Latvia University of Life Sciences and Technologies

INTERNATIONAL SCIENTIFIC METHODICAL CONFERENCE

BALTIC SURVEYING'21

Stability and Application of Geodetic Network in Riga city

May 6th, 2021,
Jelgava, Latvia (On-Line)

Armands Celms
Vivita Puķīte
Aivars Ratkevičs
Toms Līdumnieks
Latvia University of Life Sciences and Technologies

Latvia University of Life Sciences and Technologies

Aim

- Assessment of Stability of Geodetic Network in Riga

Tasks

- Development of geodetic system in Riga;
- Inspection of the geodetic network;
- Realisation of geodetic control measurement ;
- Results and analysis .

Latvia University of Life Sciences and Technologies

Importance of local geodetic reference system

- The purpose of the geodetic network is to provide the necessary geodetic support points for any kind of surveying work in the respective administrative territory.
- Stable geodetic support points are needed for cadastral surveying, acquisition of high-detailed topographic data, performance measurements, geodetic works in civil engineering, ensuring precise demarcation of the designed engineering structures and buildings in the local area.

Latvia University of Life Sciences and Technologies

History of development of Riga geodetic network

The end of 19th century

Creation of the first triangulation network

1921

Establishing of coordinate system

LGS - 21

1956-1961

Creation of 2, 3 un 4. Class triangulation network

Establishing of coordinate system СК-42

1971

local coordinate system of Riga

1990's

Establishing of coordinate system

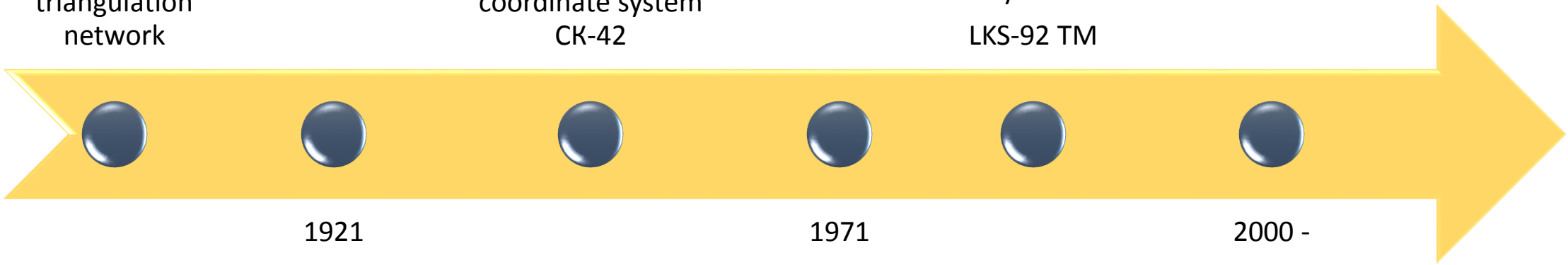
LKS-92 TM

2000 -

Creation of RG2

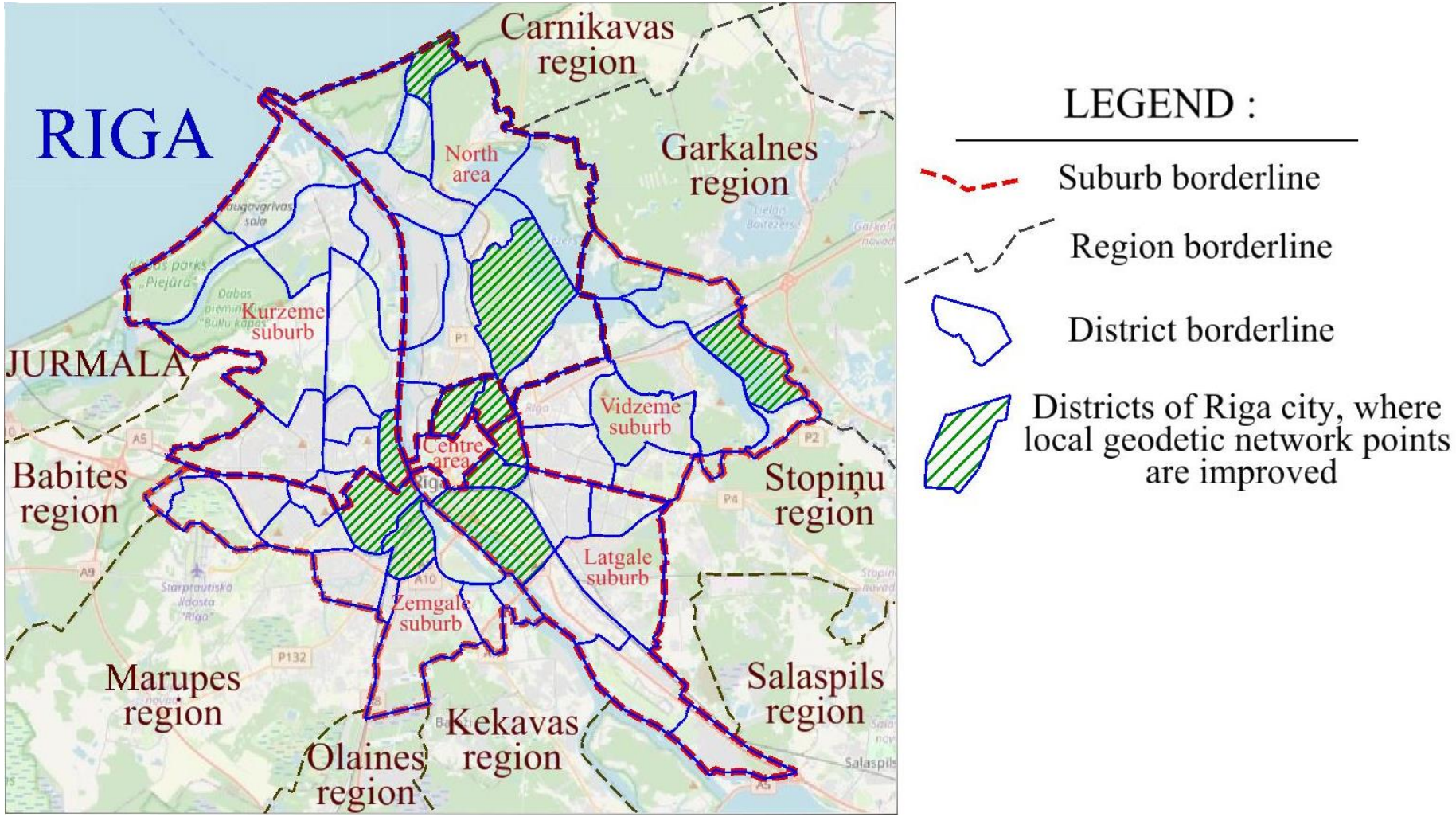
EUPOS-Rīga

Recognizition and quality control



Latvia University of Life Sciences and Technologies

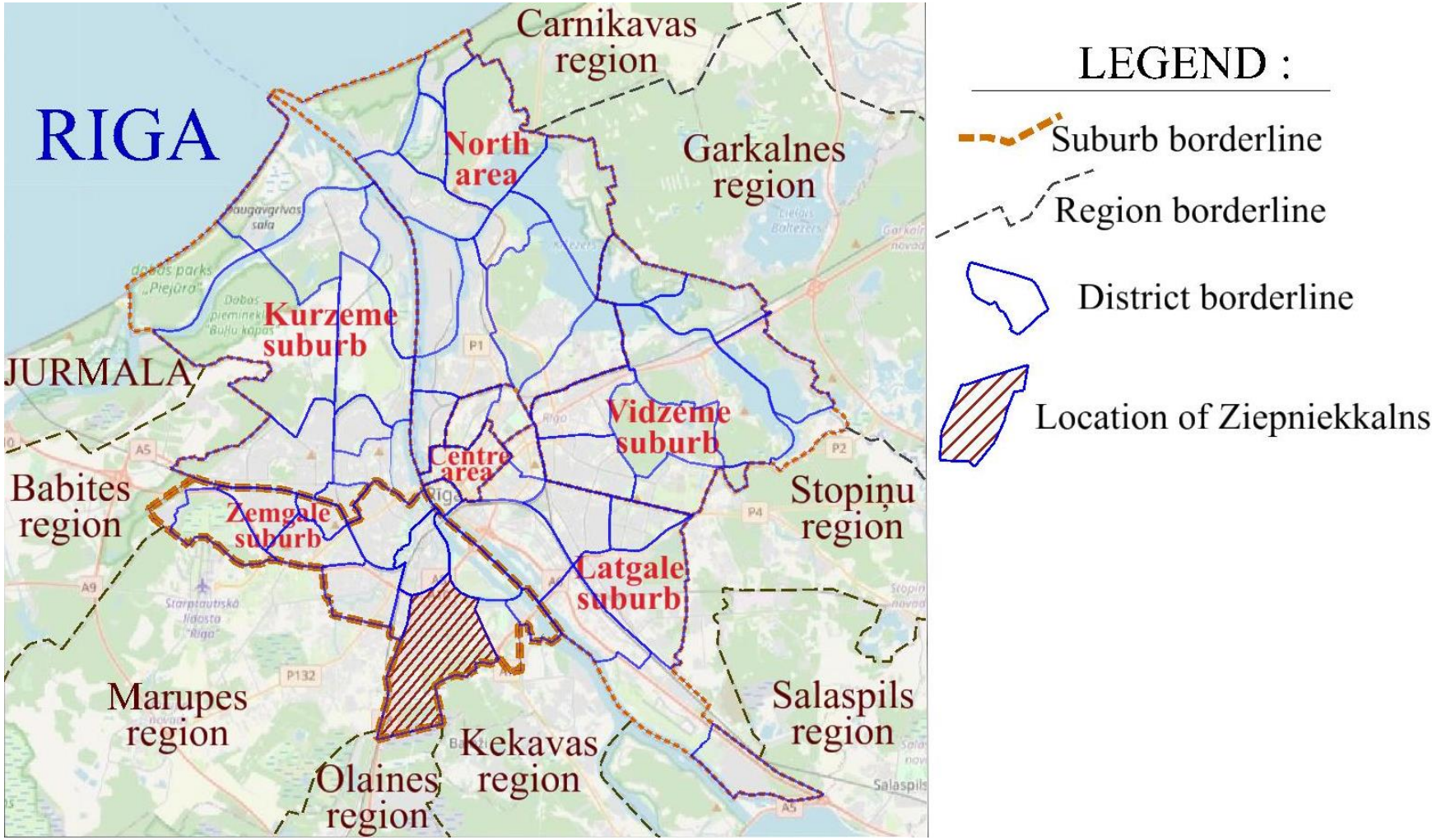
Improvement of the geodetic network in Riga



Improvement of the geodetic network 2006 - 2021

Latvia University
of Life Sciences
and Technologies

The area of research



Location of Ziepniekkalns district

Latvia University of Life Sciences and Technologies

Inspection of geodetic points in Ziepniekkalns district

- During the research in the leveling network, 15 geodetic points in the district of Ziepniekkalns were inspected and their use was assessed; including two class I bench marks .

Whall bench mark sr 1323

Ground bench mark gr 0861

Latvia University of Life Sciences and Technologies

Inspection of geodetic points in Ziepniekkalns district

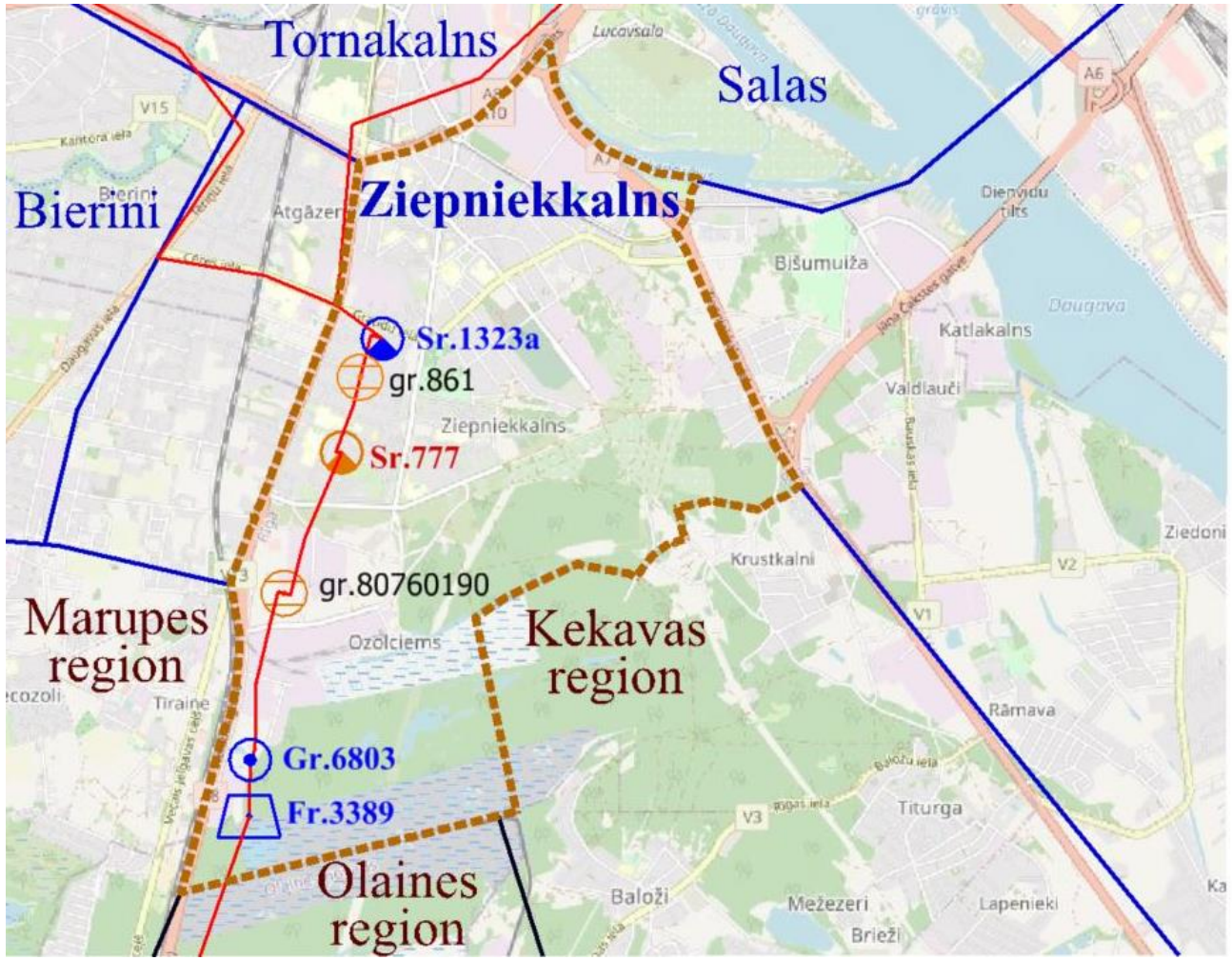
- The qualitative conditions of geodetic points are important for the realization of the set tasks.

Damaged whall bench mark sr 1365

Damaged ground bench mark gr 80760186

Latvia University of Life Sciences and Technologies

Location of the control levelling line



LEGEND :

- Ziepniekkalns borderline
- Region borderline
- District borderline
- gr.861 Local geodetic network benchmark
- Sr. National geodetic network benchmark of N1 class
- Fundamental benchmark
- Levelling wall signs
- Ground signs

Location of geodetic whall and ground benchmarks

Latvia University of Life Sciences and Technologies

Equipment of the control levelling measurements

Latvia University of Life Sciences and Technologies

Results of levelling measurements

Levelling sections		Measured elevation (m)	Calculated elevation from database (m)	Diferences of elevations (mm)	Lengh of sections (m)	Stations in section
fr.3389	**gr.6803**	- 0,3848	- 0,384	- 0,8	31	1
gr.6803	**gr.80760190**	- 0,3213	- 0,321	- 0,3	416	11
gr.80760190	**sr.777**	- 0,1596	- 0,160	+ 0,4	299	8
sr.777	**gr.861**	- 0,2341	- 0,215	**+ 19,1**	115	3
gr.861	**sr.1323**	+ 0,4135	+ 0,398	**- 15,5**	1	1

Latvia University of Life Sciences and Technologies

Conclusions and proposals (I)

1. Riga local geodetic network has more than 140 years long and rich history. It contains geodetic points that are measured in different periods with different accuracy. They as a whole make geodetic network that does not comply with requirements of regulatory acts.
2. Geometric leveling works that are performed in the framework of the research correspond to accuracy requirements of leveling of class I.
3. In the surveying of Riga local geodetic network, wide range of geodetic instruments is used beginning with optical instruments and ending with electronic devices that maximally exclude the factor of human error, improve the efficiency and accuracy of stability of geodetic system.

Latvia University
of Life Sciences
and Technologies

Thank you for your attention!