

**Titel:/Title:/Titre:**

Technical procedures for definition of the best altitude and flight direction in mountainous areas.

**Autor(en)/Author(s)/Auteur(s):**

B. ASTORI - R. CHIABRANDO

**Zusammenfassung:/Abstract:/Sommaire:**

In the formation of flight programmes for aerial photography in mountainous areas for maps with scales of 1/5000 and 1/10.000 the calculation of the optimal altitude and flight direction is the result of a process which is often long and arduous. The aim of this publication is to present a programme of calculations which bearing in mind a series of technical and economic parameters allows the automatic definition of the best altitude and flight direction to resolve the problem.

**Titel:/Title:/Titre:** Experimental Results of Lens Calibration at Different Temperatures

**Autor(en)/Author(s)/Auteur(s):**

G.E. Bormann and E. Mathieu, Heerbrugg/SWITZERLAND

**Zusammenfassung:/Abstract:/Sommaire:**

Two types of RC 10 lenses were calibrated at temperatures between + 10°C and - 30°C under laboratory conditions and the characteristic data such as distortion, calibrated principal distance, centring criteria as well as resolution were established for each temperature level. The equipment used for these experiments, the lay-out of the tests and the results are discussed.

Titel:/Title:/Titre: Status and future of electro-optical mapping systems in space

Autor(en)/Author(s)/Auteur(s): Alden P. Colvocoresses

Zusammenfassung:/Abstract:/Sommaire:

The recent progress made in the control and determination of spacecraft position, attitude and stability greatly improve the prospects for a spaceborne digital mapping system. Today no such system exists but the technical problems have, in most part, been solved. Once the associated funding and political problems are resolved, we should see a satellite defined which will result in an operational automated mapping system by which any cloud-free area of the Earth can be mapped in a matter of days. Surely this concept warrants the serious attention of the international mapping community.

Titel:/Title:/Titre:

GEOMETRIC ANALYSIS OF RECONNAISSANCE FRAME PHOTOGRAPHY

Autor(en)/Author(s)/Auteur(s):

*Dr. Ismat M. ElHassan*

Zusammenfassung:/Abstract:/Sommaire:

*The wide availability of frame reconnaissance photography together with the advantage of the high image resolution that such photography provide and the extreme flight conditions under which they can be taken meant that they are of great interest to photogrammetrists. However, the geometry of the image is invariably distorted due to the camera mode of operation. In this paper the effects of the focal plane shutter and image Motion Compensation on the geometry of the photographs are explored in detail and the resulting model deformation is investigated.*

Titel:/Title:/Titre:

*THE ITC SURVEY FLIGHT SIMULATOR*

Autor(en)/Author(s)/Auteur(s):

*R.W. LORENZ , R.E. READ*

Zusammenfassung:/Abstract:/Sommaire:

*THE IN-FLIGHT TRAINING IS THE MOST IDEAL WAY OF TRAINING SURVEY FLIGHT NAVIGATORS. THIS TRAINING IS VERY EXPENSIVE. THE EXPENSES WILL EVEN HAVE A LARGE PROGRESSIVE RATE. ON-THE-GROUND TRAINING BY MEANS OF SIMULATORS BECOMES MORE ATTRACTIVE AND IMPORTANT.*

*THE MOST IMPORTANT PART OF THE ITC SURVEY FLIGHT SIMULATOR (SFS) IS THE VISUAL SURVEY NAVIGATION SIMULATOR (VSNS). THE ALSO VERY IMPORTANT AERIAL CAMERA OPERATION SIMULATOR (ACOS) AND THE FLIGHT SIMULATOR (FS) CAN BE USED AS SEPERATE UNITS AND CAN BE OPERATED INDEPENDENTLY.*

*ALL THREE TOGETHER FORM THE SURVEY FLIGHT SIMULATOR.*

*THE VSNS WAS STARTED IN 1972 AND IS NOW ALMOST COMPLETED AND IS DAILY IN USE AS WELL AS THE FS. THE PAPER DEALS WITH THE CONSTRUCTION, FUNCTION AND VARIABILITY OF THE VSNS AND DEALS WITH THE IDEA OF THE COMPLETE SFS.*

Titel:/Title:/Titre: The Electronic Vertical Goniometer (EVG),  
a New Instrument for Geometric Calibration of Aerial  
Camera Lenses

Autor(en)/Author(s)/Auteur(s):

E. Mathieu, Heerbrugg/SWITZERLAND

Zusammenfassung:/Abstract:/Sommaire:

The main features of this new laboratory instrument are:

- measurement of the lens with the optical axis in vertical position (as in actual use).
- angular measurements by means of a photo-electric sensor, rather than by visual observation. Therefore, geometric calibration can also be carried out in the near infra-red range of the spectrum.
- automation of the measurement procedures.

The characteristics of the system and first tests are described.

Titel:/Title:/Titre:

The Orbiter Camera Payload System and the Large Format Camera

Autor(en)/Author(s)/Auteur(s):

Bernard H. Mollberg

Zusammenfassung:/Abstract:/Sommaire:

The Orbiter Camera Payload System, the OCPS, is a photographic system which has been developed as a major payload for the Space Transportation System's Orbiter vehicle. The OCPS is carried into earth orbit in the cargo bay of the Orbiter vehicle for sortie missions of 3 or more days duration. The major component of the OCPS is the Large format Camera (LFC). The LFC is a photogrammetric camera which has an aspheric lens with a 30.5 cm. focal length. The image format is 22.9x45.7 cm. and is flown with the long dimension in the direction of flight, allowing selective applications of base to height ratios of 0.3 to 1.2 over the full ground track. The LFC has a maximum film capacity of 1,200 meters of thin base film of 21.4 cm. width. This will allow for the acquisition of 2,600 frames of photography on a typical sortie mission. The primary objectives of the OCPS are to support cartographic applications at the 1:50,000 scale and to augment the efforts of the geological explorationist in his search and investigation into the earth's non-renewable resources.

(Note: Submission of this paper was recommended by the Secretary-General of the ISP.)

Titel:/Title:/Titre: Analyse topographique contribuant aux opérations de sélection des émulsions photographiques destinées à être utilisées sur Spacelab.

Autor(en)/Author(s)/Auteur(s): P. Naudin

Zusammenfassung:/Abstract:/Sommaire:

Deux campagnes de prises de vues organisées par le DFVLR et l'IGN ont permis de tester 14 émulsions sur un même terrain en des conditions variables d'altitude, de focale, de filtrage et de hauteur du soleil.

Sur chacun des 73 vols exécutés, vingt cinq catégories de détails identiques intéressant principalement la cartographie ont été sélectionnées. Elles ont été notées au cours d'un examen stéréoscopique portant sur plusieurs éléments aussi représentatifs que possible, et la somme des points obtenus a permis un classement des émulsions dont on peut tirer quelques conclusions.

Titel./Title:/Titre: FACTORS DETERMINING AIR SURVEY QUALITY

Autor(en)/Author(s)/Auteur(s): Poletayev Yu.I., Yevdokimov Yu.V.,  
Tankus A.Yu.

Zusammenfassung:/Abstract:/Sommaire: Expediency of using air survey for compiling topographic maps and studying natural resources depends on quality, geometry and image characteristics of air photograph. Some factors determining photogrammetric quality of image have mathematical foundation and can be predicted. The others hypothetically predicted determine principally quality of photo images. The above mentioned factors and their influence on air survey quality are discussed.

Titel./Title:/Titre: UNDERWATER ACQUISITION SYSTEMS

Autor(en)/Author(s)/Auteur(s): Volker A. Seifert

Zusammenfassung:/Abstract:/Sommaire:

Underwater imaging systems vary in complexity from simple hand-held photographic cameras to sophisticated imaging systems employing both electro-optical and photographic cameras. Usage is greatly dependant on applications and the type of waters encountered. This paper will briefly outline systems as used today by amateur, professional and some military organizations. It will conclude with a forcast of future systems under development based on most recent technolcical advances.

**Titel:/Title:/Titre:** Recent developments in aerial and underwater time-lapse photographic systems for marine research at the Bedford Institute of Oceanography

**Autor(en)/Author(s)/Auteur(s):** C.T. Schafer, I. Larsen, J.R. Belanger, M. Chin-Yee, N. Fenerty, and D. Heffler

**Zusammenfassung:/Abstract:/Sommaire:** Many fields of marine science research rely, to a large extent, upon visual observations of natural features and the processes that form them. Results are often interpreted from remotely-sensed photographic products. Three photographic systems have been developed at the Bedford Institute of Oceanography in response to economic considerations, and to the particular scale and sampling frequency requirements of the Institute's scientific staff. The first of these consists of a 55 mm camera and mounting frame that is certified for use on a Jet Ranger helicopter. To date, this unit has been used to systematically survey marine sediment accumulation adjacent to man-made structures, to record the circulation pattern of local currents in a Nova Scotia bay, and to target geographic control points prior to a high altitude mapping program. The second system was built around a 35 mm deep sea camera and flash that was fitted with a programmable timer for time-lapse operation. This device was operated in conjunction with a current meter to study the nature of sediment movement at a depth of 2,800 m, below the axis of the Western Boundary Undercurrent off Newfoundland. The third system employs a super 8 mm camera and was also designed for underwater time-lapse photography applications. It can presently be used in water depths of up to 200 m. This unit incorporates various sensors that are coupled to a microprocessor, which can be programmed to photograph sedimentary processes under a defined set of physical conditions; sensor inputs presently include wave height, current speed and direction, or a specific rate of change of these parameters. The configuration and utilization of the three systems will be described.

**Titel:/Title:/Titre:** Neuere Untersuchungen für Europäische Erderkundungs-satelliten und Erdorientierte Spacelabmissionen

**Autor(en)/Author(s)/Auteur(s):** Dr. E.H. Velten, G. Rausch

**Zusammenfassung:/Abstract:/Sommaire:** Im Europäischen und Deutschen Erderkundungsprogramm werden derzeit detaillierte technische Untersuchungen und Definitionen aller wesentlichen Elemente durchgeführt. Das Hauptinteresse liegt dabei bei den folgenden Schwerpunkten:

- o Definition des Weltraumsegmentes mit automatischen Satelliten mit kombinierten Nutzlasten aus optischen und Mikrowelleninstrumenten für die Land- und Ozeanbeobachtung.
- o Untersuchungen zur Nutzung des Shuttle/Spacelabsystems als Trägerplattform für Sensorsysteme im Rahmen Erdorientierter Demonstrationsmissionen für die Erderkundung und Atmosphärenforschung.
- o Entwicklung von Nutzlastelementen wie das Mikrowellenfernerkundungsexperiment (MRSE) für die Erste Spacelabmission

Die Posterpräsentation wird zu diesen Schwerpunktsthemen die wesentlichsten Ergebnisse von Studien und Entwicklungen vorstellen, welche im Auftrag der ESA und des BMFI gewonnen wurden.

Titel:/Title:/Titre:

CONCEPTION DU SYSTEME SPOT : ADEQUATION DU SYSTEME AUX EXIGENCES DE LA MISSION.  
(SPOT : SYSTEME PROBABOINE D'OBSERVATION DE LA TERRE).

Autor(en)/Author(s)/Auteur(s): GILBERT WEILL - MICHEL COURTOIS

Zusammenfassung:/Abstract:/Sommaire:

L'objet du papier présente et de montrer comment ont été dérivés les choix instrumentaux et la conception du système Spot, ( caractéristiques, orbite, bandes spectrales, ... ) en fonction des exigences de la mission d'observation de la Terre dévolue à ce satellite, dont l'objectif peut se résumer dans l'acquisition de données de télédétection à haute résolution (10 et 20 m) permettant d'effectuer des cartographies au 1/100.000<sup>e</sup>, cet objectif est atteint à l'aide de deux instruments Push-Broom embarqué sur un satellite placé sur une orbite héliosynchrone à 822 km d'altitude.

ORIENTATION OF STEREO MODELS OBTAINED  
FROM AIRCRAFT EQUIPED WITH INERTIAL NAVIGATION SYSTEM.

R. Audi, A. Rodrigues, N. Pandeló (\*)

By use of aerial photography obtained with Zeiss R M K 15/23 and Wild R C 10 15/23 cameras and the Bandeirante EMB 110 aircraft equipped with Inertial Navigation Systems PICS - Photogrammetric Integrated Control Systems produced by Litton Aero Products, it had been developed a comparative study of time spent with the absolute and relative orientation of stereo instrument.

This study was based upon the utilization of angular values of camera attitude registered at negatives and chronometration of consumed time of orientation.

Each stereo model has been oriented twice by each operator, that means, one of them without knowledge of  $\zeta$ ,  $w$ , and  $\kappa$  values to be imposed on the equipment and the other with knowledge of those values. Thirteen different operators had been selected to this operation, four of them with more than 5 years of practice in the use of equipment, and the others nine operators with average of 3 years of practice.

The results, in the group of operators with high experience were less expressive. But, in the group of the less experience operators, the time of the orientation by the employment of the values, obtained through the inertial navigation system had achieved a reduction of 50% and even 75%.

(\*) Engineers of TerraFoto S. A. - São Paulo - Brazil