

REPORT ON THE ACTIVITIES OF ISPRS WORKING GROUP V-5
(BIOSTEREOMETRICS) DURING 1984-88

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ABSTRACT

This report is an overview of the activities of ISPRS Working Group V-5 (Biostereometrics) during the inter-congress period 1984-88.

INTRODUCTION

Working Group (WG) V-5 (Biostereometrics) was one of six working groups established in response to the Resolutions adopted at the XVth Congress of the International Society for Photogrammetry and Remote Sensing (ISPRS) in Rio de Janeiro in 1984. The President of Commission V (Dr V Kratky) subsequently appointed Mr I Newton (United Kingdom) and Prof R E Herron (USA) as co-chairmen, - one (Newton) with responsibility for the technical programme and the other (Herron) for providing inter-disciplinary links with other societies. The ISPRS Council endorsed this arrangement and a preliminary programme of work in March 1985. The WG superseded the Application Group B on Biostereometrics which existed during the 1980-84 period.

PROGRAMME

The function of the WG was aimed at developing appropriate equipment and techniques for biostereometric applications including the adaptation of existing equipment and methods and the introduction of new recording and measuring technology. Also important was interaction with other disciplines and societies in order to disseminate information. Consequently the following terms of reference were adopted:-

- Development of equipment and techniques in biostereometric applications.
- Extension of real-time operating systems into biostereometric applications.
- Investigation of data presentation requirements for medical applications.
- Broad interdisciplinary cooperation and participation in other societies' programmes.

One of the first tasks was to identify persons interested in joining the WG and a questionnaire was widely circulated for this purpose. The response was encouraging and around 45 people from 12 countries agreed to participate.

As for the format of the WG, it was agreed that this should take the form of a loose study group but with organised interaction where several people were found to be working on similar topics. The following topics were identified as falling into this category:-

- moiré methods and their application particularly in the detection of scoliosis.
- on-line operating systems for the measurement of shape.
- X-ray photogrammetry.
- applications of the Reflex type of instrument.

MEETINGS

Most of the business of the WG has been conducted by correspondence. The WG did, however, participate in the Commission V inter-congress symposium held in Ottawa, Canada in 1986 and a business meeting of those present also took place during this symposium. The WG has also been represented and taken an active part in a number of biostereometrics meetings organised by other societies and groups.

Commission V inter-congress symposium, Ottawa, Canada, June 1986

Around 20 WG members attended this symposium and two of the technical sessions were allocated to biostereometrics. There was also a contribution to a joint session with WG V-3. In all 16 papers were submitted and 13 of these were presented and discussed:

Session 1 - Data Acquisition and Analysis Chairman: I Newton (UK)

P.J. Scott and C.J. Wonnacott (UK): An analytical plotter attachment for the Reflex Microscope.

- T.Y. Shih and W. Faig (Canada): An economical approach to measuring anthropological shapes by photogrammetry.
- A.R. Turner-Smith and J.D. Harris (UK): Measurement and analysis of human back surface shape.
- E.A. Baj and G. Bozzolato (Italy): On-line restitution in biostereometrics using one photograph and a metric projector.

Session 2 - Applications

Chairman: R.E. Herron (USA)

- C.J.K. Bulstrode and P.J. Scott (UK): A comparison of stereophotogrammetry with conventional techniques used to measure healing in chronic leg ulcers.
- L.P. Adams and M. Klein (South Africa): Biostereometric methods for the study of body surface motions during breathing.
- J. Peipe and W. Wester-Ebbinghaus (F.R. Germany): Zur anwendung der Teil-Messkammer - Technik in der Keiferorthopadie.
- T. Takamoto and B. Schwartz (USA): Three-dimensional mapping of retinal vessels in ophthalmology.
- F. Mesqui, F. Kaeser and P. Fischer (Switzerland): On-line three-dimensional light spot tracker and its application to clinical dentistry.

Joint session with WG V/3 - Unconventional photogrammetry in medical applications

Chairman: V. Kratky (Canada)

- S.K. Ghosh and M. Boulianne (Canada): La ligne - flottante - principe et applications.
- X. Ding and J.R. Pekelsky (Canada): The ordering of ordinary moiré fringes by photometric analysis.
- G. Robertson (Canada): New photogrammetric instrumentation for use in medical applications.
- Y. Yamashita, S. Yamakawa and N. Suzuki (Japan): Shape measurement of three-dimensional objects using image sensors and scanning lasers.

Biostereometrics '85, Cannes, France, December 1985

This four day meeting was one of 18 short conferences forming the 2nd International Technical Symposium on Optical and Electro-optical Applied Science and Engineering organised jointly by the Association Nationale de la Recherche Technique (ANRT) and the International Society for Optical Engineering (SPIE). As for the previous Biostereometrics meetings, the

coordinators were Prof A.M. Coblentz (France) and Prof R.E. Herron (USA). ISPRS WG V-5 was one of the cooperating sponsors of this meeting as part of its effort to combine forces with other international societies and promote the use of photogrammetry.

Fifteen members of the WG participated in this meeting and formed a significant group in the total attendance of just 60. The programme included 56 papers which covered a wide range of topics such as data acquisition, data analysis, clinical applications, three-dimensional anatomy and three-dimensional reconstruction and modelling.

Other meetings

Members of WG V-5 took an active part in the following other meetings during this period:-

- **Fourth International Symposium on Surface Topography and Spinal Deformity, Mont. Ste. Marie, Canada, September 1986.**

This symposium, sponsored jointly by the National Research Council (NRC) of Canada and the University of Ottawa, was organised by J.R. Pekelsky (Canada).

- **International Conference on Gait Analysis and Medical Photogrammetry, Oxford, England, April 1987.**

This conference, the first day of which was devoted to a meeting of the UK Medical Photogrammetry Group, was organised by Dr A.R. Turner-Smith (United Kingdom).

PREPARATION FOR THE 1988 CONGRESS

At the time of writing this report, the WG programme for the 16th ISPRS Congress in Kyoto is being planned. One of the nine Commission V technical sessions has been allocated to WG V-5 and this session will accommodate one Invited Paper and four Presented Papers. The Commission President has accepted our recommendation and asked Prof Y Yamashita (Japan) to prepare the Invited Paper on 'Biostereometrics in Japan'. The four Presented Papers will be selected from the submitted abstracts of proposed papers (7 so far). Additional time will be available for poster presentations.

OVERVIEW OF ACHIEVEMENTS

It is clear from papers presented at meetings, from interaction with other societies and from discussions that biostereometrics has continued to expand during the past four years. Much of this growth has been prompted by the introduction of more powerful data acquisition systems, often far removed from conventional photogrammetric systems, which in turn have created a demand for more sophisticated methods of data analysis. The increasing use of accurate, real time, three-

dimensional measurement systems has also been evident. Allied to this there has been a commensurate growth in the number of applications.

During this reporting period, the achievements of WG V-5 can be summarised as follows:-

- It obviously took some time to re-establish the WG but once established the WG has played an active role in the development of biostereometrics during the past four years. However it has been difficult to coordinate the technical activities of the group and there has not been the interaction between those working in similar areas that was hoped for. Nevertheless many members have been creative in introducing new equipment and methods for biostereometric applications.
- The plan to interact with other disciplines and societies in order to make them more aware of photogrammetry and to disseminate our expertise has been a success. Members of the WG have responded well to the encouragement given to take part in meetings organised by other groups both at an international and national level. Only through this interaction between the developers of equipment and methods and the potential users will the outcome be fully productive.

The continuing growth of biostereometrics in the future seems assured. Its widening scope however is resulting in a splintering of interests into small groups which each generate their own meetings. This WG is one of these groups largely composed of photogrammetrists concerned in the development of equipment and methods for biostereometric applications. It is questionable whether the WG should continue and the future of biostereometrics might be better served by ISPRS increasing its involvement in the organisation of regular international meetings on biostereometrics. In this way all groups would be brought together and a dialogue could be maintained between the developers and the users. This is seen as essential to the continued healthy development of the subject.

ACKNOWLEDGEMENT

We wish to express our appreciation and thanks to all members of WG V-5 for their valuable contribution, their active participation and their friendly cooperation during the past four years.