Demarcation of the state border between Republic of Belarus and Lithuanian Republic (hereinafter – border) is almost completed by now. The length of the border is more then 650 km, from junction on Marykha river, where the borders of Belarus, Lithuania and Poland are joined and up to Ludvinovo junction, where the borders of Belarus, Lithuania and Latvia are joined.

The works on border demarcation are organized and managed by Intergovernmental Demarcation Commission (hereinafter – IDC).

Demarcation works include design and survey works, building works, geodetic, cartographic and other kinds of works.

Geodetic and cartographic works are carried out by the following organizations:
from Byelorussian side – State topographic-geodetic enterprise Belgeodesia (Minsk);
from Lithuanian side – joint-stock company Aerogeodetic Institute (Kaunas).

**Introduction**

Demarcation map is one of the final documents on the state border demarcation. IDC made a decision to publish demarcation map in two coordinate systems – SC-42, used in Belarus and LKS-94, used in Lithuania.

In order to prepare the map, airborne survey, photogrammetric and cartographic works have been performed.

**Aerial survey**

To prepare demarcation map the airborne survey was executed in 2003 along Byelorussian-Lithuanian state border. Aerial photo camera RC-30 with focal length – 153,11 mm and gyro-stabilized platform PAV-30 were used for the survey. Survey scale is 1:20,000, film type – black-and-white Aviphot Pan 200 S PE 1.

Aerial survey had to be done with the following special requirements:
- Airborne survey should have the same direction as a border line on the terrain;
- Airborne survey should be done in 2 km corridor along the border line (1 km on both sides of the border)
- Survey strips deviation from pre-defined location should not exceed 1,0 cm on the images
- Images overlapping - 60 %, strips overlapping - 40%
- At one-strip survey the strips should have overlap not less than 2 photograph basis.

Fig.1 Fragment of images block scheme

Airborne survey strips length is 681 km. Total area of survey - 2697 sq.km.

**Photogrammetric works**

In Belgeodesia enterprise ORIMA and Photomod software were used for photogrammetric processing, and Aerogeodetic Institute used LEICA-HELAVA DPW 770 along with SOCET SET-HATS software.

There were defined two zones of responsibility for photogrammetric works: Lithuanian – from junction of the borders of Lithuania, Belarus and Poland to the
middle point of the border; and Byelorussian – from the middle point of the border to the junction of the borders of Belarus, Lithuania and Latvia.

Heights data on existing topographic maps correspond to the seventies of the XX century, which is why digital elevation model for Byelorussian responsibility zone was created using stereoscopic data, and in Lithuanian zone – using height data from existing maps.

![DEM creation](image)

*Fig.2 DEM creation*

Orthophotoplans were created in map sheets system defined by IDC and corresponding to future demarcation map.

Sides exchanged orthophotoplans in digital form in *.TIFF format with *.TWF georeference file.

*Cartographic works*
Demarcation map was created by stereoscopic method and in accordance with requirements to digital maps in Belarus, with further field control. And in Lithuania recently created digital map was updated with field control afterwards.

Responsibility zones were changed for cartographic works: Byelorussian zone was defined from the border deep into the Byelorussian territory, and Lithuanian zone – from the border deep into the Lithuanian territory. Digital mapping was executed entirely within each zone, i.e. Byelorussian side created its map in its own responsibility zone, and so did Lithuanian side.

Exchange format was *.SHP.

Digital topographic map was created using stereo processing of the terrain.

Fig. 3 Stereo vectorization of terrain objects

All changes made after field control as well as sheets matching was executed in Panorama software.
Output format of digital demarcation map was *.SXF.
Maps included to the album were created using digital demarcation map according to the map symbols. Map symbols system was coordinated by the experts from both sides and approved by IDC. It is based on current map symbols of each state. Exchange format was *.EPS.