

## LVIV MAPPING IN THE SOVIET PERIOD

**Objective** of our research is to identify the specific nature and common trends of Lviv mapping for government and social needs in the Soviet period. **Methodology.** The contemporary understanding of a map to be an important document that contains geospatial information and of mapping to be an important method of documenting events and phenomena are the theoretical and methodological basis for the research. Studying Lviv mapping over a certain period of time covers studying the history of ideas and methods of mapping, map production and maps themselves. The research has considered the social and political reality of the USSR and the effect it had on the mapping process. **Results.** Lviv city maps have been researched from the perspective of their intended use, map-making conditions, information, and regulatory compliance. Specific nature of map-making and information of the city maps for military needs, for the city business development needs, for the needs of the city guests and residents has been outlined. Lviv mapping was predetermined by the social processes within the state and by the accordingly prevailing trends of mapping development in the USSR. Secrecy of mapping information and security restrictions of making and using various maps was typical feature of that period. 1:10 000 scale military topographic maps and large 1:5 000, 1:2 000 scale city maps for business needs were only published “secret”-marked. In early 1980s, the city was provisioned with 1:2 000 and 1:5 000 scale multi-sheet topographic maps. Until the beginning of 1970, light-version Lviv city layouts for guests and residents were published by book publishers. Starting 1974, cartography companies of the Central Authority for Geodesy and Cartography (GUGK) began exclusively publishing tourist-oriented Lviv layouts with distorted and very lightened basis. Only in late 1980s, as the security restrictions for mapping the geographic basis got mitigated, the quality of Lviv maps for tourists started getting better. **Scientific novelty** of the research is that it is the first time when mapping of the Soviet-period Lviv has been studied chronologically, from a different perspective. **Practical relevance** of the research results is various Lviv maps and layouts found, and the prerequisites, methods and principles of their compilation.

*Key words:* Lviv city topographic maps, Lviv city layouts, Lviv city maps for tourists, mapping secrecy, plan’s quality, distorted geographic basis.

### Introduction

Lviv mapping in a historical context has not only documented the city development through centuries – which is especially important to make it possible to study and trace the city development history, – but also embedded the history of cartography development. The latter helps to trace the development of the city mapping and the improvement of ways and methods of map-making – from field to in-office works.

During almost the half of a century, 1939–1991 (except the German occupation in 1941–1944), Lviv mapping was in the hands of the Soviet government. Cartographic support for the needs of the city development, safety and security, tourists and residents required the creation of diverse mapping products. In the Soviet times, Lviv mapping was influenced immensely by the fact that since the latter half of 1960s the topography, geodesy and cartography industries in the USSR belonged to the military production sector. On the one hand, this

explains the priority of financing of the cartography and geodesy works; on the other hand, mapping information was classified that lacked adequate substantiation, and security restrictions were imposed on making and using maps.

Any special research wasn’t dedicated to Lviv mapping in the Soviet period. The process of making large-scale topographic maps of the city was studied by E. S. Havrylova during the first post-war years within the context of the general Lviv mapping history [Havrylova, 1956]. Some maps were exhibited at the “Kartohrafichni vydannya Lvova” (“Lviv Mapping Publications”) dedicated to 200<sup>th</sup> anniversary of Lviv Polytechnic National University and were included in the exhibition catalogue [Sossa et al., 2016].

### Objective

The Lviv mapping of Soviet-period intended for various needs was the result of efforts made by a number of institutions, and rested upon a range of

approaches. The Soviet system of the topography, geodesy and cartography production had a significant effect on the information, compilation and use of the city maps. Hence, the objective of our research is to identify the specific nature and common trends of Lviv mapping for government and social needs in the Soviet period.

### **Methodology**

The contemporary understanding of a map to be an important document containing geospatial information and of mapping to be an important method of documenting events and phenomena are considered as the theoretical and methodological basis for the research. Studying Lviv mapping over a certain period of time includes studying the history of ideas and methods of mapping, map production and maps themselves. We analyze the social and historical development as a collection of many elements. As such, the research has considered the social and political reality of the USSR and the effect it had on the mapping process. The discovered Lviv maps have been exposed to research from the perspective of their intended use, map-making conditions, information, and regulatory compliance. The comparative historical and informational approaches are the main research methods.

### **Results**

The Soviet period of Lviv mapping started in 1939 as the Western Ukraine got covered by the Soviet regime and joined the USSR.

The Lviv development masterplan preparation works initiated by a Lviv branch office of Dipromisto scientific and research institute in early 1940 required the respective mapping. The study and analysis of the available Polish mapping materials of interwar period (a 1:5 000 scale Lviv map, 1938, – according to an aerial survey of 1933; materials of a 1:1 000 scale ordonnance survey of 1936–1939) made by an expert commission of the People's Commissariat for Public Utilities of the UkrSSR (NKKG UkrSSR) demonstrated the need for a number of geodetic and topographic works to be done. During 1940–1941, a 1:1 000 scale combination shot was made in a 181 ha area and a 1:2 000 scale plane-table survey in a 150 ha area [Havrylova, 1956, p. 69, 70]. But the German occupation of

Lviv in 1941–1944 during WWII suspended the execution of these works.

Chronologically, the first topographic map of Lviv in the Soviet period was published by the Military Topographic Service of the Red Army at a military mapping factory in Saratov in February 1944. It is worth mentioning that this was the factory to where the equipment, archives and personnel of the Kyiv map-making unit were evacuated in July 1941. A 1:15 000 topographic military scale map was based on a 1:20 000 scale annotated mosaic of an aerial survey of 1941 interpreted in-office, and using specific materials of January 1944. A list of military production facilities and remarkable buildings of the city was provided in 1939. The map publication in early 1944 illustrated the anticipatory preparation of cartographic support of the Soviet military forces for city liberation.

In September 1947, the next edition of a military topographic map of Lviv was published, but its scale was 1:10 000. The map was based on a Polish 1:5 000 scale map of 1938, with reconnaissance in 1944–1945, and was published at Kyiv military mapping factory. The map input data mentioned “for the used Polish map of 1936”, but that was the year when the map making was completed by Edmund Wilkiewicz, Professor of Lviv Polytechnic Institute, following the aerial survey materials of 1933.

The post-war Lviv renovation and reconstruction required a base map to develop and make the city masterplan and prepare layout designs for the top-priority residential and production facilities, the main utility networks and services, transportation routes etc. The removal of projects on area required a high-precision geodetic base. That is why the primary task was to make 1:2 000 and 1:5 000 scale topographic maps.

It stands to mention that quite a few Ukrainian cities and towns, including big industrial centers, suffered from enormous destruction during WWII. It was obvious that the existing capacities were definitely not enough to do the required topography, geodesy and cartography works. The principal contractor engaged with large-scale mapping of town settlements, Geotopozyomka republican trust of NKKG UkrSSR, even though increased exceedingly its production

capacity having started its sub-divisions in big Ukrainian cities in 1944, but anyway could not do works in many cities at a time. That is why in the cities where the pre-war survey materials were available, large-scale topographic maps for business needs were made by way of updating the available materials using a plane-table reconnaissance method.

Doing Lviv masterplan preparation works, which were initiated in 1954 by Kyiv's Dipromisto scientific and research institute following the Resolution of the Council of Ministers of UkrSSR, required up-to-date 1:5 000 and 1:10 000 scale city maps. To make a 1:5 000 scale topographic map of Lviv within a short time, Geotopozymka republican trust used materials of prior surveys: plats of up-to-date 1:2 000 scale surveys that covered more than half the city area; materials of 1:500 scale surveys (1945-1948); some plats of 1:1 000 scale surveys (1940, 1947) [Havrylova, 1956, pages 71–73].

A 1:5 000 scale map was made in 1954 on 23 rectangular sheets sized  $62.5 \times 50$  cm following both already-available and newly-made 1:2 000 scale plats. Because the symbols used on the map were slightly different from GUGK's symbols accepted in 1953, each sheet had a table of symbols for buildings beyond the right-hand border. The map was made in the local coordinate system and in the Adriatic height system (in the former Austria-Hungary, the vertical datum was a tide gauge in the Port of Trieste with an automatic water gauge and a mark of +3.352 m above its zero). Continuous contours on the map were divisible by 2 meters. All names were in Russian, with a kept Ukrainian transcription of proper nouns.

Publishing originals of a 1:5 000 scale map of Lviv were not drawn. In 1955, the experts of Geotopozymka republican trust's photographic reproduction department used an offset printing machine to make a map, from its compilation originals, in 33 copies. The maps were printed in two colors (situation and legends – in black; relief – in light brown) and were intended to design the city masterplan and to meet the needs of Lviv's chief architect.

In 1954–1955, with a 1:5 000 scale map as the basis, Geotopozymka republican trust made a 1:10 000 scale Lviv map on 8 sheets. The sheets were sized similarly to those of a 1:5 000 scale map ( $62.5 \times 50$  cm). The map was made in symbols accepted for 1:10 000 scale topographic maps (GUGK, 1951).

In order to solve the city landscaping issues, surveys were made and maps were drawn at 1:500, 1:1 000 and 1:2 000 scale.

For a wider public, “Skhematychnyi plan mista Lvova” (“Lviv City Layout”) was available, published in 1947 by the Volunteer Fire-Fighting Association in 15,000 copies (Fig. 1). A single-color layout (advertisement – in two colors) was made by Lviv Oblproekt (authored by L. Tryfon, edited by V. Novikov and P. Mischenko). A  $50.5 \times 67.5$  cm layout visualized all the city streets and squares, with their new names, and that was the key benefit of this edition. Still, the layout was pretty simple cartographically. An identification list of the city streets and squares was on the reverse of the layout.

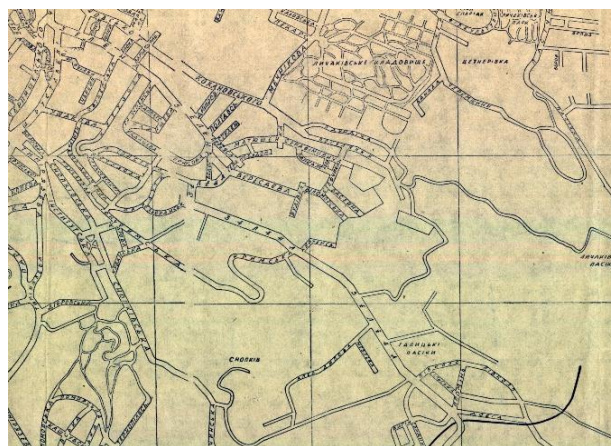


Fig. 1. Extract of “Skhematychnyi plan mista Lvova” (“Lviv city layout”), 1947

Lviv, as any other big city, needed a city map for public use. As a historical and cultural center, with a wealth of history and architecture landmarks, monuments, museums, remarkable landscaping sites, Lviv also needed a tourist-oriented map. However, in the political and economic reality of 1950s – early 1960s, Lviv was not a very much visited city. The so-called “Khrushchev Thaw” encouraged the development of foreign tourism in the USSR. The Soviet government was interested in improving its international reputation and thus raising currency proceeds from visits of foreign tourists. In 1964, they initiated the UkrSSR Department of Foreign Tourism and the related regional department of the All-Union Joint-Stock Company “Intourist” in Lviv Region. Domestic tourism started its gradual development.

In the late 1950s – early 1970s, few Lviv maps were published for the city guests and residents. There were mostly tourist-oriented layouts with public

vehicle routes, published by book publishers as separate editions. Such information-poor layouts were before the early 1970s published by Lviv's "Kamenyar" book publisher in big-size print runs.

For example, the layout edition "Lviv. Skhema mista. Lvov. Skhema goroda" ("Lviv. City layout") was published in 1972, with a print run of 200,000 copies [Lviv. The scheme of the city, 1972]. The principal layout information was a system of streets with public vehicle routes, parkland and service facilities. The city blocks were highlighted in orange, with no visualization of developed and undeveloped city areas; the parkland was sketched schematically on the pale green background. As for the streets, schematic sketches were made for main streets and those with routes of public vehicles (trams, trolleys, buses, taxi stops). In total, 214 streets and squares were visualized and their names written on the layout. On its edges, the layout had black-and-white photos of Lviv attractions. Symbolic for that time was a photo of a Lviv branch of the Central Lenin Museum placed first and of the Hill of Glory ("Pahorb Slavy"). The visualized service facilities were monuments, museums, architecture landmarks, institutions of higher education, theatres, cinemas, halls and palaces of culture, sports buildings, hotels, stores, a central station. These facilities were shown with geometrical symbols, marked with numbers and identified in the lists at the map reverse. Cartographically, the layouts were very much simple and even had no railways. The scheme said in its user-intended description, "layout is tentative and scaleless".

Such layouts were published in Ukrainian (names of streets, squares, parks, cemeteries written on a layout) and the identification lists of the facilities introduced on layouts and street and square names were bilingual (Ukrainian, Russian) or trilingual (Ukrainian, Russian, English). These light-version city layouts, with no public vehicle routes, could be found in very few and rare travel guides.

Post-war period of Lviv mapping was principally streamlined by the dominant trends of mapping development in the USSR. Cartography and geodesy operations gradually became an absolute government monopoly. The Military Topographic Service of the Armed Forces of the USSR was responsible for procurements of topography, geodesy and cartography information to the military department – namely, the Service was engaged with mapping of the USSR territory (1:50 000 scale and smaller topographic

maps; topographic drawings of the cities and towns important for military needs), with delimitation and demarcation of the state boundaries, and with mapping of territories of foreign countries. The Civil State Service for Geodesy and Cartography, as represented by the Chief Department of Geodesy and Cartography at the Council of Ministers of the USSR (GUGK), was vested with making the 1:10 000 and 1:25 000 scale USSR territory topographic maps, doing large-scale surveys of town settlements and publishing non-secret maps for public use.

After GUGK joined the military production sector in 1967, the geodesy and cartography secrecy aggravated, especially since the early 1970s. The secrecy that lacked adequate substantiation and the industry-specific security restrictions complicated significantly both doing topography, geodesy and cartography works for city map-making and also using those maps by Lviv businesses, residents and guests. Only GUGK's companies could do topography and geodesy works in the areas exceeding 10 km<sup>2</sup>, while the companies of other ministries and departments could only do such works where the areas were smaller than 10 km<sup>2</sup>. At the beginning of 1970s, all GUGK's maps of Ukraine were only made in Russian.

In 1970s, GUGK's sub-divisions did huge scopes of works dedicated to making large-scale topographic maps required for various types and stages of design. The principal methods of map-making, the fundamental requirements to the information and execution of 1:5 000, 1:2 000, 1:1 000 and 1:500 scale city maps were formalized in the applicable technical regulations [The main provisions ..., 1970; The main provisions ..., 1979].

1:5 000 topographic maps were intended to develop city masterplans and prepare layout designs for the top-priority construction facilities, utility networks and services, transportation routes, engineer training, land management and landscaping etc. 1:5 000 and 1:2 000 scale topographic maps were "secret"-marked; 1:1 000 and 1:500 scale maps had "For internal use" tags.

Given heavy residential and industrial construction in the city and heavy road-building, 1:5 000 and 1:2 000 scale Lviv city topographic maps made in mid of 1950s suffered from significant obsolescence over 20 years. As a responsive measure, GUGK made an order in June 1974 for Company No. 13 to do topography and geodesy works at "Lviv" project

during 1976-1980 intended to make a city map. The expedition No. 247 of Company No. 13 was doing topography and geodesy field works; the Expedition No. 247 and Workshops No. 1 and No. 2 of Company No. 13 were doing in-office works.

As a planimetric geodetic base, a traverse network of polygonometry of the 4<sup>th</sup> order, 1<sup>st</sup> and 2<sup>nd</sup> class, was extended to the total Lviv area in 1977-1979. The works were done in the local coordinate system. A secondary triangulation point "Lviv" ("Vysokyi Zamok") was taken as an origin of coordinates. To make an elevation datum of the city and to support the 1:2 000 and 1:5 000 scale stereotopographic surveys with elevation control, 2<sup>nd</sup>-, 3<sup>rd</sup>- and 4<sup>th</sup>-order levelling works were done in 1977-1979 at "Lviv" project. Those levelling works were done in the Adriatic and Baltic height systems.

To make topographic works, the Ukrainian Civil Aviation Authority made an aerial survey in 1974, scales 1:20 000 (focal length = 200 mm) and 1:10 000 (focal length = 100 mm). The flight materials were used to make a planimetric base, annotated mosaic, interpretation of the map information components, and stereoscopic relief drawing.

The planimetric part and specific elements of relief (but for contours) were drawn on maps as a result of interpretation. On the sheets of 1:5 000 and 1:2 000 scale stereotopographic surveys, interpretation was made using annotated mosaic. The field interpretation was combined with in-office one. To draw relief and to make topographic map originals, a stereoscopic method was applied and universal devices SD-2, SD-3 and STs-1 were used. Relief drawing with 1 m interval was based on materials of continuous field observations.

The topographic maps were prepared for publishing in 1980 by Workshop No. 2 of Company No. 13. In total, the following were prepared for publishing: 101 trapezes (73 complete and 28 incomplete), with a 87.25 km<sup>2</sup> area and a 1:2 000 scale; and 50 trapezes (45 complete and 5 incomplete), with a 75.75 km<sup>2</sup> area and a 1:5 000 scale. From smooth-delineation maps of 1:2 000 and 1:5 000 scale Lviv topographic maps, single-color maps (30 copies each) were made, 3 of them with tracing. Topographic maps were "secret"-marked (Fig. 2).

From publishing original maps of a 1:5 000 scale map, 1:10 000 scale collective maps were made using a photomechanical method, with a twofold reduction, and with no generalization. 18 original

maps encompassed the area of 189 km<sup>2</sup>; these were used to make 21 single-color maps, 3 of them with tracing.

A 1:5 000 scale Lviv topographic map was updated and re-published in 1985, on 58 sheets.

Along with topographic maps of city and town settlements principally intended for the city and town development purposes, which were made by GUGK's companies and organizations, the Military Topographic Service units issued topographic maps of big cities for military needs. The fundamental requirements to the information and execution of 1:10 000 and 1:25 000 scale city maps, the techniques of making maps with the use of mapping and aerial survey materials, and their further preparation for publishing was strictly controlled by the technical regulations approved by the Head of the Military Topographic Department of the Central Command of the Armed Forces of the USSR and by the Head of GUGK at the Council of Ministers of the USSR [Manual on the compilation ..., 1972; Guide to cartographic ... 1978].



Fig. 2. Extract of a 1:5 000 city topographic map, 1980

Such military and topographic maps were intended for detailed research of cities and approaches to them, navigation, precise measurements and calculations while planning and implementing defense measures. Those maps accurately and reliably represented the location of objects; helped to identify quickly the important facilities and checking points, main streets, obstacles on approaches to the city; helped to quickly detect rectangular and geographic coordinates, absolute and relative heights; and had a description and list of the map streets. City maps for the defense departments were made in a Gaussian transverse-cylindrical projection calculated from the parameters of the Krasovsky ellipsoid system of coordinates in 1942 and in the Baltic height system.

Considering huge workload of the military map-makers being engaged with making topographic maps and plans of foreign territories, the works on compilation of such city maps and their further preparation for publishing were often vested with the hands of civilians. If that was the case, then topographic maps could be printed in two ways: labelled by the Central Command of the Armed Forces of the USSR and labelled by GUGK. For example, the last edition of a 1:10 000 scale Lviv topographic map for military needs in the Soviet period was made by Company No. 13. The related works on map compilation and preparation for publishing were done as ordered by the Military Topographic Department (the so-called “Client No. 9”). The map was compiled in 1975 and further updated in 1984 according to the aerial survey and field survey materials. In November 1987, the map was published on 4 sheets at the Kyiv military mapping factory (Fig. 3).

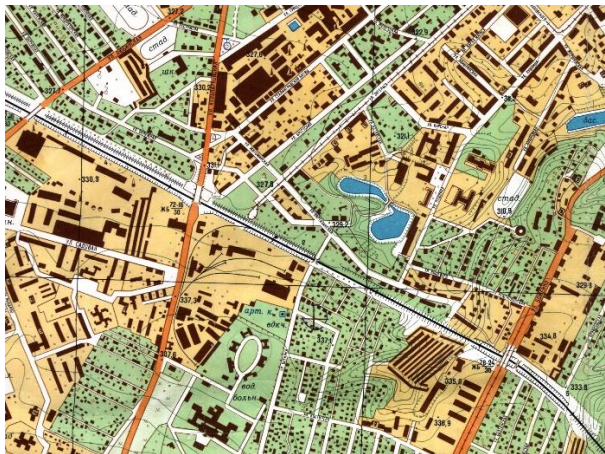


Fig. 3. Extract of a 1:10 000 city topographic map, 1987

To implement the Decree of the Central Committee of the Communist Party of the Soviet Union (TsK KPRS), the Council of Ministers of the USSR and the All-Union Central Trade Union Council (VTsRPS) “On Measures for Subsequent Development of Tourism and Excursions in the Country” adopted in 1969, GUGK started actively developing since early 1970s a new area of tourist-oriented mapping – sightseeing, traffic-route and city layouts for tourists. From then on, tourist-oriented city layouts were solely published by GUGK’s sub-divisions, while book publishers were not allowed to make mapping products, even with very schematic sketches of the intra-city situation.

Since 1974, the central map-making company of Ukraine, Factory No. 1 of GUGK (from 1977 –

the Scientific and Editorial Map-Making Company; now – the State Scientific Production Enterprise (SSPE) “Kartographia”) started regular publication of the city layout “Lvov.Turistskaya Skhema” (“Lviv.Tourist plan”) in Russian, with no scale mentioned on the layout (1974, 1976, 1977, 1979). The layouts were published in big-size print runs. For example, the city layout edition of 1976 was printed in 314,000 copies. It stands to mention specifically that from then on, all maps of Lviv for public use were developed, made and prepared for publishing at the above-mentioned company in Kyiv, but given the secrecy typical of the-then cartography industry, “Moscow: GUGK USSR” was designated as a publisher in the input data.

The information and accuracy of geographic presentation in the first edition of a tourist-oriented city layout of 1974 (edited by O. I. Kolyada) was only a bit different from that in the previous edition made by “Kamenyar” book publisher [Lviv. Tourist scheme, 1974] (Fig. 4). However, the size was slightly reduced (49 × 69 cm) and the scale was slightly increased. That is why the area of the city mapping somewhat decreased. Due to an almost 10 % increase in the number of streets, almost the same number of streets (218) and with their same drawing was presented and their names were identified in writing on the layout. The first GUGK’s layouts also had no railways (1974, 1976), which appeared in the subsequent editions. The layout coloring definitely got better – this was also contributed by colored photos at the layout front and back. The city was colored by districts, which from then on started being introduced on tourist-oriented layouts.

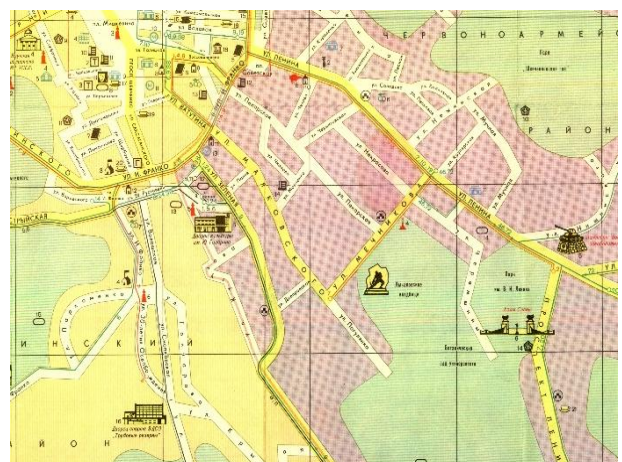


Fig. 4. Extract of “Lvov.Turistskaya Skhema” (“Lviv.Tourist-oriented city layout”), 1974

Topics information of the previous city layout editions was similar to that. Consistent with reality of that period, the following topics were introduced on layouts: “Landmarks and memorable sites of history and revolution events”, “Monuments and memorial places of the Great Patriotic War”. Unlike in the previous editions, the lists of architecture landmarks didn’t include the names of churches and temples – only mentioned them being architecture landmarks.

Based on a Russian-language city layout “Lvov.Turistskaya Skhema”, almost identical city layouts were published in 1979 in English, German and French (edited by Yu. I. Loza). Names of streets, squares and parks were transliterated in Latin and were identical on all city layouts published in foreign languages (Fig. 5).

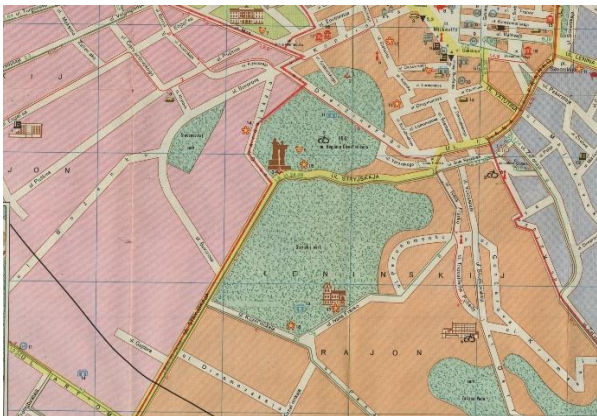


Fig. 5. Extract of “Lvov” layout for tourists (“Lviv. Tourist-oriented city layout”), 1979

It stands to mention that since the first half of 1970s, the history of Soviet mapping witnessed the beginning of the period distinguished for the biggest secrecy of topography, geodesy and cartography works in the USSR. Almost all processes, from production development to use of mapping materials, were strictly regulated. For example, to make any maps for a wider public, GUGK’s map-making subdivisions had to use a distorted 1:2 500 000 scale base map of the USSR originating from 1976 as the basic mapping material. For instance, the geographic basis of regional administrative maps in a 1:400 000 scale was made by map production units using a method of photomechanical increase of the base map by 6.25 times and by way of eye estimation (!) of which components missing in the basic mapping material should be added.

All city layouts were regulated by the guidelines “Instruktsiya o poryadke sostavleniya i izdaniya planov gorodov, prednaznachennykh dlya otkrytogo opublikovaniya i sluzhebnoho polzovaniya, organizatsiyami ministerstv i vedomstv SSSR (SPG-73)” (“Guidelines on Making and Publishing the City Layouts, Which are Intended For a Wider Public and For Internal Use, by the Companies of the USSR Ministries and Departments”) [Instruction SPG-73, 1973]. Those guidelines described the procedure for making and publishing (distribution) of the city layouts intended for a wider public and for internal use, including the issue of permits to do such works, and also regulated the information and accuracy of those layouts.

The basic mapping material to make a layout was normally “secret”-marked, and the compiled base had to be free from secrecy. To achieve this, a blue copy made on the Whatman drawing paper from the basic mapping material was cut in small 5–8 cm pieces and glued to a hard foundation according to Instruktsiya SPG-73. While gluing, the blue copy pieces had to be spread unevenly in various layout positions to distort the layout scale, the directions and adjacence angles of streets etc. The deviation from the north-south direction by several degrees, a larger layout scale in the city center and a smaller one in the suburbs were mandatory. The mosaic of such cut and spread fragments of the city geographic basis served the base for a distorted city layout, which was still “secret”-marked. Only upon inspection by the Territorial Inspectorate of the State Geodetic Supervision of Ukraine and Moldova for compliance with Instruktsiya SPG-73, the geographic basis of the layout was allowed to be opened.

To harmonize and standardize the information of the tourist-oriented layouts intended for public use, which were published by GUGK’s map-making subdivisions, GUGK’s Head, by his Order of 28.12.1979, introduced the guidelines “Rukovodyaschyi tekhnicheskyyi material po sozdaniyu turistskikh skhematicheskikh planov gorodov na russkom, natsionalnykh i inostrannykh yazykakh i skhem gorodskogo passazhyrskogo transporta” (RTM-68-13.03-79) (“Technical Guidelines on Making City Layouts For Tourists in the Russian Language, in National and Foreign Languages and on Making

Layouts of Public Vehicle Routes”). Geographic basis was made in strict compliance with Instruksiya SPG-73. The scale could not exceed 1:10 000, but could not anyway be mentioned on the layout. The front cover had a designation “Layout for tourists” or “Layout of public vehicle routes”. Highlights were made for water surfaces, green planting, city blocks and undeveloped city areas (colored as blocks but paler). For railways, only the main lines were visualized – the approach tracks were not allowed for visualization.

The information of the city layouts by topics included in standard symbols the following elements: tourist organizations, history and culture landmarks, culture and education institutions, service facilities (hotels, catering etc.), transportation services and other facilities (children’s railways, botanical gardens, zoos, cemeteries etc.).

RTM on making city layouts for tourists focused seriously on high-quality artwork of layout editions, on adequate selection of colored illustrations. The city layout cover had to be bright and eye-catching. In selecting colored illustrations, it was recommended to opt for pictures of contemporary architecture landmarks and new buildings, military and history attractions, monuments of famous people, sports buildings, culture and education institutions. Ecclesiastical architecture pictures on layout covers were solely allowed in exceptional cases, and only the world-famous ones.

GUGK’s next city layout editions of “Lviv. Tourist scheme” (1982, 1984) were published in a somewhat different size (52 × 72 cm), with a slightly increased area of the city mapping and in a new art design. Beneficially increased insert of the city center, highlights of the city blocks and undeveloped area, slight increase of the visualized streets (242) could not overall improve the poor cartographic content. In 1982, this city layout was published in English, German and French.

Based on the tourist-oriented city layout published in 1982, the layout “Lvov. Skhema passazhirskogo transporta” (“Lviv. Layout of public vehicle routes”) was made and prepared for publishing, and was published twice – in 1984 and 1986 (Fig. 6). The edition had an insert “Skhema prymiskykh marshrutiv

avtobusnoho ta zaliznychnoho transportu” (“Layout of Bus and Railway Commuter Routes”).

Attempts of democratic changes in the Soviet society during the second half of 1980s had a positive effect on mapping development. The guidelines “Instruksiya o poryadke sostavleniya i izdaniya planov gorodov i drugikh naselyonnykh punktov, prednaznachennykh dlya otkrytogo opublikovaniya i s grifom “dlya sluzhebnogo polzovaniya” (SPG-88)” (“Guidelines on Making and Publishing Maps of Cities and Other Towns and Settlements, Which are Intended For a Wider Public and For Internal Use”) were developed and approved, and replaced Instruksiya SPG-73 [Instruction SPG-88]. The city maps intended for a wider public could now be made in a 1:5 000 or smaller scale; maps for internal use in a 1:2 000 or smaller scale. True coordinates of geographic locations on public maps were not allowed to be more accurate than 150 m. Their north-south direction was normally 2–3° deviated. It became possible to visualize the relief with shading and gradation, with hypsometric tinting, with symbols (steeps, ravines, rocks), with names of relief objects written on maps and layouts.

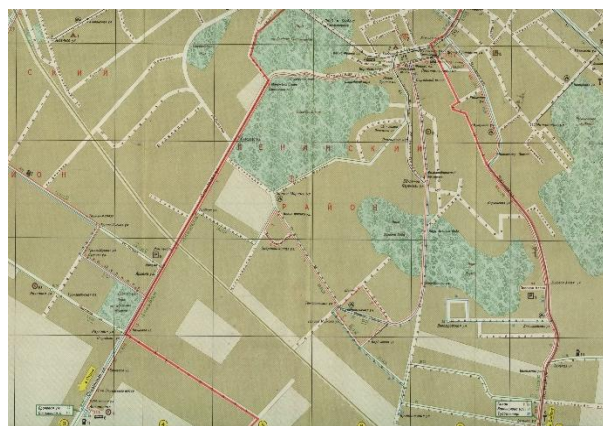


Fig. 6. Extract of “Lvov. Skhema pasazhirskogo transporta” (“Lviv. Layout of public vehicle routes”), 1984

Considering the requirements of Instruksiya SPG-88, the regulations “Rukovodstvo po sozdaniyu planov gorodov, prednaznachennykh dlya otkrytogo opublikovaniya” (“Regulations on Making City Maps Intended For Public Use”) were made and further approved by GUGK USSR’s Order No. 172 p dd. 16.05.1989 as temporary regulations [Guideline



..., 1989]. Rukovodstvo regulated the intended use of city maps, fundamental requirements to such maps, specific issues of editing, compilation, preparation for publishing, re-publication, and procedure for map approvals. Those new regulations cancelled some restrictions that existed for presentation of geographic basis and information by topics. Now, the city maps were allowed to have numbering of corner buildings. Still, a lot of restrictions on presentation of geographic locations still remained. The city maps were not allowed to visualize and identify in writing the horizontal and vertical geodetic control points; depots and warehouses; stub railways and railway approach lines; military and restricted access facilities; names of plants, factories and other industrial facilities other than those allowed for open publication; specifications of power lines, railways, tunnels, bridges etc.

It stands to mention specifically that in the second half of 1980s some methods of how to present the geographic basis and information by topics were being implemented at map-making production facilities well before the introduction of official regulations.

Partial cancellation of the restrictions that had been strictly regulated before allowed improving the accuracy, detailing and overall quality of city maps and layouts for public use. The last tourist-oriented Lviv maps of the Soviet period were published before the introduction of the above regulations; that is why they were still called ‘city layouts for tourists’, and the scale was not mentioned on those layouts. However, the cartographic component of those maps was definitely improved. This is proven by a 1986-year edition of “Lvov.Turistskaya Skhema” (re-published in 1987 and 1988) with somewhat bigger size (69 × 72 cm) and a much better cartographic base (increased number of visualized streets, more accurate basis). The map additionally had a layout of the Museum of Folk Architecture and Lifestyle. In 1987, the city layout for tourists “Lviv.Turystska Skhema” (“Lviv. Tourist plan”) was firstly published by GUGK in Ukrainian (based on a Russian-language layout of 1986) [Lviv, 1987].

The atlases were a new area of tourist-oriented mapping for tourists launched for production in the

USSR starting mid 1980s. A tourist atlas “Lvov” (1989) demonstrated the attractive history and culture of a famous Ukrainian tourist center [Lviv, 1989]. The atlas had relatively detailed and accurate geographic basis and also visualized quite a few city streets never identified on public maps before (Fig. 7). Overall, the atlas visualized and identified in writing 654 intra-city objects. On its 27 pages, the atlas had a city map, with a larger-scaled center. A 1:5 000 scale city topographic map was visually used to make the atlas basis (1980). The atlas map was supplemented with a list of Lviv landmarks and infrastructure facilities. It also incorporated excursion routes, detailed park layouts and public vehicle route layouts.

### Scientific novelty and practical relevance

The scientific novelty of the research is that it is the first time when mapping of Lviv Soviet-period, a big administrative, industrial, cultural and tourist center of the Western Ukraine, has been studied chronologically, from a different perspective. Specific nature of map-making and information of the major types of city maps for military needs, for the city business development needs, for the needs of the city guests and residents has been outlined. Specific notice of the effect on Lviv mapping development has been done, considering the security restrictions imposed on publication of cartographic information in the Soviet period.

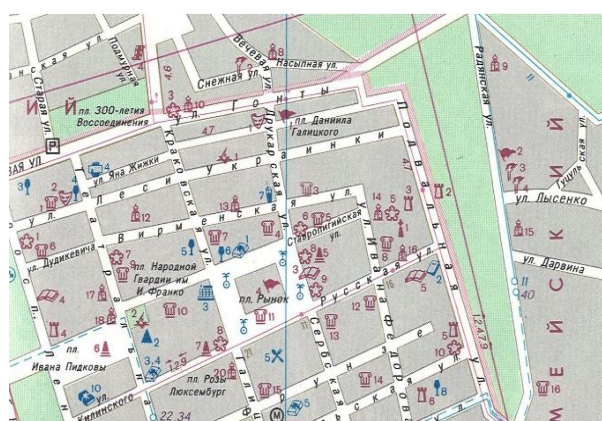


Fig. 7. Extract of a page from “Lvov. Atlas turista” (“Lviv. Atlas for tourists”), 1989

Various Lviv maps and layouts, prerequisites, methods and principles of their compilation make the research results practically relevant for the experts of

cartography and geodesy production and for the researchers of rich city and mapping histories.

The prospect of this study is an accuracy estimating of geographical basis representation at plans of Lviv, that were created in the Soviet period for different purposes.

*The publication is funded by the Polish National Agency for Academic Exchange (NAWA) as part of the International Academic Partnerships program, project "the 9th Scientific and Technical Conference "Environmental Engineering, Photogrammetry, Geoinformatics – Modern Technologies and Development Perspectives"."*

### Conclusions

Lviv mapping in the Soviet period had been predetermined by the political processes within the state and by the accordingly prevailing trends of mapping development in the USSR. Typical of that period was secrecy of mapping information, which lacked adequate substantiation, and security restrictions of making and using various maps. Military topographic maps and large-scale city maps for business needs were only published "secret"-marked. In early 1980s, the city was provisioned with 1:2 000 and 1:5 000 scale multi-sheet topographic maps. Until the beginning of 1970, very simple, light-version Lviv city layouts for guests and residents were published by book publishers. Starting 1974, with absolute USSR government's monopoly for doing topography, geodesy and cartography works, cartography companies of the Central Authority for Geodesy and Cartography (GUGK) regularly published tourist-oriented Lviv layouts with distorted and very lightened basis. Only in late 1980s, as the security restrictions for mapping the geographic basis got mitigated, the quality of Lviv maps for tourists started getting better.

### REFERENCES

- Havrylova, E. S. (1956). Map of the city of Lviv and its development. Lviv: Publishing house of LPI (in Ukrainian).
- Guide to cartographic and publishing work. Part 4. (1978). Drawing up and preparation for the publication of city plans. Moscow: RIO VTS (in Russian)
- Guideline for creating city plans for public publishing. (1989). Moscow: PKO "Cartography" (in Russian)
- Guiding technical material on the creation of tourist schematic city plans in Russian, national and foreign languages and urban passenger transport schemes. (1980). Moscow: TsNIIGAiK (in Russian)
- Instruction on the procedure for the preparation and publication of plans of cities and other settlements intended for open publication and marked "for official use" (SPG -88). (1989). Moscow: GUGK (in Russian)
- Instruction on the procedure for compiling and publishing city plans intended for open publication and official use by organizations of ministries and departments of the USSR (SPG-73). (1973). Moscow: GUGK (in Russian)
- Lviv. The scheme of the city. Lviv City scheme. (1972). Lviv: "Kamenyar" book publisher (in Ukrainian).
- Lviv. Tourist plan. (1987). Moscow: GUGK (in Russian)
- Lviv Atlas of the tourist. (1989). Moscow: GUGK (in Russian)
- Lviv Tourist scheme. (1974). Moscow: GUGK (in Russian)
- Manual on the compilation and publication of cities plans. (1972). Moscow: RIO VTS (in Russian)
- The main provisions for the creation of topographic plans on a scale of 1: 5 000, 1: 2 000, 1: 1 000 and 1: 500. (1970). Moscow: GUGK at the Council of Ministers of the USSR (in Russian)
- Sossa R., Kryshtalovych U., Shyshka O. (2016). Cartographic view of Lviv: Catalog of the exhibition (in Ukrainian)
- The main provisions for the creation of topographic plans on a scale of 1: 5 000, 1: 2 000, 1: 1 000 and 1: 500. (1979). Moscow: GUGK at the Council of Ministers of the USSR (in Russian)

P. I. СОССА

Кафедра картографії та геопросторового моделювання, Національний університет «Львівська політехніка», вул. С. Бандери, 12, Львів, 79013, Україна, ел. пошта: Rostyslav.I.Sossa@lpnu.ua

#### КАРТОГРАФУВАННЯ ЛЬВОВА У РАДЯНСЬКИЙ ПЕРІОД

Плани Львова досліджено з позицій їх цільового призначення, умов створення, змістовного наповнення, відповідності нормативним документам. Визначено особливості створення та змісту основних типів планів міста для військових потреб, для потреб господарського розвитку міста, для туристів і мешканців міста. Картографування Львова визначалося розвитком суспільних процесів в державі та відповідно домінуючими тенденціями розвитку картографування в СРСР. Характерними ознаками цього періоду були утаємниченість картографічної інформації та режимні обмеження на створення й використання різноманітних карт. Військові топографічні плани масштабу 1:10 000 та великомасштабні (1:5 000, 1:2 000) плани міста для господарських цілей видавали тільки з грифом “таємно”. На початок 1980-х років місто було забезпечено топографічними багатоаркушевими планами у масштабах 1:2 000 і 1:5 000. Дуже спрощені схеми Львова для гостей і жителів міста до початку 1970-х років видавали книжкові видавництва. З 1974 р. картографічні підприємства ГУГК монополярно випускають туристичні схеми міста із спотвореною та значно розвантаженою основою. Лише наприкінці 1980-х років із зменшенням режимних обмежень на відображення елементів географічної основи картографічна якість туристичних планів Львова поліпшується.

*Ключові слова:* топографічні плани Львова, схематичні плани Львова, туристичні плани Львова, таємність картографічних робіт, якість планів, спотворення географічної основи.

Received 20.12.2019