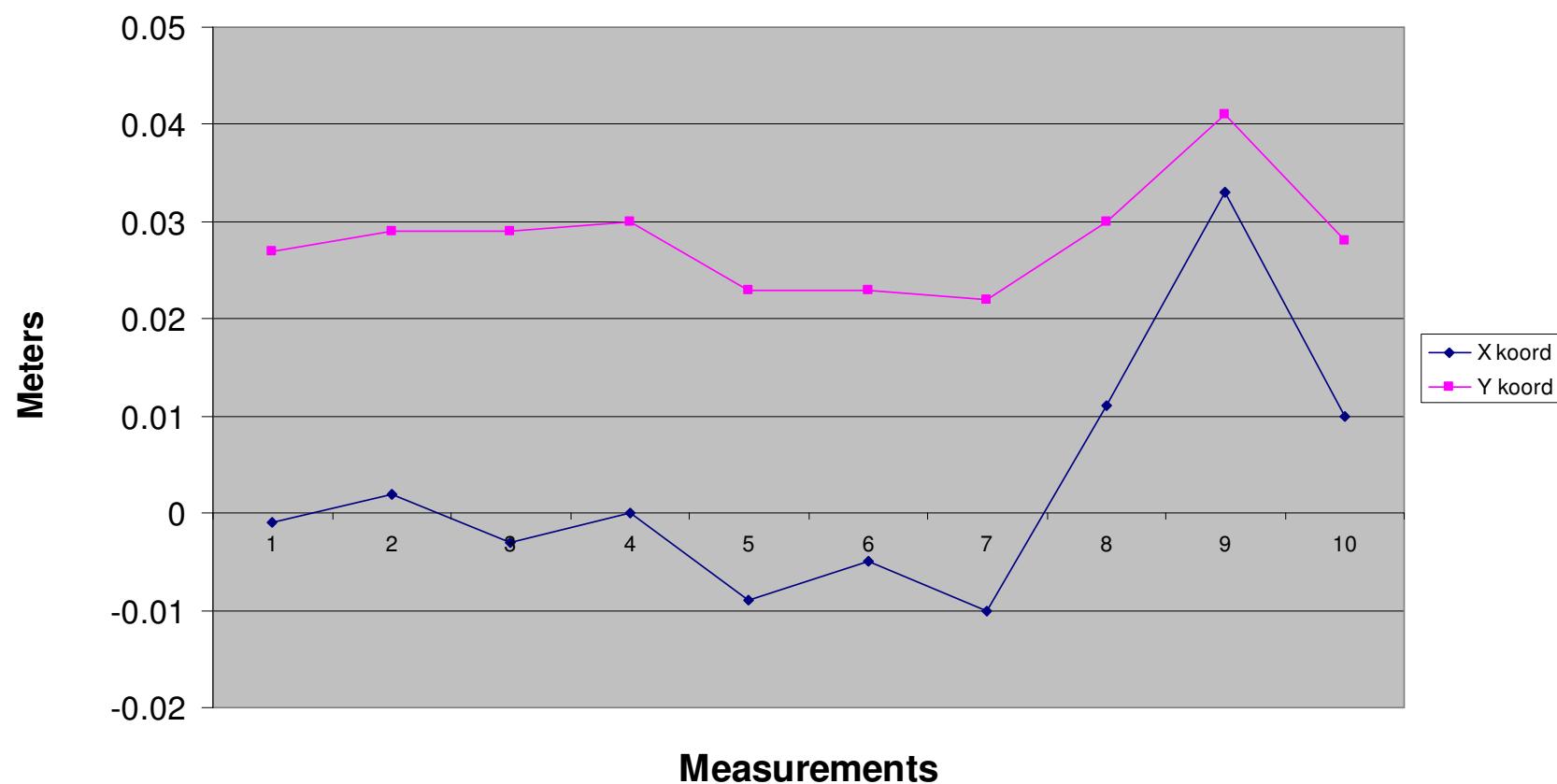
Control measurements on Geodetic Benchmark



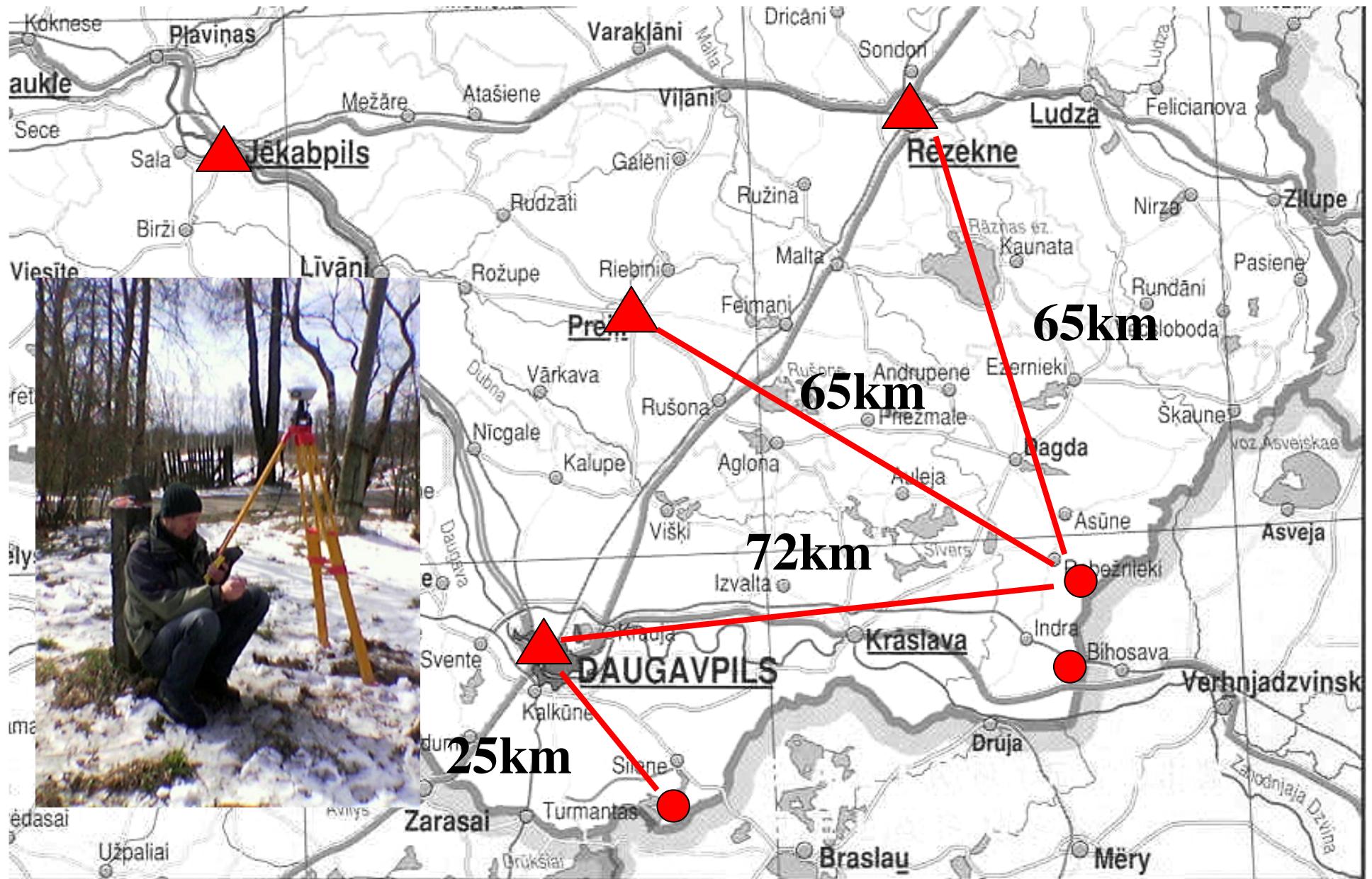


Control measurements on Geodetic Benchmark

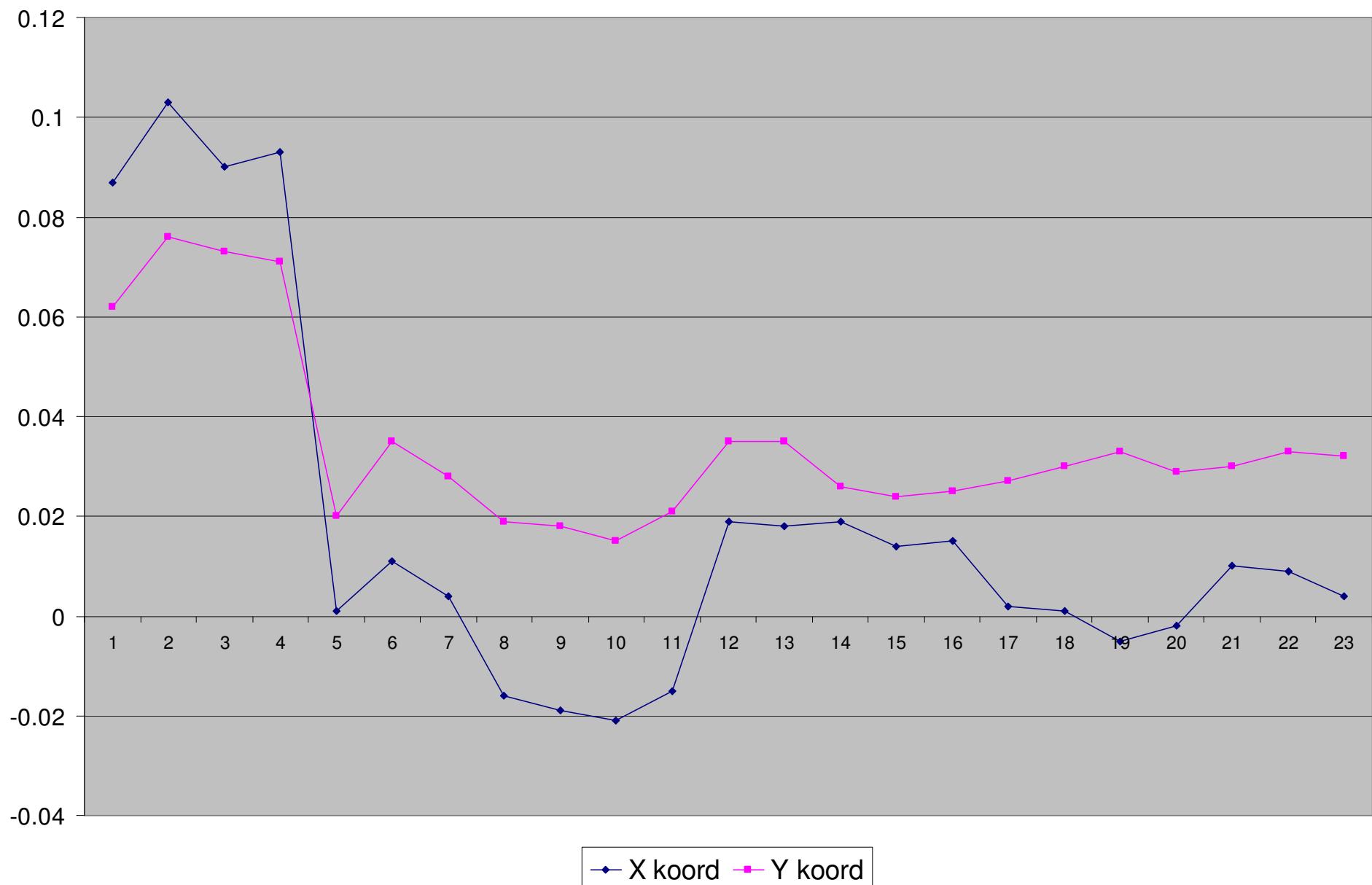
Geodetic Point 47



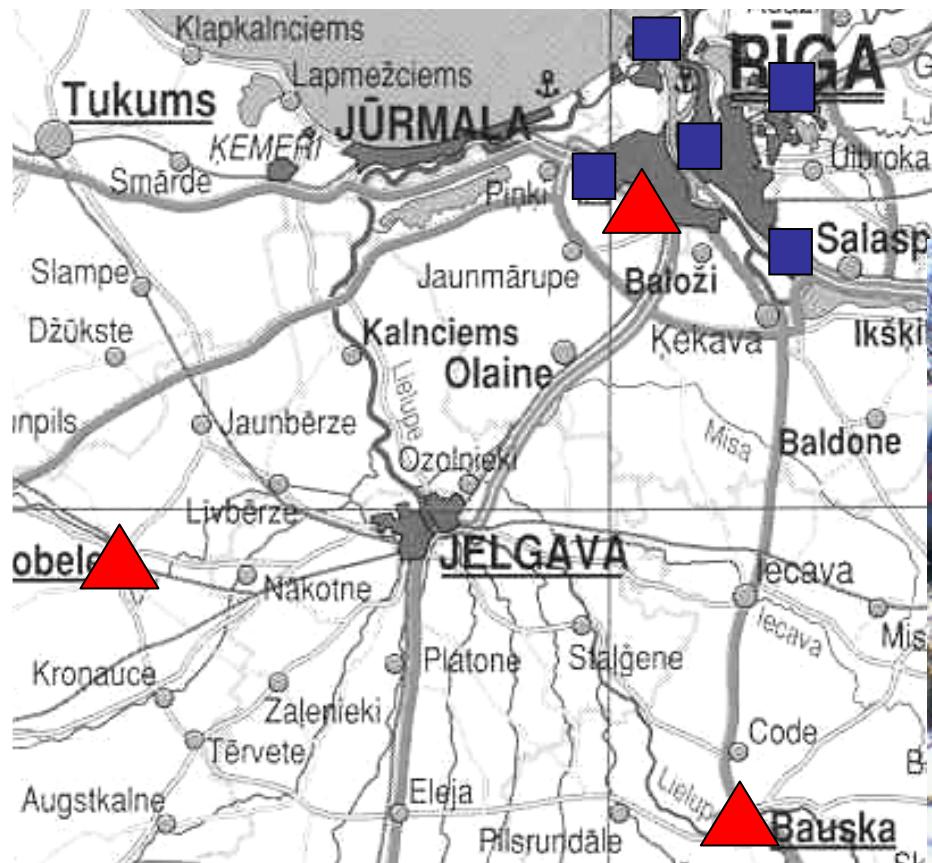
Measurements outside Network



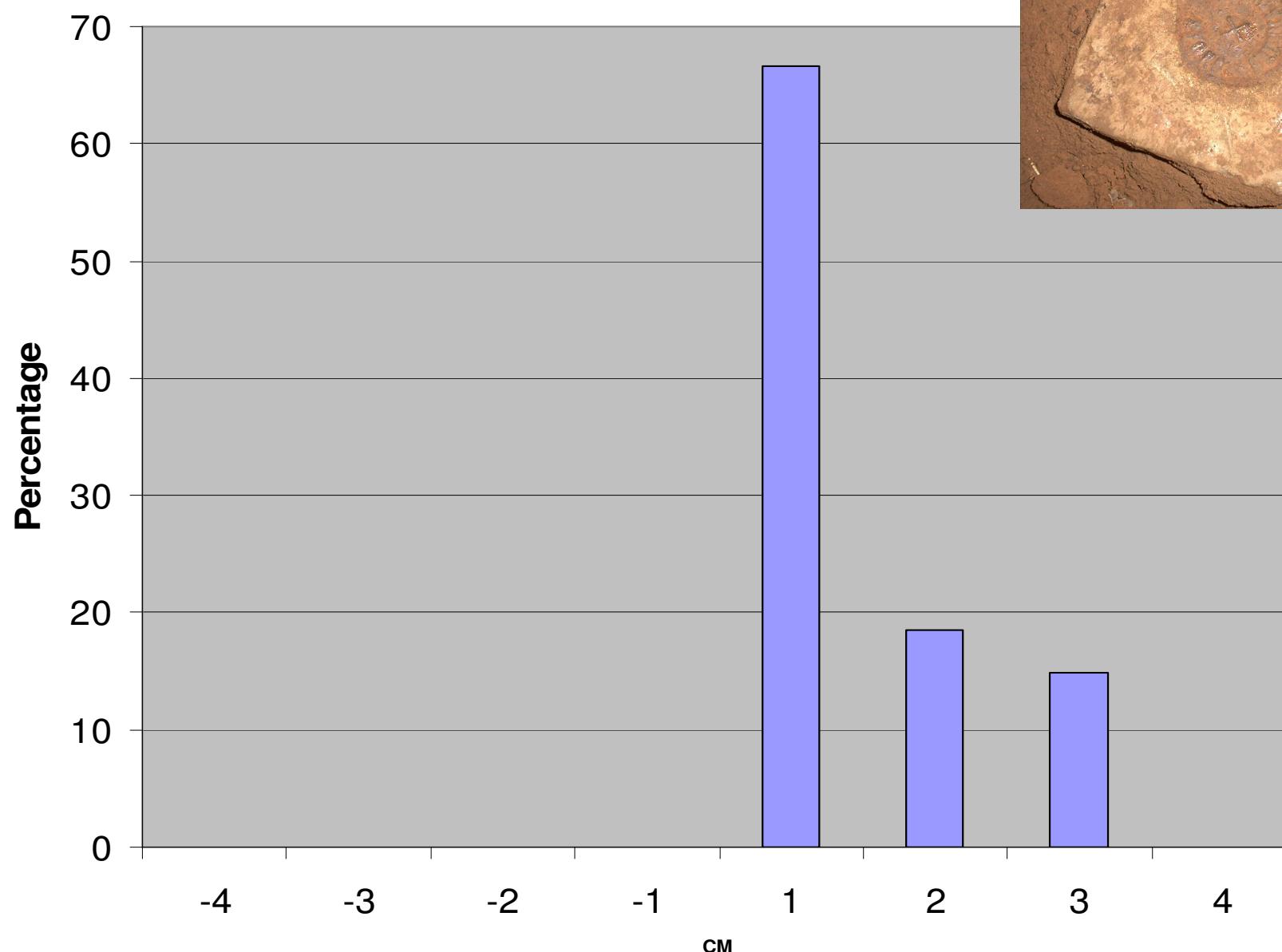
Geodetic point 141 3rd class – base ~70 km



**RTK test –
LatPos vs EUPOS-RIGA
Receivers: Leica 1200,
Trimble R8, Topcon
Message: RTCM 3.0**



LatPos error distribution



Search for lost
benchmark after
construction
works



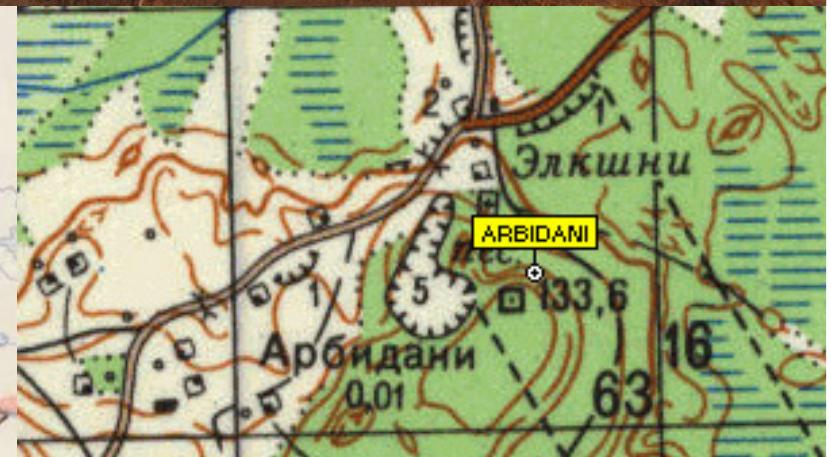
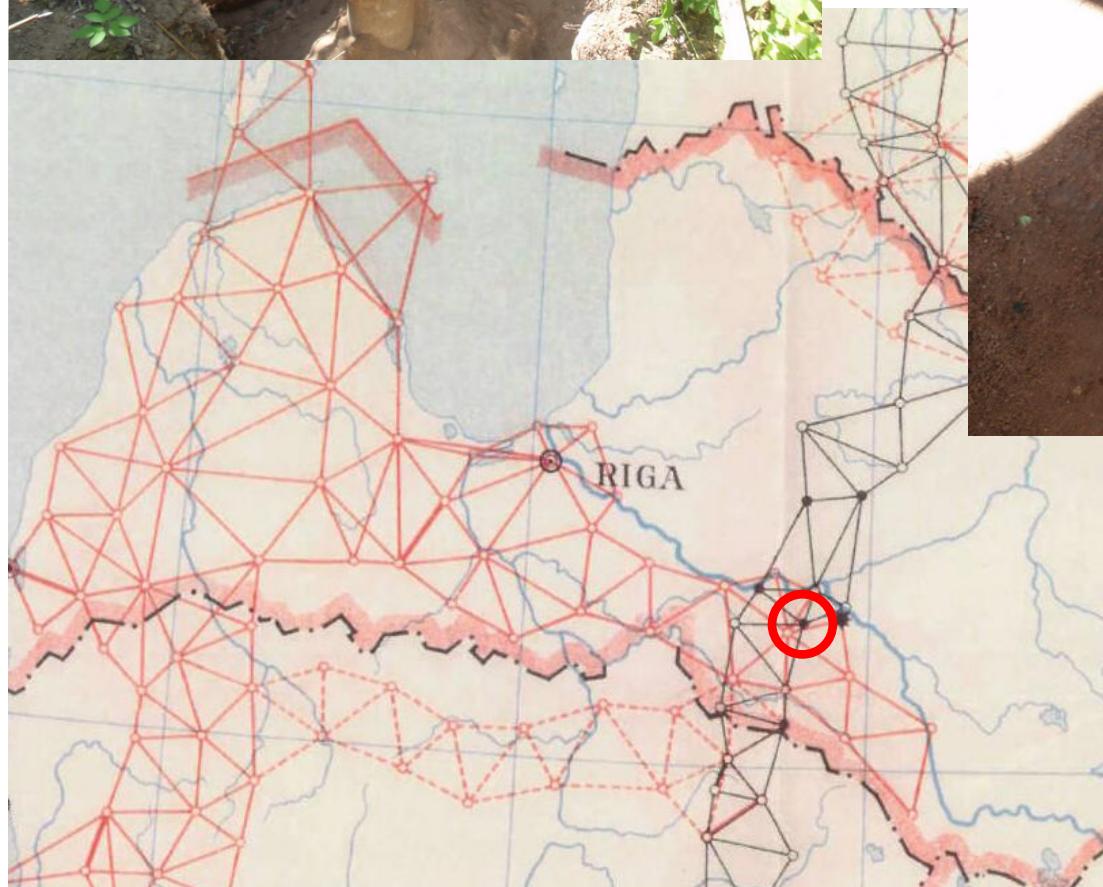
Expierence

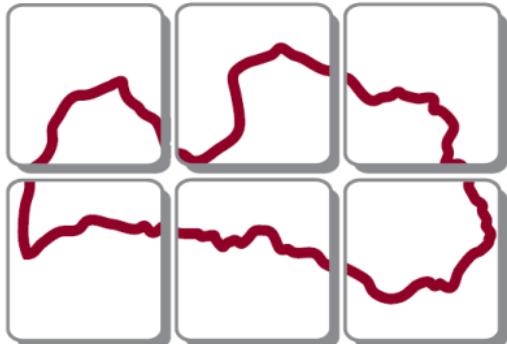




STRUVE ARC

Point ARBIDANI





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GPS receivers Geodetic

- Dual frequency (L1 un L2)
- Modem GPRS (GSM)
- 2 cm

135 Realtime Users

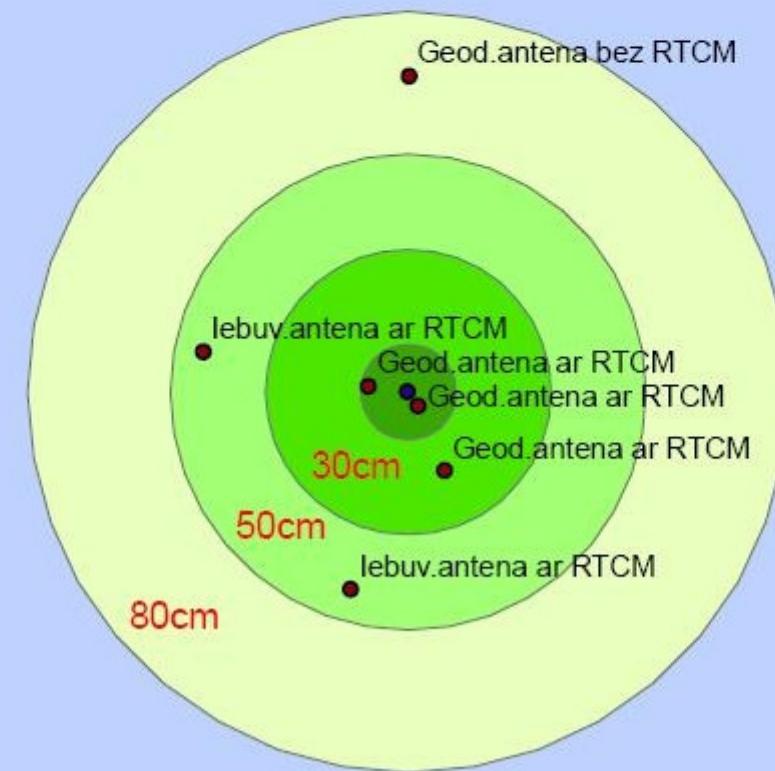
450 Post processing
Users



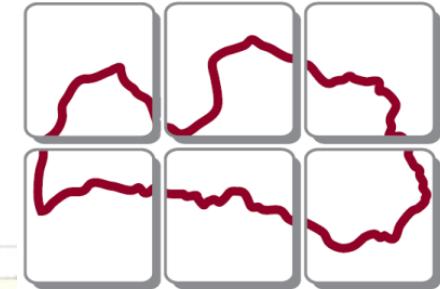
Single frequency GPS



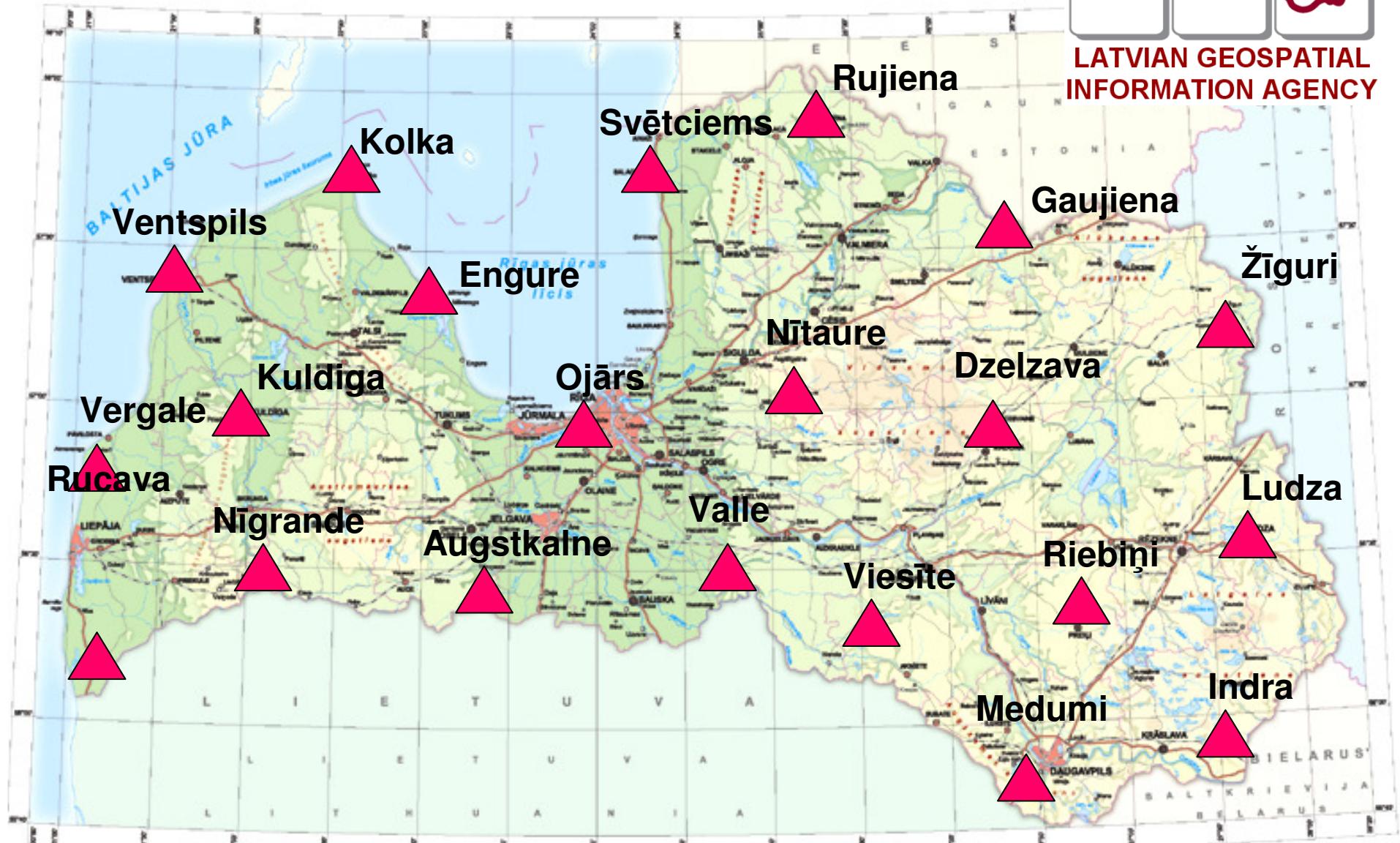
- Built in antena 80 cm
- Geodetic antena 30 cm
- Single frequency (L1)
- Modem GPRS (GSM)
- 50cm



Future plans



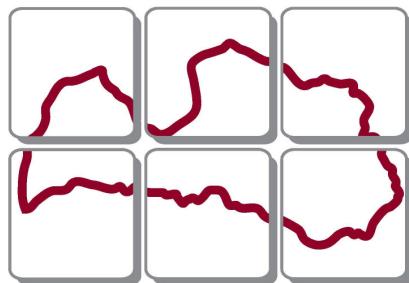
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Conclusions

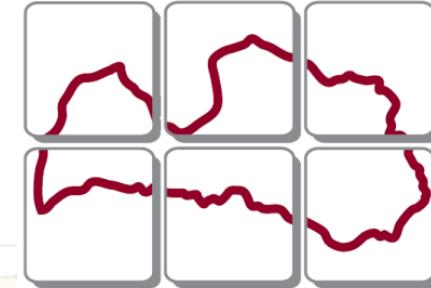
- 1.GNSS network speeds up measurements.
- 2.Next generation for local Networks
 - cheaper and easiest management, realtime monitoring
 - accuracy - 2 cm, outside – 4cm
 - integer network.
 - crossborder cooperation
3. Develop system to receive GLONASS
GALILEO, COMPASS





LATVIJAS GEOTELPISKĀS
INFORMĀCIJAS AĢENTŪRA

Contacts



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