

**VACH, K.: Digital photogrammetry - a necessary part of the total help offered from survey enterprises.** In: XIXth ISPRS Congress. Amsterdam, 16-23 July 2000.

## **I. Our application**

EuroGV enterprise was founded in 1993. The Rolleimetric intersection photogrammetry and its practical application in surveying is our main field of activity since the very beginning. This resulted in close co-operation with Rollei Fototechnic Inc. We use Rollei 3003 and 6006 metrical cameras in our technologies as well as Rolleimetric SDW and MSR system of digital photogrammetry and CAP software for multiple photo adjustment. Atlas Digital Terrain Model serves to evaluation of digital terrain models and to work in upper layers. Rolleimetric - OrtoImage is applied to ortophoto production. AutoCAD and MicroStation serve to CAD.

Our work was focused to extensive photogrammetric applications in following directions:

### **a) Building industry, architecture:**

- Facade measurement - there are 20 -30 cases annually, mostly in Prague. To the most important jobs belongs measurement of Kounic Palace, Nostic Palace, Congress Centre in Prague, front row of buildings at the Old Town Square etc. Fig. 1 shows merging of an orthophoto with line drawing of measured facade of the Ministry of Justice in Prague.
- Photo survey and photogrammetric evaluation of interiors of complicated buildings in 3D, e.g. the church of St. Francis Xaverius at the village of Opařany and the church of Nativity of Our Lady in the town of Tábor. Our most important work was detailed survey of vaults in the St. Vitus Cathedral in the Castle of Prague (Fig. 2). Fig. 3 shows contoured plan of vaults of the Old Vestry. There were measured 2200 points on the vaults, dimensions: 8 by 16 meters, accuracy: 5 mm, number of photographs: 35, contour interval: 10 cm.
- Documentation of large building constructions in progress, e.g. photogrammetric survey and evaluation of northern and southern end of the Strahov tunnel in Prague and following 3D representation of the actual state, time-series-photo survey of Congress Centre construction in Prague with animated course of work.
- We are experienced also in smaller jobs as drawing in photographs, reconstructing non-metrical photographs etc.

### **b) Energetics, chemical and machine industry:**

Experience gain by co-operation with Siemens AG-KWU enterprise in photogrammetric survey and documentation of actual state of pipeline systems and technologies of nuclear plants, chemical and machine shops in 2D and 3D. We have surveyed shelf in Dukovany nuclear plant in 1993. Its dimensions were 70 by 20 by 8 meters, 750 photographs were oriented, 4 500 points measured. From the technical point of view the most demanding were orientations and adjustment of photos of Rohr Channel survey at the BIBLIS-B nuclear plant in the Federal Republic of Germany. Here 1 900 photos were adjusted and 11 000 points surveyed, while individual oriented series included up to 700 photos. Further projects on which we have participated are Würgassen Nuclear Plant, Krümmel Nuclear Plant, Calvert Cliffs Nuclear Plant (USA), Mochovce Nuclear Plant etc.

### **c) Geology**

Important work was done in aerial photo survey from low altitudes on the board of planes or helicopters to document actual state of not accessible rocky slopes along railroad line from Prague to Děčín (Czech Republic). We were surveying many other similar places e.g. Roudnice nad labem, Čertova Voda, Dolní Žleb, Mlčechvosty, Lítovice, Podbaba, Libčice, Sedlec, Dolany, Roztoky, Povrly, Kozí vrch, Nelahozeves etc.

### **d) Police**

We offer technologic support to the Police of the Czech Republic which operates the Rolleimetric system. We co-operate with police in Prague and in Liberec at documenting traffic incidents and criminal deeds.

### **e) Research and development**

Our experience in photogrammetric survey tends us toward technological development what are asked on our market as low altitude thematical photogrammetric survey [4], application of intersection photogrammetry to monitoring of movements and deformations, using of digital cameras to monitoring of spatial passage ability of railway lines for Czech Railways (viz. Fig. 4) [5], automated photogrammetric survey of slope volumes by tunnel raising, metrology of industrial measurements etc.

## **II. Methodology of photogrammetric systems applied for practical using [5]**

We try to find answers to following general criteria for photogrammetric system applicability for practical using during testing and reviewing:

- sorting of a system according to the classification of our firm,

- evaluating of system reliability and conclusive evidence of its applicability
- simplicity, work speed, reliability during field survey,
- requirements to geodetic support,
- software resistance against gross errors, their elimination,
- repeatability of results, elimination of personal errors during evaluation,
- demands on personell, applicability to individual jobs,
- accuracy of determined points and accuracy control during evaluation, accuracy planning,
- easy integration of photogrammetric data to CAD, DTM, statistic analyses,
- price, guarantees for system,
- results of testing.

## **Fig.1 – Fig.4**

### **REFERENCES**

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[5] VACH, K., HANZL, V.: Nahbereichs-Photogrammetrie zur Raumbestimmung von Hindernissen ausserhalb des Lichtraumprofils bei Eisenbahntrassen. [Near photogrammetry determines obstacles outside the free profile of railways] VR61/2, April 1999.

[6] VACH, K.:Současné aplikace vícesnímkové průsekové fotogrammetrie. [Application of multiphoto intersection photogrammetry] In: III. Mezinárodní česko-slovensko-polské geodetické dny, Hradec nad Moravicí, 1997,s.112-115.