

REPORT ON THE ACTIVITIES OF WORKING GROUP V/2, 1980 - 1988 (LOW ALTITUDE AERIAL PHOTOGRAMMETRY)

Landolf Maelshagen

Deutsches Bergbau-Museum
Am Bergbaumuseum 28, D-4630 Bochum
Federal Republic of Germany
Commission V

Introduction

With the threshold dates, namely the invention of the hot air balloon by the French brothers Montgolfier in the year 1783 and the invention of the Daguerreo-types by the French Niepce and Daguerre in the year 1839 the way in the aerial photography is basically laid down. In 1858 just twenty years after that the French medical doctor Tournachon, called NADAR, who is well known from contemporary caricatures, used a hot air balloon to shoot the first aerial images of the town Paris. It is to state additionally that in the course of the following century and beyond that time a demand for and a utilization of low altitude aerial photos and photogrammetry can be substantiated sporadically. The impetus of human beings to fly has created diversified and dazzling blossoms with regard to fashion and design of the flying objects during the development.

Fields of application and background

Low altitude aerial photography covers more different scale fields than terrestrial and aerial photogrammetry normally do. It can be regarded as a connecting link between the two domains and its field of activities can comprise the following points of emphasis as potential applications (without claim of completeness):

-- mapping, measurements:

- architecture and engineering,
- archaeology, preservation of monuments,
- town- and space-planning,
- geo-sciences,
- mining industry,
- mapping for land utilization,

-- surveillance, securing of evidence:

- pipelines,
- coastlines,
- industrial installations,
- infrastructure, traffic census,
- animal ethology, herd behaviour, livestock census,

-- determination of volume, surface analysis:

- gravel-pits,
- quarries,
- dumps, depots,

-- environmental protection:

- forestry, wood inventory,
- old and new charges,
- identification of pollution,
- protection of waters,
- measuring of erosion.

The whole field of low altitude photography got a strong stimulation when the fully automated middle format cameras were developed in 1979. Above all the Rollei system has to be named, which became a partial-metric camera after Wester-Ebbinghaus' suggestion to incorporate a Réseau platen. This camera has a radio release and is equipped with an automatical film transport as well as exposur timer. The three kilogrammes of weight can be carried by small flying objects.

Nearly at the same time, when this development became known, air photo- and flying-enthusiasts at different institutions started to construct flying objects and to use them:

- gas balloon (Lubowski et al. 1978/80),
- model airplane (Przybilla et al. 1979),
- photo-helicopter (Schlüter, Wester-Ebbinghaus 1980),
- hot air balloon (Heckes 1980),
- hot air ship (Busemeyer 1981).

The working group V/2 "Low altitude aerial photogrammetry" of ISPRS

Because of the increasing activities in that field, which were shown in some papers on the XIV. ISP-Congress at Hamburg in 1980 and by the exhibition of flying objects (model air plane, photo-helicopter, hot air ship), recommendations for resolutions were made by G. Kupfer/Bonn. The General Assembly of the Congress passed the following resolution T. V/2:

The Congress,

noting the increased availability of suitable camera platforms,

referring to several papers on the subject at the XIV. ISP- Congress and to relevant equipment exhibited in connection with that Congress, and

recognizing the growth of interest in the mapping of sites of limited area from photography taken from balloons, kites, model aircrafts and helicopters,

recommends that a working group be established to co-ordinate and develop activities in low altitude aerial photogrammetry.

Since the beginning the chairman of this working group is W. Wester-Ebbinghaus. The first meeting of the WG V/2 was held in 1982 during the Symposium of Commission V at York. In two sessions applications of different flying equipments, as kite, balloon, model aircraft and helicopter were demonstrated and questions of economy and navigation systems were discussed (see bibliography) as well as the methods for simultaneous bundle triangulation and calibration of terrestrial and aerial cameras. The CIPA (Comité International de Photogrammétrie Architecturale) is an associated group to the Commission V. In 1982 some lectures of members of WG V/2 have been held on the CIPA-Symposium at Siena.

A year before the ISPRS-Congress in 1984 at Rio de Janeiro a circular letter was sent to the interests designated to the working group. Despite for that the echo remained very little. Nearly the same group of participating institutions joint the two sessions of WG V/2 at the Rio-Congress, where practical inve-

stigations of the above mentioned flying objects, sport-plane and microlight-plane were shown. Gyro stabilized systems are in a test phase. As there is an increasing number of bundle triangulation programmes, which can be used simultaneously for all kinds of photos and focal lengths, which can include different additional parameters for improving the image geometry as well as the simultaneous treatment of geodetic and photogrammetric observations, low altitude aerial photography can be taken for applications, which acquire high accuracies, above all if the Réseau-information of a partial-metric camera has been pre-considered. At the business meeting the desire was declared to find more contacts to other working groups and to have more participants from other countries that are members of ISPRS, than only FR Germany, Great Britain and Japan and to spread widely all the experiences of the working group.

In March 1986 the chairman of WG V/2 welcomed more than 70 participants from four European countries (France, FR Germany, Netherlands, Spain) on a meeting at the German Mining Museum at Bochum. At one day 15 lectures were given. Flying systems, cameras and evaluation methods were described. The use of metric, partial-metric and non-metric cameras was shown for forestry, wave measuring, town-planning, preservation of monuments, archaeology and mapping pollution damages. On the second day flying equipment (including hot airship, model helicopter, model airplane, kite and microlight) were demonstrated in and around the mashine hall of the former Zollern II/IV coal mine at Dortmund. Besides that a poster session and an exhibition from 10 participants (showing equipment, aerial photographs, photogrammetric plots) took place. The proceedings from that meeting have been printed in 1987 and can be ordered from the German Mining Museum (Veröffentlichungen aus dem Deutschen Bergbau-Museum, Heft Nr. 41 / Proceedings ISPRS WG V/2(86)).

On the Symposium of Commission V at Ottawa in 1986 only one session of WG V/2 was held where applications for archaeology and surveying were shown. On the business meeting the future existence of the WG was discussed and it was considered to end the work after the Kyoto-Congress in 1988, if there are no further special investigations and developments.

Some members of the WG V/2 gave lectures on low altitude aerial photography at the "Seminar on historic resource photogrammetry" of ICOMOS Canada at Ottawa and at a Seminar of the Royal Aeronautical Society at London in 1986, and in 1987 on the "Seminar on small format aerial photography" at London and on the CIPA-Colloquy at Strasbourg.

Besides the lectures, papers and publications at the official ISPRS congresses, symposia and conferences there were a lot of activities concerned with low altitude aerial photogrammetry at other places. Unfortunately the authresses and authors did not follow the calls of WG V/2 and join its parties. The following periodicals from the last ten years and other booklets have been checked by the author for such papers. All in all these publications are summarized in the bibliography.

Revised periodicals:

- Aerial Archaeology (GB),
- Allgemeine Vermessung-Nachrichten (FRG),
- Archäologische Informationen (FRG),
- Bildmessung und Luftbildwesen (FRG),
- Bulletin de la Société Française de Photogrammétrie et Télédétection (F),
- Canadian Surveyor (CAN),
- Der Anschnitt (FRG),
- International Journal of Remote Sensing (USA),
- ITC-Journal (NL),

- Österreichische Zeitschrift für Vermessungswesen und Photogrammetrie (A),
- Photogrammetric Engineering and Remote Sensing (USA),
- Photogrammetric Record (GB).

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