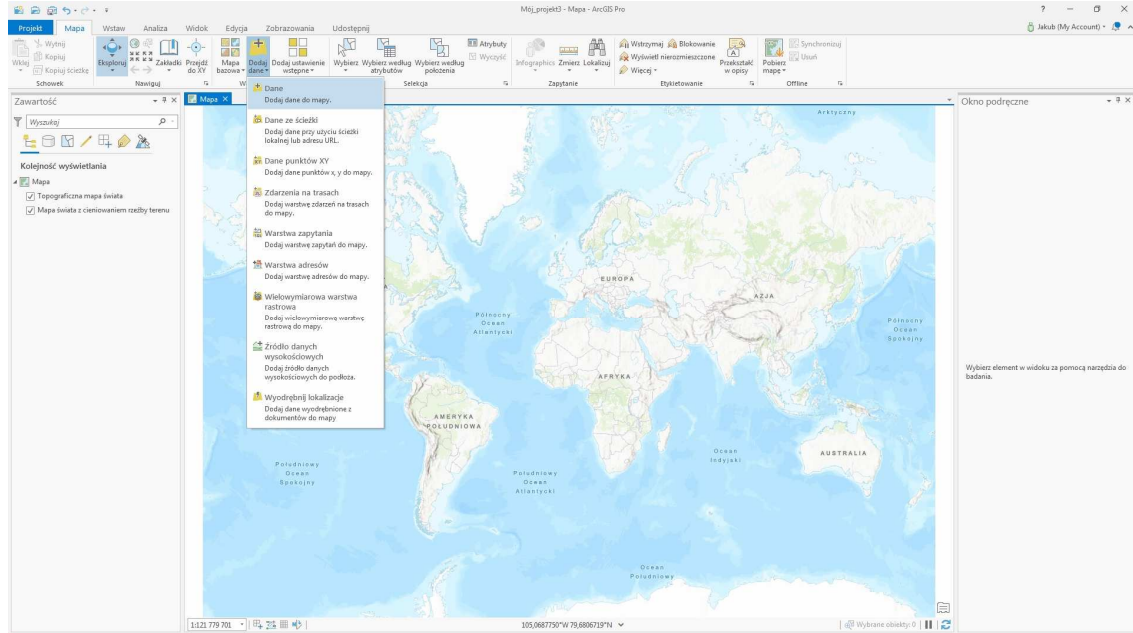


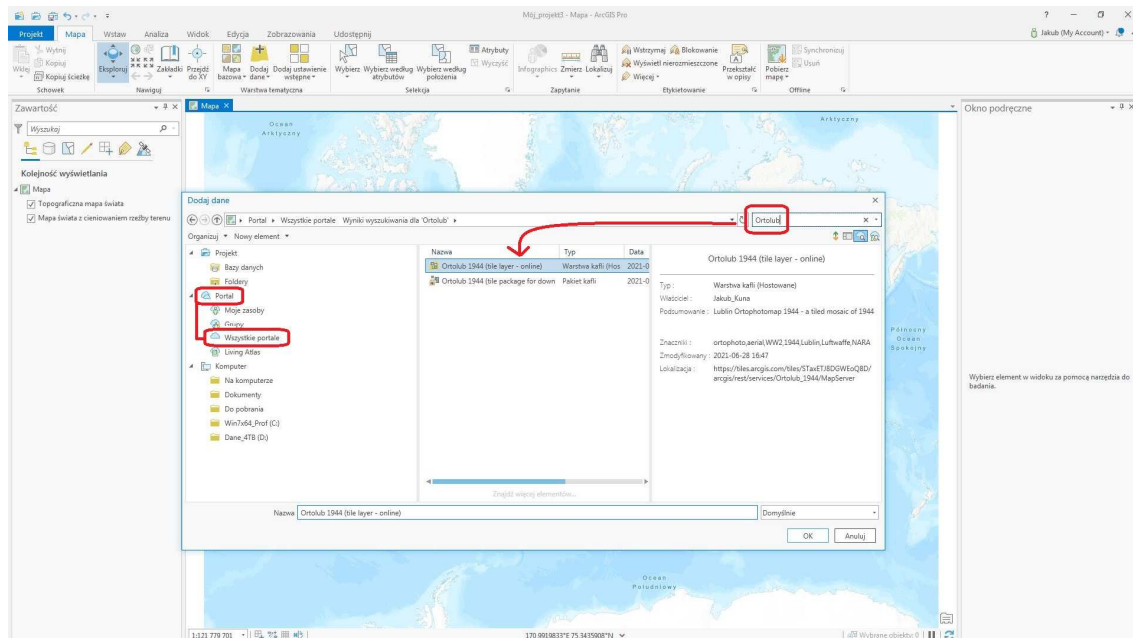
MANUAL

Adding Lublin Ortophotomap 1944 to ArcGIS PRO from ArcGIS Online

1. Open a new project in ArcGIS PRO 2020 or newer. Go to **Add Data...** → **Portal** → **All Portals** and type the phrase "**Ortolub**" in the search box.

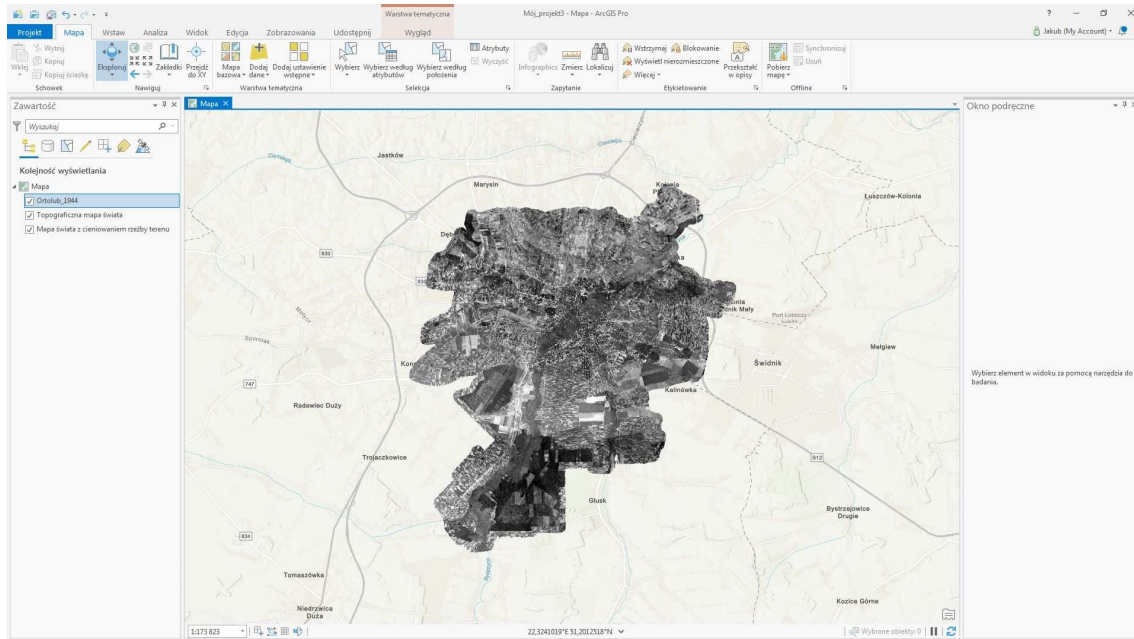


2. Select the **Ortolub 1944 layer (tile layer - online)** and add it to your project. **If you want to work with tiles offline, you can download them by adding **Ortolub 1944 layer (tile package for download)** to your project. The weight of the package is approx. 330 MB. The program will perform the download itself.*

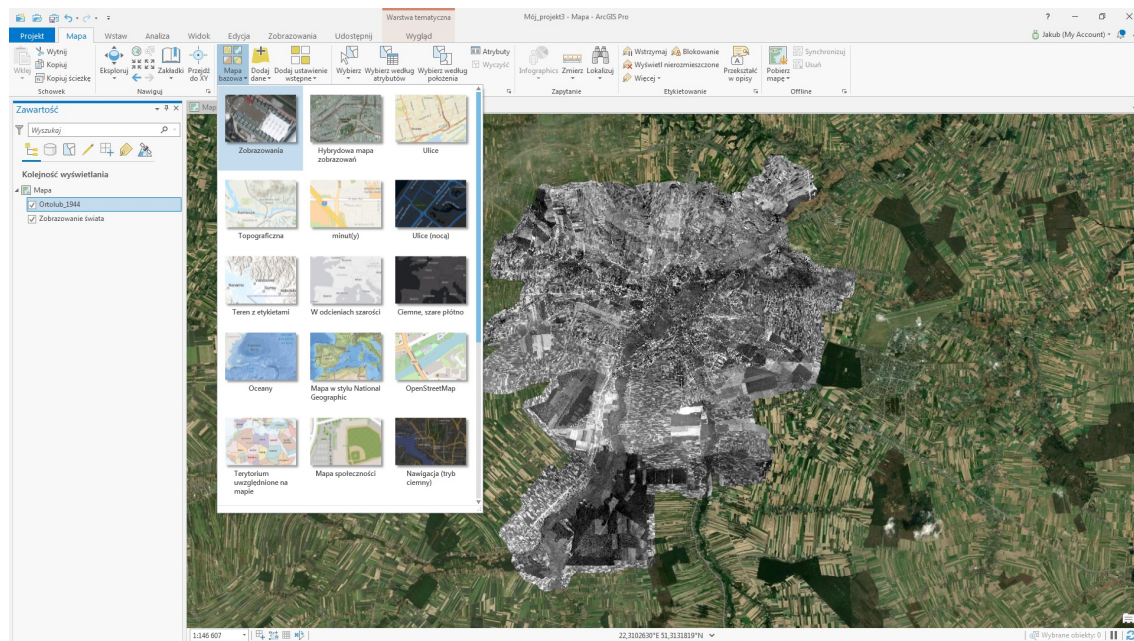


3. The cartographic projection will automatically change to EPSG:3857. The layer consists of 19 levels of tiles (zoom 0 - 18) with dimensions of 256 × 256 pixels and resolution of 96 DPI. After a moment of refreshing the **Lublin Ortophotomap 1944** is ready to work with:



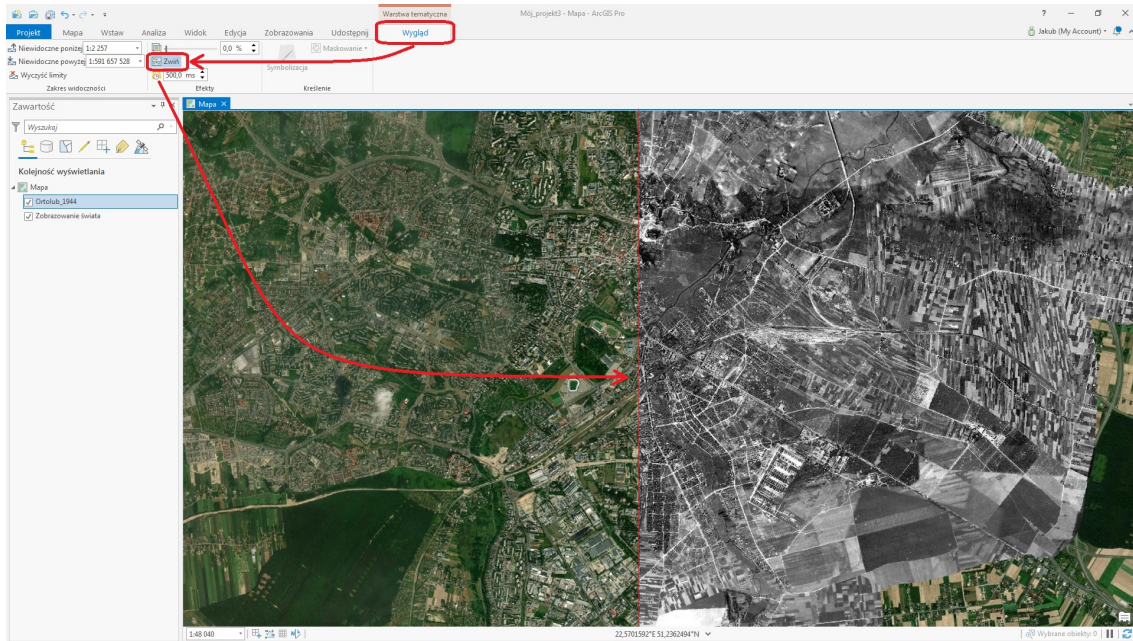


4. You can add your own spatial data or other data from the ArcGIS Online portal, basemaps, and satellite imagery to the project. To compare the historical situation with the contemporary state, you can add a base map to the project, e.g. *Add Basemap* → *Imagery* or *OpenStreetMap* (move the map bar below).

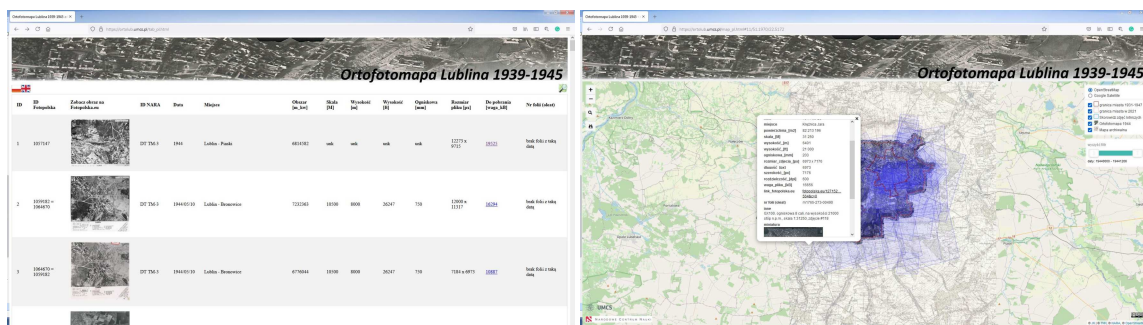


5. With a good Internet connection the tile layers load smoothly. When zooming in, there is an impression of slight shifting of the content, so called "waving" of tiles, which is caused by averaging of pixel values in the image. After zooming and loading tiles of the proper level, the *Lublin Ortophotomap 1944* presents very high compatibility with contemporary spatial data.
6. A convenient way of viewing *Lublin Ortophotomap 1944* and comparing it with the contemporary situation is the *Swipe* tool available in the *Effects* tab. After activating the appropriate layer in the toolbar, using smooth strokes with the left mouse button, you can dynamically switch off the layer display, similarly to selecting text in a text editor.

Lublin Ortophotomap 1939-1945

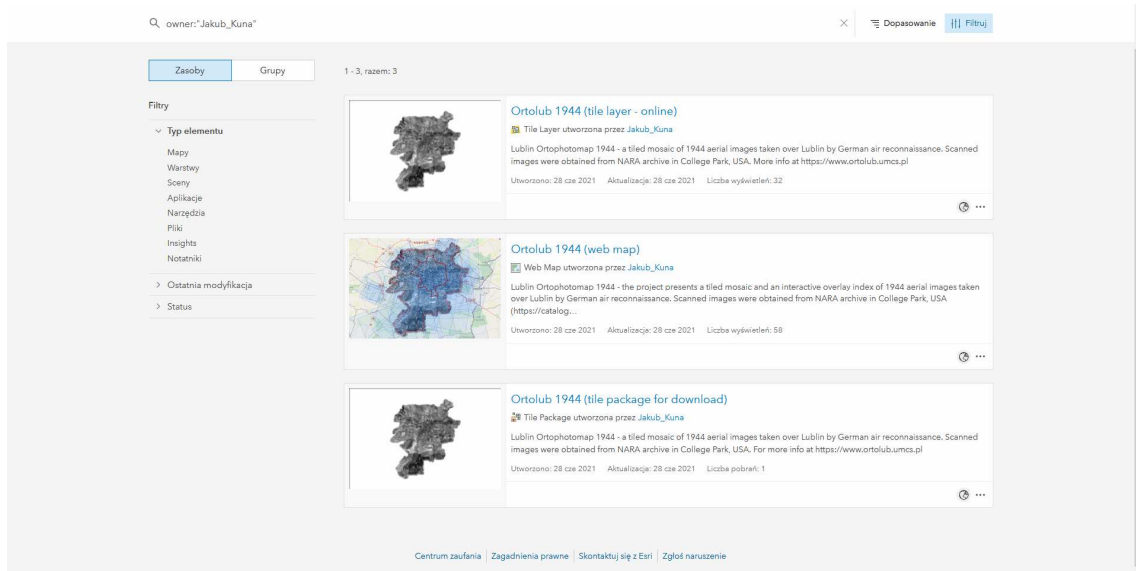


- Due to the nature of source data (age and scale of archival aerial photographs and quality of scanning) *Lublin Ortophotomap 1944* is inferior in quality to modern aerial orthophotomaps made available by the Main Office of Geodesy and Cartography (GUGiK). You can read about adding the GUGiK Ortophotomap as a WMTS service here: <https://enterprise.arcgis.com/pl/portal/latest/use/add-layers.htm> and here: <https://enterprise.arcgis.com/pl/portal/latest/use/hosted-web-layers.htm>
- Depending on the number of ground control points used to calibrate the individual images, the accuracy of point features ranges from approximately 0.1 m to values slightly exceeding 1 m. The base pixel size of the mosaic of the aerial photographs taken is 0.42 x 0.42m, the mosaic file has dimensions of 38397 x 44310 px and occupies respectively: 828 MB - geoTIFF file in 8-bit grayscale and LZW compression; 3160 MB - geoTIFF file with alpha channel, masking residual fragments of the photos located outside the present administrative area of Lublin. The ESRI tiled package (.tkpg) weighs about 330 MB.
- The list of images used to develop the Ortophotomap is available as a table at https://ortolub.umcs.pl/tab_en.html and as an interactive map index at https://ortolub.umcs.pl/map_en.html. You may also download it as a geojson file from https://ortolub.umcs.pl/data/Ortolub_1944_geojson_3.zip. The historical city boundary from the first half of the 20th century can be found in the same location in file [Lublin_1931_1947.zip](#).



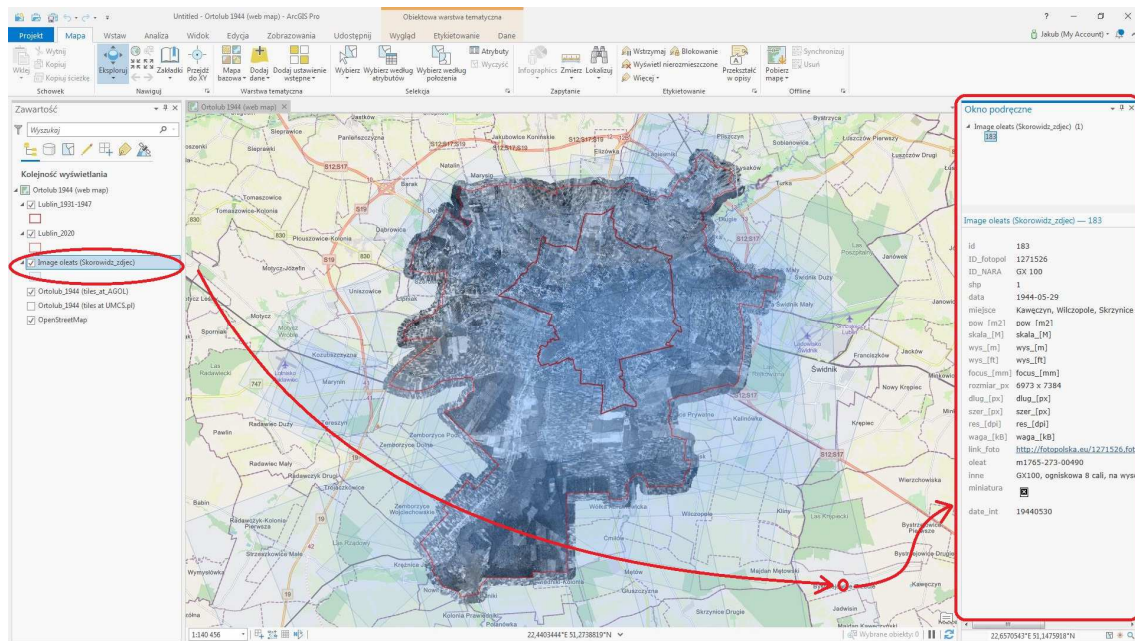
- The historical ortophotomap is also available at ArcGIS Online, when typing "Jakub_Kuna" you can find an interactive web-map, online tile layer and a tile layer package for download https://www.arcgis.com/home/search.html?q=owner%3A%22Jakub_Kuna%22&t=content&restrict=false.





11. Short version (for lazy people).

Download the file https://ortolub.umcs.pl/data/Ortolub_1944_ArcGIS_PRO.zip, extract the *.pitemx* file and open it. Once the project is open, refresh the existing basemap or add a new basemap. Use historical Orthophotomap and index of aerial photographs of Lublin in ArcGIS PRO desktop application:



12. The project was carried out under the Polish National Science Centre (*pol. Narodowe Centrum Nauki, NCN*). grant programme Miniatura 4.0. 'Development of the Orthophotomap of Lublin 1939–1945' (ref. no. 2020/04/X/HS4/00382).

13. The results of my work are made available under a Creative Commons **CC BY-SA 4.0** license (attribution - under the same conditions).

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15. Good luck!

