

## **A retrospective analysis and technological features of digital engineering mapping for municipal districts (on the example of municipalities in the Irkutsk region)**

*P. A. Fyodorov<sup>1</sup>\*, L. A. Plastinin<sup>1</sup>, S. F. Mazurov<sup>2</sup>, S. M. Kuznetsov<sup>1</sup>*

<sup>1</sup> Irkutsk National Research Technical University, Irkutsk, Russian Federation

<sup>2</sup> East Siberian Aerogeodetic Enterprise, Irkutsk, Russian Federation

\* e-mail: fpao2010@ya.ru

**Abstract.** The article considers retrospective, modern and prospective ideas about the types of data sources for engineering mapping with economic applications, examples of the selection of source materials and cartographic documents for creating economic engineering maps of various types, including the preparation of a unified electronic cartographic base, data of remote sensing of the Earth from space and aerial photography. The retrospective analysis of cartographic works differs from other research methods in that it compares the planned results with the achieved results, and also takes into account the existing experience in creating maps, which makes it possible to optimize and regulate the mapping technology in the future. The advantages of modern sources of spatial data, their relationship with each other and their content of thematic information for solving specific engineering problems of forestry, agriculture, land cadastre are reflected. Also indicators of optimal management of the municipal territories in the Irkutsk region and the study of natural and ecological complexes of all Baikal areas are noted. Based on the retrospective analysis the article reflects the method of choosing the scale of the created map and the selection of materials, corresponding to it, and considers the main combinations used for the synthesis of multispectral images for the purpose of engineering mapping.

**Keywords:** retrospective analysis, engineering mapping, classification of engineering maps, forestry map, agricultural map, remote sensing of the earth

### **REFERENCES**

1. Hoang Zion Huang. (2016). Development of Content and Making Technology for Electronic Agricultural Maps of North Vietnam Based on GIS and ERS. *Extended abstract of candidate's thesis*. Irkutsk: INRTU Publ., 148 p. [in Russian].
2. Fyodorov, P. A. (2020). The Use of Engineering & Economic Maps in the Quantitative and Qualitative Accounting of Forest Resources in the Southern Baikal Region. In *Sbornik materialov Mezhdunarodnoi nauch.-prakticheskoi konferentsii: Perspektivy razvitiia gorno-metallurgicheskoi otrassli (Igoshinskie chteniia – 2019) [Proceedings of International Science and Practical Conference: Mining & Metallurgical Industry Development (Igoshin Lectures – 2019)]* (pp. 108–113). Irkutsk: INRTU Publ., [in Russian].
3. Plastinin, L. A. [Map & Sci. Ed.]. (1997). Forestry Map of the Raw Material Base for Ust-Ilimsk Timber Industry (Map). Scale 1:200 000. Irkutsk: East Siberian Aerogeodetic Ent. Publ. [in Russian].
4. Plastinin, L. A. [Map & Sci. Ed.]. (1995). The Ekhirit-Bulagatsky District's Environmental Map (UOBAO of the Irkutsk Oblast) (Map). Scale 1:200 000. Irkutsk: East Siberian Aerogeodetic Ent. Publ. [in Russian].
5. Hoang Zion Huang, Plastinin, L. A., & Olzoev, B. N. (2016). Aggregate Digital Agricultural Mapping Methods for the Area of Vietnam Based on ERS from Space. *Vestnik SGUGiT [Vestnik SSUGT]*, 4(36), 100–113 [in Russian].
6. Kuznetsov, S. M., Klevtsov, E. V., Zaytsev, N. V., & et al. (2020). On the Cadastral Engineering Mapping's Issue of the Baikal Region Municipalities. In *Sbornik materialov Mezhdunarodnoi nauch.-prakticheskoi konferentsii: Perspektivy razvitiia gorno-metallurgicheskoi otrassli (Igoshinskie chteniia – 2019) [Proceedings of International Science and Practical Conference: Mining & Metallurgical Industry Development (Igoshin Lectures – 2019)]* (pp. 99–102). Irkutsk: INRTU Publ. [in Russian].
7. Plastinin, L. A. [Map & Sci. Ed.]. (2001). Forestry Map of the Irkutsk Oblast's Bratsk District (Map). Scale 1:200 000. Irkutsk: East Siberian Aerogeodetic Ent. Publ. [in Russian].
8. Plastinin, L. A., & Batuev, A. R. [Map & Sci. Ed.] (2003). Irkutsk Oblast's Irkutsk District's Environmental Map (Map). Scale 1:100 000. Irkutsk: East Siberian Aerogeodetic Ent. Publ. [in Russian].
9. Berlyant, A. M. (2014). *Kartografiia [Cartography]*. Moscow: ID KDU Publ., 464 p. [in Russian].
10. Classifier of Thematic Tasks for Natural Resources and the Environment Assessing Based on ERS Data (2008). (*Classifier*). Irkutsk: Baikal Center Publ., Ed. 7, 80 p. [in Russian].

11. Plastinin, L. A., & Stupin, V. P. (2018). *Kartografo-kosmicheskii monitoring zony vozdeistviia vodokhranilishch Angarskogo kaskada [Cartographic and Space Monitoring of Angara Cascade Reservoirs Impact Area]*. Irkutsk: INRTU Publ., 188 p. [in Russian].
12. Limonov, A. N., & Gavrilova, L. A. (2016). *Fotogrammetriia i distantsionnoe zondirovaniye [Photogrammetry and Remote Sensing]*. Moscow: Akademicheskiy Proekt Publ., 296 p. [in Russian].

#### **Author details**

*Pyotr A. Fyodorov* – Ph. D. Student.

*Leonid A. Plastinin* – D. Sc., Professor, Department of Mine Surveying and Geodesy.

*Sergey F. Mazurov* – General Director.

*Sergey M. Kuznetsov* – Ph. D. Student.

Received 18.01.2022

©*P. A. Fyodorov, L. A. Plastinin, S. F. Mazurov, S. M. Kuznetsov, 2022*