Cartography in Croatia 2019–2023
National Report to the ICA 19th General Assembly
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1 Introduction

Croatia has been a member of the International Cartographic Association (ICA) since 1995 and one of its obligations has been to submit national reports on cartographic activities to the General Assembly held every four years. The bearer of those activities in Croatia is the Croatian Cartographic Society.

Croatia became a member of the ICA in Barcelona in 1995, where its first national report for the period 1991–1995 was submitted. Reports were also submitted for 1995–1999 in Ottawa, for 1999–2003 in Durban, for 2003–2007 in Moscow, for 2007–2011 in Paris, for 2011–2015 in Rio de Janeiro, and for 2015–2019 in Tokyo. This report, which covers 2019–2023, was submitted at the General Assembly of the ICA in Cape Town in 2023. The Republic of Croatia has a comprehensive overview of its cartographic activities in the past 32 years, i.e. since it became an independent state.

The report is divided into the following sections: Official Cartography, Academic Cartography, Commercial Cartography and Other Activities. The report ends with acknowledgments and a bibliography.

This kind of report can never cover absolutely all the activities of the period in questions. Not all parties responded to the invite to collaborate. Nevertheless, the most relevant institutions and companies are represented in the report. The individuals who contributed are listed in the acknowledgments.

The list of references at the end of the report was based on data provided by collaborators on the report and searches of the Croatian Scientific Bibliography database.
2 Official Cartography

2.1 Geographic Names

The State Survey and Real Estate Cadastre Act (Official Gazette, 112/18) for the first time in the Republic of Croatia enabled the formation of a body at the national level that will deal with the standardization of geographical names. Accordingly, in 2019, the Government of the Republic of Croatia established the Commission for Standardization of Geographical Names. The Commission, as a multi-disciplinary and multi-institutional body, is composed of experts in the fields of geodesy, geography, cartography, hydrography, linguistics, history, culture, international relations and science and education, and has 11 members and a president who comes from the body responsible for the Register of Geographical Names, i.e. the State Geodetic Administration.

The Commission is a body that makes recommendations for the standardization of geographical names to public decision making bodies that create new or change existing geographical names within the scope of their competence in the scope established by the State Survey and Real Estate Cadastre Act (Official Gazette, no. 112/2018) and opinions on proposals for naming settlements, streets, and squares of local self-government units in accordance with the Settlements Act (Official Gazette, No. 39/2022). If necessary, the Commission also gives an opinion related to geographical names and on other grounds.

The standardization of geographic names is performed by public decision-making bodies in accordance with the Commission’s recommendations.

The Commission also forms working groups, as operational bodies that continuously work on the preparation of professional documents related to geographical names and their standardization.

The second term of the Commission is currently active, and it held a total of 20 sessions:

- 18 in the first term that was valid from 2019-2023, and
- 2 in the second term appointed in April 2023.

So far, the Commission has prepared and published the following documents:

- Recommendations for the standardization of geographical names in the Republic of Croatia - the naming of settlements, streets and squares
- Recommendation for the standardization of geographical names in the Republic of Croatia - the writing and use of geographical names from foreign languages
- Methodology for the standardization of geographical names in the database of the Register of Geographical Names

The Commission has also prepared the following documents:

- Recommendations for the standardization of geographical names in the Republic of Croatia – the writing and use of geographical names from foreign languages – the naming of transport infrastructure
- Recommendations for writing geographical names on maps and in other publications

Currently, working groups are working on the following documents:

- Recommendations for the standardization of geographical names in the Republic of Croatia – the writing and use of geographical names from foreign languages – the naming of islands and peninsulas
- Brochures on geographical names with the aim of popularizing the issue.

The Commission’s activities are regularly reported to UNGEGN, as the umbrella organization that takes care of geographical names at the global level.

More information on the activities of the Commission for the Standardization of Geographical Names is available at https://rgi.dgu.hr/

2.2 State Geodetic Administration (SGA)

The State Geodetic Administration (SGA) is a state administrative organization that performs tasks in the field of geodesy, cartography, cadastre and photogrammetry and is in charge of the establishment of the national spatial data infrastructure, computerization of the cadastre and geodetic-spatial system, state official cartography (1:5000, 1: 25,000, 1:50,000, 1:100,000, 1:250,000), geodetic documentation, statistical data on the real estate cadastre, spatial units and infrastructure, and geodetic and cadastral work for the state border on land.

The State Geodetic Administration carries out tasks within its scope in the Central Office in Zagreb and in 20 regional offices throughout the Republic of Croatia in accordance with the State Survey and Real Estate Cadastre Act ("Official Gazette" no. 112/18, 39/22). Exceptionally, in the area of the City of Zagreb, administrative and professional tasks that are legally placed in the scope of the regional office
are performed by the City Office for Cadastre and Geodetic Affairs of the City of Zagreb.

State survey and real estate cadastre work is performed on the basis of annual and multi-annual programmes.

In the period from 2019 to 2023, the following works were carried out within the framework of official cartography:

106 sheets of topographic maps were made at the scale of 1:25,000 (TK25). With the transition to a new division into sheets, the above sheets were updated and put into official use by a decision of the Director General of the SGA. In total, 483 out of 539 sheets of TK25 have been produced to date, and activities on the production of maps are still ongoing. In parallel with the creation of a new digital topographic map, the data of the Basic Topographic Database is also being updated.

The creation of a digital orthophoto map 1:5000 (DOP5) is ongoing: in 2019–2020, 10,750 sheets were completed and in 2021–2022, 10,925 sheets DOP5 were completed. During 2023 and 2024, the activities of producing DOP5 sheets will continue in a two-year cycle. In parallel with the production of DOP5 sheets, the digital relief model for the entire Republic of Croatia was also updated.

For the needs of EuroGeographics, the data on for the subject of transport for the EuroRegional Map has been updated.

In 2021, a contract was signed for Multi-Sensor Aerial Imaging of the Republic of Croatia for the purposes of disaster risk reduction assessment, and LIDAR data will be collected for the entire country. The project is co-financed by EU funds.

The project financed by the EU was successfully completed: “Establishment of the Official Topographic-Cartographic Information System”. It will be used as the background for geo-information systems of state administration bodies and the public sector. The system was established and tested on the area of one sheet of TK250.

After the earthquake that hit the central parts of the Republic of Croatia, orthophoto maps were made at the scale of 1:1000. The areas affected by the earthquake on 77,000 ha were included.

During the mentioned period, maps installed on the floor/walls were made and placed in 22 locations.

In 2020, amendments were made to the Cartographic Signs Ordinance with the associated Collection of Cartographic Signs ("Official Gazette" no. 15/20).

More information on the activities of the State Geodetic Administration can be found on the website https://dgu.gov.hr.

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2.3 Hydrographic Institute of the Republic of Croatia (HHI)

http://www.hhi.hr

The Hydrographic Institute of the Republic of Croatia (HHI) carries out hydrographic activity of interest to the Republic of Croatia, which includes scientific research, and development and professional tasks relating to navigational safety in the Adriatic, hydrographic-geodetic survey of the Adriatic, marine geodesy, construction and production of nautical charts and publications, oceanographic research, marine geology, development of a hydrographic information system, and publishing and printing tasks.

The Institute is authorised to develop the safety of navigation service in the Adriatic in accordance with recommendations of the following organizations:

- International Hydrographic Organization (IHO)
- International Maritime Organization (IMO)
- International Association of Lighthouse Authorities (IALA),

and in cooperation with the Ministry of the Sea, Transport and Infrastructure, the Croatian Navy, harbour master’s offices, the Plovput company, and hydrographic offices and institutes of maritime nations worldwide.

According to annual work plans, between 2019 and 2023 the cartographic activity of the HHI involved the production and publishing of nautical charts and publications, their continuous updating, intensified work on vectorization and production of electronic navigational charts (ENC) still pending, construction and production of plans and other graphic representations appearing in nautical publications, good cooperation with Croatian ministries (MMPI, MVEP, MORH, etc.), professional work on the preparation of studies and projects, as well as other cartographic tasks.

**Official paper navigational charts**

First edition:

- Confidential chart made for the Ministry of Defence of the Republic of Croatia (2019)
- Navigational chart No. 351 Venezia – Zadar, 1:350 000 scale (2020)
- Navigational chart No. 352 Ancona – Šibenik, 1:350 000 scale (2020)
- Navigational chart No. 353 Pescara – Split, 1:350 000 scale (2020)
• Navigational chart No. 354 Barletta – Dubrovnik, 1:350 000 scale (2020)
• Navigational chart No. 55 Pelješki kanal, 1:25 000 scale, A Korčula, 1:10 000 scale (2021)
• Navigational chart No. 73 Kanal Malog Stona i Stonska prevlaka, 1:30 000 scale, A Mali Ston, 1:10 000 scale, B Ston, 1:6000 scale (2022)
• Thematic chart No. 101 G Granice Republike Hrvatske na Jadranskom moru, 1:800 000 (2022)
• Navigational chart No. 46 Drvenički kanal i Trogirski zaljev, 1:25 000 scale, 1:25 000 scale (2023)

New edition:
• Navigational chart No. 15 / INT 3474 Rijeka, 1:15 000 scale, A Luka Rijeka, 1:4000 scale, B Brajdica – kontejnerski terminal, 1:4000 scale (2020)
• Navigational chart No. 11 Zapadna obala Istre – plans of ports, 9 plans at different scales (2020)
• Navigational chart No. INT 3410 Rijeka – Venezia, 1:250 000 scale (2021)
• Navigational chart No. 100-18 / INT 3473 Rijeka – Kvarnerić, 1:100 000 scale (2022)
• Navigational chart No. INT 3410, 1:250 000 scale (2021)
• Navigational chart No. INT 3412 Split – Gargano, 1:250 000 scale (2022)
• Navigational chart No. 22 Kvarnerić – plans of ports, 6 plans at different scales (2023)

Revised reprint:
All other HHI navigational charts were printed according to need and demand as revised reprints with updated contents, for the purpose of ensuring safe navigation in the Adriatic Sea.

Continuous updating of official navigational charts
A large part of the cartographic work involves updating official navigational charts both in analogue and electronic form, comprising the following tasks:
• Defining of corrections for already published official charts, publishing these corrections in the monthly publication Oglas za pomorce (OZP) (Notices to Mariners).
• Production of block corrections to be added to existing charts and publications for updating their contents. Block corrections are parts of cartographic representations, i.e. extracts from charts or plans or graphic representations appearing in publications. Between June 2019 and May 2023, a total of 37 block corrections were produced and published in OZP for updating purposes.

Printing of charts using high-quality large format printers (plotters)
Introducing new technology, the HHI production of new charts and new editions of charts in recent years has been based on a unique database, while printing on paper is usually performed using high-quality large format printers (plotters), always resulting in an up-to-date official chart (print on demand).

Conversion to the WGS84 ellipsoid
Most of official HHI charts were constructed on the Bessel ellipsoid. To achieve compliance with the IHO standard stipulating that charts should be produced on the WGS84 ellipsoid, the HHI aims at producing all official charts on the WGS84 ellipsoid.

Therefore, using new technology and specification of work processes and software, all new charts and new editions of charts are constructed on the WGS84 ellipsoid. Revised reprints pending new editions continue to be constructed on the Bessel ellipsoid indicating the correction for the WGS84 ellipsoid.

Official electronic navigational charts (ENC)
A large part of the basic cartographic activity involves the production of new ENC cells and updating already released ENC cells for the area under HHI competence (area of the Adriatic Sea under the jurisdiction of the Republic of Croatia).
• In the period between May 2019 and May 2023 intensive production of new ENC cells took place, both for official charts and for plans of ports, harbours, marinas and quays appearing in official nautical publications. In the reporting period 104 new ENC cells were produced, validated (quality control performed) and released. Currently, a total of 311 ENC cells have been released through the PRIMAR distribution centre, Norway (May 2023).
• Maintenance of released ENC cells, due to the structure of corrections and correcting method, is performed by updating, re-issuing or a new edition.

The annual work programmes of the Hydrographic Institute of the Republic of Croatia as well as the annual work reports can be found at this link: https://www.hhi.hr/dokumenti/planovi-i-izvjesca
2.4 Croatian Geological Survey (HGI-CGS)

The Croatian Geological Survey is the largest research institute in the field of geosciences and geological engineering in the Republic of Croatia. Geological data form the basis for undertaking numerous projects of national interest, such as fresh water supply, water and soil protection, the construction of large infrastructure objects, city planning, defining mineral resource reserves, and environmental protection. Research is done using the latest methods and information and computer technology.

Annual reports are available at https://www.hgi-cgs.hr/godisnjaci-hgi/

2.5 Croatian Bureau of Statistics (CBS)

Strategic plans and reports are available at https://dzs.gov.hr/strategic-plans-and-reports/751

2.6 Croatian State Archives (CSA)

The Croatian State Archives keeps archival materials of the central executive, legislative and administrative bodies and governmental bodies, structured in fonds/collections that mostly correspond to whole units created by a single creator or an institution (or multiple creators in case of a collection), which were active in the territory of the Croatian countries in the historical context. The cartographic records are kept separately in individual collections or as parts of fonds (construction designs, plans or maps as enclosure to documents created by the activity of the central executive, legislative and administrative bodies and governmental bodies in the territory of the Croatian countries in the historical context, pertaining to different technical works and building construction). Search aids for fonds and collections are available to users in the Main Reading Room of the CSA, as well as via the national archival information system NAIS that is used for describing, processing and managing archives, representing the online registry of archival fonds and collections (http://arhinet.arhiv.hr/). Analytically described cartographic archives for the 2019-2023 period, with analytically described data available in the Main Reading Room of the CSA, includes the following collections/fonds:

Cartographic Collection (reference code HR-HDA-902)

General information about the archival records

The Cartographic Collection has been created by regular transfer of records (legal obligation), purchase, donation or separation from individual archival fonds. The collection currently has 6174 processed and analytically described cartographic items. A cartographic item can have one or more pages i.e. several hundred pages when atlases are concerned. The maps in the collection are processed in accordance with the International Standard Biographic Description for Cartographic Materials – ISBD (CM) and are described according to the map types: general, topographic, cadastral, maritime, bathymetric, forester’s, plant-geographical, geological, geomorphological, seismological, pedological, hydrological, climatological, wartime, military-didactical, historical, archaeological, traffic, aeronautical, postal, kilometrical, demographical, ethnographical, lingual, economic, tourist, mountainous, administrative, political maps, demarcation maps, settlements plans, property plans and other maps (astronomical, trigonometrical, medicinal). Users can access the databases on the computers in the CSA Main Reading Room.

Description and processing of the maps/plans

All maps and plans are processed in accordance with the International Standard Biographic Description for Cartographic Materials – ISBD (CM) and are analytically described in the database according to the given parameters. In the period from 2019 to 2023, a total of 1445 cartographic map items of maps and plans were described.

Digitization of maps

The digitisation of cartographic records is regularly provided on users’ request and at the same time the collection of digitised copies of the Cartographic
Collection is made. It has been planned for the next period to digitize maps and plans via the E-culture – Digitization of cultural heritage project.

**Acquiring new cadastral archival records**

In the period from 2019 to 2023 the following total was acquired:

- 2763 maps (acquired through official duty)
- 24 maps (purchase)

**Building Designs Collection (reference code HR-HDA-905)**

**General information about the archival records**

The Building Designs Collection includes public objects designs, seldom private ones. The processed designs were created in the period from 1770 to 1990. Considering the object they show, the collection designs were divided into 38 groups (regulatory basis of settlements; conservation studies; regional designs and site diagrams of streets and squares; educational institutions; pedagogical and social institutions; scientific institutes; health facilities; medicinal institutes; judiciary; administration; cultural institutions; publishing; financial institution; PTT; military facilities; police and guardhouses; penitentiaries; industrial facilities; mines and quarries; state farms; cooperative facilities; rural economic facilities; veterinary surgeries; other economic facilities; road building; railway; bridge building; inland waters regulation; harbours and seashore arrangement; sewerage; waterworks; water supply; wells; residential facilities; tourist and catering facilities; castles; fortresses; citadels; church facilities; cemeteries; tombs; monuments; builder’s examination tests; furniture designs; detail designs; tools, appliances and machines designs; land holdings). The collection is regularly complemented with new acquisitions – mostly by separating them from other archival fonds.

**Description and processing of designs, plans and maps**

In the period from 2019 to 2023 a total of 29 designs, plans and 2 filing folders were analytically processed and described in accordance with the International Standard Biographic Description for Cartographic Materials – ISBD (CM). Users can access the finding aid in the CSA Main Reading Room.

**Land Government’s Department for Internal Affairs (reference code HR-HDA-79)**

Land Government’s Department for Internal Affairs (Odjel za unutarnje poslove Zemaljske vlade) is a fonds that also keeps records created by the activity of the Cultural-Technical Section, with cartographic records created by the activity of the same creator that mostly pertain to public facilities and rarely private ones. The processed cartographic records pertain to the period from 1869 to 1921. Depending on the facility they show, the cartographic items are divided into several dozen thematic groups and are processed in accordance with the International Standard Biographic Description for Cartographic Materials – ISBD (CM). So far, a total of 1174 designs and plans has been described and analytically processed.

**Educational Activities**

**Cartographic workshops**

Since May 2014, the CSA has in its offer a new educational activity, a cartographic workshop entitled “Let us read maps”, intended for the children of various ages – from preschool (6 years) to 4th grade of elementary school, as well as for senior classes. Mirjana Jurić is the author of the cartographic workshops. The goal of executing the workshops in preschool institutions is to introduce additional activities in order to better perceive the world around us. It has also been coordinated with the National basic curriculum for preschool education and general obligatory and high school education. The goal of executing the workshop in elementary schools is to introduce after-school activities in order to better master the material of nature studies and society/geography. It has also been coordinated with the National basic curriculum for preschool education and general obligatory and high school education, as well as with the curriculum for nature science and society/geography classes. The workshop uses various educational materials created by using old maps and plans from the Cartographic Collection of the CSA, entered into the Register of Cultural Goods by the Ministry of Culture. The main purpose of the workshop is to encourage an interest in maps, stimulate artistic creativity in children by presenting space, promote cartography and improve cartographic perception of the children so that they acquire new knowledge and experiences, develop new skills (better orientation, orientation on a map, reading maps, recognizing symbols on maps from different time periods), comprehend spatial relations, are introduced to cartographic heritage and historical sources, as well as develop via geography classes basic cartographic literacy that is needed in their future education. Several thematic workshops were designed, depending on the age of the children and by adjusting the terminology and the level of their current knowledge i.e. depending on the mastered material from the nature sciences and society classes new ones are designed (each senior class has wider workshop terminology).
In the period from 2019 to 2023, a total of 10 elementary school children attended the workshop from the Zagreb area, due to the fact that such activities had been stymied during the Covid-19 pandemic.

**Student training programme**

A student training programme lasting a total of 40 hours for 3rd year university students of the Department of Geography of the Faculty of Science in Zagreb has been taking place since 2013 and is mentored by Mirjana Jurić. For the duration of the training the students are introduced to the Cartographic Collection and Archives of Maps for Croatia and Slavonia (content-related physiognomy, types of maps, map reproduction techniques, artistic processing of maps through history, cadastral sources, topographic and cadastral surveys, different publishers of maps), while during the practical part the topographic maps of various publishers from the turn of the 19th to 20th century, cadastral plans from the fonds Archives of maps for Croatia and Slavonia (lithographic copies) and microtoponyms from cadastral plans from the period of Francis I are analytically listed. In the period from 2019 to 2023 a total of 2 female students did their training.

2.7 Institute for Migration and Ethnic Studies

![IMIN Logo](http://www.imin.hr/)

**Lectures**

Since the academic year 2018/2019 Ph.D. Dubravka Mlinarić gave lectures on historical cartography entitled ‘Cartographic Sources for Pre-Modern History’ for Postgraduate Studies in Pre-modern History, History Department, Faculty of Humanities and Social Sciences, University of Zagreb.

**Conference Papers**

8–10 November 2019, Osijek

Dubravka Mlinarić presented a paper entitled *Uloga digitaliziranih izvora iz privatnih kartografskih zbirk u vrijeme ograničenoga fizičkog pristupa* (The role of digital data from the private map collections in time of limited physical access) at the international conference *Enciklopedika 2020 – dosezi i izazovi*, organised by The Miroslav Krleža Institute of Lexicography in Zagreb

26–29 May 2021, Gibraltar

D. Mlinarić (with co-author Lena Mirošević, Geography Department, University of Zadar) delivered a paper entitled *The Role of Decorative Elements on the Early Modern Nautical Charts: The case of the Adriatic Sea* at the international conference of the Mediterranean Studies Association, organized by the MSA

28 June – 1 July 2021, Prague

D. Mlinarić (with co-authors Ivka Kljajić, Faculty of Geodesy, University of Zagreb and Josip Faričić, Geography Department, University of Zadar) gave a lecture entitled *Symbolism of the Early Modern Nautical Charts of the Adriatic Sea*, at the 8th EUGEO Congress in Prague.

19–21 August 2022, Vienna

D. Mlinarić (with co-author Lena Mirošević, Geography Department, University of Zadar) delivered a paper entitled *Symbolism of the Early Modern Nautical Charts of the Adriatic Sea and the Representation of the “Other”* at the EuroCarto-2022, organized by the International Cartographic Association at the TU Wien, Austria.

28–29 June 2023, Osijek

D. Mlinarić (co-author Kristina Rupert) presented a paper entitled *Doprinos kartografa Komisije za razgraničenje iz 1699. godine boljem poznavanju hrvatskog graničnog prostora* (Contribution of the cartographers from the Bordering Commission in 1699 to the better understanding of the Croatian borderlands) at the workshop Tematska kartografija held by the Croatian Cartographic Society, and the Faculty of Civil Engineering and Architecture, Osijek.

**Media, Public Lectures, Popularising Cartography**

16 May 2019, public presentation within the Kliofest – festival of history, popularizing cartography: *Private Cartographic Collections as Croatian Cultural Heritage: Rethinking the Access to Archival Sources (Privatne kartografske zbirk kao hrvatska kulturna baština: Promišljanje mogućnosti pristupa povijesnoj građi)* organised by the Croatian Cartographic Society and delivered by Dubravka Mlinarić at the Croatian State Archives in Zagreb.

1 February 2023, Faculty of Geodesy, Zagreb, public presentation and popularization of cartography: *The*
role of foreigners in the development of the cartography of Croatian lands: the case of Lazarus Secretaries and his map Tabula Hungariae (Uloga stranaca u razvoju kartografije hrvatskih zemalja: primjer Lazarusa Secretariusa i njegove karte Tabula Hungariae), organized by the Croatian Cartographic Society and the Faculty of Geodesy and delivered by Dubravka Mlinarić and Petra Plantosar.

26 April 2023, Technical Museum Nikola Tesla, Zagreb, public presentation and popularization of cartography: Johann Christoph Müller and cartography of the Border Commission from the beginning of the 18th century (Johann Christoph Müller i kartografija Komisije za razgraničenje s početka 18. stoljeća), co-organized by the Croatian Cartographic Society and the Technical Museum Nikola Tesla and delivered by Dubravka Mlinarić and Kristina Rupert.

Dubravka Mlinarić, Research Advisor, is currently employed at the Department for Migration and Demographic Research. A list of her published papers for the period 2019–2023 can be found in the Bibliography section and at: https://www.bib.irb.hr/pretraga?operators=and|Mlinari%C4%87,%20Dbravka%20%2826545%29|text|profile
3 Academic Cartography

3.1 Faculty of Geodesy of the University of Zagreb

http://www.geof.unizg.hr/

The Institute for Cartography and Photogrammetry is one of three Institutes at the Faculty of Geodesy. The Institute has three chairs: Chair of Cartography, Chair of Geoinformation, and Chair of Photogrammetry and Remote Sensing.

Chair of Cartography

Teaching cartographic subjects:

- Engineering graphics in geodesy and geoinformatics
- Cartography
- Topographic cartography
- Spatial orientation and perception of the environment
- Web-cartography
- Thematic cartography
- Geovisualization
- Practical cartography
- Graduation thesis
- Military geography with topography

Vesna Poslončec Petrić was promoted to associate professor in November 2021. Robert Župan was promoted to full professor in January 2022.


In 2020 S. Frangeš and R. Župan led the project TK25, TK50, TK100, TK250 Product Specifications. The client was the State Geodetic Administration.

R. Župan was a collaborator on the following projects: Hydrolab and Labyrinth, which were performed at the Faculty of Geodesy, University of Zagreb.

V. Poslončec-Petrić participated in these projects:

Western Balkans Academic Education Evolution and Professional’s Sustainable Training for Spatial Data Infrastructures – BESTSDI, Erasmus+ KA2 CBHE project, project code: 574150-EPP-1-2016-1-HR-EPPKA2-CBHE-JP, 2016-2019, project coordinator: Prof. Željko Bačić, PhD, Faculty of Geodesy, University of Zagreb

Towards an innovative strategy for skills development and capacity building in the space geo-information sector – EO4GEO; Erasmus+ Sector Skills Alliances project, project code: 591991-EPP-1-2017-1-IT-EPPKA2-SSA-B; 2018-2022, coordinating association GISIG, Genoa, Italy

SPIDER: open SPatial data Infrastructure eDucation nTWOriK, ERASMUS+ project KA203 – Strategic partnership, 2019–2022, coordinator: HSBO Bochum, Germany

GEOBIZ, 610225-EPP-1-2019-1-HR-EPPKA2-CBHE-JP, 2019-2022 Erasmus+ KA2 CBHE Business driven problem-based learning for academic excellence in geoinformatics, project coordinator: Prof. Željko Bačić, PhD, Faculty of Geodesy, University of Zagreb

Twinning Open Data Operational – TODO; 2020-2023, project manager: Ana Kuveždić Divjak, coordinator: the Faculty of Geodesy, University of Zagreb


Curricula innovation in climate-smart urban development based on green and energy efficiency with the non-academic sector, Erasmus+ KA2 CBHE project, 2023-2026, coordinator: University of Montenegro

GEOinformation educational resources for CLimate Change Management, Erasmus+ Cooperation Partnership, 2021-2024, coordinator: Vrije Universiteit Brussel, Belgium

Service-oriented cartography and GIS, Support for scientific research, Ministry of Science and Education of the Republic of Croatia, 2019-2020; 2020-2021; 2021-2022, project manager: V. Poslončec-Petrić

Two noise mapping workshops were held:

1st Noise Mapping workshop, March 11-16, 2023, Alexandria, Egypt

2nd Noise Mapping workshop, April 17-21, 2023, Zagreb, Croatia

Prof. S. Frangeš, PhD is the author of these maps:
In 2019, base maps for the following cycling maps were created for the Tourist Board of the Zadar County:

1. Map of Pag at the scale of 1:90 000
2. Zadar-Nin map at the scale of 1:1:75 000
3. Map of Velebit at the scale of 1:1:75 000
4. Map of the Zadar islands at the scale of 1:60 000
5. Vransko Lake map at the scale of 1:1:60 000

In 2022, the following were created for the Tourist Board of Velika Gorica:

1. Cycling map of the area of Velika Gorica at the scale of 1:55 000
2. Map of the Šumarica hiking trail at the scale of 1:15 000.

For the company HD Navigatio d.o.o. in 2023, a cartographic base for the Bibinje bicycle path routing project was created at the scale of 1:12 000.

The list of published works by the staff of the Department of Geoinformation are:

- A. Kuveždić Divjak was elected to the scientific-teaching position of Assist. Prof. in October 2020, and M. Viličić in January 2023.

The employees of the Department teach subjects related to the issues of different handling of geoinformation, with special emphasis on cartography and GIS. At the undergraduate study of geodesy and geoinformatics, they hold classes in the following subjects: Basics of geoinformatics, Engineering graphics in geodesy and geoinformatics, Free geoinformation, Algorithms in geoinformation systems, Handling of geoinformation and Map projections.

At the postgraduate study of geodesy and geoinformatics, they teach the following subjects: Digital cartography, Cartographic generalization, Cartography and GIS, Multimedia cartography, Geoinformation generalization – project, Cartography and new technologies – project. In the postgraduate specialist study of geodesy and geoinformatics on the topic/cycle Geoinformation systems – practical applications, they teach the following subjects: GIS and cartography, GIS and cartography – seminar, GIS and cartography – seminar, Workshop, Handling geoinformation – seminar.

At the postgraduate doctoral study, classes were held from the project Twinning Open Data Operational – TODO.

I. Kljajić mentored fourteen graduate theses, A. Kuveždić Divjak eight graduate theses, Marina Viličić two graduate theses.

On the occasion of the completion of the conservation and restoration work on Stjepan Glavač’s map from 1673, on 16 September 2021, the Croatian State Archives and the Metropolitan Library of the Zagreb Archdiocese organized a scientific conference, entitled Glavač's Map of Croatia. As part of that scientific conference, M. Viličić participated in setting up the exhibition and creating the exhibition catalogue, which was intended to consolidate research on all aspects of Glavač’s map, the period and circumstances in which the map was created, and the conservation and restoration works.

At the 2019 Science Festival held in the Technical Museum in Zagreb, M. Viličić as co-author with M. Triplat Horvat PhD participated with a presentation The Use of Colours on Maps. A. Kuveždić Divjak and A. Miletić participated in the 2022 Science Festival held at the Technical Museum in Zagreb with the presentation Life in the Virtual World – Young People in Europe and Habits Connected to the Internet From open data to an open map in 15 minutes.

At the National Open Data Conference NODC2021, A. Kuveždić Divjak held the workshop Show the data! – open data mapping for beginners. A. Kuveždić Divjak held a workshop Open Data Mapping: Increasing the impact of open data through visualisation and communication at the International Conference on Open Data (ICOD 2022).

As part of the workshops organized by the Croatian Cartographic Society, the Education and Teacher Training Agency and the Geodetic Faculty of the University of Zagreb, M. Viličić as co-author with Prof. Emer. M. Lapaine gave two lectures. She gave the lecture New Map Projections and Map Projections in Practice in 2022, and the lecture National Geographic MapMaker in class in 2023. In 2022, A. Kuveždić Divjak held the lecture Learning and teaching about open (spatial) data for the development of students’ cartographic literacy, and in 2023 she held the lecture Open data and its application in teaching geography: from open data to thematic maps, step by step.

Students of the Multimedia Cartography course took part in the Datathon competition organized by the Central State Office for the Development of the Digital Society, on 12 May 2023, in the premises of the Faculty of Electrical Engineering and Computing, as part of the DORS/CLUC 2023 conference with the following papers: Mapping the gap: Digital skills in Europe by Andrija Gunjević, Karlo Kević, Ana Kuveždić Divjak, Filip Papić, Toni Škvorc and Croatian Youth vs. EU: Who Has It Better? (Story-driven mapping visualisation) by A. Batur, M. Bošnjak, D. Krpeta, A. Kuveždić Divjak, A. Miletić.
The scientific and research activities of the Department members took place within the framework of projects funded by the European Union and the Croatian Science Foundation, and within the framework of support for scientific research funded by the University of Zagreb.

**Twinning Open Data Operational – TODO, EU Horizon2020 – Twinning (Grant: 857592)** is a scientific research project financed by the European Union as part of the Horizon 2020 programme. The project manager/coordinator was A. Kuveždić Divjak. M. Viličić, K. Kević and A. Miletić were collaborators on the project. The duration of the project is 2019–2023. As part of the project, among other things, research was carried out on spatial information visualization and communication methods, as well as research on new contents and services in cartography and GIS based on freely available (open) data and technologies. The project is aimed at improving the interdisciplinary scientific research activity and the innovation capacity of the University of Zagreb components in the field of open data.

M. Viličić and K. Kević participated in the Erasmus+ project **SPIDER: open SPatial data Infrastructure eDucation eLwoRK** (Grant: 2019-1-DE01-KA203-005042). The project was financed by the European Union as part of the Erasmus Plus programme. The project coordinator was Asoc. Prof. Hrvoje Tomić PhD. The duration of the project was 2019–2022.

I. Kljajić is a collaborator on the project **Ranovovjekovne pomorske karte Jadranskog mora: izvor spoznaja, sredstvo navigacije i medij komunikacije / Modern Nautical Charts of the Adriatic Sea: Information Sources, Navigation Means and Communication Media (NACHAS)**. The project is financed by the Croatian Science Foundation. Prof. Josip Faričić PhD is the project manager. The duration of the project is four years (2020–2024).

I. Kljajić and K. Kević participated in the internal project **Service-oriented cartography and GIS** to support scientific research in 2020. I. Kljajić, M. Viličić and K. Kević participated in the internal project **Service-oriented cartography and IPP** to support scientific research in 2021. The project manager for both projects was Assoc. Prof. Vesna Poslončec-Petrić PhD.

I. Kljajić, A. Kuveždić Divjak and M. Viličić were members of the local organizing committee of the 17th International Conference on Geoinformation and Cartography held in 2021, and M. Viličić was a member of the local organizing committee of the 18th International Conference on Geoinformation and Cartography held in 2022.

The members of the Department participated independently or as co-authors at several scientific and professional conferences in Croatia and abroad and published a large number of scientific and professional papers in journals and books of abstracts.

The list of published works by the staff of the Department of Geoinformation, Faculty of Geodesy, University of Zagreb is available in the Bibliography section and at https://www.croris.hr/crosbi/.

More details on the Faculty of Geodesy of the University of Zagreb can be found at www.geof.hr

### 3.2 Department of Geography of the Faculty of Science of the University of Zagreb

https://www.pmf.unizg.hr/geog#

During the period 2019–2023 Department of Geography, Faculty of Science, University of Zagreb, participated in many teaching, professional and scientific activities in the field of Cartography, Geoinformatics (GIS) and Remote Sensing.

**Teaching activities**

**Undergraduate university study programme Geography; course: research**

Compulsory courses: Cartography I, Cartography II, Geoinformatics I and Geoinformatics II

Integrated undergraduate and graduate university study programme Geography and History; course: education

Compulsory course: Cartography

**Graduate university study programme Geography; course: research**

Compulsory courses: Analysis in GIS, Visualization of spatial data in GIS, Remote sensing, GIS in regional and spatial planning, Digital Terrain Analysis

Elective courses: GIS analysis of cultural landscape, Applying GIS in the analysis of census data, Geomorphological Mapping

**Undergraduate university study programme Environmental Sciences**

Compulsory course: Cartographic Basis for GIS

Elective course: Mobile Cartography

**Graduate university study programme Environmental Sciences**
Compulsory course: Geographic Information Systems

Elective course: Analysis in GIS

**Participation in scientific conferences / congresses** (with published abstracts in proceedings and journals)


Both presentations include the application of different analysis and models in the development and structure of landscape, and land use / land cover, by using GIS technology.

**Lectures and workshops**

Professors and students of the Department of Geography, Faculty of Science, University of Zagreb in the analysed 4-year period held several lectures and organized workshops on the topic of cartography, GIS and remote sensing.

1. Borna Fuerst-Bjeliš, PhD, Full Professor in 2019 held an invited lecture Mediterranean Landscape: Uses and Consequences, on land use and lifestyle changes and economies in the last two centuries in the Adriatic part of Mediterranean, by using historical cartographic and cadastral documents as sources in research. The lecture was held at the University of Primorska, Koper, Slovenia, for students and professors of the Faculty of Philosophy, Department of Geography and Department of History.

2. Borna Fuerst-Bjeliš, PhD, Full Professor in 2020 held an invited lecture Sources and methodologies in environmental history research. Examples from case studies in Mediterranean Croatia, on cartographic and cadastral historical sources, methodology, specifics and challenges of its usage in research of different historical-geographical relations and changes. The lecture was held at the University of Zagreb, Faculty of Philosophy, History Doctoral Study (Round Table Environmental Historical Topics in Pre-modern Context).

3. Danijel Orešić, PhD, Full Professor in 2021 held a lecture Primjer istraživačkog rada uz korištenje historijskih i suvremenih katastarskih karata s mrežnih stranica (An example of scientific research work using historical and contemporary cadastral maps from websites) at the 67th Winter Seminar for geographers (organizers: Education and Teacher Training Agency, Croatian Geographical Society and the Department of Geography, Faculty of Science)

4. Tomislav Tesla, mag. geogr. from the GDi company, held a lecture and workshop Migracija iz ArcMapa u Arc GIS Pro – Zašto? i Kako? (Migration from ArcMap to ArcGIS Pro – Why? and How?) during the manifestation GIS Day 2022 at the Department of Geography, Faculty of Science.

5. Students of the Undergraduate university study programme Geography; course: research actively participated in the Science Festival 2023 with the workshop Cartography and Volcanoes, intended for pre-school and elementary school students.

6. During the traditional event Day and Night at the Faculty of Science 2023, within the Open Day of Geography, Luka Valožić, PhD, Assistant Professor with geography students held the workshop Making maps with online GIS, and the lecture Remote Sensing Up Close.

**Hardware and software**

In the period 2019-2023, the Department of Geography purchased several DJI Phantom 4 drones as well as the professional photogrammetry software Pix4D for drone mapping. Two 50 license packages of ArcGIS Pro software were also purchased.

The list of published works by the employees of the Department of Geography of the Faculty of Science, University of Zagreb related to cartography is available in the Bibliography section and at [https://www.croris.hr/crosbi/](https://www.croris.hr/crosbi/).

### 3.3 Department of Geography of the University of Zadar

[http://www.unizd.hr/](http://www.unizd.hr/)

From 2019 to 2023, the University of Zadar, through the Department of Geography, carried out several cartographic activities related to scientific research and teaching at all levels of university studies, but also in cooperation with related scientific and cultural institutions. Scientific research in the fields of
cartography and GIS as well as remote sensing for the purpose of complex geographical analysis and application in knowledge and technology transfer projects have contributed to the improvement of existing knowledge, techniques and methods. In the field of cartography, scientists Tome Marelić, Lena Mirošević and Josip Faričić were the most involved, supported by their assistant Julijan Sutlović. Ante Šiljeg, Ivan Marić, Fran Domazetović, Lovre Panda, Silvija Šiljeg and Rajko Marinić were most involved in GIS and remote sensing, and Rina Milošević from the Croatian Geographical Society – Zadar also joined them.

Historical cartographic topics were mainly researched within the scientific project Early Modern Nautical Maps of the Adriatic Sea: Information Sources, Navigational Means and Communication Media, funded by the Croatian Science Foundation. The research team actively collected digital reproductions (scanned originals) of nautical charts of the Adriatic Sea by making requests to European and American archives and libraries and by contacting private collections of old nautical charts. The early modern nautical charts of the Adriatic are read as complex and multi-layered data sources that can be considered in terms of different scientific discourses: historical, geographical, geodetic and navigational. Different aspects of the usability of the old charts as navigational tools at the time of their production and their complementarity with navigational manuals were identified. As far as the quality of the representation of coastlines is concerned, nautical charts were of better quality than geographic maps, although by the 18th century there was a lack of data. Partial progress was made in nautical charts on a larger scale, which showed the ports of the Adriatic and included data on sea depths and, rarely, data on magnetic declination. Cartometric analysis revealed unexpected details, for example that data on longitude was more accurate than data on latitude, which is unusual considering that latitude could be determined quite accurately by observing celestial bodies, while precise and rapid determination of longitude did not take place until the invention and use of the chronometer in the 18th century. Nautical charts were richly decorated, mainly because they circulated and were widely used in elite social and economic circles. This indicates a general interest in nautical charts, but also a focus on the Adriatic, which was an area of multiple contacts and conflicts between European powers in the early modern period. The research results were presented at international scientific conferences and published or prepared for publication in internationally relevant journals and other scientific publications. Participation in scientific conferences serves networking and the exchange of knowledge, experience and ideas.

The scientific team of the Laboratory for Geospatial Analysis project, funded by the Croatian Science Foundation, contributed to the application of geospatial analysis in the field of GIS, remote sensing and statistics. Geospatial Analysis comprises a set of analytical techniques whose results depend on the position and location of the spatial objects or phenomena. The application of these analysis techniques provided insight into the spatial arrangement of the studied objects, facilitated the interpretation of spatial processes and phenomena, and improved the general understanding of cause-effect relationships in the area of the Croatian Adriatic. Many scientific papers were published, and members of the project team participated in numerous international conferences, which contributed to the dissemination of the research results. The results of this research were also applied in technology transfer projects, of which the Stream project is noteworthy, in the framework of which numerous settlements on the eastern Adriatic were studied. The objectives of Stream, which were successfully achieved, were to reduce human and socio-economic losses in the event of flood hazards by improving flood risk management by local authorities and emergency services with a cross-border approach. The partners from Croatia and Italy worked together to develop risk monitoring tools and early warning procedures with a combined bottom-up and top-down approach. Data sharing, exchange of practises and capacity building programmes will bring additional know-how to the actors in the project area. Scientific activities from the cartography and geoinformation fields were key to the process of collecting, processing and finalising the results with specific application in spatial planning and management. All these activities were the basis for the establishment of the Centre for Geospatial Technologies (GAL) at the University of Zadar, whose aim is to gather an interdisciplinary team from different scientific fields, disciplines and sectors to conduct interdisciplinary scientific research, train young researchers, apply new knowledge and technologies and develop innovative research methods based on geospatial technologies.

The Department of Geography of the University of Zadar, in cooperation with the co-organisers, organised three exhibitions of old maps:

1. The Island of Molat on Old Maps, The Association of Prisoners from Dalmatia in the Fascist Concentration Camps of Italy and University of Zadar, Molat, July and August 2022

2. Descriptio oeconomiae, State Geodetic Administration, State Archives in Zadar and University of Zadar, Zadar 19 October 2022 – 25 October 2022

3. Sea charts – the meeting of science, art and practise, University of Zadar, Zadar, Training ship Kraljica mora (Queen of the sea), 10 March 2023 - 17 March 2023.

In the study of geography at the University of Zadar, cartographic content was systematically covered in
several courses: Mathematical Geography, Cartography I, Cartography II, Cartography and Visualisation, Geoinformatics, Multimedia Geography, Geoinformation System I and Geoinformation System II. In many other courses, cartography is part of the course content, which is viewed from the various geographical perspectives: Modelling Spatial, Data in GIS I, Modelling Spatial Data in GIS II, Geographic Analysis of Landscapes, Spatial Analysis in GIS and Remote Research. In the doctoral programme The Adriatic – a Link between Continents, cartographic content is mainly considered in the courses Application of GIS in Geography and History and Development of the Adriatic in the Light of Cartographic Sources.

The list of published works by the employees of the Department of Geography of the University of Zadar related to cartography is available in the Bibliography section and at https://www.crosis.hr/crosbi/.
4 Commercial Cartography

4.1 Croatia Control Ltd. (HKZP)

http://www.crocontrol.hr

Croatia Control Ltd. (CCL) is a state-owned limited liability company that operates independently in the Republic of Croatia, pursuant to the relevant laws and company acts. In the implementation of its obligations as an air navigation service provider, certified in accordance with EU regulations, it provides safe, efficient and environmentally friendly air navigation services to civil and military users of the airspace of the Republic of Croatia and the neighbouring portions of airspace assigned to its management.

The primary mission of CCL is the provision of air navigation services, pursuing the basic principle of a high level of air traffic safety.

Its business includes: air traffic management services, technical services, aeronautical meteorology services, aeronautical information services, and services for the design, documentation and validation of flight procedures, which include mapping activities, airspace and air traffic flow management functions.

In accordance with the Single European Sky legal framework, CCL is a certified service provider for the following:

- provision of operational air navigation services – air traffic control, alerting service, provision of preflight and flight information services to enable safe, orderly and expeditious air traffic flow; processing and retention of flight data; forwarding of information significant to air traffic safety; management of air traffic flow and airspace use;
- collection, processing and promulgation of aeronautical information, including issuance of specific publications;
- identification of operational requirements for air traffic control systems, surveillance systems, equipment and infrastructure;
- planning of airspace structure and flying procedures, taking into account interests of civil and military users, as well as environmental requirements;
- implementation and harmonization of operational, developmental and international tasks and duties with international organizations, especially ICAO (International Civil Aviation Organization) and EUROCONTROL (European Organisation for the Safety of Air Navigation).

CCL has implemented airspace management systems AMC Portal and AMC Portal Mobile, which are used as an automated procedure of establishing ad hoc structures or predefined flexible structures and approving activities in controlled airspace. AMC Portal also has a network identification function to display the position of drones in real time, compatible with the EnforceAir drone detection system.

CCL’s Department of Air Navigation, Procedure Design and Cartography employs four cartographers. The collection, processing and publication of aeronautical information is done in the form of text and charts.

The data is published in the Aeronautical Information Publication Croatia (eAIP) and in the VFR Manual in regular, predetermined cycles. All aeronautical information products, including charts, are also available in the European AIS Data Base (EAD).

CCL publishes various types of thematic maps for all international airports in the Republic of Croatia, airfields, water aerodromes and for the entire area of flight information in the Republic of Croatia. Maps are made in different display scales, in analog and digital form.

Charts are adapted to the specific cartographic key for aeronautical charts, according to the standards and recommendations of ICAO Annex 4, ICAO Doc 8697 of the Aeronautical Chart Manual and the Aeronautical Data Catalog from Commission Implementing Regulation (EU) 2020/469.

Various types of charts made in CCL, and published in the Aeronautical Information Publication and in the VFR Manual, for the period 2019 – 2023 include:

- VFR Charts with recommended VFR routes, 1:50 000
- Aerodrome Charts – ICAO 1:10 000 – 1:20 000
- Aircraft Parking/Docking Charts – ICAO
- Aerodrome Obstacle Charts Type A – ICAO, 1:10 000 – 1:20 000
- Precision Approach Terrain Charts – ICAO
- Instrument Approach Charts – ICAO, 1:100 000 – 1:500 000
- Visual Manoeuvring – Circling Charts (IFR) – ICAO
- Standard Instrument Departure Charts (SID) – ICAO
- Standard Arrival Charts – Instrument (STAR) – ICAO
- Enroute Charts – ICAO, 1:1 000 000 - ICAO
- Visual Approach Charts – ICAO, 1:100 000 – 1:250 000
- Visual Operation Charts 1:200 000 – 1:300 000
- ATC Surveillance Minimum Altitude Charts – ICAO
- Index Charts – Aerial Sporting and Recreational Activities – Index Chart, Military Exercise and Training Areas, TRA and TSA – Index Chart, Prohibited, Restricted and Danger Areas – Index Chart, Radio Facility – Index Chart, Bird Migration Routes – Index Chart, Free Route Airspace SECSI FRA – Index Chart, Flexible Structures – Index Chart etc.

Instrument approach, standard instrument departure and arrival charts have also been developed and published for conventional navigation and for aircraft performance-based navigation (PBN) for spatial navigation RNAV or RNP required navigation capability, using global navigation satellite systems (GNSS).

Charts are created and printed using digital methods and are also provided in electronic form in the eAIP of the Republic of Croatia and the VFR Manual.

A total number of about 230 types of charts were published during the period 2019 – 2023, which were updated and republished several times (once to several times a year), as soon as aeronautical data important for air traffic safety changes.

In addition to the production of various types of charts, the project aimed to establish AIM/AIS geoinformation systems for the implementation of Regulations (EU) 2018/373, 2020/469 and INSPIRE is in its final phase.

More details about the activities of Croatia Control Ltd. at http://www.crocontrol.hr

4.2 OIKON Ltd. – Institute of Applied Ecology

https://oikon.hr/

Oikon Ltd – Institute of Applied Ecology is a reputable consulting company and research institute in Croatia and the surrounding region, specializing in applied ecology. With over 24 years of experience, Oikon has established itself as a trusted partner for clients seeking tailored solutions in environmental protection, ecological modelling, and geographic information systems (GIS).

Oikon's expertise in cartography and remote sensing is evident through its notable projects. Through collaboration with a strong consortium and the Croatian Ministry of Economy and Sustainable Development it is working on the project Mapping of Coastal and Benthic Marine Habitats in the Adriatic Sea under National Jurisdiction, which is currently the largest project of its kind in Europe. The goal of the project is to create a complete map of marine habitats for at least 51% of the coastal and bottom marine habitats in the Croatian territorial sea and continental shelf, as well as to revise the national classification of habitats and to align with the EUNIS classification. The project will greatly contribute to increased data availability and distribution of marine resources, supplementing and determining the conservation goals of the Natura 2000 ecological network in the sea, as well as better planning, management, and use of biological marine resources. Additionally, the company’s proficiency in remote sensing technologies has enabled precise land cover mapping, supporting effective land management and environmental planning.

Its partnership with the European Space Agency has led to successful projects in various areas. Oikon has developed innovative methods for detecting invasive alien plant species using Sentinel satellite data, contributing to biodiversity preservation and ecosystem health. Furthermore, its utilization of advanced remote sensing techniques and machine learning algorithms has facilitated the monitoring and classification of human-induced coastal changes. By analysing satellite imagery, Oikon has enabled efficient conservation efforts and sustainable coastal management. It also successfully tested a machine learning solution for sea habitat type mapping from Sentinel 2 imagery.

In addition to its work with the European Space Agency, Oikon has completed numerous projects for international financial institutions, governments, and private funds. The company’s extensive experience and commitment to quality have solidified their reputation as a highly sought-after project partner in cartography and remote sensing. Oikon Ltd - Institute of Applied Ecology showcases excellence in cartography and remote sensing through its project portfolio. With a track record of delivering comprehensive outputs, Oikon continues to contribute to environmental protection, sustainable development, and informed decision-making. Their dedication to innovation and their commitment to preserving the environment make them a unique and trustworthy partner.
4.3 CroMaps

http://www.cromaps.com/branka
Cartographic products by Branka Poljak issued between 2019 and 2023

Croatia – postal codes map
Slovenia – postal codes map

Croatian counties (20 + 1)

School wall maps
Croatia
Homeland map of the County of Istria
Homeland map of the Karlovac County
Homeland map of the Krapina-Zagorje County
Homeland map of the Međimurje County
Homeland map of the Požega-Slavonia County
Homeland map of the Sisak-Moslavina County
Homeland map of the Zagreb County
Homeland map of the Dubrovnik-Neretva County
Homeland map of the Zadar County
Homeland map of the Primorje-Gorski Kotar County
Homeland map of the Lika-Senj County
Homeland map of the Split-Dalmatia County
Physical map of North and Central America
Europe - physical wall map Miller projection

The map catalogue can be found at https://www.cromaps.com/katalog/index.html
5 Other Activities

5.1 Croatian Cartographic Society

http://www.kartografija.hr/

2019

The 20th Annual Assembly of the Croatian Cartographic Society (CCS) was held on 5 December 2019 in the Council Hall of the Faculty of Architecture, Civil Engineering and Geodesy, Kačičeva 26, Zagreb.

The Assembly consisted of three parts and was opened and chaired by Prof. Emer. Miljenko Lapaine, President of the CCS. In the first, unofficial part, he gave a lecture entitled Tokyo 2019.

In his report on the work of the CCS in 2019, the President said that regular meetings of the presidency had taken place. He highlighted the following important events in 2019.

We applied on time for Ministry of Science and Education grants to support the society, organise conferences, the journal, and subsidise membership of international societies. We will receive a grant for the society’s expenses, and for organising a conference.

The final report and accounts for the Agreement on Sponsorship which obliged the CCS to engage in preparations and participate in the 29th Cartographic Conference and 17th General Assembly of the ICA in Tokyo, 15–20 July 2019, and to acquaint the international cartographic community with the achievements of Croatian cartography, was sent to the State Geodetic Administration (SGA).

The third session of the presidency of the CCS was held in the Dubovac Castle and organised by Karlovac Civic Museum. Before the official start of the meeting, the members visited the Habsburg roots of the chessboard on the crest of Karlovac exhibition and were given a guided tour by the author of the exhibition, Zvonimir Gerber. The curator of the museum, Igor Ćulig, presented a project proposal called Tower of cartographers.

The 15th International Conference on Geoinformation and Cartography and Faculty of Geodesy Day were held successfully from 26 to 29 September 2019. The four-day conference was held in Zagreb, Vodnjan, Pula and on Brijuni, while the last day was in Venice. The success of the conference was due in particular to contributions from the Faculty of Geodesy, Germano Fiornati, Milka Kosanović, Adam Vinković, Marina Viličić, Matej Varga, Željka Molak Župan and Robert Župan, Marija Brajković and students Marijana Križić and Iva Rajković.

The anniversary of the CCS was celebrated on 10 October 2019 at the Faculty of Geodesy. The President gave a lecture to mark the occasion, followed by a reception.

Issue 31 of Cartography and Geoinformation was printed and distributed.

2020

Due to the pandemic, the 21st Annual Assembly of the Croatian Cartographic Society (CCS) was held by e-mail from 9-12 December 2020. In his report on the activities of the CCS in 2020, the President highlighted the following.

Four regular sessions of the Presidency were held. In 2020, the Council of Honour did not have any work to attend to.

Since its foundation, the CCS has partly used the infrastructure of the Faculty of Geodesy and is grateful for that. For several years in a row, the CCS and the Faculty of Geodesy successfully organised international conferences on geoinformation and cartography. The Faculty of Geodesy financially supported the publication of the Cartographic Dictionary. The Croatian Chamber of Chartered Geodetic Engineers (HKOIG) donated to help publish the Cartographic Dictionary. A large number of chartered geodetic engineers participate in conferences organised by the CCS with the Faculty of Geodesy.

Twenty-five years ago, Croatia was admitted to the ICA as a full member at the General Assembly in Barcelona in 1995. The annual membership fee of €250 for 2020 was paid. The President was invited to participate in the ICA’s Working Group for CartoBoK.

On 21 February 2020, on The Eye of Science on Croatian Radio, the President spoke about cartography. I. Ćrljenko, D. Mlinarić and M. Lapaine participated on 15 and 16 October 2020 in the international scientific conference Encyclopaedics 2020, which was held to mark the 70th anniversary of the The Miroslav Krleža Institute of Lexicography.

Krigis d.o.o. duly takes care of the IT infrastructure of the CCS. Cloud server hosting services have been extended with a 20 GB package for one year. CARNet has extended the domain kartografija.hr for one year until 26 December 2021.

The CCS and Faculty of Geodesy of the University of Zagreb organised the 16th International Conference on Geoinformation and Cartography from 24-27 September 2020. The sponsor was the International Cartographic Association (ICA), and the partners were the State Geodetic Administration, the Italian Community of Vodnjan – Comunita ‘degli
Italiani di Dignano, the Rovinj Centre for Historical Research - Il Centro di Ricerche Storiche Rovigno, the Franciscan Monastery of Rovinj / Rovigno and the Rovinj / Rovigno Tourist Office. All the materials from the 16th International Conference on Geoinformation and Cartography, including the publication Programme and Abstracts, are available at www.kartografija.hr. As part of the conference, an exhibition of geological maps was set up at the Faculty of Geodesy and a book launch for the new Cartographic Dictionary was held. Custom masks were made for the conference participants.

*Cartography and Geoinformation: Issues 32 and 33 have been printed.*

**2021**

The 22nd annual assembly of the Croatian Cartographic Society (CCS) was held via e-mail because of the pandemic. On 30 November 2021, an e-mail was sent to CCS members regarding the organization of the CCS annual assembly over the internet due to the pandemic.

In his report on the CCS activities in 2021, the President pointed out the following.

CCS donated HRK 10,000.00 to the victims of the earthquake in the vicinity of Glina.

CCS was founded on 10 October 2001. Its 20th birthday was marked on 9 October 2021 by a guided tour of the Barać Caves, Rastoke near Slunj and a visit to Aquatica, the Karlovac freshwater aquarium located on the right bank of the Korana River.

The membership fee to the International Cartographic Association (ICA) in the amount of EUR 250 for 2021 was paid. The official endorsement of ICA for the 17th International Conference on Geoinformation and Cartography was received. The President became a member of the Cartographic Body of Knowledge Working Group. This Working Group holds meetings online once a month. Two papers were prepared for the International Cartographic Conference in Florence. One is on the definition of the map and cartography, and the other is about the activities of the Working Group.

The Croatian Chamber of Chartered Geodetic Engineers (HKOIG) donated to the CCS for the journal Cartography and Geoinformation.

At the 14th Symposium of Chartered Geodetic Engineers entitled "Women in Geodesy", which was held from 4 to 7 November 2021 in Opatija, the President held a video presentation: "Croatian Women Cartographers, Doctors of Science". In addition to this lecture, there were several other lectures on cartographic topics.

The CCS together with the Faculty of Geodesy organized the 17th International Conference on Geoinformation and Cartography (17th ICGC). Prof. D. Medak, President of the Organising Committee, coordinated everything superbly with his associates. Everything took place according to the plan and programme. The publication Program & Abstracts was prepared and printed for the participants and published on the conference website (www.kartografija.hr). 22 lectures were presented at the conference. The invited speakers were from China and Australia. Apart from them, lecturers from abroad included those from the USA, Hungary and Slovenia. Of particular note is the very large number of people registered for the conference, a total of 389. 295 people took the exam after the conference and answered the questions on time.

Mrs. Zlata Novak, wife of the late Dr. Drago Novak, donated 41 books and 17 atlases. Due to the lack of storage space, the President addressed the Faculty of Geodesy, which accepted the offer, and enabled the storage and disposal of this donation.

On 16 September 2021, the meeting Glavačeva karta Hrvatske (Glavač’s Map of Croatia) was held at the Croatian State Archives on the occasion of the completion of conservation and restoration works on that map. The meeting was attended by about ten people. As part of the meeting, a valuable exhibition was set up, which unfortunately lasted a very short time. A printed publication with texts about Glavač’s map was published.

The International Cartographic Conference was held this year from 14 to 18 December in Florence (https://www.icc2021.net). As part of this conference, traditionally an international exhibition of maps and an exhibition of children's works of art was held.

26 works were submitted for the competition of children's drawings, *A map of my future world*, which was conducted by the CCS in Croatia. The commission selected 6 children's works for the international exhibition in Florence.

Due to the need to move from Kačićeva 26, a new space for the CCS headquarters was sought. Premise no. 15 on the ground floor of Medimurska 17 in Zagreb was selected as the most favourable solution, with an area of 18.54 m². A sales contract was concluded, and CCS has become the owner of the premise. Furnishing the space and relocation are forthcoming.

The company Krigis d.o.o. regularly takes care of the IT infrastructure of the CCS. M. Viličić maintains the CCS website. CARNET has sent a notification about the expiration of the domain kartografija.hr. The domain was extended for a year.

Journal Cartography and Geoinformation: issues 34 and 35 have been published. All issues of Cartography and Geoinformation published so far are also available in the British Library and Bodleian Libraries, University of Oxford.
2022

The twenty-third annual assembly of the Croatian Cartographic Society (CCS) was held on 8 December 2022, in the Faculty of Architecture, Civil Engineering and Geodesy Hall in Zagreb. Before the official part of the assembly, the president gave a lecture *Lambert Conformal Conic Projection – 250th Anniversary*.

Before the official start of the assembly, the president informed those present that CCS member E. Lynn Usery (1951–2022) had left us. Lynn was a great friend of ours, he participated in our international conferences and published in Cartography and Geoinformation. He was honoured with a minute of silence.

In his report on the work of the CCS in 2022, the president reported that four regular sessions of the Presidency were held during 2022. Among the more important events in 2022, the president highlighted the following.

By a unanimous decision of the Presidency of the CCS dated 12 November 2021, new premises for the CCS headquarters were purchased. It is located in Zagreb, at Međimurska 17. The sanitary area of the CCS headquarters were purchased. It is located in Zagreb, Međimurska 17. The sanitary area

The annual membership fee has for years been: HRK 120 for individuals, HRK 1200 for companies and institutions, HRK 40 for students and pensioners. At the session held on 16 November 2022, the Presidency decided that from 2023 the annual membership fee will be €20 for individuals, €200 for companies and institutions, and €7 for students and pensioners. The price of an individual issue of the Cartography and Geoinformation journal is €25.

The Director General of SGA came to the ceremonial opening of the 18th ICGC in Selce, and 11 SGA employees participated in the entire conference. SGA helped with the transportation of foreign guests to the 18th ICGC and donated 30 topographic maps for the conference participants. Director General Damir Santek PhD suddenly resigned. Communication continues with his deputy Antonio Šustić through M. Triplat Horvat. Deputy Director General A. Šustić and CCS president M. Lapaine signed an addendum to the contract on business and technical cooperation on the tasks of informing the professional public about the SGA activities in the journal Cartography and Geoinformation. This addendum to the contract regulates assistance to CCS for the publication of an extraordinary issue of the journal in 2022.

The president participated as a guest at the 15th Symposium of Chartered Geodetic Engineers in Opatija, 12–15 October 2022. He held a presentation of the chronicle 15 Symposia of Chartered Geodetic Engineers for which he was the editor.

For professional development in 2023, CCS registered a workshop for teachers on thematic cartography, to be held at the Faculty of Civil Engineering in Osijek and online, in June 2023, and the 19th ICGC, which will be held in co-organization with the Faculty of Geodesy of the University of Zagreb, Department of Geography of the University of Zadar and the Croatian Geographical Society - Zadar in Zadar, 7–9 September 2023.

On 20 May 2022, the workshop *Map Projections and New Developments in Cartography* was held, organized by the Croatian Cartographic Society, the Education and Teacher Training Agency and the Faculty of Geodesy of the University of Zagreb. The workshop was intended for teachers and all those who wanted to refresh and expand their knowledge of cartography. The workshop was included in the professional development programme for teachers and chartered geodetic engineers. The details are available at www.kartografija.hr

The CCS is organizing a workshop for teachers at the Faculty of Civil Engineering in Osijek and online, on 29 June 2023. CCS is cooperating with the Faculty of Geodesy (Prof. D. Medak) and advisor S. Burčar from the Education and Teacher Training Agency. The main topic will be thematic cartography.

The organizers of the 18th International Conference on Geoinformation and Cartography were the Croatian Cartographic Society and the Faculty of Geodesy, University of Zagreb. The conference was held at the Marina Hotel in Selce from 14–16 September 2022. The details can be found in Cartography and Geoinformation, and are also available at www.kartografija.hr

Issue 37 of the Cartography and Geoinformation (KiG) has been printed, and 38 is being prepared. A special issue on the occasion of M. Lapaine's 70th birthday is also being prepared. Thanks to Iva Grabarić Andonovski, the secretary of the Znak association, it seems that both open questions regarding Scopus have been resolved: all Croatian journals in the Scopus database have the three-letter code HRV, not SCR (Serbo-Croatian) as was the case before, and KiG is in Scopus from the first issue, and not since 2007 as was the case before.

The company Krigis d.o.o. regularly takes care of the IT infrastructure of the CCS. The server located at Kačićeva 26 occasionally fails. It will need to be replaced with a new one.
More information on CCS activities can be found at www.kartografija.hr.

5.2 Zagreb Astronomical Observatory

https://zvjezdarnica.hr/en/about-us/about-observatory/

Chart of the starry sky, II amended and corrected edition, 2019
Dimensions: B1 (1000×700 mm)
ISBN 978-953-7841-01-0
Publisher: Zagreb Observatory – Astronomical Association of Zagreb
Author: Damir Hržina
Projections: simple cylindrical (declination from −40° to 40°), polar azimuth equidistant (southern and northern hemisphere)
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