REOPRT ON ACTIVITIES OF COMMISSION I

—PRIMARY DATA ACQUISITION—

14th International Congress of
The International Scoiety for Photogrammetry

Hamburg

July, 1980

Dr. Iwao Nakajima, President of Commission I
Dr. Shunji Murai, Secretary of Commission I

1. General Reoprt on Activities from July 1976 to July 1980

The chairmen of the working groups and active members who were so much interested in Commission I contributed to this general report by sending information in their conserning fields of each working group and their own country, for which we extend our heartful gratitude.

As the last Congress of Helsinki in July, 1976 the Commission I resolutions were approved for guiding the Comm. I activities between 1976 and 1980.

Depending on the subjects of the resoulutions those following working groups have been established.

1. Working Group I/1 Image Quality Including OTF/MTF
   Chairman : Dr. Roy Welch
2. Working Group I/2 Image Geometry with Camera Calibration
   Chairman : Dr. Hartmut Ziemann
3. Working Group I/3 Image Properties with Environmental Facters
   Chairman : Mrs. Clarice L. Norton
4. Working Group I/4 Sensor Orientation and Navigation
   Chairman : Ir.F.L.J.H. Corten
5. Working Group I/5 Data Acquisition and Image Processing in Remote Sensing
   Chairman : Dr. W.A. Fischer
   (Replaced by Dr. Robert McEwen in March, 1980)
6. Working Group I/6 Underwater Photogrammetry
   Chairman : Mr. G.T. McNeil

The developing techniques such as holography, lider system and etc. should be promoted for future session. But the more systematic research collaboration with traditional metric camera and electro-optical sensors must be promoted with bigger priority in this period.

The general policy of the commission activities was based on the

contributions of those working groups under the above chairmen and active members.

The interim Comm. I Symposium on Data Acquisition and Improvement of Image Quality and Image Geometry was held from May 20 to 31, 1978 in Tokyo, in the presence of Dr. F.J. Doyle and Prof. G. Konecny,Council members of ISP.

The reports and contributed papers were published at the Congress and were mailed to the related organizations later on.

A proposed plan of the Comm. I program for Hamburg Congress in 1980 was maild on the 3rd, March, 1980 to the chairmen of working groups, proposed speakers, and Congress Director.

The following is the program of Interim Tokyo Symposium of Comm. I.

Day	Time	Subject	Chairman, Speakers
Monday May 29,	9:30 - 10:45	Opening Session	Doyle Nakajima Konecny
	10:50 - 12:30	Session 1 : Camera Five Papers	Ziemann Appointed Speakers
	13:45 - 14:50	Session 2 : Film Three Papers	Norton Appointed Speakers
	15:10 - 17:00	Session 3 : Remote Sensing & Remote Sensor Three Papers	Konecny Appointed Speakers
Tuesday May 30,	9:30 - 12:00	Report by WG-3 "Image Properties with Environmental Factors" Seven Papers	Norton Appointed Speakers
	13:30 - 15:20	Report by WG-1 "Image Quality" Six Papers	Welch Appointed Speakers
	15:40 - 17:30	Report by WG-2 including Chairman's Report "Image Geometry with Camera Calibration" Two Papers	Ziemann Appointed Speakers
Wednesday May 31,	9:30 - 12:00	Report by WG-5 "Data Acquisition and Image Processing in Remote Sensing" Five Papers	Fischer Appointed Speakers
	13:00 - 14:50	Report by WG-4 "Sensor Orientation and Navigation"	Lorenz
	15:00 - 16:30	Panel Discussion "Activity of Comm. I until 1980" Experts: Konecny, Nakajima, Welch, Ziemann, Norton, Lorenz, Fischer	Doyle
	16:30 - 16:50	Closing Session	

Program of Comm. I in Hamburg Congress (As of April 22, 1980)

Day	Time	Subject	Chairman, Speakers
Tuesday July 15,	9:00 - 9:20	Report on Activities of Comm. I	Nakajima
	9:20 - 9:45	Report of WG-1 "Image Quality"	Welch
	9:45 - 11:30	Related Papers	Appointed Speagers
Wedeseday July 16,	16:00 - 16:20	Activities of WG-2 "Image Geometry"	Ziemann
	16:20 - 17:30	Related Papers	Appointed Speakers
Thursday July 17,	16:00 - 16:20	Report by WG-3 "Image Quality with Environmental Factors"	Norton
	16:20 - 17:30	Related Papers	Appointed Speakers
Friday July 18,	11:00 - 11:20	"Sensor Orientation and Navigation"	To be determined
	11:20 - 12:30	Related Papers	Appointed Speakers
	19:00 - 20:00	Panel "Image Quality and Image Geometry-Future Prospect 1980-1984"	Welch
Monday July 21,	16:00 - 16.20	Review of Space Sensing 1976-1980	McEwen
	16:20 - 17:05	Related Papers	Appointed Speakers
	17:05 - 17:30	Panel :Future Prospect and International Cooporation in Space Sensing"	Doyle
Tuseday July 22,	16:00 - 16:20	Report on Activities of WG-3	McNeil
	16:20 - 17:00	Related Papers	Appointed Speakers
	17:00 - 17:30	Informal Discussion	McNeil

2. Activities of Commission I Between 1976 and 1980

Image Quality (Working Group I/1)

The techniques to measure the MTF of aerial camera and its use for application were discussed as a main topic of WG-1 in Tokyo Symposium.

R. Welch evaluated the techniques to measure the MTF of camera lenses in different countries and showed the comparisons between those results.

J.C. Trinder reported the results on measurability and interpretability of photogrammetric details and proposed parameters for descriving the MTF curve and granularity effects.

H. Tiziani discussed how best to use MTF measurement for the application of the optical system by "Image Quality Criteria for Aerial Survey Lenses".

A. Bode, B. Bissman, K. Murata also discussed the use of MTF measurement for photogrammetric camera.

Those will be followed by further research works untill Hamburg Congress adn reviewed by R. Welch as WG-1 report. Another paper is prepared on "Quality Analysis Method for Spacelab Mission Selection" by an international working group of IGN, DFVLR and others for the evaluation of the obatined 14 different aerial films and the metric camera experiments for the first Spacelab mission.

W.M. Strome prepared a paper on evaluation for some difinitions of spatial resolution for electro-optical sensors. ISP is requested to give the difinition of "Effective Radiometric Resolution Elements(ERRE)" by the United Nations.

This problem should be treated in a joint intercommission as its further work.

Y. Chiba presented a paper on "Two instruments for the photometer charactaristic measurement of survey camera". This paper is aimed for the exposure distribution measurement using 15 silicon photocells over the focal plane and for the colored glare spot measurement appearing in the center of the picture. The paper made it claer that cosine low may not be adequate for super wide angle camera to correct vignetting effect.

P.D. Carman reported effectes of ambient conditions on film sensitivity, both before and after exposure, which were introduced by the practical experiences.

J. Sievers reported the investigation of diffuse density of the different aerial films.

Y. Yasuda presented a report on "Image quality and preservation of color photographs" and recommended the environmental conditions of low humidity and low temporature for long term preservation.

Image Geometry with Camera Calibration (Working Group I/2)

H. Ziemann gave a report on the research work on determination of lens distortion for two cameras using different instrumentation. This program involved the comparative study between eleven institutions and organizations. This work has been continued and a report is prepared on "The Activities of the WG-2 between 1972-1980" in Hamburg Congress. This will be also discussed in a panel.

G. Wurz presented a paper on the lense development for metric camera of VEB Carl Zeiss Jena, and calibration techniques using a bank of 17 collimators.

G. Kupfer reported a paper on "Partial Field Calibration of Two Reseau System over the Rheidt Test Area" and concluded that the partial field calibration is recommended as a tool for advanced photogrammetry.

T. Hirai will present a paper on "Total System of Evaluating Aerial Survey Camera of G.S.I. Japan",in which some experimental results were shown to develope the assessment of an aerial camera property.

Image Quality with Environmental Factors (Working Group I/3)

At Tokyo Symposium, C. Norton presented the interim report of this working group concerning cartographic camera and clarified the basic element and condition for further research. Active efforts have been paid continously untill the present to analyse the effects of environmental factors. That will be presented in "Report of WG-3" in Hamburg Congress.

P.D. Carman reported on vibration test of air-borne camera at Tokyo Symposium by using flashlight at night flight with camera shutter open. Also he showed the measurement results of the modern survey cameras over the last few years. These will be discussed in the paper on "Vibration Characteristics of Aerial Camera Mount" at Hamburg Congress.

H.R. Meier reported on "The Effects of Environmental Conditions on Distortion, Calibrated Focal Length and Focus of Aerial Camera" at Tokyo Symposium, and estimated the impacts under the 3 typical environmental conditions, using camera window with various test conditions.

F.J. Worton presented a paper on "The Environment of the Air-borne Metric Camera" based on well established test results which was published in the Photogrammetric Record 1977.

J. Hakkarainen also presented some flight test results and showed similiar temperature distortion pattern for air-borne camera as Worton. Advanced test results are reported in his paper "On the Influence of Some Flight Factors on Image Qualtiy" in Hamburg.

As the advanced steps of this working field, G.E. Bormann and E. Mathieu also present a paper on "Experimental Results of Lense Calibration at Different Temperatures" in Hamburg.

G.A. Wood will report "Environmental Design Considerations for the NASA Large Format Camera". Expected environmental conditions, the potential impact of environmental facotrs upon resolution performance and geometrical stability, and the design feature employed to minimize the environmental degradations for high altitude aircraft programs will be discussed.

Sensor Orientation and Navigation (Working Group I/4)

R. Lorenz presented a report on three significant aspects of the state in present survey navigation at Tokyo Symposium. That is, (1) usefulness of the LANDSAT imagery for the basis of contact navigation for samll-scale photography, (2) the effective use of pocket caluculators and mini-computers for the survey navigation problems, and (3) the availability of the advanced self-contained precision navigation equipment.

Also he discussed the dopper navigation system development and its error function.

T. Oka, K. Yazawa, and T. Inagaki will report "A Simple Method for Correcting Geometric Distortion of Air-borne Multispectral Data" which deals with correction for in-flight-image by means of the newly developed program of numerical simulation.

Although the Working Group I/4 was considered as one of active groups,

there has not been any international activity in this field, during 1976-1980.

Others Related WG-I/1, I/2 and I/3

L. Scott prepared a report on "Specification for Vertical Air Photography" at Hamburg Congress, which was approved by Royal Institute of Chartered Surveyors and British Air Survey Association.

F.J. Worton prepared a report on the "Activities and Progress in Primary Data Acquisition 1976-1980 in the United Kingdom". This report was made by questionnaire-surveys in the United Kingdom in this period concerning activities of the Comm. I.

K.J. Rosenbach published a report on "Considerations Regarding Image Geometry and Image Quality" in Photogrammetria Vol. 33 No. 5, 1977 and discussed the importance of OTF measurement for the image quality evaluation. Some OTF values and field curvatures of old and newer lenses are demostrated.

H. Ziemann reported "Visual Calibration of Reseau Cameras" in Photogrammetria Vol. 34 No. 5, 1978 and introduced a collinearity model applicable to cameras with glass reseau. Standard calibration procedures by using goriometer were propossed for aerial camera. The lens distotion is derived from a comparison of reasau point locations and a three-dimensiaonl object bundle given by goriometer readings provided by two manufactures.

W. Tayman published a report on "Analytical Multicollimator Camera Calibration" in Photogrammetria Vol. 34 1978.

From the results of calibration with multicollimator in the U.S. Geological Survey the calibrated focal length, the point of synmetry, the radial distotion referred to the point of synmetry, and asynmetric charactaristics of the camera lens, were determined. Copies of the standard USGS calibration were included.

Data Acquisition and Image Processing in Remote Sensing (Working Group I/5)

At Tokyo Symposium, M. Hirai presented a paper on Earth Observation Satellite Project in Japan. "MOS and LOS Project" will be presented in Hamburg, by the representative of National Aeronautics and Space Development Agency in Japan.

J. Plevin reported the review of present and future plans of the E.S.A., and also his works to identify and quantify user requirements, for metric Camera and microwave facility experiment on Spaceblab at Tokyo Symposium. "Resent Investigation on Eruopean Remote Sensing Satellite and Earth Oriented Spacelab Missions" will be presented by E. Velten and G. Ranch at Hamburg Congress.

F.J. Doyle reviewed the development of large format camera for space shuttle mission and its advanced abilities at Tokyo Symposium. "Review of Space Sensing 1976-1980" will be presented by R. McEwen in Hamburg.

The following papers were presented in this field at Tokyo Symposium.

S. Tanaka reported his research on the "Perspective drawing made from LANDSAT Data".

H. Koshiishi reported the Conceptural Design of Electronic Self Scanning Radiometer for MOS.

W.A. Fischer gaved a summary on "Remote Sensing Program and Near Future Plan", the problems concerning the digital data covering large section of the earth surface and questions of the map projection to be used.

Under Water Photogrammetry (Working Group I/6)

The activities of this working field was encouraged very much by G.T. McNeil with intense information excahge between active members of the working group during 1976-1980. A report on "Underwater Photography Goals" will be presented in Hamburg.

L.E. Merten presents a paper on "In water photogrammetry" summarizes the various degradation introduced by the water path, and shows various methods of predicting imaging system performance.

V.A. Seifert presents a report on "Underwater Acquisition System" including the systems as used today by amateur, professional and some military organizations.

3. Proposals

F.J. Doyle, Seretary General suggested that a joint resolution should be adopted by Comm. I, VII and perhaps IV, at Hamburg Congress. Last year the ISP was called upon to "Evaluate Some Difinitions of Spatial Resolution for Electro-optical Sensors" for which W.M. Strome submitted a report to the United Nations. A joint working group on this problem, should be established by the representatives of Comm. I, IV and Comm.VII during 1980-1984 period.

F.J. Worton pointed that even all working groups in Commission I were engaged in optical problems in the metric camera except WG-I/4, though there should be investigations on problems related to "Film and Film Processing". There was a strong support for this proposal by F.J. Doyle at Tokyo Sympsium. He suggested to include this idea in resolutions for 1980-1984.

G.T. McNeil proposed a resolution in his report on underwater photography goals for international acceptance of "The Index of Refraction of Seawater by Austin and Halikas" for underwater camera calibration and other primary data acquisition.

4. Board of Comm. I, ISP

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