



Latvian Geospatial  
Information Agency

# **Cartographic activities in 2019 – 2023**

**National Report  
for the 19th General Assembly of the ICA  
(13-18 August 2023, Cape Town, South Africa)**

## CONTENTS

<b>INTRODUCTION .....</b>	<b>3</b>
<b>1. COMPETENCE OF THE AGENCY .....</b>	<b>4</b>
<b>1.1. FUNCTIONS .....</b>	<b>4</b>
<b>1.2. TASKS.....</b>	<b>4</b>
<b>2. MAIN ACTIVITIES IN THE GEOSPATIAL INFORMATION FIELD .....</b>	<b>6</b>
1.1. INFORMATION SYSTEM OF GEOSPATIAL REFERENCE DATA .....	6
1.2. GEODESY .....	8
1.3. REMOTE SENSING .....	12
1.4. CARTOGRAPHY.....	17
1.5. GEOGRAPHICAL NAMES .....	23
1.6. PRINTING.....	24
<b>2. INTERNATIONAL ACTIVITIES .....</b>	<b>25</b>
<b>3. CARTOGRAPHIC EDUCATION .....</b>	<b>26</b>
<b>4. OTHER CARTOGRAPHIC DATA PRODUCERS .....</b>	<b>27</b>

## **INTRODUCTION**

The national report “Cartographic Activities 2019-2023” is published by the Latvian Geospatial Information Agency. The report is addressed to the delegates of the General Assembly of the International Cartographic Association in Cape Town, South Africa

The Latvian Geospatial Information Agency (hereinafter – Agency) is the leading institution in the realizing of the national policy in the field of geodesy, cartography and geospatial information and participates in the development of this policy.

The Agency works in compliance with the regulations of the Cabinet of Ministers of the Republic of Latvia and Agency’s mid-term performance results and annual plan.

The Ministry of Defence plans and monitors the obtaining, preparation and updating of the Agency geodetic and cartographic reference data, as well as the execution of the geospatial information service providing in accordance with the annual state budget framework.

Pursuant to the competence Agency cooperates with state and local authorities, with the North Atlantic Treaty Organisation member states, with European Union institutions and competent international organizations, as well as provides to these organizations and to the public geodetic, cartographic and geospatial information.

# **1. COMPETENCE OF THE AGENCY**

## **1.1. FUNCTIONS**

The Agency has the following functions:

- to obtain, process and maintain geospatial basic data for military and civil needs and to ensure carrying out of other functions laid down in the Geospatial Information Law;
- to create and develop the uniform geospatial reference data information system referred to in Section 12, Paragraph five, Section 17, Paragraph three and Section 18, Paragraph two of the Geospatial Information Law;
- according to the competence thereof to co-operate with State and local government institutions, Member States of the North Atlantic Treaty Organisation, the authorities of the European Union and competent international organisations, as well as to provide geodetic, cartographic and geospatial information to them and to the society.

## **1.2. TASKS**

In order to implement the functions specified, the Agency shall:

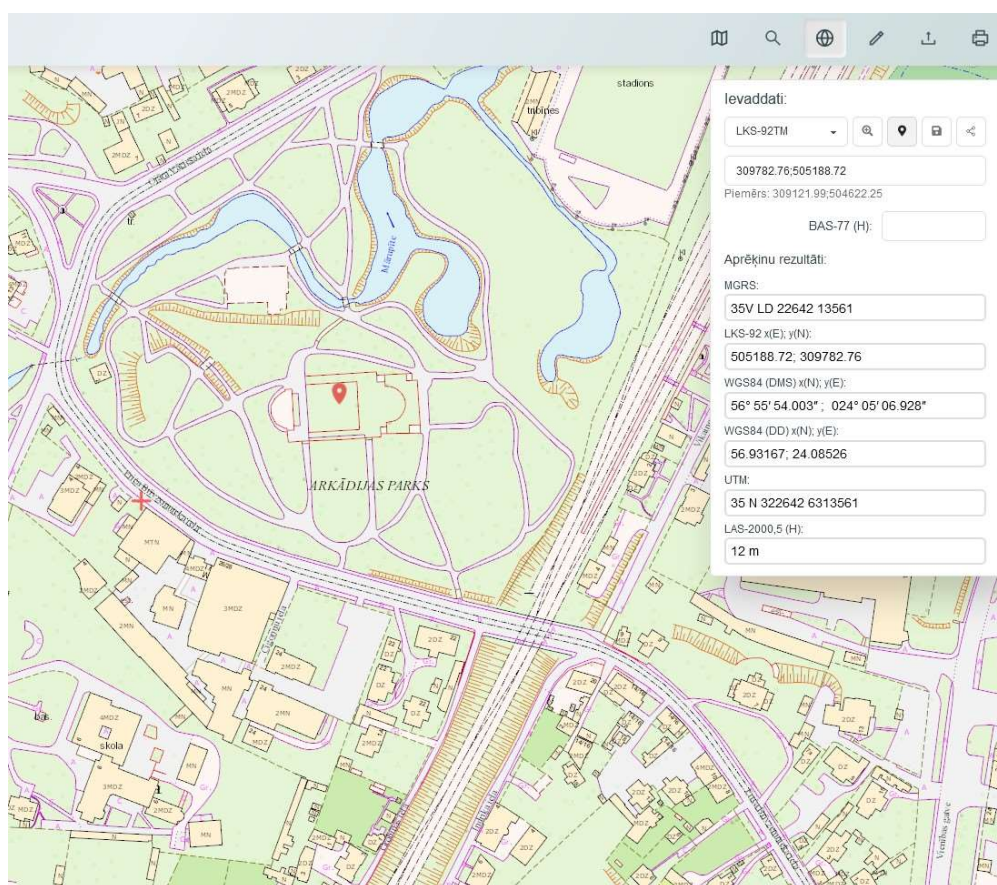
- supervise in accordance with the procedures laid down in laws and regulations and co-ordinate the creation and maintaining of the geodetic reference system;
- create and maintain the national Geodetic Network Database and is the manager of the State information system of the National Geodetic Network;
- create and maintain the System of Permanent Global Positioning Base Stations "Positioning System of Latvia" or "LatPos";
- survey the state border - determine the state border line and geodetic coordinates of state border signs and draw up demarcation maps of the border;
- obtain, prepare and update basic data of geodetic information, including:
- images of the surface and remote sensing data of the Earth;
- orthophotos of the framework of the scale line 1:50 000 - 1:2000;
- digital terrain and surface models, which are used for drawing up of topographic plans and topographic maps within the framework of the scale line 1:250 000 - 1:10 000;
- geospatial information, which is included in topographic plans and topographic maps within the framework of the scale line 1:250 000 - 1:2000;

- reference data in order to provide support for the carrying out of the tasks of the National Armed Forces and their participation in the North Atlantic Treaty Organisation in accordance with the procedures stipulated by the Ministry of Defence;
- make and maintain military geodetic and cartography products;
- obtain, prepare and update information for aviation needs in accordance with the procedures laid down in laws and regulations, as well as by co-operation with the competent authorities in the field of aviation:
- prepare air navigation maps for aviation needs;
- create and maintain the database of objects dangerous for the safety of aircraft flights;
- create and maintain the national Place Names Database;
- perform expert-examination of geodetic work results upon request of State administration and local government institutions, legal persons and natural persons in accordance with the procedures laid down in laws and regulations, as well as co-operate with the competent authorities in the field of aviation and perform expert-examination of carrying out geodetic work for aviation needs;
- create and maintain a geospatial information infrastructure for preparation and maintaining of geodetic, cartographic and geospatial information, including create and maintain the information system of geospatial basic data;
- create and maintain the archives of materials of geospatial information;
- perform printing works;
- prepare and provide the reference data of geospatial information referred to in the Geospatial Information Law, as well as provide services of geodetic, cartography and geospatial information upon request of State administration and local governments, legal persons and natural persons.

## 2. MAIN ACTIVITIES IN THE GEOSPATIAL INFORMATION FIELD

### 1.1. INFORMATION SYSTEM OF GEOSPATIAL REFERENCE DATA

- The Agency is the holder of the national Geospatial Reference Data Information System or “GPIS”. The system provides preparation and storing of geospatial data and provision of geospatial information services, including in the form of web services. Data from GPIS are transferred to other information systems and to individual users.
- In 2021 users received a new version of the Agency map browser “LGIA Maps”, which is accessible free of charge to all interested parties on the website <https://kartes.lgia.gov.lv>. Most of the geospatial data prepared by the Agency can be viewed on “LGIA Maps”, including orthophoto maps of various years, digital elevation models, topographic maps of various scales.



*Tool for reading and transforming coordinates in “LGIA Maps”*

Various functions are built into the browser, in particular, the functions of searching, drawing of new items, saving, export in KML formats, map printing, adding of external web services, creation of the “iFrame” link for placing it on websites, tools for reading and transformation of coordinates, determination of altitudes, etc.

- The adaptive design of the map browser ensures that it would look equally good and will function on a mobile phone, a tablet, a portable and desktop computer.



*“LGIA Maps” on different devices*

- The Agency provides compliance with the requirements of Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE), in particular, maintains the sets of geospatial data “Geographical names”, “Hydrography”, “Elevation”, “Land cover” and “Orthoimagery”, and ensures accessibility of these data on the National Uniform Geospatial information portal and the European Commission INSPIRE Geoportal.



## 1.2. GEODESY

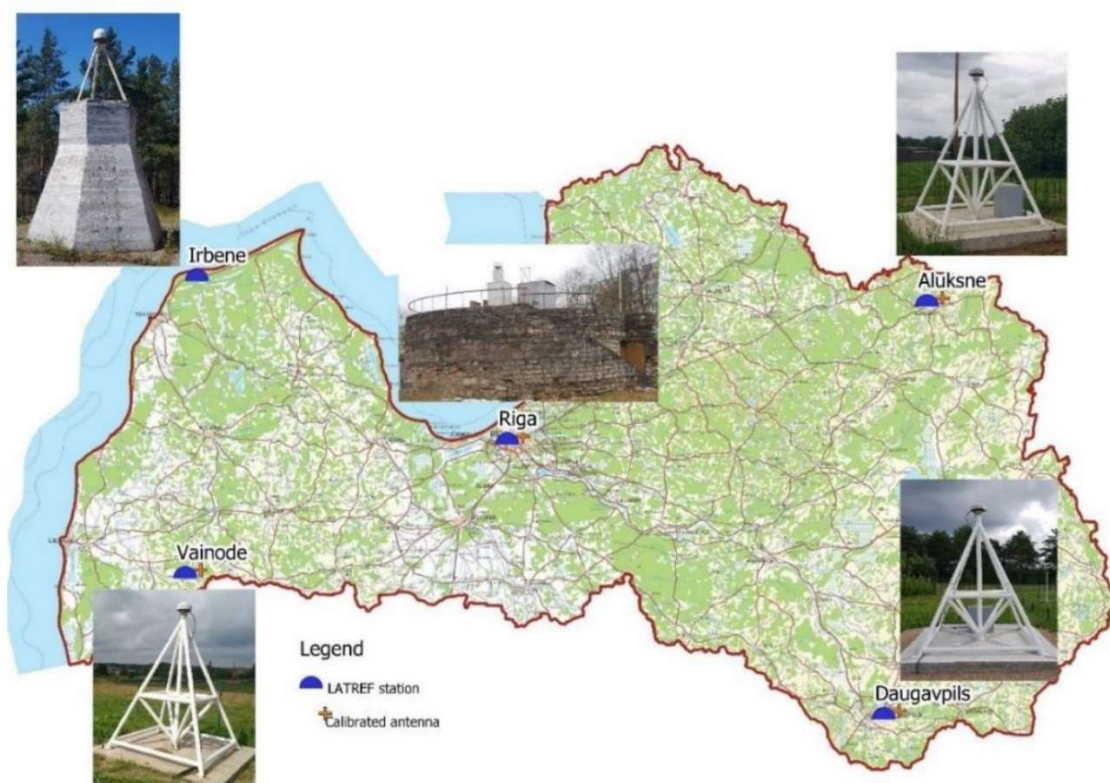
- Continuous management of the geodetic reference system is provided by performing arrangement, improvement and maintenance of the national geodetic network. A new cycle of uniform survey of the national geodetic network was started in 2022 and it is intended to be two years instead of the former four years. Within the scope of these works, survey and arrangement of geodetic points was performed, damaged or destroyed points were identified. All the information is stored in the National Geodetic Network Database.



*Kinds of geodetic points*

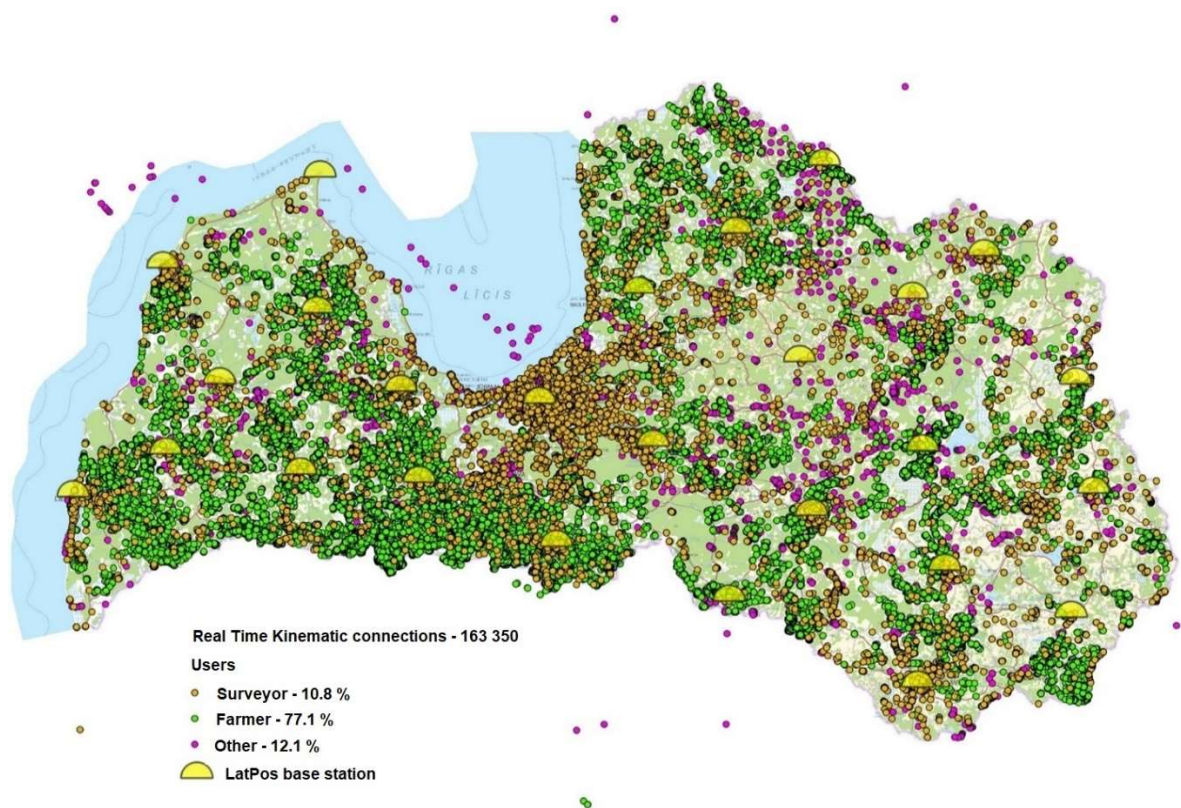
- Works for maintaining the national geodetic reference system are being performed. Linkage of coordinates with the European Terrestrial Reference System ETRS89 is improved, within the scope of these works geodetic characteristics are obtained, analysed and processed from the network of fundamentally enforced permanent base stations LATREF providing international linkage and internal certainty of the Latvian coordinate system - for the points in Vainode, Alūksne and Daugavpils.





*Permanent base stations network LATREF*

- In cooperation with the Estonian State Land Service (Maa-met), in 2021 and 2022 the Agency implemented the international cooperation project “GeoRefAct”, resulting in harmonisation of the geodetic reference systems of both countries in the border territory and accessibility of high accuracy geodetic reassessment tools on the Internet free of charge.
- An inter-institutional working group of experts is operating under the Agency management for upgrading the Latvian geodetic coordinate system. The working group consists of representatives of higher educational establishments, ministries, major holders of geospatial data and professional organisations. The geodetic substantiation needed for the upgrade of the coordinate system and proposals for amendments of laws and regulations have been prepared, international registration of the new Latvian geodetic coordinate system, preparation of the tool of reassessment of coordinates has been initiated.
- Operation of the service of the national information system LatPos available to all users free of charge has been provided. The number of the system users has increased rapidly, in particular, in accurate agriculture, during recent years.



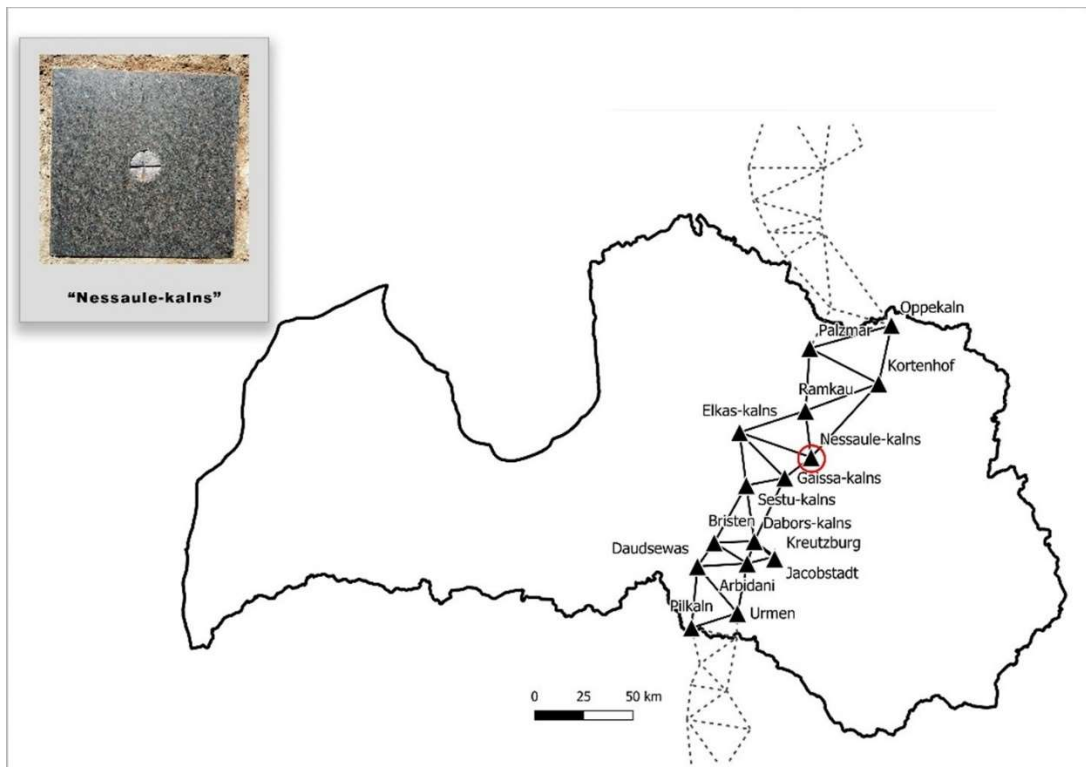
*LatPos usage statistics for the month of August 2022*

- In 2022 construction of a variometer station in Dagda district was completed, it is necessary for comprehensive incorporation of the geomagnetic observations of the national geodetic network in international geomagnetism measurements and for continuous geomagnetism monitoring in the territory of Latvia.
- The Council of Preservation and Development of Struve Geodetic Arc has been established in Latvia for preserving Struve Geodetic Arc and development of related infrastructure, as well as for promoting the heritage interpretation initiatives. The Council consists of the representatives of the Agency, UNESCO Latvian National Committee, the National Culture Heritage Council and the municipalities in the territories of which points of Struve Geodetic Arc are located.

Geodesy experts of the Agency search for the historical points of Struve Geodetic Arc and participate in restoring them.

Among implemented works there is the inter-country cooperation project “Struve Route Network” resulting in development of three educating tourism routes around and via the points of Struve Geodetic Arc - “Sestukalns”, “Gaissa-kalns” un “Nessaule-kalns”. Three interactive information

displays and points for making unique memory coins are located in the tourism information centres near the points.



*Struve Geodetic Arc in Latvia*

On 22 August 2019 the centre of the mark of the geodetic point of Struve Geodetic Arc "Nessaule-kalns" was restored, thus symbolically completing restoration of this point "Nesaule-kalns". On 14 May 2021 the renovated point "Bristen" of with a field observatory was opened.



### 1.3. REMOTE SENSING

- Aerial photos of the territory of Latvia are made according to a three-year cycle by covering one third of the country territory every year. The works of aerophotography are performed by an outsourced provider, further processing of collected data and preparation of ortophotos is provided by the Agency. Data are obtained in RGB, CIR, RGBi colour ranges.

The 7th cycle of preparing aerial photos of the territory of Latvia since restoration of independence was performed from year 2019 to 2021. The resolution of collected aerial images has reached 25 cm.

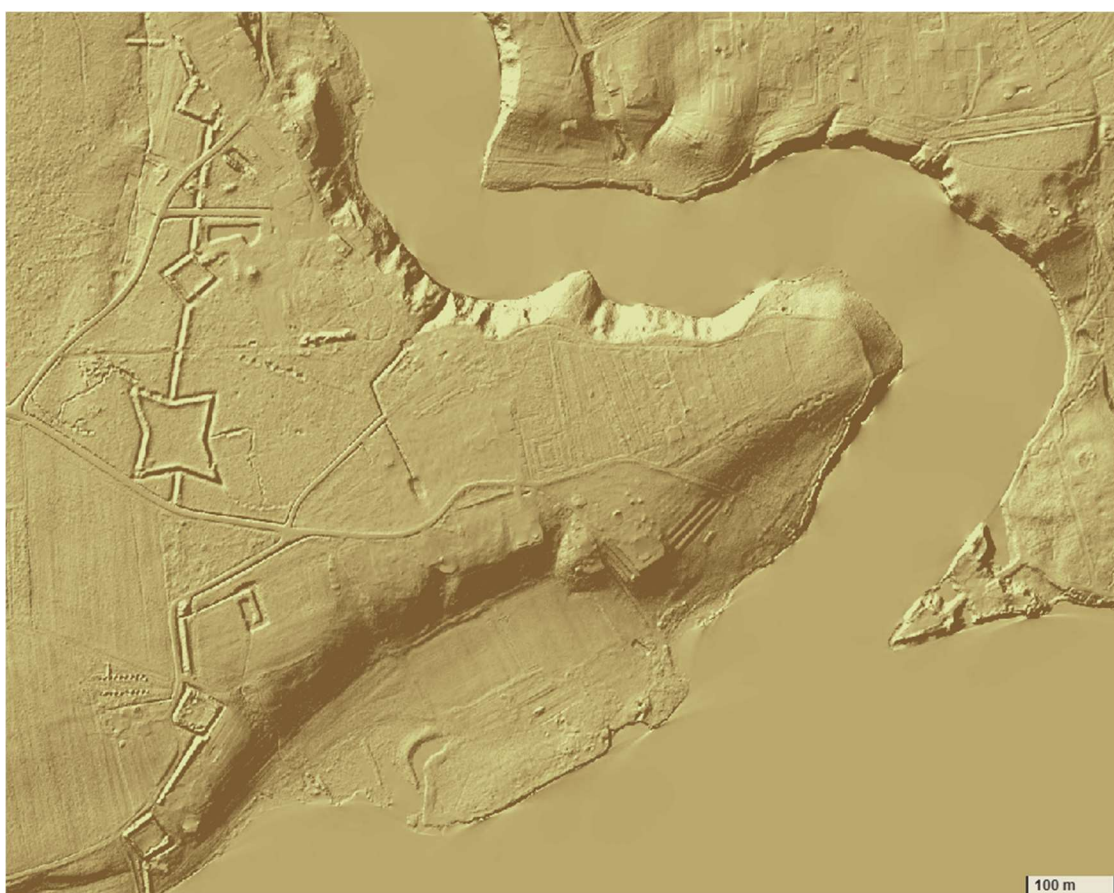


*Pasta sala [Post Island] in Jelgava city,  
aerial photography taken on June 27, 2022*

The 8th cycle of aerophotography was started in 2022 (2022-2024). The achieved resolution of collected data is 20 cm. Acceptance, processing of collected data and preparation of ortophoto maps and their delivery to users is provided.

- The reference data of the digital elevation model are available for the entire territory of the country and these were prepared based on the airborne laser scanning data collected during the time period from 2013 to 2019. The density of collected points is minimum 4.5 points per m<sup>2</sup>, the density of the points describing the earth surface is 1.5 points per m<sup>2</sup>.

These data are accessible free of charge as open data on the Agency Open Data Site (<https://www.lgia.gov.lv/lv/atvertie-dati>), on the National Geospatial Information Portal (<https://geolatvija.lv>) and the Open Data Portal of Latvia (<https://data.gov.lv>).



*Remains of fortifications from 17th century near Koknese town  
in digital terrain model*

A new cycle of uniform airborne laser scanning of the territory of Latvia was launched in 2022 and it is envisaged to complete it during six years, by year 2027. Delivered data are accepted, processed and incorporated in all the existing data of the altitude model.



- A layer of contour lines at scale 1:10,000 is prepared based on the data of the digital terrain model in order to provide them to topographic maps. These data are prepared for most of the territory of Latvia.



*Layer of contour lines*

- Unmanned aerial vehicles are utilised for preparation of topographic maps. The Agency also uses these vehicles for supporting preparation of aeronavigation data, for determining required parameters for flight safety of potentially dangerous items.
- Simultaneous aerophotography and aero laser scanning of the territory of Riga city, including aerophotography by inclined angle cameras was performed in 2021. The collected data were used for preparing a 3-dimensional photo reality model of Riga city and the LOD standard model of buildings.





*Photorealistic model of the city of Riga,  
made from oblique camera footage obtained in 2021*



*The vectorized LOD 2 model for the territory of Riga,  
prepared from airborne laser scanning data obtained in 2021*

These data are available on Riga City Local Government data publishing portal (<https://georiga.eu/3d-riga>)



Digitalisation and preparation of ortophotos of historical aerophotography images and negatives in the Archive of the Agency has been started. The Archive contains these materials for the time period starting from 1957.



*Digitized raw aerial photo image – Płaviņas town, August 1, 1983*

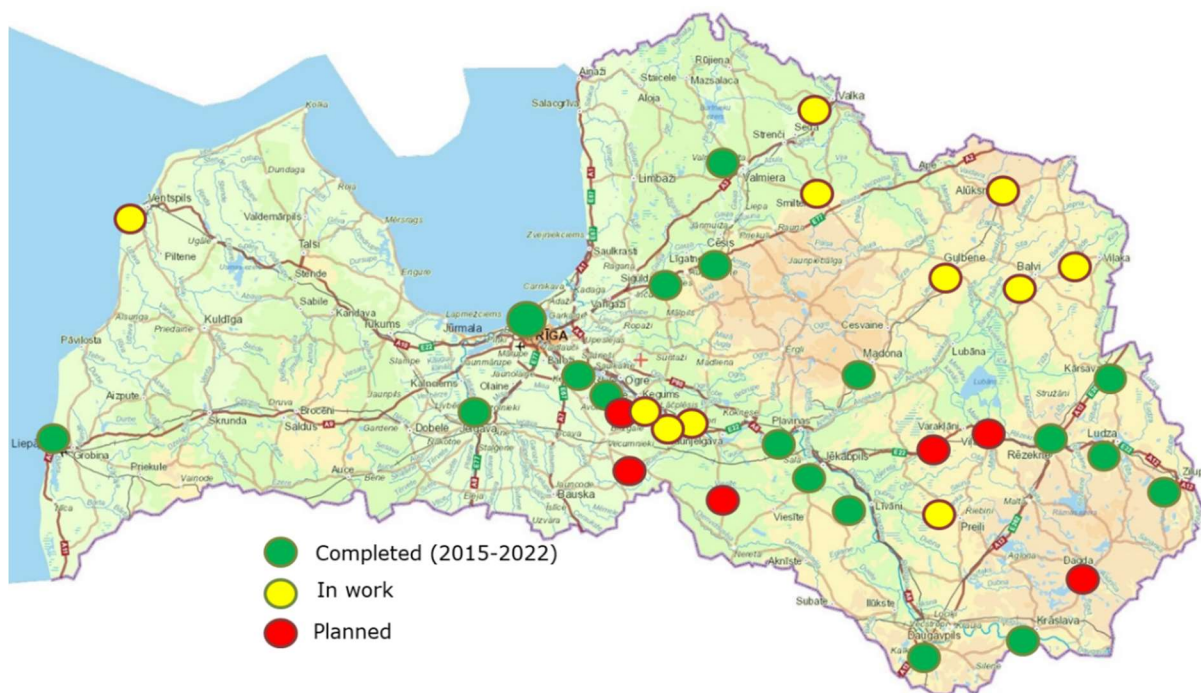
## 1.4. CARTOGRAPHY

- The Agency performs topographic mapping of the territory of the country for both military and civil needs, as well as provides preparation of various thematic and aeronavigation maps.
- The topographic plan at scale 1:2000 presents the largest scale cartographic data prepared by the Agency. Every year such data are prepared for a territory of approximately 70 km<sup>2</sup>, in particular, for densely populated areas, mainly cities, in some cases also for special territories.



*Topographic plan at scale 1:2000*



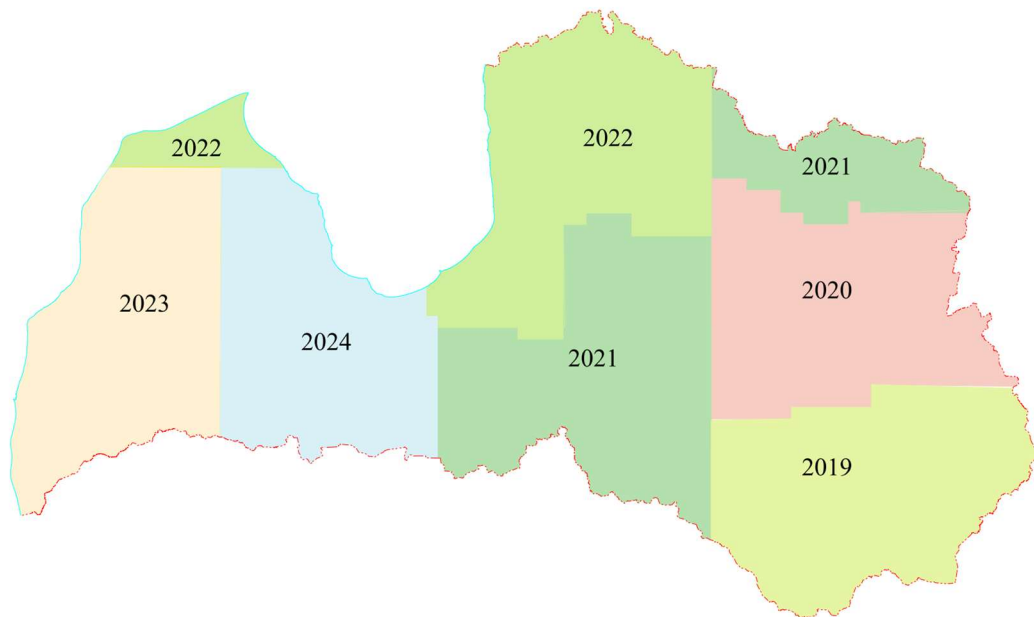


*Preparation plan of data at scale 1:2000*

- In order to optimise preparation of maps of various scales, to ensure compatibility of data between scales, to use uniform data quality verification rules for civil and military versions of maps, a single type technology line with uniform software is used for data production. A unified system of classification of geospatial items and coding of geospatial data has been introduced in preparation of topographic maps by the Agency for supporting the technology line. This system is used in topographic maps at scales 1:10,000, 1:25,000, 1:50,000, 1:100,000 and 1:250,000.

In 2019 the new system was implemented for preparation of the base map of the country, namely, a topographic map at scale 1:10,000. This has created preconditions for introduction of the cartography generalisation technologies for production of topographic maps of all the most demanded scales.

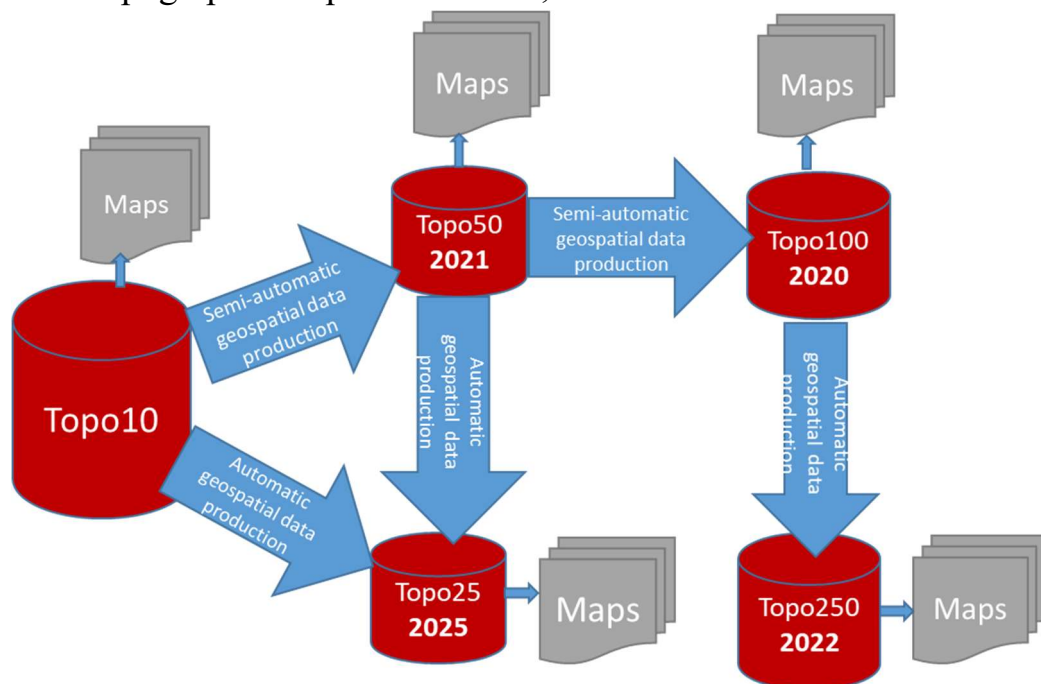




*Preparation plan of topographic map at scale 1:10,000*

- During recent years the Agency has achieved considerable progress in development of technologies for preparation of maps by applying the semi-automated cartographic generalisation method.

In 2020 the Agency completed the first project of introduction of semi-automated cartographic generalisation technologies, in particular, a military map at scale 1:25,000 for the entire territory of the country based on the topographic map at scale 1:10,000.



*Semi-automated cartographic generalisation workflow*

In 2022 the military topographic map at scale 1:100,000 was prepared for the entire territory of the country by applying the partially automated cartographic generalisation method. The topographic map at scale 1:50,000 was used as a basis of the map. This was the first time when a topographic map of this scale was prepared for the entire territory of the country. Excluding development of the technology, preparation of the map was completed within a little more than two years.



*Topographic map at scale 1:100,000*

In 2021 preparation of a topographic map at scale 1:50,000 was started by applying this technology. In 2023 works were commenced to prepare various maps at scale 1:250,000 by applying the partially automated generalisation technologies.

It is envisaged to gradually increase the proportion of automatically performed tasks, which is from 60% to 90% now depending on the map scale.





- The Agency also prepares the state overview maps at scales 1:250,000 (the last issue in 2023) and 1:500,000 (the last issue in 2019).



*Overview map of Latvia at scale 1:100,000*

- Maintenance and development of the Agency Database of Important Objects is continued for the needs of preparing aeronavigation and topographic maps.
- In order to provide performance of the Agency tasks related to compliance with the INSPIRE Directive, data updating is performed for the data sets “Hydrography” and “Orthoimagery”.
- Survey of the state border, in particular, determination of the state boundary line and the geodesic coordinates of the state border signs and preparation of the border demarcation maps, is among the Agency tasks. As the state border demarcation works with all the neighbouring countries have been completed, maintenance of the state border data is performed. In 2021 the works of re-demarcation of the state border of the Republic of Latvia and the Republic of Lithuania were started because the preceding border demarcation was completed in 2000.







- The Agency is a member of the European Association of Cartography and Cadastre Agencies „EuroGeographics”. Preparation of EuroRegionalMap where the Agency prepares data about the territory of Latvia is among the most important practical results of this cooperation. EuroRegionalMap is a pan-European dataset containing topographic information at the scale 1:250 000 covering 51 European countries and territories. Data are available on the website (<https://www.mapsforeurope.org/access-data>).

## Access Data

Please select the datasets you want, and then review and accept the [licence terms](#) and enter your e-mail address. We will send you a download link and/or instructions for connecting to the service.

If you have any queries, please go to our [FAQ's](#)

 <p><b>EuroGlobalMap</b>            GeoPackage - 372.3Mb zip            Shapefile - 327.1Mb zip            WFS, WMS, WMTS            Last Update: 03/2023</p> <p><input type="checkbox"/> Download <input type="checkbox"/> Web Service</p>	 <p><b>EuroRegionalMap</b>            GeoPackage - 3.0Gb zip            File GDB - 1.2Gb zip            Shapefile - 2.6Gb zip            WFS, WMS, WMTS            Last Update: 05/2023</p> <p><input type="checkbox"/> Download <input type="checkbox"/> Web Service</p>	 <p><b>EuroDEM</b>            Tiff - 2.5Gb zip            WMS, WMTS            Last Update: 04/2022</p> <p><input type="checkbox"/> Download <input type="checkbox"/> Web Service</p>	 <p><b>Open Cadastral Map</b>            WMS, WMTS            Last Update: November 2022</p> <p><input type="checkbox"/> Web Service</p>
 <p><b>Pan-European Imagery</b>            WMS            Last Update: 2018</p> <p><input type="checkbox"/> Web Service</p>	 <p><b>Open Gazetteer</b>            Geopackage - 115.1Mb zip            WFS, WMS, WMTS            Last Update: 10/2022</p> <p><input type="checkbox"/> Download <input type="checkbox"/> Web Service</p>		

## 1.5. GEOGRAPHICAL NAMES

- The Agency maintains the national Place Names Database and its public version is freely accessible online at <https://vietvardi.lgia.gov.lv>.
- The Place Names Database is continuously updated and supplemented. On 30 June 2023 the database contained 184,778 place names referring to 131,713 geographic items.
- The scope of place names and the accuracy in the Place Names Database fully provides the needs of maps of the scale 1:50,000 and below. Currently the database is being supplemented and data are being detailed in order to secure that the comprehensiveness and accuracy of the contained data conforms to the scales 1:25,000 and 1:10,000. Supplementing of the data of place names follows the mapping cycle at scale 1:10,000.

**Vietvārdu datubāze**  
Publiskā versija  
8. izdevums

Datu meklēšanas nosacījumi

Vietvārdu datubāzes publiskās versijas 8. izdevumā iekļauts vairāk nekā 110,6 tūkstoši ierakstu par Latvijas Republikas teritoriju. Dati atbilst uz mērogiem līdz 1:10 000.

Vietvārdu datubāzē izmantotā ciemu klasifikācija (mazciems, vidējciems, skrajciems, vasarnīcu ciems u.tml.) ir izveidota kartogrāfijas vajadzībām un tai ir tikai informatīvs raksturs.

Datu meklēšanas nosacījumi

Objekta veids	apdzīvotais
Nosaukuma daļa	<input type="text"/> <input type="checkbox"/> Meklēt, ignorējot diakritiskās zīmes <input type="checkbox"/> Meklēt tikai oficiālos nosaukumus <input type="checkbox"/> Meklēt tikai ar LGIA lēmumu apstiprinātus
Objekta ID	<input type="text"/>
Atlasīto objektu skaits vienā lapā:	50
Piezīmes	Meklējamā nosaukuma daļai jābūt vismaz 3 rakstzīmju garai. Meklēšanu pēc nosaukuma daļas var precizēt, izmantojot <a href="#">%</a> un <a href="#">_</a> zīmes. Šos simbolus iespējams arī <a href="#">kombinēt</a> .

Meklēt datus    Noņemt

### *Public version of Place Names Database*

The Place Names Database is linked to the data of the State Address Register for which the State Land Service is responsible. The geometry of the lines of the names of water streams is gradually updated according to scale 1:10,000, data are also aligned with the Classification of Water Economic Sections under supervision of the Ministry of Environmental Protection and Regional Development and, as far as possible, the data of



the Melioration Digital Cadastre maintained by the State-Owned Limited Liability Company "Zemkopības ministrijas nekustamie īpašumi" [Real Estate of the Ministry of Agriculture].

- For provision of the quality of the data of place names the Agency also cooperates with the Institute of the Latvian Language of the University of Latvia and the Institute of Livs etc.
- In compliance with the stipulations of the Cabinet Regulations No. 50 of 10 January 2012 "Regulations of the information of place names", the Agency has performed initial assessment of the status of the place names of nature sites included in the Place Names Database and has submitted proposals regarding assigning official names and official parallel names thereof to the State Language Centre.

Based on the conclusions of the Centre, the Agency assigns official place names to nature sites. Decisions are published on the Agency website in the Section "Toponymics laboratory" (<https://www.lgia.gov.lv/lv/oficialie-vietvardi-dabas-objektiem-0>)

- A new glossary of geographic place names "Lakes of Latvia in Annexes to the Civil Law" has been published on the Agency website.

## **1.6. PRINTING**

- The printing house "Latvijas karte" [Latvian Map] providing preparation and execution of various cartographic and general printing works operates within the Agency.
- For example, in 2022 the printing house printed 406,000 copies of the brochure "Action in a crisis situation 72h", issued 194 various map sheets for civil and military needs.

## 2. INTERNATIONAL ACTIVITIES

- Geodesy experts of the Agency continued work in the working groups of the Nordic Geodetic Commission on geoides and altitude system, geodynamics, global positioning and geodetic reference systems, as well as participation in the activities of the Regional Reference Frame Sub-Commission for Europe (EUREF). In 2022 Latvia, along with Estonia and Lithuania, was officially admitted to the Nordic Geodetic Commission as a full partner. The Agency is also a member of the International Union of Geodesy and Geophysics.
- In the field of cartography, the Agency represents the state in the European Association of Cartography and Cadastre Agencies „EuroGeographics” and International Cartographic Association.
- The Agency's place name experts work in United Nations Group of Experts on Geographical Names or UNGEGN and Baltic Division of UNGEGN.



*2023 session of the United Nations Group of Experts on Geographical Names  
at the United Nations Headquarters in New York*

### 3. CARTOGRAPHIC EDUCATION

- In order to work as a cartography engineer in Latvia, a person needs higher education diploma in cartography, geography, land arrangement, geodesy or another related speciality. This education is provided by several educational establishments.



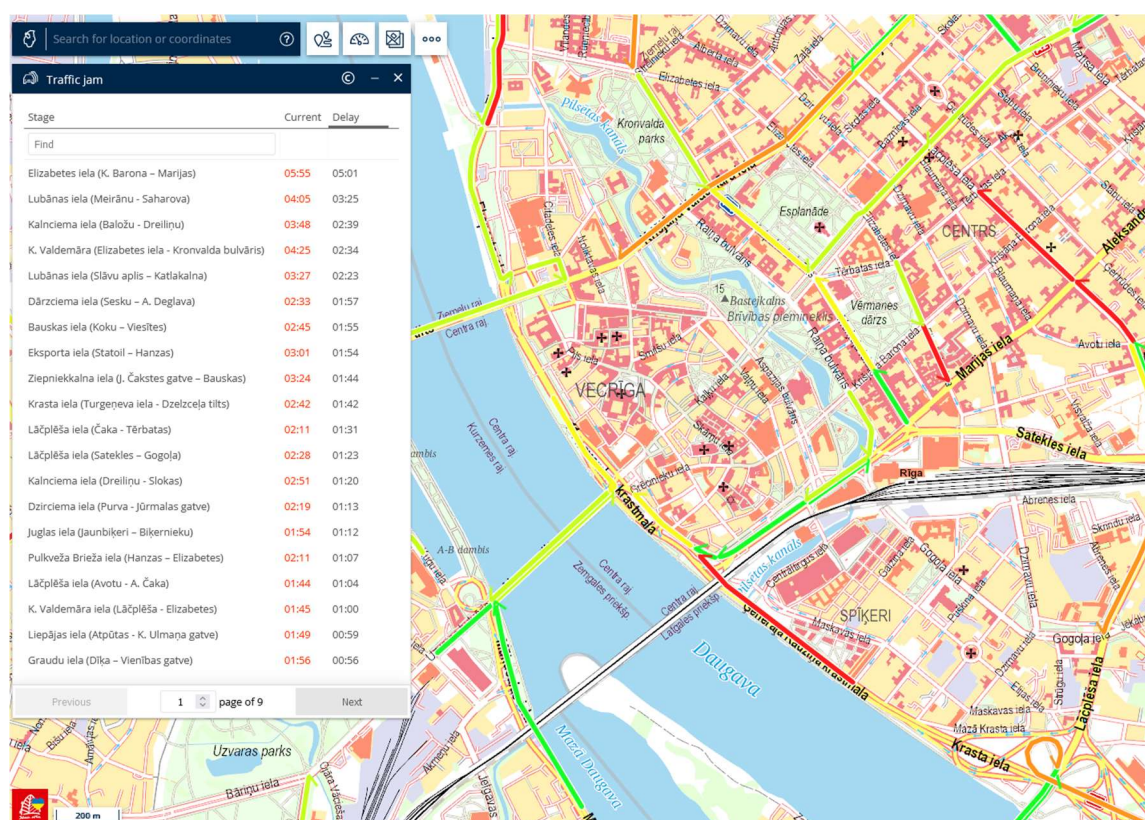
*The Centre for Natural Sciences of the University of Latvia*

- The Faculty of Geography and Earth Sciences of the University of Latvia provides training for the Bachelor degree of Natural Sciences in geography or geology. Also, the Master degree in these specialities can be obtained there.
- The Faculty of Civil Engineering of the Riga Technical University provides professional Bachelor study programs in the specialities of geodesy and cartography engineer, geoinformation engineer and land arrangement engineer, as well as training for the professional Master degree in geomatics.
- The Faculty of Environment and Building Sciences of the Latvian University of Biosciences and Technologies trains experts with the qualification of a land arrangement engineer.



## 4. OTHER CARTOGRAPHIC DATA PRODUCERS

- The private cartography and geospatial data solutions company “Jāņa sēta” possessing more than 25-year-experience in producing maps and development of geospatial information products and services also operates in Latvia. “Jāņa sēta” is the leading company of this type in the Baltic countries exporting its products to other European countries. The company prepares issues of both traditional cartography, line road maps, tourism maps, atlases, educational publications, wall maps, etc., as well as develops various digital maps and geospatial information products based on orders.
- The best-known product of “Jāņa sēta” is “BalticMaps” (<https://balticmaps.eu>), which is accessible free of charge to all interested parties. The users of “BalticMaps” can search addresses or places, plan routes, obtain information about traffic and traffic jams. This browser of maps allows measuring distances, marking points in the map or sending a selected map link to e-mail.



*Traffic jam layer on “BalticMaps”*



- The Hydrography Service of the Latvian Maritime Administration prepares and issues official sea navigation maps covering the waters of the Republic of Latvia. Data are also available in the form of electronic maps.
- In compliance with the Geospatial Information Law, the Ministry of Defence organises and coordinates implementation of the national policy in the field of geodesy, cartography and geospatial information. However, certain functions in implementation of the policy in the field of geodesy, cartography and geospatial information are also performed by other ministries according to their competence and they supervise producers of geospatial data within their relevant scope of competence. For example, the State Land Service under the Ministry of Justice prepares and maintains data of the state cadastre of real estate, boundaries of administrative territories, addresses; the Nature Protection Authority under the Ministry of Environmental Protection and Regional Development maintains geospatial information regarding specially protected nature territories.
- The current competence of the producers of geospatial data of Latvia was defined by the geospatial information policy planning document “Concept of development of the geospatial information of Latvia” approved by the Order of Cabinet of Ministers No. 686 of 28 December 2013 “On the concept of development of the geospatial information of Latvia”. As the above document has expired, a new development strategy of the geospatial data infrastructure of Latvia is being developed and it will define the tasks in the field of geospatial information policy during the time period from 2023 to 2027.