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NATIONAL REPORT OF THE PEOPLE'S REPUBLIC OF BULGARIA

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A b s t r a c t

This national report deals with the activities in the field of the work of the seven ISP commissions during the years 1976-1980. Before this period, as well as in the course of these years photogrammetry has been widely applied. Parallely with large-amount production, technological investigations in different fields were made. Particular attention was given to automated systems for data processing, aerotriangulation, orthophotoscopy, remote sensing and architectural photogrammetry.

I n t r o d u c t i o n

The development of photogrammetry in the People's Republic of Bulgaria in the period between the I3th and I4th Congresses of the International Society for Photogrammetry continues to make progress in applying photogrammetric methods in different fields of human activities. Alongside with photogrammetric production, relevant investigations of mainly methodical and technological character were made, without their being devoid of the respective theoretical character.

While photogrammetric production is concentrated in specialized state enterprises, or in such enterprises, which have another object of activity, but make use of photogrammetry for its specific needs, scientific investigations are being carried out in one research institute and several technical universities. However, Photogrammetry section at the Scientific and Technical Union for Geodesy is the one that unites and represents photogrammetric activities in this country.

National reporters for the seven ISP commissions during the period under review were the following section members:

Commission I - Nikola Hristov

Commission II - Pencho Zafirov, Deputy Chairman of Section

Commission III- Gencho Genov

Commission IV - Ivan Katzarsky, Deputy Chairman, responsible for ISP

Commission V - Slaveiko Gaitandjiev

Commission VI - Prof. Ivan Haidushky, Chairman of the Section

During this period four national scientific and technical conferences on topics, including photogrammetry were held. Particular attention was given to automated systems for data acquisition and data processing, aerotriangulation, orthophotography, remote sensing and architectural photogrammetry. These are also the tendencies for the future development of photogrammetry in Bulgaria.

C o m m i s s i o n I: Primary Data Acquisition

Periodical covering of the country's territory with aerial photographs at the scale of I:3000 to I:30 000 intended for different purposes continued in the years 1976-1980. Wide-angle (15/23 cm) and normal-angle (30/23 cm) cameras borne by Antonov AN-30 and AN-14 aircraft are most widely used.

Besides, for the purposes of natural resources investigations and environmental protection aerial photographs are taken at the scale of I:30 000 to I:100 000. Multizonal photographs have been made by means of a Zeiss-Jena MKF-6 multispectral camera, used for the establishment of test-areas for space pictures interpretation.

C o m m i s s i o n II: Instrumentation for Data Reduction

Automatic recording devices Izot 9II5 E controlling data recording on perfotapes or magnetic tapes are attached to the available Zeiss-Jena stereocomparators of Stecometer and Steco I8I8 type. Besides, automatic recording system Izot 9II5 E/EC 9002.02, or 9003, or EC 9II3 are attached to some analogue instruments, for example Zeiss-Jena Stereometrograph and Topocart. Data recording is done on magnetic tape or discets.

Up to 16 working places can be connected for simultaneous work by means of the EC 9003 with minicomputer, and in the EC 9113 there is a microcomputer system.

The differential rectification system is extended by using an automatic recording of real time data device, which provides the necessary information for automatic control of the process. Different kinds of digitizers are introduced for the creation of a digital model on the basis of graphic information sources, including orthophotoplans. For automatic drawing or engraving plotters are used, which operate independently.

The above mentioned peripheral and additional devices and systems to the photogrammetric instruments are developed and produced in Bulgaria.

C o m m i s s i o n III: Mathematical Analysis of Data

A Programme package for comprising and processing of graphic information received from different types of digitizers and photogrammetric instruments has been developed. The programs are intended for computers of the Unified System and the Bulgarian minicomputer Izot 310. Methods for creating of digital terrain model by means of analogue instruments and digitizers have been developed. The respective software is for Unified System computers.

Technical devices for establishing a data bank for the towns and the country's territory, as well as a project for building up a land information system have been elaborated.

Among other methods for photogrammetric densification of the geodetic network, a technology for analytical block aeri-triangulation is applied. The photograph coordinates measurements are carried out by Zeiss-Jena Stecometer stereocomparator and their registration is effected by means of the Bulgarian-made Izot 9115 E/EC 9002 recording system. Zeiss-Jena Transmark and Wild PUG-4 devices are used for marking the image points on the diapositives. Calculations are done by IBM-370 or Unified System computers. A package of three Fortran programs is in use. Block adjustment is performed by polynomial interpolation. Besides, a program for block bundle adjustment is being elaborated.

C o m m i s s i o n IV: Topographic and Cartographic Applications

The basic photogrammetric activities in this country continue to be the making and revision of topographic maps at the scales of I:2000, I:5000, I:10 000 and I:25 000, maps of populated areas at the scales of I:500 and I:1000, as well as maps at the scales of I:500 to I:10 000 for the specific needs of surveying and designing of different projects and structures.

The topographic map of Bulgaria at the scale of I:25 000 nowadays is being revised on the basis of aerial photographs at the scales of I:25 000 to I:30 000. Together with the making of the large-scale topographic map (I:5000 and I:10 000) its revision is done using aerial photographs at the scales of I:12 000 to I:30 000.

The making of urban maps at the scales of I:500 and I:1000 is done on the basis of aerial photographs at the scales of I:3000 to I:6000. Maps at the scale of I:500 to I:10 000 are being made to meet the special needs of surveying and designing of different projects and structures (mining and geological works, roads, railways and other projects, bridges, tunnels and other engineering structures, industrial zones, etc.). We must mention also the photogrammetric measurements of terrain profiles for the needs of automatic designing of motorways and the photogrammetric investigation of the existing road network. Besides, photomosaics at different scales for the needs of town-planning are being made. Photomaps and orthophotomaps at the scales of I:5000 and I:10 000 as a basis of the Unified Cadastre of the People's Republic of Bulgaria are created.

Investigations have been made for making and revision of small-scale maps on the basis of space photographs. They are being processed by means of analogue and analytical photogrammetry, rectification and orthophotoscopy.

C o m m i s s i o n V: Non-topographic Photogrammetry

Terrestrial photogrammetry continues to efficiently improve measuring processes in the field of some activities, such as coke-production, mining industry, civil-, transport- and hydroconstruction, architecture, archaeology, machine-

construction, medicine, forestry and criminology.

For the purposes of architecture stereoplotted plans and photoplans of streets and silhouettes, monumental buildings, as well as for interior decoration (icon-stands, profiles and arches for churches, details and reliefs, mural paintings, etc.) at the scale of 1:20 to 1:100 are made. Both aerial and terrestrial photogrammetry are applied in the making up of documents of archaeological projects, by working up stereoplotted plans at the scales of 1:100 to 1:1000.

Terrestrial photogrammetry is applied in industrial field when bulk material volume is determined. For hydroconstruction needs the areas for building up water behind dams are specified by digitalizing of contours and estimation of areas. Open-mines areas and earth mass bulks are measured.

In medicine and surgery methods for stereophotogrammetric photograph taking and documentation of pathological cases are elaborated. A polarization method for film-showing in lecture-rooms of stereoimages of characteristic surgical features and phases, as well as for space indication of different characteristic stages of surgical intervention and treatment.

C o m i s s i o n VI: Economic, Professional and Educational Aspects of Photogrammetry

During the period between the 13th and 14th Congresses of ISP a history of the development of photogrammetry in Bulgaria since the beginning of the century was written. For this purpose the available documents, articles, text-books and other printing material, cartographic documents and photographs were made use of. The memories of old surveyors were taken into consideration too. This document was sent to the Chairman of Commission VI of the International Society for Photogrammetry. A bibliography of photogrammetric publications and literature is compiled, which consists of about 600 titles. It is going to be printed soon.

The problem of special education has always been the centre of activities of Commission VI. Photogrammetry is studied in four technical universities and six technical

schools in Bulgaria. The matter of periodical updating of the curricula has always been a topical one.

C o m m i s s i o n VII: Interpretation of Data

Besides aerial photographs at relevant scales, multizonal scanning pictures, reproduced on magnetic tape are used for photointerpretation. Interpretation includes test-observations for determining the charactersitic features of respective projects.

Methods for revision of geographical and topographic maps in small-scale mainly on the basis of space pictures is being worked up.

C l o s i n g n o t e s

It must be noted that quick development of photogrammetry requires reconsideration of the matter concerning the objects and titles of the seven commissions of the International Society for Photogrammetry as they were specified at the Ottawa Congress in 1972. This suggestion could be put under question, but the setting up of a separate commission for remote sensing is beyond any doubt. The Scientific and Technical Union for Geodesy in Bulgaria calls the attention of the other members of the International Society for Photogrammetry on the above mentioned suggestion.