FIRST UNITED NATIONS REGIONAL CARTOGRAPHIC CONFERENCE FOR THE AMERICAS

Panama, 8-19 March 1976

Vol. I.–Report of the Conference

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NOTE

Symbols of United Nations documents are composed of capital letters combined with figures. Mention of such a symbol indicates a reference to a United Nations document.

The proceedings of the First United Nations Regional Cartographic Conference for the Americas, held at Panama from 8 to 19 March 1976, are being issued in two volumes, as follows:

Volume I. Report of the Conference

Volume II. Technical papers

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I. ORGANIZATION OF THE CONFERENCE

Opening and duration of the Conference

1. The First United Nations Regional Cartographic Conference for the Americas took place at Panama from 8 to 19 March 1976, at the invitation of the Government of Panama, which provided facilities for the Conference. The Conference was held in accordance with resolution 1839 (LVI) adopted by the Economic and Social Council on 15 May 1974.

Attendance

2. The Conference was attended by 151 delegates and observers from 38 countries, two specialized agencies, three intergovernmental organizations, four international scientific organizations and representatives of the United Nations Development Programme (UNDP).

Opening ceremony

3. The opening ceremony was presided over by Mr. Néstor Tomás Guerra, Minister of Public Works, acting on behalf of Mr. Gerardo González, Vice-President of Panama and representative of the Executive Organ. Mr. Julio Mock C., Chairman of the Co-ordinating Committee and Director of the Instituto Geográfico Nacional "Tommy Guardia" welcomed the participants. Mr. Chris N. Christopher, Executive Secretary of the Conference, opened the proceedings on behalf of the Secretary-General of the United Nations.

Adoption of the rules of procedure

4. The Conference unanimously adopted its rules of procedure (E/CONF.67/2 and Corr.1 and 2).

Agenda

5. The Conference at its opening meeting, adopted the following agenda:

1. Adoption of the rules of procedure
2. Election of officers
3. Adoption of the agenda
4. Report on credentials
5. Establishment of technical committees
6. Review of cartographic activities in the Americas

7. Review of techniques and recent developments in basic mapping:

   (a) Geodesy and ground control

   (b) Topographic mapping and photogrammetry

   (c) Cadastral surveying and mapping (including urban mapping)

   (d) Hydrographic surveying and charting

8. Conventional and satellite remote-sensing methods and techniques (including aerial photography)

9. Small-scale mapping:

   (a) International Map of the World on the Millionth Scale (IMW)

   (b) Aeronautical charts

   (c) Other international map series

10. Preparation and reproduction of maps and other questions related to map compilation; geographical names, automation, etc.

11. Thematic cartography

   (a) Photo-interpretation

   (b) Atlases

12. Practical applications of cartographic techniques to:

   (a) Location and development of mineral resources

   (b) Regional land-use surveys

   (c) Forest development and management

   (d) Agricultural planning and development

   (e) Assessment and use of water resources

   (f) Civil engineering projects

   (g) Land settlement and land tenure

13. Technical assistance (including training)

14. Adoption of the report of the Conference

Technical Committees

6. The Conference established four technical committees and allocated agenda items to them as shown below:

Committee I	Item 7
Committee II	Items 9 and 11
Committee III	Items 8 and 12
Committee IV	Item 10

Items 1 to 6 and items 13 and 14 were considered at plenary meetings.

Election of officers

7. The Conference elected the following officers:

President:	Julio Mock C. (Panama)
Vice-President:	Adolfo Romero (Venezuela)
Rapporteur:	Héctor Alonso Espinosa (Mexico)

8. The Conference elected the following officers for the technical committees:

Committee I

Chairman:	Miguel Alves de Lima (Brazil)
Vice-Chairman:	César Aníbal Real Robayo (Ecuador)
Rapporteur:	Roberto López Meyer (El Salvador)

Committee II

Chairman:	Ernesto J. Tacchi (Argentina)
Vice-Chairman:	Cristián Alvarez Sgolia (Chile)
Rapporteur:	Colonel Hilario García (Uruguay)

Committee III

Chairman:	Alden P. Colvocoresses (United States of America)
Vice-Chairman:	Horace A. King (Barbados)
Rapporteur:	J. M. Zarzycki (Canada)

Committee IV

Chairman:	Fernando Lanza Sandoval (Honduras)
Vice-Chairman:	Ydelis R. Velásquez G. (Cuba)
Rapporteur:	Consuelo Tempone (Panama)

9. Mr. Chris N. Christopher, United Nations Secretariat, served as Executive Secretary of the Conference.

Report on credentials

10. The Credentials Committee of the Conference having examined the credentials and found that all representatives were duly accredited, the list of participants was approved.

Vote of thanks

11. At its closing meeting, the Conference adopted by acclamation a vote of thanks to the Government of Panama for the excellent arrangements provided for the organization of the Conference and for the kind hospitality extended to the participants.

II. SUMMARY OF PROCEEDINGS OF THE PLENARY MEETINGS

Items 1-6

12. The Conference considered agenda items 1-6 in plenary session. Under item 6 (Review of cartographic activities in the Americas), seven papers were reviewed. Since the occasion was the first cartographic conference for the Americas, the countries of the region were requested to summarize briefly their experience in surveying and mapping. Other delegations outlined their past and present national progress in cartography.

Technical assistance (including training) (item 13)

13. Under agenda item 13 the Conference considered and discussed in plenary session seven papers on bilateral technical assistance and the training of personnel. These papers were submitted by France, the German Democratic Republic, the Federal Republic of Germany, Mexico, the Union of Soviet Socialist Republics and the United Kingdom of Great Britain and Northern Ireland. A statement was made on behalf of the Resident Representative of the United Nations Development Programme (UNDP) in Panama, which briefly outlined the technical assistance programme of UNDP. The Secretariat introduced three information papers on the subject.

14. At the final plenary meeting, the Conference adopted resolution 1, in which it recommended that the Second United Nations Regional Cartographic Conference for the Americas should be held not later than 1979 and expressed its appreciation to the Government of Mexico for its offer to act as host country. (For the text of the resolution, see chap. VII below.)

III. REVIEW OF TECHNIQUES AND RECENT DEVELOPMENTS IN BASIC MAPPING: WORK OF COMMITTEE I

15. The Committee considered agenda item 7 (Review of techniques and recent developments in basic mapping: (a) Geodesy and ground control; (b) Topographic mapping and photogrammetry; (c) Cadastral surveying and mapping (including urban mapping); and (d) Hydrographic surveying and charting). Nineteen papers were directed to this agenda item and six draft resolutions were submitted to the Conference and subsequently adopted as resolutions 2 to 7 (see chap. VII below).

Geodesy and ground control

16. In its paper entitled "The future of satellite geodesy in mapping, charting and geodesy (M, C and G) applications" (E/CONF.67/L.2), the United States of America gave an account of the geodetic operations currently being carried out by the Defense Mapping Agency (DMA) using the Doppler satellite receiver. As the Navy Navigation Satellite System (NNSS) and its supporting tracking equipment was programmed to operate until the mid 1980s, DMA would continue to use the supporting Tracking Network (TRANET) until a total operational capability was attained by the NAVSTAR Global Positioning System in about 1985. The Committee subsequently considered various aspects of the Doppler system, and the representative of Norway proposed a vote of thanks to the United States for the excellent document it had submitted and the research it was carrying out in that field.

17. In the paper entitled "Geodesy by Doppler satellite" (E/CONF.67/L.8), submitted by France, an analysis was given of Doppler systems on board TRANSIT satellites, as developed over the past 15 years, and their potential for obtaining geodetic nets which ensure the stability, homogeneity and ease of use of the information obtained. The paper also reviewed the practical advantages of the system and its uses in the Institut géographique national of France. Replying to questions from the representatives of Chile and the Libyan Arab Republic concerning wider dissemination and publication of the experience gained, the representative of France said that work was currently in progress on improving calculations, that the results would be published and that the system combined the advantages of the Doppler method and simultaneous measurements of distances.

18. The Federal Republic of Germany, in a paper entitled "Geodesy and ground control - the importance of gravity in the establishment and maintenance of vertical-control networks" (E/CONF.67/L.51), gave a clear explanation of the relationship between levelling and gravity and its importance in the establishment and maintenance of precise vertical-control networks serving as a base for cartographic surveys and regional height studies - a major problem in geodynamic research. The Chairman of the Committee subsequently invited delegations to discuss the paper. The representative of Brazil asked whether any work had been done on heights obtained using georeceivers, since, in Brazil, heights obtained from Doppler observations differed by up to 4 metres for long lines in a given direction from results obtained using conventional systems. The representative of the Federal Republic of Germany explained that perhaps that was due to the fact that they were

obtained by two different height systems and that, in any event, geoid heights should be taken into account. The representative of the Pan-American Institute of Geography and History (PAIGH) proposed that a committee or working group should be formed to study horizontal and vertical displacements caused by the recent tectonic movement in Guatemala. The representatives of Argentina and the Federal Republic of Germany supported the submission of a draft resolution to the Conference calling upon the International Gravimetry Committee of the International Association of Geodesy to form the working group proposed by the representative of PAIGH.

Topographic mapping and photogrammetry

19. In a paper entitled "The National Mapping Program of the United States of America" (E/CONF.67/L.1), the United States gave an account of advances in topographic mapping, mapping activities directed towards the production of standard general-purpose topographic maps and the new National Mapping Program, the main purpose of which is to make available basic cartographic data in a form compatible with modern computer-based administration systems. The main change is in the method of collecting the data and in the form of the final product, the system being a digitized process. The paper also dealt with other important aspects of studies conducted by the National Cartographic Information Center in the fields of orthophotography, topographic maps and cartographic data. Replying to a question on the scale of 1:24,000 used by the United States for topographic mapping, the United States representative explained that the first maps were produced under the pressure of national highway programmes, but the impending change to the metric system was having its effect and the new series would be published using that system. There was an exchange of views on the estimated period between the initiation of a cartographic project and its final printing, and it was established that in practice an estimated time of from three and a half to four years was needed.

20. France submitted a paper entitled "Digital photogrammetry and automated mapping: application to large scales" (E/CONF.67/L.14), in which a concise description was given of a programme in progress since 1974 at the Institut géographique national, which was designed to perfect a processing line for the digital data provided by photogrammetric plotters on work carried out at scales of from 1:1,000 to 1:10,000, with the object of producing 200 sheets at those scales at a cost of less than 20 francs per hectare, with an anticipated time of 5-10 days between the end of the photogrammetric operation and the preparation of a complete sheet.

21. In its paper entitled "Recent developments in photomapping at the Directorate of Overseas Surveys" (E/CONF.67/L.19 and Add.1), the United Kingdom described the new system used in photomapping. The main difference between that and the earlier system was that three half-tone negatives of different densities were produced and the combination of those at the printing stage resulted in an improved product, using only four printing plates. The products were cheap, could be produced rapidly and were used in overseas countries where no other types of cartographic products were available.

22. In the paper "Development of photogrammetry in the Comisión de Estudios del Territorio Nacional (CETENAL)" (E/CONF.67/L.28 and Add.1), Mexico provided a summary of the work carried out and advances made by CETENAL in the fields of

aerial photography, geodesy, aerotriangulation, topographic maps, photomaps, geographical data bank, instrumentation and the training of personnel. A variety of opinions was expressed, and there was an exchange of views on the training and recruitment of personnel. It was noted that CETENAL was an example of an institution which, within its short years of existence, had achieved a high level of technology and production; the Committee also decided to recommend that maps should be made available to users without restriction, as had been done in Mexico.

23. Panama submitted a paper entitled "Aerial photography in Panama" (E/CONF.67/L.29), in which it described the applications of aerial photography in national development planning and programme implementation activities carried out by Panamanian agencies.

24. The Scientific Committee on Antarctic Research (SCAR) submitted a paper entitled "Scientific Committee on Antarctic Research (SCAR): Working Group on Geodesy and Cartography: Information report" (E/CONF.67/L.33), in which it described the activities carried out by the Working Group, introduced with the comment that those activities were also described in the general report by the United States.

25. Two papers submitted by the German Democratic Republic, "Digicart - universal system of large-scale mapping" (E/CONF.67/L.36) and "Efficient photogrammetric instrumentation - a must for economic map production: modern surveying methods and instrumentation employed for map-making in the German Democratic Republic; orthophotography - the most economical method of making small-scale topographic maps" (E/CONF.67/L.38), were discussed together; the representative of the German Democratic Republic explained that his country's Geodesy Service had developed a system of processing surveying and cartographic information, called Digicart, which permitted the economic preparation of accurate large-scale maps by means of digital data-processing; the advantages and applications of the system were discussed. It was reported that the photogrammetric and cartographic offices of the German Democratic Republic used a great variety of instrumentation of high quality and productivity, which enabled a high degree of efficiency to be achieved in the preparation of orthophotos on the 1:50,000 and 1:100,000 scales by means of the Topocart-Orthophot device produced by VEB Carl Zeiss-Jena. The speaker answered a number of questions concerning the altimetric accuracy of the "drop-lines" systems of the Topocart-Orthophot equipment and its advantages with regard to orthophotography in developing countries.

26. The paper entitled "Large-scale and medium-scale maps in Poland" (E/CONF.67/L.44) summarized all the types of maps and scales handled by the Head Office of the Institute of Geodesy and Cartography of Poland.

Cadastral surveying and mapping (including urban mapping)

27. The United Kingdom, in a paper entitled "An economical approach to large-scale mapping at the Directorate of Overseas Surveys" (E/CONF.67/L.17), explained how that institution produced stable base positives from which dye-line copies could be made, thus reducing the number of photographic processes and their costs. The representative of the United Kingdom explained that the system was applicable to large-scale (1:2,500) urban mapping derived from aerial photographs on the 1:10,000 scale.

28. The information given in the paper entitled "The rural cadastral survey and political divisions - one of Mexico's needs" (E/CONF.67/L.30 and Add.1) was amplified by the representative of Mexico, who said that a pilot plan had begun in the State of Aguascalientes, which would be completed within a year, and that rural cadastral surveys would be made on the bases of orthophotos on the 1:5,000 and 1:10,000 scales, on which property boundaries would be marked; the speaker added that in Mexico urban cadastral surveys were carried out on the 1:500 scale but that it was feasible to make them on the 1:1,000 scale if suitable processing was employed.

29. A paper entitled "Task, state and future development of the Escuela de Topografía y Catastro (ETC) in Costa Rica" (E/CONF.67/L.49), submitted by the Federal Republic of Germany, described the objectives, curricula, operation, financing, fellowship plans and admission procedures of ETC, which had been affiliated to the National University of Heredia, in Costa Rica, for the past two years under a technical assistance agreement between the Federal Republic of Germany and the countries of Central America and Panama. The representative of the Federal Republic of Germany outlined plans to enlarge the school and referred to the possibility of admitting students from countries outside the Central American area and to the admission requirements of the school.

30. In its paper entitled "Status of cadastre in the Arab Republic of Egypt" (E/CONF.67/L.55), Egypt described current and future cadastral survey activities in that country; in the paper the United Nations was requested to promote the exchange of technicians, training and the supply of funds for those surveys.

31. In a paper entitled "Methods of data acquisition for the establishment of a multipurpose land registration system in urban and rural areas, with special emphasis on photogrammetry" (E/CONF.67/L.63), the Federal Republic of Germany analysed the need for and availability of maps and their bearing on national economic development at various levels and by types of economy; the paper included tables and commentaries with regard to the production time and cost of different systems and the development of new techniques applicable to developing countries.

Hydrographic surveying and charting

32. The United Kingdom submitted a paper entitled "The potential for international hydrographic co-operation in Central and South America" (E/CONF.67/L.21), in which it explained the role of hydrography in economic development, the current and future status of the Caribbean areas traditionally charted by the United Kingdom: it was suggested that each country should review its surveys and make them compatible with the new 200-mile maritime limit that would probably be approved by the United Nations Conference on the Law of the Sea. The document pointed out that the prospects for international co-operation in the production of hydrographic research and charts were encouraging and that the exchange of hydrographic information essential for bringing up to date and correcting navigational charts used by shipping should be promoted. The representative of the United States congratulated the delegation on its work and explained the HARSAP programme which the Oceanographic Office of the United Nations was carrying out in co-operation with a number of Latin American countries. In reply to the representative of Norway, the representative of the United Kingdom explained that aircraft-mounted laser systems were being tested which might accelerate the process of hydrographic surveying.

33. The International Hydrographic Organization (IHO) submitted a paper entitled "Progress towards a co-ordinated world-wide navigational warning system" (E/CONF.67/L.54), in which it described the work that had been carried out since 1973 by the Intergovernmental Maritime Consultative Organization (IMCO) and IHO with a view to establishing an international radio warning system for shipping; co-ordinators for the majority of the geographical areas have already been established. In conclusion, the representative of IHO recommended that a resolution should be adopted to the effect that hydrography should not be neglected at cartographic conferences and that there should be greater participation by hydrographers.

IV. SMALL-SCALE MAPPING AND THEMATIC CARTOGRAPHY: WORK OF COMMITTEE II

34. The Committee considered agenda item 9 (Small-scale mapping: (a) International Map of the World on the Millionth Scale (IMW): (b) Aeronautical charts; (c) Other international map series) and agenda item 11 (Thematic cartography: (a) Photo-interpretation; (b) Atlases). Eight papers were directed to item 9 and three to item 11; five draft resolutions were submitted to the Conference which were subsequently adopted as resolutions 8 to 12 (see chap. VII below).

Small-scale mapping

35. In a paper submitted by France entitled "French cartography in the Americas" (E/CONF.67/L.7), it was stated that, until the Second World War, the mapping of the French departments and territories in the Americas had been somewhat neglected. Apart from nautical charts for the islands, all very old, there had only been partial or incomplete cadastral or military surveys and poor quality general maps compiled in Paris at the Ministry for the Colonies. Since 1945, the functions of the Institut géographique national had been extended to those countries, methods had greatly improved, and modern surveys had been conducted systematically. The islands, which were small but densely populated, had been given the same basic mapping as the metropolitan country. However, French Guiana, a hilly and wooded country in which travelling was extremely difficult, was less fortunate and was still not completely covered by reliable maps. In addition, the Institut was preparing and publishing a number of small-scale general maps which extended far beyond the national territory. The maps were compiled from a wide variety of documentation, particularly those published by the official authorities of the States concerned. Two of the most important of those publications covered the American continent: the Map of the Continents on the 1:5,000,000 Scale and the General Map of the World on the 1:10,000,000 Scale (at the Equator).

36. Reporting on the results of geoscientific surveys of the Institute of Geosciences and Natural Resources in Latin American countries (E/CONF.67/L.45), the Federal Republic of Germany presented a comprehensive outline of the work that had been successfully carried out in the field of geoscience mapping in the Latin American countries by the Institute of Geosciences and Natural Resources of the Federal Republic of Germany.

37. In a report entitled "Aspects of education, communication and techniques in the field of thematic cartography" (E/CONF.67/L.47), the Federal Republic of Germany stated that in the past cartographers had confined themselves mainly to portraying parts of the earth's surface or facts concerning their relationships, with a view to producing practical data and reproducing them clearly in cartographic form. About 15 years earlier cartographers had started to see maps increasingly as a means of communication between the makers and the users of maps and charts. The chief need was for a basic vocabulary of graphics in order to ensure legible cartographic representation. Unified education, communication and techniques in cartography would open the way for better map design and map

production. In that connexion, a short summary of some background information might show the necessity for a bridge between theory and communication in cartography in order to have a comprehensive understanding in the future. National points of view and different languages were the barriers that must be overcome if there was to be one day only one definition, one scientific programme, one goal: optimal dissemination of information levels by maps and charts. Questions of editing, generalization, representation, and revision, instruction and research arose daily, including the tasks of the future: mapping techniques, automation, environmental research and space cartography. Those growing domains constituted the focal point in the theory of cartography: for example, in planning, in the basic geographical and geological sciences, on which all planning was founded, in economic and transport regionalization, and in many other related fields. Particular mention was made of Professor Komkov, of Moscow, who had expressed, as early as 1955, his thoughts about the "relationships between cartography, geodesy, topography, and geography in the present state of these sciences" from the geodetic-topographic point of view. The same problem, seen from the equally necessary geographic viewpoint, was treated by Professor Armberger, of Vienna, in his 1970 paper "Cartography as a science and its relations to geography and geodesy". In addition, the International Cartographic Association (ICA) had developed certain terms of communication since its Fifth Technical Conference, held at Stresa in 1970. For example, it was possible to use the theoretical base from a modified mathematical aspect of 1949, in so far as problems of generalization were concerned, for all studies and presentations of cartography, both in general and specifically. A study of the sources revealed what was needed in cartography in the late 1970s: the compilation of far more topical maps, far more than could be imagined at the moment. According to United Nations statistics, by the year 2000 maps would be needed in a quantity that would exceed all current official budgets. How arduous such an expansion of tasks would become could be seen from a look at the depressing United Nations survey of the status of world cartography 1/ and volume XII of the International Yearbook of Cartography, 1972. 2/ To make it clearer: only with the aid of good and freely available large-scale or medium-scale topographic maps of all countries was it possible to create useful topical maps and map series. That implied three main requirements. First, attention should be directed to problems of aerial photography, interpretation, the techniques of orthophotography, interpretation of satellite photos, and automation for geographical and geological operations. Secondly, the geographer and other geoscientists should feel compelled to follow more intensively than before technical progress in cartography, mathematical fundamentals and technical production, including the problems of the analysis of factors, the techniques of grid plans and similar fundamental domains of modern organization and representation of labour. Good thematic maps were the main basis for all planning work if countries were to be developed for the good of mankind. All the useful techniques just mentioned were urgently needed as supplements to cartography, but thirdly, traditions must be observed, current stages noted and important relationships maintained and, above all, it must be realized that aspects of communication in cartography included the demand for changes in certain stages of the educational process.

1/ World Cartography, Volume XIV (United Nations publication, Sales No. E.76.I.XIII).

2/ Bonn, Kirschbaum Verlag, 1972.

Aeronautical charts

38. In the paper entitled "A modern World Aeronautical Chart concept: VFR radio navigation chart" (E/CONF.67/L.3), submitted by the United States of America, a number of the main characteristics of the new chart were listed and it was stated that the National Ocean Survey was optimistic that the chart would receive full acceptance from the aviation community and would ultimately replace the World Aeronautical Chart (WAC). That opinion had been substantiated by the enthusiastic comments of users when the first experimental chart had been issued in September 1974. A second prototype of the new chart had been produced, incorporating the results of an evaluation received from the first prototype. The chart would be given wider distribution by the National Ocean Survey and Federal Aviation Administration prior to final acceptance as an operational product.

39. In a paper describing the United States Department of Defense Flight Information Publication (FLIP) Program (E/CONF.67/L.4) the United States of America stated that the purpose of the Program was to provide timely and accurate flight information for official United States aviation to ensure flying safety. The publications, which were available generally, were dependent upon the co-operation and data contributions from the many national aviation authorities. The FLIP Program, based on the concept of three phases of flight, namely flight planning, en route operations and terminal operations, included a planning document, en route charts and Terminal Instrument Approach procedures. In effect the set of charts and documents contained a compendium of information required for planning and executing a flight. The exchange of flight information data and the preparation of those publications were in accordance with the over-all policies of the International Civil Aviation Organization (ICAO), which recognized that flying safety throughout the free-flying areas of the world was the responsibility of each nation and the culmination of the combined efforts of all nations.

Other international map series

40. In its paper entitled "The map: sheets of the World Map 1:2,500,000 of South America" (E/CONF.67/L.35), the German Democratic Republic stated that during the period from 1963 to 1970, the Geodetic Service of the German Democratic Republic produced the first edition of the 26 map sheets of the world map at 1:2,500,000 of South America. Those map sheets were part of a major map series for the entire earth. The map series was produced by the Geodetic Services of Bulgaria, Czechoslovakia, the German Democratic Republic, Hungary, Poland, Romania and the USSR. The preparation of this first edition was completed in 1975. The map sheets of North and Central America were produced by the Geodetic Service of Hungary. Work on the production of the world map series is continuing.

41. The USSR submitted a paper on Soviet cartographers' participation in the compilation of great international cartographic works (E/CONF.67/L.42), in which it stated that the world map on the 1:2,500,000 scale was a geographical map depicting the total surface of the globe. In accordance with its scale, the map represented physical and political conditions on the Earth's structure. The world map on the 1:2,500,000 scale was produced on 234 sheets numbered with Arabic numerals.

Thematic cartography

42. The representative of Panama noted that the report on census cartography submitted by Panama (E/CONF.67/L.60) described his country's experience in that area and the procedures followed by the Department of Statistics and Census in the preparation of special maps for the specific purposes of censuses and surveys. Special emphasis was given to the achievements resulting from the cartographic plan that had been implemented in connexion with the most recent programme of national censuses (1970). Panama's cartographic material had been widely used by governmental and private agencies in carrying out their research and projects - a good indication of the importance attached to census cartography in the country. Cartography, as the physical basis for national censuses, had first become a specialized activity in 1949, with the organization of the Fifth National Census of Population and Housing. For the 1960 censuses far more topographic maps and aerial photographs had been available, and these, together with new techniques and equipment, had resulted in the preparation of more detailed maps embodying a greater volume of data. The census maps of 1970 incorporated the experience of the two previous decades, which had enabled certain amendments to be made to the maps with a view to better presentation and ease of interpretation and identification.

Atlases

43. In the paper entitled "Atlas of Martinique" (E/CONF.67/L.11), submitted by France, it was reported that the Institut géographique national had begun the preparation and printing of a series of atlases of the French overseas departments based on sketches made by the Centre d'études de géographie tropicale of the Centre national de la recherche scientifique. The atlas of Martinique, currently in preparation, was the second of the series and was expected to be published in 1976; the atlas of Réunion had already been published. It was composed of 37 map sheets on the standard themes of all publications of the national atlas type: maps of the physical environment (oro-hydrography, geology, geomorphology, pedology, climatology, vegetation), demographic maps (ethnic composition, geographical distribution and density per square kilometre, socio-occupational structure, migration, housing, types of habitat), economic maps (land occupation, land-ownership structure, agricultural equipment, special crops - sugar cane, banana and secondary - fishing, traffic and transport, energy, commerce, industry) and maps of the cultural situation (schools, health and tourist facilities, banks, religious and administrative buildings, postal services and telecommunications). The maps were accompanied by explanatory notes covering about 100 pages of texts, graphs, and simple monochrome maps, which together represented a substantial body of geographical and statistical data collected and processed by numerous specialists in the department concerned.

44. The USSR, in its paper entitled "Atlas of the World's Oceans: a new cartographic work devoted to the nature of the world's oceans" (E/CONF.67/L.39), stated that the new Atlas had been prepared by the Soviet Navy and that the first volume, published in 1975, was devoted to the Pacific. The Atlas showed the physical characteristics of the water up to depths of 5,000 metres and also covered the atmosphere to a height of 16-18 kilometres. The first volume of the Atlas began with a section entitled "History of ocean exploration", which contained charts of geographical discoveries of coasts and islands of the Pacific and charts of the most important oceanographic expeditions in the Pacific from

the seventeenth century until recent times. The second section of the Atlas was concerned with the bottom of the Pacific. It covered the following topics: bottom relief, earthquakes and volcanoes, tectonics, geomorphology, types of coasts and bottom sediments. The section entitled "Climate" investigated the heat balance of the ocean, the air temperature and water régime of the atmosphere and atmospheric circulation. The charts gave detailed characteristics of heat-balance components, air temperature, heat exchange between ocean and atmosphere, wind, precipitation, visibility, cloud and other climatic features. The charts showed both mean and extreme values of climatic features, and their recurrence and variation. The section entitled "Hydrology" described in detail the temperature, salinity and density of the Pacific waters and sound velocity in water. All the information was presented by season and month. It was obtained by processing the world series of hydrological observations carried out mainly during the period 1925-1972. The Atlas contained tidal charts constructed, for the first time in the world, not only for the narrow coastal zone, as had previously been customary, but also for the open ocean. Waves, water-mixing processes and water circulation at depths of 100, 200 and 500 metres were thoroughly characterized. In the section entitled "Biogeography" quantitative characteristics were given for the first time of such complex biological elements as primary production and biomoss of zooplankton and of bottom fauna. The Atlas introduced an innovation in the form of a chart of bottom trophic areas, reflecting connexions between the development of bottom fauna and conditions of its habitat. Much attention was given to distribution of fish, especially commercial species, and other kinds of oceanic fauna, including whales, pinnipeds and seabirds. The first volume of the Atlas concluded with an index containing about 10,000 geographical names and terms.

45. In its paper on Soviet cartographers' participation in the compilation of great international cartographic works (E/CONF.67/L.42), also reviewed under item 9 (c) (see para. 41 above), the USSR gave a thorough description of the geological-geophysical Atlas of the Indian Ocean that had been assigned to the USSR by the decisions of the United Nations Educational, Scientific and Cultural Organization (UNESCO) in 1975. The Atlas was an important scientific cartographic work and had been highly appreciated in the USSR and abroad. It was based on the material acquired from the International Indian Ocean Expedition (1959-1965). The following countries had made contributions to and co-operated in the production of the Atlas: the USSR, the United Kingdom, the United States of America, the Federal Republic of Germany and South Africa. The Atlas incorporated data on ocean-floor relief, magnetic anomalies, gravity field, water temperature, seismic activity etc. The geological-geophysical Atlas of the Indian Ocean was the first experiment in compiling an atlas for a large region of the world ocean on the basis of international co-operation.

V. CONVENTIONAL AND SATELLITE REMOTE-SENSING METHODS AND TECHNIQUES AND PRACTICAL APPLICATIONS OF CARTOGRAPHIC TECHNIQUES: WORK OF COMMITTEE III

46. The Committee considered agenda item 8 (Conventional and satellite remote-sensing methods and techniques (including aerial photography)), and agenda item 12 (Practical applications of cartographic techniques to: (a) Location and development of mineral resources; (b) Regional land-use surveys; (c) Forest development and management; (d) Agricultural planning and development; (e) Assessment and use of water resources; (f) Civil engineering projects; (g) Land settlement and land tenure). Five papers were directed to item 8 and 10 to item 12; the Committee held two general meetings at which the papers were introduced and discussed. A working group on remote sensing was formed and submitted four draft resolutions to the Conference, which were subsequently adopted as resolutions 13 to 16 (see chap. VII below).

Conventional and satellite remote-sensing methods and techniques

47. In the papers "Remote sensing at the Institut géographique national, France" (E/CONF.67/L.9) and "The Earth Resources Technology Satellite No. 1 (ERTS-1) - applications in conventional mapping at 1:1,000,000 and 1:500,000" (E/CONF.67/L.10), France summarized its activities in the field of remote sensing and gave examples of practical application of ERTS imagery.

48. In the paper entitled "New frontiers in cartographic science" (E/CONF.67/L.18), the United States of America provided a comprehensive review of the current status of and future developments in remote-sensing techniques and methods and their application to cartography. The paper pointed out that spacecraft were already providing image data for mapping the earth at scales smaller than 1:250,000. Digital processing of imagery showed potential for rapid cartographic compilation and revision. It was becoming possible to conceive of a system in which cartographic image or line data would be shown digitally, updated almost automatically whenever new imagery became available, and printed out on demand as a completely correct and current map at the desired scale. Despite the elegance of digital processing, however, the final map still had to be painstakingly compiled by skilled cartographers. The paper concluded, moreover, that manned multipurpose spacecraft were an ineffective means of acquiring the systematic image coverage required for cartographic applications. Dedicated long-life spacecraft in near-polar orbits were essential.

49. In the discussions the representatives of Canada outlined the application of LANDSAT 3/ imagery to the updating of maps at scales 1:250,000 and 1:50,000 in remote areas, the positioning of islands in the Arctic and the preparation of LANDSAT mosaics of Canada at scales of 1:500,000, 1:2,500,000 and 1:1,000,000.

3/ The National Aeronautics and Space Agency of the United States of America changed the name of ERTS to LANDSAT in 1975.

They underlined the importance of satellite imagery to cartography in poorly or inadequately mapped areas and expressed the need for further improvements, particularly in the spatial resolution and geometric fidelity of the electro-optical system. They expressed the desire for a system that would provide stereoscopic capability of adequate resolution on stable medium, such as film, in order to meet urgent demands for topographic mapping. It was also pointed out that training courses and seminars on remote sensing and its application to cartography should be encouraged and that technical assistance should be provided in the area of practical application of remote sensing to specific projects in developing countries.

50. Chile, in its paper entitled "Conventional and satellite remote-sensing methods and techniques (including aerial photography)" (E/CONF.67/L.23), outlined procedures employed and major studies conducted at the Instituto Geográfico Militar and the Instituto de Investigación de Recursos Naturales - Corporación de Fomento de la Producción (IREN-CORFO). It underlined the importance of this new technology in providing data for the planning of developing projects.

51. The Federal Republic of Germany, in its paper "Remote sensing for regional and environmental planning" (E/CONF.67/L.52), outlined research in the use of aerial photography and remote surveying techniques to provide basic data for regional planning.

Practical applications of cartographic techniques

52. France in the paper "Interpretation of dry-farming crops in tropical regions" (E/CONF.67/L.12), cited a project in the Department of Dosso in the Niger as an example of the production of land-use maps of tropical regions and providing statistical data from the interpretation of aerial photographs.

53. Mexico submitted five papers: "Summary of work carried out in locating and prospecting minerals using the information of the Comisión de Estudios del Territorio Nacional (CETENAL)" (E/CONF.67/L.25 and Add.1 and 2), "Information provided by the Comisión de Estudios del Territorio Nacional (CETENAL) on zoning for agriculture and forestry to ensure better natural resources planning and development" (E/CONF.67/L.26 and Add.1 and 2), "Applications to civil engineering projects: data of the Comisión de Estudios del Territorio Nacional (CETENAL) in the planning, design and construction of weirs and dams" (E/CONF.67/L.27 and Add.1 and 2), "Information from the Comisión de Estudios del Territorio Nacional (CETENAL) concerning roads and electric transmission lines" (E/CONF.67/L.31 and Add.1 and 2), and "Cartographic information in national development planning" (E/CONF.67/L.32 and Add.1 and 2). The papers described the geographical surveys of natural resources, both renewable and non-renewable, carried out by CETENAL, topographic mapping, human resources, information on infrastructure and other data pertinent to regional and national planning. The information produced was being systematically stored in a computer memory to form a geographical data bank. The papers gave examples of the practical application of these data to mineral prospecting, agriculture, forestry and civil engineering projects.

54. The USSR, in its paper entitled "Main trends and methods in the exploration of the earth's natural resources" (E/CONF.67/L.43), provided a comprehensive review of remote sensing from space, as employed in the USSR as a method of resource exploration. Employing a multitude of sensors, homogeneous information on vast

territories could be obtained. In response to questions, the Soviet representative stated that film recovered from satellites was employed in his country's remote-sensing programme in preference to electro-optical imagery.

55. The paper entitled "Results of geoscientific surveys of the Institute of Geosciences and Natural Resources in Latin American countries" (E/CONF.67/L.45), submitted by the Federal Republic of Germany, described the work carried out by that Institute in Latin America.

56. In the paper entitled "Atlas zur Raumentwicklung: a new thematic atlas - a contribution towards the solution of regional planning problems" (E/CONF.67/L.53 and Add.1), submitted by the Federal Republic of Germany, the application of thematic atlases to planning was given particular importance.

57. The final paper submitted by the Federal Republic of Germany, which was entitled "Data-processing methods in remote sensing and present application possibilities" (E/CONF.67/L.62), discussed sensor parameters, platform mapping requirements, thematic requirements and data processing in remote sensing.

VI. PREPARATION AND REPRODUCTION OF MAPS AND OTHER FUNCTIONS RELATED TO MAP COMPILATION: WORK OF COMMITTEE IV

58. The Committee considered agenda item 10 (Preparation and reproduction of maps and other functions related to map compilation). Nine papers were directed to the item and two resolutions on automation and geographical names were submitted to the Conference, which were subsequently adopted as resolutions 17 and 18 (see chap. VII below).

Automation

59. The Committee considered a number of documents concerning the automation of mapping by the use of various programmable instruments, used in conjunction with computer programmes.

60. The United States of America submitted, under the title "The trend towards automated mapping instrumentation" (E/CONF.67/L.5), a review of the automation of various phases of the mapping process in the United States. Automated operations ranged from aerial photography, using twin cameras with focal lengths of 22.5 to 25 centimetres, high resolving power and the capacity to attain accurate side-lap and forward-lap along extremely long parallel flight lines, which were mounted on aircraft using an inertial guidance system, to the type-setting and reproduction stage, using several type-setting machines with direct on-line connexion to a computer, and the production of large-format negatives and plates from digital raster-data tapes and analog signals from companion raster scanners. There was a trend towards the automation of all phases of the mapping process and production was increasing very fast.

61. Two papers entitled "Production promotion by automation in cartography" (E/CONF.67/48) and "New technical equipment in map reproduction" (E/CONF.67/50) were submitted by the Federal Republic of Germany. In the first of those papers it was demonstrated that computer-aided processes enabled the production time for an individual map section to be reduced to 78 per cent of that required for the conventional procedure, and that the time taken was reduced to 61 per cent if the preparation of two map sections was combined, the increase in cost being 20 per cent in both cases. Multiple application of the data base would probably lead to a reduction in costs.

62. The second paper gave an account of the progress achieved during the last decade in the reproduction operation, especially with regard to the preparation of material from film and printing plates. Three electronically controlled processing devices had been introduced for reproduction photography: (1) a blueprint exposing and developing device; (2) a film processor; and (3) a direct screen colour separation device. The paper stated that, thanks to the introduction of such electronically controlled devices, reproduction techniques at the Institute of Applied Geodesy had taken a major step forward towards rationalization and at the same time had resulted in improved quality.

63. Speaking on the same subject, the representative of the United States of America stated that in his country the Aerospace Center of the Defense Mapping Agency was continuing its research on the subject but that the results had not been published; reports had been published on the standardization of colours and screens.

Digital mapping

64. The Committee considered two papers relating to digital mapping: "Some uses of a digital topographic data base" (E/CONF.67/L.20 and Add.1), submitted by the United Kingdom, and "Digital topographic data banks and automated cartography in Canada" (E/CONF.67/L.58), submitted by Canada. The first gave an account of the work done by the United Kingdom's Ordnance Survey on experimental digital mapping projects since 1972, which had thus far resulted in the digitizing of approximately 2 per cent of the Survey's basic scale mapping; the paper also described the method used to produce a whole range of maps at varying scales from a digital data base and, in conclusion, explained how the Ordnance Survey expected to meet the increasing demand for map data for use in computer-based information systems. The paper stressed that the use of data in various forms depended on the up-to-dateness of the data base and on its suitability for each specific use; that work was the heart of the research currently being conducted by the Ordnance Survey.

65. The Canadian paper (E/CONF.67/L.58) described the extent to which the concept of collecting and communicating terrain information had changed with the advent of computer technology and recent advances in computer graphics.

Technical innovations in geodesy and cartography

66. The paper entitled "Technical novelties in geodesy and cartography" (E/CONF.67/L.56), submitted by Hungary, described the progress made over the past 10 to 15 years in geodesy, photogrammetry and mapping through the use of new distance-measuring instruments, angular measurement, levelling, computation of co-ordinates, data storage etc. In 1974 Hungary had published an atlas of the whole of the national territory, in six volumes, which would advance economic management and regional planning.

Geographical names

67. The statements made by the representatives of Argentina, Barbados, Brazil, Canada, Chile, Costa Rica, Cuba, the Dominican Republic, El Salvador, the Federal Republic of Germany, Honduras, Hungary, India, Panama, Surinam, the USSR, the United States of America, Uruguay and Venezuela showed that a considerable amount of work was being done in those countries with regard to the compilation, standardization and production of publications on geographical names. The discussion also highlighted the lack of technical organizations to deal with toponymic questions in some countries of the Americas.

Cartographic literature

68. The Committee considered a paper entitled "Documentation on the literature of cartography: an essential aid in map design and map production" (E/CONF.67/L.46), submitted by the Federal Republic of Germany; the paper stated that only through the simultaneous study of the literature of cartography and maps could an effective result be obtained for the development of any geoscience. The compilation of the literature, its classification, the study of source material and the presentation of material for future research resulted in a comprehensive bibliography, which was an essential device for all scientific work.

VII. RESOLUTIONS ADOPTED BY THE CONFERENCE

A. List of resolutions

1. Second United Nations Regional Cartographic Conference for the Americas
2. Satellite geodesy
3. Acceleration of cartographic production in the Americas and equipment costs
4. Recent crustal movements
5. Education in topography and cadastre
6. Cadastral surveying and mapping
7. Development of hydrographic charting
8. International co-operation in cartography
9. Thematic cartography
10. International civil aviation organization
11. Education and training in cartography
12. Literature on cartography
13. Remote sensing information transfer
14. Application of remote sensing in developing countries
15. Remote sensing and satellite imagery
16. Airborne remote sensing
17. Automation
18. Geographical names
19. Vote of thanks

B. Texts of resolutions

1. Second United Nations Regional Cartographic Conference for the Americas

The Conference,

Appreciating the offer of the Government of Mexico to act as host country for the Second United Nations Regional Cartographic Conference for the Americas,

Recommends that the Economic and Social Council convene the Second United Nations Regional Cartographic Conference for the Americas in Mexico in autumn, 1979.

19 March 1976

2. Satellite geodesy

The Conference,

Recognizing the considerable improvement in the efficiency of geodetic surveys produced by the use of geodetic satellite systems,

Further recognizing the specific contributions being made by Doppler satellite geodesy,

Noting that during the next decade new systems now under study, such as NAVSTAR (Global Positioning System), will probably become available,

1. Recommends that the nations of the Americas:

(a) Continue to utilize satellite geodesy to extend and adjust geodetic control systems;

(b) Consider the application of advanced technology such as NAVSTAR;

2. Requests the Government of the United States of America to continue to operate the Navy Navigation Satellite system to support Doppler satellite geodesy in order to permit an orderly transition to the use of the NAVSTAR system for geodetic purposes.

19 March 1976

3. Acceleration of cartographic production in the Americas and equipment costs

The Conference,

Considering that the assimilation of the benefits of science and technology is a gradual process in the developing countries,

Considering also that there is a scientific and technological gap between the developing and highly industrialized developed countries, and that this gap will continue to exist for some time to come,

Considering also that at present cartographic progress must be backed by the equipment needed for those techniques and methods which are most in demand,

Further considering that the problem of cartographic progress in developing countries is one not only of expertise but also of the cost of gaining access to the means of production and research,

Recommends that, with a view to encouraging the wider utilization of automatic systems in cartography, especially in photogrammetry and Doppler-type applications, countries producing instrumentation of this kind should give greater emphasis to research into the production costs of such equipment, so as to secure a larger market for them and make them accessible to countries which need to accelerate their progress in cartography.

19 March 1976

4. Recent crustal movements

The Conference,

Noting the severe effects of recent movements of the earth's crust on the human environment in the Americas, and

Recognizing the multidisciplinary efforts being undertaken in the geosciences to measure and predict these movements,

1. Recommends the concentrated investigation of crustal movements in the tectonically active regions of the Americas;

2. Asks the International Association of Geodesy of the International Union of Geodesy and Geophysics to support these activities.

19 March 1976

5. Education in topography and cadastre

The Conference,

Considering that one of the purposes of this Conference is to help to train technical personnel in topography and cadastre,

Considering that the School of Topography and Cadastre at Heredia, Costa Rica, is operating in affiliation with the National University and that this School was established by means of technical assistance from the Federal Republic of Germany,

Further considering that the said School is a regional institution serving Central America,

Also considering that from 1977 onwards the Federal Republic of Germany will gradually reduce the financing of fellowships, a step which could cause the School to fail,

Recommends that the Governments concerned request both technical and financial assistance from the United Nations to be channelled through the United Nations and its specialized agencies.

19 March 1976

6. Cadastral surveying and mapping

The Conference,

Noting resolution 24 of the Seventh United Nations Regional Cartographic Conference for Asia and the Far East, 4/

Recognizing the need to develop modern technological methods and techniques for conducting cadastral surveys and producing cadastral maps (plans),

1. Recommends that interested developing countries in need of technical assistance request such advice and assistance, as applicable through the United Nations;

2. Further recommends that countries make appropriate use of the services of the advisory panel referred to in paragraph 1 of resolution 24 of the Seventh United Nations Regional Cartographic Conference for Asia and the Far East as soon as it has been established;

3. Urges that the United Nations inform interested countries, on request, on information related to practical experiences attained by countries already advanced in the cadastral surveying and mapping field;

4. Invites Member States with adequate resources to assist the advisory panel and developing countries who may ask the United Nations for advice or assistance on cadastral matters.

19 March 1976

7. Development of hydrographic charting

A.

Creation of hydrographic organizations in developing countries

Recognizing that the increasing importance of sea communications, together with

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4/ Seventh United Nations Regional Cartographic Conference for Asia and the Far East, Tokyo, 15-27 October 1973, vol. I, Report of the Conference (United Nations publication, Sales No. E.74.I.7), chap. VII.

the exploration of the resources of the sea and sea-bed require changing and increasing hydrographic support in the form of charts and publications,

Noting that the area of national jurisdiction regarding the exploration of the sea may be greatly extended by the United Nations Conference on the Law of the Sea,

1. Considers that there is a greater need than before to develop basic hydrographic survey capabilities in all maritime countries;

2. Recommends that maritime States should establish their own hydrographic organizations of appropriate size in order to undertake hydrographic surveying and, in due course, chart making and to maintain close liaison with other charting authorities.

B.

Encouragement of bilateral hydrographic projects

Recognizing that developing countries which do not yet have hydrographic organizations are likely to establish such an organization to meet the growing need for up-to-date national hydrographic charts and publications,

Noting that such developing countries will require guidance, technical advice and training for potential hydrographic personnel, and that a number of States members of the International Hydrographic Organization are already providing such facilities for developing countries,

Recommends that those nations with full hydrographic capability look favourably upon requests for assistance from countries desiring to establish hydrographic organizations.

19 March 1976

8. International co-operation in cartography

The Conference,

Noting, from the papers and discussions treated by Committee II, the increasing need for further development of an integrated application of cartography in its widest sense to provide a better basis for development planning,

Noting further that important new technical means have become available to execute this task in a quicker, more reliable and more economic way,

Considering that the countries of the Americas should make an effort to make the best possible use of these means,

Considering further that optional use should be made of the experience and knowledge of other countries and organizations,

1. Recommends that Governments of American countries give priority to the establishment or strengthening of cartographic organizations in their country;

2. Recommends that appropriate means should be made available for professional education and training on all levels in the field of cartography whereas the basic elements of cartography (including photo-interpretation) should be included in the curricula for study in natural resources and other related disciplines;

3. Further recommends that all countries should co-operate fully in the preparation and publication of small-scale maps on a regional and interregional basis.

19 March 1976

9. Thematic cartography

The Conference,

Considering that the countries of the Americas require adequately trained personnel for the preparation of the base mapping needed for the Programme for the 1980 Census of the Americas;

Considering also that national geographic institutes and other institutions having similar functions are in a position to provide effective and timely assistance to national statistical services,

1. Recommends that the United Nations and the countries of the region, in co-operation with the Inter-American Statistical Institute, the Pan-American Institute of Geography and History and other international agencies promote, through regional or subregional courses, the training of national personnel responsible for the preparation of cartographic material for forthcoming national censuses;

2. Recommends that the Pan-American Institute of Geography and History, in consultation with other cartographic institutes or agencies in the Americas, should develop standard methods and procedures for such statistical or census cartography as may have a practical application for groups of countries with common characteristics;

3. Further recommends that the national geographical institutes or other organizations having similar functions should provide maximum support to the national statistical offices in the cartographic work associated with national statistical or census activities.

19 March 1976

10. International Civil Aviation Organization

The Conference,

Noting the vital role played by aeronautical charts for flight safety, produced under the guidance of the International Civil Aviation Organization,

Recommends that States of the world that have not yet done so become members of the International Civil Aviation Organization.

19 March 1976

11. Education and training in cartography

The Conference,

Considering the extremely great need for education and training on all levels in cartography,

Having noted resolution 11 of the Seventh United Nations Regional Cartographic Conference for Asia and the Far East, 5/

1. Recommends that the countries of the Americas co-operate as much as possible with Commission I (Education) of the International Cartographic Association to promote uniformity in levels of education; 6/

2. Further recommends that the Cartography Section of the Centre for Natural Resources, Energy and Transport, Department of Economic and Social Affairs, prepare a review of existing appropriate educational possibilities in and outside the Americas that could be used for solving immediate educational problems, and to ask the assistance of member countries to provide translations into Spanish of selected literature important to cartography.

19 March 1976

12. Literature on cartography

The Conference,

Noting that the Federal Republic of Germany has established a bibliography of cartography literature (Bibliographia Cartographica 7/) with chapter headings in English, French, Russian and German,

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5/ Ibid.

6/ For relevant literature on this subject please see, inter alia, Ausbildungswege in der Kartographie (Bonn, Kirschbaum Verlag, 1975).

7/ Inquiries concerning the Bibliographia Cartographica should be addressed to the publishers, Verlag Dokumentation Saur KG, D-8023 Pullach, Federal Republic of Germany.

Further noting that 44 experts from 37 nations, with assistance of the United Nations and other national and international organizations, are involved in the recording of all relevant titles and that the production of the bibliography, which is controlled by a working group established by the German Society for Cartography, has international support from the International Cartographic Association, the International Association of Geodesy, the International Society of Photogrammetry and the International Federation of Surveyors,

Recommends that nations with interest in the field of cartographic literature should:

(a) Submit titles to the Chairman of the International Working Group 8/ twice a year, in March and September, in the form detailed in appendix II of the document entitled "Documentation on the literature of cartography: an essential aid in map design and map production" (E/CONF.67/L.46);

(b) Observe the coming bibliographies on United Nations cartographic literature and on automation in cartography; 9/

(c) Take note of the existence of the International Yearbook of Cartography, 10/ published annually in co-operation with the International Cartographic Association to develop the theory and practice of cartography.

19 March 1976

13. Remote-sensing information transfer

The Conference,

Considering the rapid advances in the cartographic aspects of remote sensing and recognizing the role of the United Nations in this field,

Recommends that an appropriate unit in the Department of Economic and Social Affairs of the United Nations establish the necessary facilities to perform the following tasks:

(a) To accept, review and disseminate technical data pertinent to this subject;

8/ The current Chairman of the International Working Group is Dr. Lothar Zogner; correspondence should be addressed to him at: D-1 Berlin, Burgherrenstrasse 7, Federal Republic of Germany.

9/ The authors of the bibliographies will be Dr. Meine and collaborators; correspondence should be addressed to them at: D-3 Hannover 51, Stilleweg 2, Federal Republic of Germany.

10/ Inquiries should be addressed to the publishers of the Yearbook, Kirschbaum Verlag, D-53 Bonn-Bad Godesberg, Ruedigerstrasse 34, Federal Republic of Germany.

(b) To promote the establishment of appropriate international (regional) training courses and seminars on this subject, to be held at appropriate locations;

(c) To promote the establishment of fellowships and scholarships on this subject.

19 March 1976

14. Application of remote sensing in developing countries

The Conference,

Considering the importance of the proper application of remote-sensing techniques in developing countries,

Considering further the present lack of expertise in those countries for carrying out relevant projects,

Recommends that the United Nations or its specialized agencies promote the availability of technical and training assistance, as well as consulting services for the economic application of remote sensing techniques to developing countries in pursuit of specific projects.

19 March 1976

15. Remote sensing and satellite imagery

A

The Conference

1. Recognizes that remote sensing from satellites has a mapping potential and can be used for compilation of resources inventories and control of the environment;

2. Further recognizes the role of the United States of America in this field;

3. Recommends that interested countries request the United States of America to:

(a) Continue the LANDSAT 11/ programme;

(b) Improve the timeliness and quality of LANDSAT data in both image and digital tape forms;

11/ The National Aeronautics and Space Agency of the United States changed the name of ERTS to LANDSAT in 1975.

(c) Make available, when developed, precision-processed LANDSAT imagery and tapes;

4. Further recommends that all countries concerned consider improving satellite imagery for future systems in the following ways:

(a) By increasing the spatial resolution and geometric fidelity of an electro-optical system such as is used in LANDSAT in order to satisfy the demand for mapping;

(b) By providing, when possible, stereoscopic capability of adequate resolution on suitable material, such as film, in order to meet the urgent needs for topographical mapping;

(c) By further developing the multispectral concepts of remote sensing.

B

The Conference

1. Notes that the Shuttle Spacelab programme will develop;

2. Invites the European Space Agency and the National Aeronautics and Space Agency of the United States of America to utilize a metric camera to obtain imagery coverage of such areas as the Americas.

16. Airborne remote sensing

The Conference,

Considering the advances made in remote sensing from airborne platforms,

Requests that the United Nations continue to recognize this effort and encourage the continuation and expansion of work relating to airborne data acquisition and processing.

19 March 1976

17. Automation

The Conference,

Recognizing the complex nature of automated cartographic systems and the need for experts to install, operate and maintain such systems,

Further recognizing that automation is being rapidly applied to various aspects of cartographic production,

Noting that considerable study of the developments in cartographic automation is already under way in such international technical organizations as the International Cartographic Association, the International Federation of Surveyors and the International Society of Photogrammetry,

1. Recommends that the countries of the Americas:

(a) Participate in the activities of international technical organizations;

(b) Contribute their views and recommendations;

(c) Take advantage of increased production efficiencies which these new systems can provide;

(d) Standardize automated data formats, as appropriate, to facilitate exchange of digital cartographic data;

2. Further recommends that the nations manufacturing such automated systems ensure that proper training, maintenance and technological support is established and available in the Americas, as well as in countries of other regions, in order to ensure effective operation of such systems.

19 March 1976

18. Geographical names

The Conference,

Considering the importance of standardizing geographical names,

Bearing in mind that, according to the reports submitted to the Conference by the countries of the Americas, national bodies responsible for standardizing geographical names do not exist in all cases,

1. Recommends that in countries in which they do not exist, the Governments concerned should set up national bodies for the standardization of geographical names;

2. Recommends that the Governments of the countries of the Americas should send representatives to the Third United Nations Conference on the Standardization of Geographical Names, to be held at Athens from 17 August to 7 September 1977;

3. Also recommends that the United Nations should use its good offices with international organizations to secure technical and financial assistance for those countries which require it, in connexion with the standardization of geographical names.

4. Strongly recommends the organization of pilot training courses in toponymy,

as provided for in the reports of the United Nations Group of Experts on Geographical Names at its fifth 12/ and sixth 13/ sessions.

19 March 1976

19. Vote of thanks

The Conference,

1. Expresses its heartfelt thanks to the Government of Panama for the excellent arrangements made by it for the organization of the First United Nations Regional Cartographic Conference for the Americas and for the warm hospitality extended to each and every participant;

2. Further expresses its deep appreciation for the excellent work done by the Secretariat of the United Nations towards the functioning of this Conference with expediency and efficiency.

19 March 1976

12/ See ESA/RT/C/GN/3, annex V.

13/ See ESA/RT/C/GN/4, annex V.

Annex

LIST OF DOCUMENTS ISSUED FOR THE CONFERENCE

Series E/CONF.67/...

E/CONF.67/1 . . . . . Provisional agenda

E/CONF.67/2 and Corr.1 (English only) and 2 (Spanish only) . . . . . Rules of procedure

E/CONF.67/3 . . . . . Draft report of the Conference

Series E/CONF.67/INF...

E/CONF.67/INF/1 and Add.1 . . . . . Documentation for the Conference

E/CONF.67/INF/2 . . . . . Preliminary information on general arrangements of immediate interest to participants

E/CONF.67/INF/3 . . . . . Study on the status of world cartography

E/CONF.67/INF/4 . . . . . The United Nations Development Programme: questions and answers

E/CONF.67/INF/5 . . . . . United Nations technical assistance projects in surveying and mapping

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