

Department of Technical Co-operation for Development

**ELEVENTH UNITED NATIONS
REGIONAL
CARTOGRAPHIC CONFERENCE
FOR ASIA AND THE PACIFIC**

Bangkok, 5-16 January 1987

Vol. I.—Report of the Conference



UNITED NATIONS

New York, 1987

NOTE

Symbols of United Nations documents are composed of capital letters combined with figures.

The proceedings of the Eleventh United Nations Regional Cartographic Conference for Asia and the Pacific, held at Bangkok, Thailand, from 5-16 January 1987, are being issued in two volumes, as follows:

Volume I. Report of the Conference

Volume II. Technical Papers

The proceedings of the previous United Nations regional cartographic conferences for Asia and the Far East were issued under the following symbols and sales codes: E/CONF.18/6 (Sales No. 55.I.29) and E/CONF.18/7 (Sales No. 56.I.23) for the First Conference; E/CONF.25/3 (Sales No. 59.I.9) and E/CONF.25/4 (Sales No. 61.I.8) for the Second Conference; E/CONF.36/2 (Sales No. 62.I.14) and E/CONF.36/3 (Sales No. 64.I.17) for the Third Conference; E/CONF.50/4 (Sales No. 65.I.16) and E/CONF.50/5 (Sales No.66.I.3) for the Fourth Conference; E/CONF.52/4 (Sales No. E.68.I.2) and E/CONF.52/5 (Sales No. E.68.I.14) for the Fifth Conference; E/CONF.57/2 (Sales No. E.71.I.15) and E/CONF.57/3 (Sales No. E.72.I.20) for the Sixth Conference; E/CONF.62/3 (Sales No. E.74.I.7) and E/CONF.62/4 (Sales No. E.74.I.25) for the Seventh Conference; E/CONF.68/3 (Sales No. E.77.I.12) and E/CONF.68/3/Add.1 (Sales No. E.78.I.8) for the Eighth Conference; E/CONF.72/4 (Sales No. E.81.I.2) and E/CONF.72/4/Add.1 (Sales No. E/P.83.I.14) for the Ninth Conference; E/CONF.75/5 (Sales No. E. 83.I.18) and E/CONF.75/5/Add.1 (Sales No. E/P.86.I.11) for the Tenth Conference.

E/CONF.78/4

UNITED NATIONS PUBLICATION

Sales No. E.87.I.13

00900

ISBN 92-1-100316-4

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I. ORGANIZATION OF THE CONFERENCE

A. Terms of reference

1. The Eleventh United Nations Regional Cartographic Conference for Asia and the Pacific was held at Bangkok, Thailand, from 5 to 16 January 1987. The Conference was held in accordance with Economic and Social Council decision 1983/121 of 26 May 1983.

B. Opening of the Conference

2. The Executive Secretary of the Economic and Social Commission for Asia and the Pacific (ESCAP) inaugurated the Conference and welcomed the participants on behalf of the Commission. The Executive Secretary of the Conference read a message of welcome on behalf of the Under-Secretary-General of the Department of Technical Co-operation for Development and also delivered the opening address.

C. Attendance

3. The Conference was attended by 199 representatives and observers of 34 countries and territories, the Economic and Social Commission for Asia and the Pacific, 1 specialized agency and 6 intergovernmental and international scientific organizations. The list of participants appears as annex I to the present report.

4. The Conference was greatly honoured by H.R.H. Princess Maha Chakri Sirindhorn's attendance at a special plenary session held on 12 January 1987.

D. Agenda

5. The Conference adopted its agenda as contained in document E/CONF.78/1. The agenda, as adopted appears as annex II to the present report.

E. Adoption of the rules of procedure

6. At its first plenary meeting, the Conference adopted its rules of procedure as contained in document E/CONF.78/2, the text of which is reproduced in annex III to the present report.

F. Election of officers

7. The Conference elected the following officers:

President: Lieutenant-General Vichien Sungpriwon (Thailand)

First Vice-President: Takahiro Sato (Japan)

Second Vice-President: Chen Junyong (China)

Rapporteur: Vic North (Australia)

G. Organization of work

8. The Conference adopted the organization of work as proposed by the Secretariat. In addition, the Conference requested the Executive Secretary to provide facilities for the delegations to hold an exhibition of maps and related cartographic products. The Executive Secretary stressed the fact that it was a very delicate and sensitive subject and that such an exhibition could take place only if there was a clear understanding that the sole responsibility for the content of the exhibited cartographic products rested entirely with the delegations exhibiting their products. It was also made clear that the Secretariat was in no way responsible for the content of the exhibited material, and that the fact that the material was exhibited on United Nations premises did not imply any endorsement or acceptance by the United Nations. The Conference agreed with that statement.

H. Technical committees

9. The Conference established four technical committees and allocated to each committee the agenda items shown below:

Committee I item 5
Committee II item 6
Committee III item 7
Committee IV item 8

10. Agenda items 1, 2, 3, 4, 9, 10 and 11 were considered at plenary meetings. A working group, comprising representatives from the delegations of Australia, China, the Federal Republic of Germany, India, Japan, Malaysia, the United States of America and the observers of the International Hydrographic Organization (IHO) and of the International Federation of Surveyors (FIG), was established to consider agenda item 10.

11. The following officers were elected to the four Committees:

Committee I

Chairman: J. Rais (Indonesia)
Vice-Chairman: G. Andreassend (Hong Kong)
Rapporteur: Bentley E. Furmston (United Kingdom of Great Britain and Northern Ireland)

Committee II

Chairman: Lowell F. Starr (United States of America)
Vice-Chairman: Won-Ik Kim (Republic of Korea)
Rapporteur: Ray Cole (Australia)

Committee III

Chairman: G. Konecny (Federal Republic of Germany)
Vice-Chairman: Nikolai L. Makarenko (Union of Soviet Socialist Republics)
Rapporteur: Asfaw Fanta (Ethiopia)

Committee IV

Chairman: Jose Solis (Philippines)
Vice-Chairman: Leong K. Kwoh (Singapore)
Rapporteur: S. M. Chadha (India)

I. Documentation

12. A list of the documents submitted to the Conference appears as annex IV to the present report. The technical papers are to be published in volume II of the proceedings of the Conference.

J. Report on credentials

13. The Credentials Committee, composed of the First Vice-President, acting as President, the Second Vice-President and the Rapporteur, with the Executive Secretary ex officio, reported that the credentials of all representatives had been found to be in order.

14. Questions were raised by the representatives of Poland and of the Union of Soviet Socialist Republics regarding the inclusion of a resident of Berlin (West) in the delegation of the Federal Republic of Germany. The representative of the United Kingdom of Great Britain and Northern Ireland, on behalf of the delegations of France, the United States and the United Kingdom, parties to the Quadripartite Agreement, stated that permanent residents of the western sectors of Berlin may participate jointly with participants from the Federal Republic of Germany in international exchanges. The delegation of the Federal Republic of Germany shared that position.

15. The representatives of Poland and of the USSR challenged the legitimacy of the representative of Democratic Kampuchea; the representative of Democratic Kampuchea rejected categorically this declaration. The delegations of China and of Thailand made written statements in support of the legitimacy of the representation of Democratic Kampuchea.

K. Vote of thanks

16. At its closing meeting, the Conference adopted by acclamation a vote of thanks to Her Royal Highness Princess Maha Chakri Sirindhorn for having graced the Conference with her presence, to the Government of Thailand for the hospitality extended to the participants, and to the Economic and Social Commission for Asia and the Pacific for the excellent arrangements made and services provided for the Conference. It also expressed its appreciation to the President and the officers of the Conference for the way in which they had conducted the meetings and its gratitude to the officers and staff of the United Nations Secretariat for their hard work.

II. SUMMARY OF PLENARY MEETINGS

Item 4: Country reports and reports on the progress made since the Tenth United Nations Regional Cartographic Conference for Asia and the Pacific

17. The Conference considered 22 reports submitted by countries and areas under item 4.

18. In addition, under this item, the Secretariat circulated a background paper on the status of world topographic and cadastral mapping (E/CONF.78/BP.7).

Visit by Her Royal Highness Princess Maha Chakri Sirindhorn

19. A special session was arranged on 12 January 1987 to coincide with the visit of Her Royal Highness. The President of the Conference, Lieutenant-General Vichien Sungpriwon, formally welcomed Her Royal Highness. He advised her that a special session had been arranged for her benefit and that a number of speakers would give presentations on topics in which she had earlier indicated an interest.

20. Professor G. Konecny, President of the International Society of Photogrammetry and Remote Sensing, was the first speaker. He provided a brief overview of the aims of the Conference and informed the Conference on the topic of land information systems.

21. The representative of France followed with an introduction on the satellite SPOT and its applications. This was followed by a presentation from the representative of the United States of America, outlining the LANDSAT programme. The final paper in the session was delivered by the representative of the Union of Soviet Socialist Republics, who presented an overview of cartographic space activities in the USSR. Lieut.-General Sungpriwon concluded the session by thanking Her Royal Highness for her interest in the programme and for her attendance at the Conference.

Item 9: Technical assistance and transfer of technology

22. The first paper on agenda item 9 was presented by Charles Weir, President of the International Federation of Surveyors (FIG), who gave background information on the Federation (E/CONF.78/L.9).

23. Mr. Weir also informed the Conference of the recent formation of the International Union of Surveys and Mapping, which comprised representatives from FIG, the International Cartographic Association (ICA) and the International Society for Photogrammetry and Remote Sensing (ISPRS).

24. The second paper in the session, submitted by the Secretariat of the United Nations and entitled "United Nations technical co-operation activities in surveying, mapping and charting, with special emphasis on Asia and the Pacific" (E/CONF.78/L.10) was presented by the Executive Secretary of the Conference.

25. The paper dealt with the technical co-operation activities executed by the Department of Technical Co-operation for Development of the United Nations Secretariat, covering the fields of geodesy, topographical surveying, photogrammetry, mapping, cartography, map reproduction, hydrography, cadastral registration and cadastral surveying.

26. The next paper, entitled "Report by the Government of Japan on technical co-operation" (E/CONF.78/L.24), was presented by a representative of Japan. The paper covered the activities of the Geographical Survey Institute, the Hydrographic Department and the Geological Survey of Japan in a number of areas such as training of technical personnel from developing countries; dispatch of technical experts; the development of survey projects; and bilateral technical co-operation.

27. The Federal Republic of Germany presented a paper entitled "Twenty-five years of Federal Republic of Germany technical assistance and transfer of technology in the fields of surveying and mapping" (E/CONF.78/L.26). The paper dealt with education and training programmes designed to assist developing countries and surveying and mapping projects which had been carried out in developing countries by the Federal Republic of Germany.

28. A paper entitled "Indonesia-Australia co-operation in remote sensing" was submitted by Indonesia (E/CONF.78/L.41). The paper referred to the signing of a Memorandum of Understanding on Co-operation in Science and Technology between Indonesia and Australia at Jakarta on 7 February 1985. The two countries hoped to seek the utmost mutual benefit in exchanging experiences and transferring technologies. This would be done with the Australian technological and industrial back-up and through the Indonesian need to develop its national capability in the use of remote sensing technology in order to enhance utilization of its natural resources, with due consideration for environmental impacts. A number of projects of interest have already been identified by both parties.

29. The final paper in the session was presented by the representative of Poland and was entitled "Remarks and suggestions on transfer of technology in the field of mapping with the use of remotely sensed data" (E/CONF.78/L.64). The paper included discussion on the realistic and cost-saving approach towards the development of technologies of production and updating of topographic maps with the use of data of new-generation satellites. Transfer of technology to the developing countries was also discussed, with particular emphasis on applications of remote sensing in the fields of cartography, geology, hydrology, oceanology, spatial planning, urban studies, agriculture, forestry, mining and others.

Item 10: Provisional agenda of the Twelfth United Nations Regional
Cartographic Conference for Asia and the Pacific

30. A working group chaired by the Acting President, and comprising representatives from Australia, China, the Federal Republic of Germany, India, Malaysia, the United States, FIG and IHO, was established at the first plenary meeting to consider agenda item 10.

31. The Working Group held three meetings and recommended that the Twelfth United Nations Regional Cartographic Conference for Asia and the Pacific, should be held

in 1991 and that the duration of the Conference should be reduced to seven working days.

32. The Working Group recommended that in the provisional agenda of the twelfth Conference:

(a) Items 1, 2, 3, 4, 9, 10 and 11 of the present provisional agenda should be retained.

(b) Items 5, 6, 7 and 8 should be grouped under the following four headings, the subjects of which should form also the names of the four technical committees of the Conference, i.e., review of the latest technology and its relationship to policy, economy and development in the following fields:

- (i) Cartographic data acquisition and supporting activities;
- (ii) Cartographic data recording, compilation and manipulation;
- (iii) Cartographic data retrieval, analysis, depiction, presentation and product generation;
- (iv) Management of national mapping and charting programmes.

A possible breakdown under each heading is given below for guidance, the Cartography Unit of the United Nations Secretariat being left to finalize it at the appropriate time.

33. Proposed provisional agenda for the Twelfth Regional Cartographic Conference for Asia and the Pacific:

Review of the latest technology and its relationship to policy, economy and development in the following fields:

- 1. Cartographic data acquisition and supporting activities
 - (a) Conventional and satellite geodesy
 - (b) Acquisition of cartographic data from airborne and space platforms
 - (c) Surveys for mapping and charting
 - (d) Hydrographic surveying and nautical charting
- 2. Cartographic data recording, compilation and manipulation
 - (a) Large-scale topographic mapping
 - (b) Small-scale topographic mapping
 - (c) Cadastral mapping
 - (d) Navigational and bathymetric charting

- (e) Thematic mapping
 - (f) Special mapping (including mapping for the handicapped and IMW)
3. Cartographic data retrieval, analysis, depiction, presentation and product generation
- (a) Map and chart reproduction, publishing and printing
 - (b) Digital data bases
 - (c) Land information systems
 - (d) Geographic information systems
 - (e) Specifications and standards
4. Management of national mapping and charting programmes
- (a) Education and training
 - (b) National programmes
 - (c) Sales and distribution of maps and charts and digital products
 - (d) Geographical names

In addition, the provisional agenda will include items dealing with the organization of the Conference and with country reports, etc. (see para. 32).

34. Seven draft resolutions were presented to the Conference and were subsequently adopted as resolutions 1, 2, 3, 5, 10, 16 and 23. (For the text of the resolutions, see chapter VII.)

III. WORK OF COMMITTEE I: CARTOGRAPHIC DATA ACQUISITION
AND SUPPORTING ACTIVITIES

35. The work of Committee I covered agenda item 5 on cartographic data acquisition and supporting activities. In addition to a background paper (E/CONF.78/BP.1), presented by the Secretariat, 15 papers were presented relating to the following sub-items:

- (a) Conventional and satellite geodesy;
- (b) Acquisition of cartographic data from space;
- (c) Aerial photography and other remote sensing activities;
- (e) Hydrographic surveying and nautical charting;
- (f) Development of digital data bases.

36. In the first category, Japan presented a paper describing the observation project of the Japanese geodetic satellite AJISAI (E/CONF.78/L.3). AJISAI was launched in August 1986 by the National Space Development Agency of Japan; it carries both mirrors and corner cube reflectors. A transportable laser ranging system will be completed in 1987, after which 10 primary stations in isolated islands will be fixed by laser ranging to supplement earlier fixations obtained by laser ranging to other satellites and by the Doppler method. Finland's paper (E/CONF.78/L.5) described the experience gained by the Geodetic Division of the Finnish National Survey Board in observing ground control from GPS (global positioning system) satellites: the GeoHydro system, of which the basic unit is the Trimble 4000S, was used for a period of some four months between May and September 1986 to observe a group of 5 stations separated by distances of up to 30 km. The incomplete status of the NAVSTAR satellites, of which there are only 7 operational that are of the planned 18, restricted the time for which 4 satellites can be observed simultaneously. Preliminary computations using only part of the available data, however, suggest that distances between stations can be obtained to an accuracy in the order of 2 parts per million.

37. France submitted a paper entitled "Global positioning system by satellites (GPS)" (E/CONF.78/L.16), which described research in progress at the National Geographic Institute (IGN) to develop software for processing GPS data for single point positioning, differential positioning (or translocation) and as rapid, but less accurate positioning. IGN had computed from distance measurement and using techniques of measuring phase. It had been found that an accuracy of about 1 ppm could be obtained from translocation using phase difference, although a position to some 5 metres could be found very rapidly - using data obtained in only 10 minutes. A paper submitted by the Federal Republic of Germany (E/CONF.78/L.27) then described a mobile satellite laser ranging system MTLRS (modular transportable laser ranging system), together with its use in the Eastern Mediterranean to provide distance measurements to further research into crustal movement and for the study of Kramatic models and tectonic processes underlying those motions. Collocation measurements confirmed that accuracies of less than 1 centimetre would be obtained when the results were fully processed.

38. Turning to the acquisition of cartographic data from space, France presented four papers. The first (E/CONF.78/L.18) referred to the launching of the French SPOT satellite in February 1986, its special characteristics of small pixel size and stereo capability; it described the forms in which scenes were available and discussed applications to new basic mapping, the maintenance of existing basic mapping and thematic descriptions, such as resource inventories. Another paper (E/CONF.78/L.17) related to the potential of SPOT imagery concerning topographic and digital mapping. It indicated that SPOT scenes were well-adapted for 1:100,000 scale mapping and for 1:50,000 scale mapping in low density population areas. SPOT data were also described as suitable for revision of maps at similar scales and for the acquisition of digital data for geographic data bases.

39. In the paper entitled "The SPOT satellite and space maps" (E/CONF.78/L.19), the term "space map" was introduced, analogous to photo-maps. It was suggested that space maps could be used either as new maps or for the revision of existing maps, with their accuracy in planimetry amounting to the graphic error arising from the pixel-size and in height adequate for 10-metre contours. The process would include the acquisition of SPOT imagery, field control with a density of 3 points per image, photogrammetric plotting, editing with additional non-visible information and reproduction. Costs were suggested as \$US 8 per square kilometre for 1:100,000 maps as opposed to \$US 30 for classical mapping while speed might be increased by a factor of 3. In discussion of a point raised by India, the appropriate contour intervals were suggested as 20 m in flat terrain and 40 m in mountain areas. The fourth of the papers submitted by France (E/CONF.78/L.20) suggested that the advent of the SPOT satellite added so many possibilities to the existing types of map that new terminology was needed to describe map type and associated accuracy, reliability and the degree of cartographic enhancement of the basic image from which data had been derived. Work was in progress at IGN to revise official technical words through the National Committee for Geographic Information (CNIG).

40. A paper submitted by Indonesia (E/CONF.78/L.50) described experimental radar/laser survey and mapping in Indonesia. The activity had grown out of a need to survey some 2.5 million hectares (ha) per year in connection with agricultural (rice growing) development and settlement schemes. It was necessary to identify land with a slope of less than 8 per cent; ground measurement is time consuming. A radar contour mapping system provided contour mapping at 1:10,000 but contained local inaccuracies of 10 metres and more in elevation. Radar test profiles were, however, more accurate with a mean square error of ± 3 metres. The cost, at \$US 47/ha was high. The airborne laser profiling system was tested in 1985/86, flown on a grid system by helicopter with a spacing of 25 metres. This gave good results, and at a cost of \$US 12/ha compared well with the cost of ground survey at \$US 10/ha while being much quicker. A second paper submitted in this category by Indonesia, described the acquisition of high resolution synthetic aperture radar data of Indonesia (E/CONF.78/L.51). The SAR survey covered 168,000 km of Kalimantan and 105,000 sq km of Irian Jaya, much of it first time coverage. The ability to obtain digital mosaics of the imagery and land form information suggested that the radar data from the STAR-1 imaging system, processed by a DIPIX ARIES III image analysis system, could provide a synoptic overview of large areas independent of cloud cover and most weather conditions. A third paper submitted under the sub-item on aerial photography and other remote sensing activities (E/CONF.78/L.12), came from the Federal Republic of Germany and described the aims and achievements of aid projects to assist the Instituto Geográfico Nacional in

Managua, Nicaragua, and the National Cartography Authority in Manila. The need for care in the transfer of technology and the strengthening of institutions in the recipient country through training and organization of staff were stressed.

41. No papers were submitted for the sub-item "Surveys for mapping and charting". This may be due to an overlap with satellite geodesy in that much ground control for medium and small-scale mapping is now obtained from satellite fixations. In the "Hydrographic surveying and nautical charting" category a paper with the same title (E/CONF.78/L.13) was submitted by the Federal Republic of Germany. It described the organization and activity of the German Hydrographic Institute (DHI), which was 125 years old in 1986. Although they form a relatively small section of the specialist surveying community in the Federal Republic of Germany, the hydrographic surveyors are active in giving assistance overseas, and the paper noted the holding of the United Nations Interregional Seminar on Hydrographic Surveying and Bathymetric Charting at Hamburg in September 1986. The Executive Secretary drew attention to a joint DTCD/IHO study jointly sponsored by the Department of Technical Co-operation for Development and IHO, entitled "Status of hydrographic surveying and nautical charting world-wide" which had been presented at the Third United Nations Regional Cartographic Conference for the Americas (E/CONF.77/L.12) and revealed that large areas of continental shelf and waters in exclusive economic zones were still inadequately surveyed or not surveyed at all.

42. Turning to the subject of development of digital data bases, the United States submitted three papers. The first discussed digital data formats (E/CONF.78/L.32). It described the evolution of the Defense Mapping Agency's first data structures and explains the standard linear format (SLF) currently being implemented, having been developed in 1984. It is necessary so that data can be easily transferred between different computer systems, must accommodate a variety of digital feature data and should be efficient in terms of storage requirements and maintenance. The SLF incorporates two overlying data structures - spatial, which associates cartographic features with their exact geometric position and cartographic, which links these spatial structures with their role and attributes in the real world. It is associated with the DMA feature attribute coding standard (FACS). Together these provide the basis for storing, exchanging and identifying digital data. Evolution will, however, continue and some thoughts were expressed on advanced structures which may be necessary to develop from SLF and FACS to meet the needs of the 1990s. The paper entitled "Processing and exchange of digital bathymetry" (E/CONF.78/L.33) went on to discuss additional systems - the hydrographic information handling system (HIHAN) and the bathymetric information system (BIS). The software developed by DMA deals automatically with the processing and integration of bathymetric data, formatted in SLF. The systems and formats described are compatible with standards proposed by the International Hydrographic Organization (IHO) and will thus facilitate international exchange of data. Finally, "Mark II: the next step in digital systems development at the United States Geological Survey" (E/CONF.78/L.36) described how USGS had begun a major new system development effort, known as Mark II, aiming to provide the requirements of the National Mapping Program through to 2000. To meet this goal, a series of development tasks are aimed at the expansion of mass digitizing capability, the modification of data structures, the development of methods of revising digitized data and of creating standard, derived and specialized products, the improvement of quality control and the support of advanced analysis and applications of the digital data. Long-term production objectives have been defined, and development and management strategies were set out which are intended to meet these objectives.

43. The background paper "Cartographic data acquisition and supporting activities" (E/CONF.78/BP.1), submitted by the Secretariat, reviews the history, development and current techniques relevant to all six categories of acquisition and activities. It provoked further discussion relating to the availability and probable cost of position-fixing hardware utilizing the GPS satellites, and whether that might eventually develop into a hand-held receiver with instantaneous read-out. The representative of the Federal Republic of Germany suggested that more and more accurate orbit tracking would be necessary, spread through different countries and continents, before positions would be universally of sufficient accuracy for many purposes.

IV. WORK OF COMMITTEE II: CARTOGRAPHIC DATA MANIPULATION

44. The work of Committee II covered agenda item 6, being a review of the latest techniques and developments under the following sub-items:

- (a) Conventional and digital large-scale topographic map compilation;
- (c) Conventional and digital charting compilation;
- (d) Compilation of small-scale maps and charts, the International Map of the World on the Millionth Scale (IMW), national and regional atlases etc.;
- (e) Digital terrain models;
- (f) Conventional and digital cadastral mapping;
- (g) Land information systems;
- (i) Thematic mapping.

45. A background paper entitled "Cartographic data manipulation in the computer age" (E/CONF.78/BP.2), submitted by the Secretariat, was presented by the President of the International Cartographic Association. This set the scene for the session. The paper concentrated on electronic technology now used in cartography and stressed that cartographic data manipulation processes could be grouped into three classes: (a) the old and rigorously defined, for example plotting of map projections; (b) the group of processes that have been used for many years but are not rigorously defined, such as generalization and interpolation; and (c) the group of new processes that cartographers must now use because manipulations are done in a computer-assisted environment. Four examples of the manipulation of data were discussed: creating files, editing files, calculating data and generating products. Significant problems associated with data manipulation were identified: data structures, data exchange formats, archiving, data tolerance setting, mixing of data sets of different accuracies, paneling, partitioning and generalization.

46. A second background paper, also submitted by the Secretariat and entitled "A system approach to the design of land information systems" (E/CONF.78/BP.5) was presented by the President of the International Federation of Surveyors (FIG). The paper records the FIG definition of land information system (LIS) and further describes its linkage to the synonymous term Geographic Information System (GIS). The paper stressed the complexity and difficulty of designing a land information system and proposed a system approach to simplify the task. A land information system is seen as a sub-system of broader decision making, land tenure and socio-economic systems and is not an end in itself. Efficiency, economy and effectiveness were identified as three major design features or performance criteria about which we need to be concerned. The paper concluded that the United Nations should initiate measures to prepare an in-depth study of the principal features and variations of the design of land information systems currently being developed around the world. This is in keeping with resolution 13 on land information systems approved at the Tenth United Nations Regional Cartographic Conference for Asia and the Pacific.

A. Conventional and digital large-scale topographic map compilation

47. The paper entitled "Low cost digital mapping and data management for upgrading residential projects" (E/CONF.78/L.8) was presented by Finland. It discussed the feasibility of designing an integrated software package called MASMAP (Mapping and Analysing from Small Format Aerial Photographs), to provide a substitute for, or to support conventional mapping. MASMAP will be suitable for use in cities having areas of fast uncontrolled growth to analyse data for planning purposes. The system will enable a data base to be derived from the aerial photographs instead of a standard map, which will save both time and costs. MASMAP should be understood as an attempt to provide a simple geo-information system to countries (or users) with little or no background in using computer systems.

48. France reported on a large scale digital topographic mapping process which could be adapted to both fiscal and legal cadastres in a paper entitled "Large-scale mapping in developing countries" (E/CONF.78/L.21). The methodology is based on the principle of a digital photogrammetric survey and the use of digital plotting techniques to produce graphic outputs. The graphic outputs could be field completed by plane table methods. The advantages of the system were described.

49. Japan presented a paper entitled "Standardization of digital mapping" (E/CONF.78/L.22). The paper described the results of a study prepared by the Geographical Survey Institute of Japan (GSI) in 1985, which stressed the requirement for establishing digital mapping standards as a pre-requisite for producing digital map data for a variety of uses.

50. A paper, "Geometrical and logical encoding of field data for large-scale topographical mapping using self-recording tacheometers and electronic graphic data processing" (E/CONF.78/L.28), was submitted by a representative of the Federal Republic of Germany. The paper described a method for automatically producing large-scale topographic surveys using total station systems and interactive digital data processing. The Federal Republic of Germany also submitted a report, "10 years of practical experience in digital large-scale topographic map compilation" (E/CONF.78/L.29). The report compared conventional and digital large-scale topographic mapping, reviewed analog methods, described new techniques of digital mapping used for producing topographic data bases and compared the economic performance of analog and digital methods.

B. Conventional and digital charting compilation

51. A paper entitled "Chart prepared by computer-aided system for nautical chart compilation" (E/CONF.78/L.1) was submitted by Japan. The paper dealt with research on a computer-aided system for nautical chart compilation conducted by the Hydrographic Department of the Maritime Safety Agency of Japan between 1983 and 1986. Software development is continuing and the point was made that it would be some time before manual intervention, presently required for checking and correction, would be eliminated. Japan also submitted a report, "Current status of the electronic chart display system in Japan (ECDIS)" (E/CONF.78/L.2). The paper described the present status of electronic chart display systems being produced by the commercial sector for both large and smaller ships. The quality of image display capability was discussed and it was reported that currently available ECDIS equipment was useful but could not yet replace conventional paper charts. The need

was identified for international standardization of data formats and for methods to prevent illegal reproduction of electronic navigation chart data.

52. The United States presented a paper entitled "The aeronautical chart automation project - data base concept" (E/CONF.78/L.35). The paper described a project undertaken by the Aeronautical Charting Division (ACD) of the National Ocean Service (NOS), National Oceanic and Atmospheric Administration (NOAA), which had resulted in the Aeronautical Chart Automated Production (ACAP) system for presenting aeronautical data in the form of charts and related products. Dual chart dependent and chart independent data bases had been developed and thoroughly tested over five years of parallel and interactive operations with normal ACD processes. It is anticipated that the system will provide for the needs of the ACD well into the future.

C. Compilation of small-scale maps and charts and the International Map of the World on the Millionth Scale (IMW)

53. In implementing resolution 9, adopted at the Third United Nations Regional Cartographic Conference for the Americas in February 1985, an Ad Hoc Group of Experts on the International Map of the World on the Millionth Scale convened at Headquarters from 9-11 December 1986 to study the situation and to make appropriate recommendations. The Group was composed of representatives from Canada, France, the Federal Republic of Germany, the United Kingdom, the United States, the International Civil Aviation Organization and the United Nations. The report of the Group was issued as document E/CONF.78/BP.6.

54. The Group noted that many countries had stopped work on the IMW maps altogether and others had delayed IMW production or revision for lengthy periods owing to priority determination or non-availability of funds. It was also found that while production and interest in the IMW series were reduced in many countries, other countries had continued to produce and distribute maps for an array of users.

55. After examining the out-dated state of the map series, alternative possibilities likely to serve the original objectives of the IMW and relevant aspects of the current state-of-the-art of cartography, the Group concluded that it was not possible under present conditions to offer an alternative practical solution to problems associated with the IMW series. The Group agreed on a number of findings and recommendations, as follows:

(1) The Group found the request framed in resolution 9 of the Third United Nations Regional Cartographic Conference for the Americas, in February 1985, fully justified and had used its recommendations as the basis of deliberations.

(2) The Group found that the concept of the International Map of the World on the Millionth Scale appeared to be no longer appropriate or feasible.

(3) The Group considered the current prospect of achieving successful production of any international map series to be remote.

(4) The Group recommended that there was no longer a need for the United Nations to continue monitoring the IMW programme by which Member States were urged to produce and report on IMW maps.

(5) The Group recommended that those countries that elected to produce or continue to produce millionth scale maps as part of their national map series should be encouraged to use the Bonn 1962 IMW specifications for that purpose.

(6) The Group recognized the obligations of member States of the International Civil Aviation Organization (ICAO) to produce World Aeronautical Charts: ICAO (1:1,000,000). The Group recommended that the member States fulfilling that obligation by providing an aeronautical overprint on existing IMW maps should continue to maintain those IMW maps.

(7) The Group agreed that existing IMW maps had value and recommended States Members of the United Nations to retain and make available IMW map stocks. Further, the Group recommended the immediate requirement for Member States to retain IMW reproduction material in operational condition.

(8) Given the acceptance of (4) above, the Group recommended that the United Nations IMW map collections should be maintained in the United Nations Dag Hammarskjöld Library in New York.

(9) The Group requested the Department of Technical Co-operation for Development to submit its report and recommendations to the next round of United Nations Regional Cartographic Conferences for consideration by States Members of the United Nations.

56. Considerable discussion followed the presentation of the report, and it was agreed that a suitable resolution would be drafted for consideration in plenary session.

D. Digital terrain models

57. The Federal Republic of Germany presented a paper entitled "Digital elevation models for the orthophoto map" (E/CONF.78/L.15). The paper referred to increasing demand for digital elevation models (DEM's) for use in the production of orthophoto maps. The determination of DEM's by photogrammetric measurement of profiles on analog and analytical plotting instruments was described, as well as the derivation of such data from the digital records of contours. Some examples of the utilization of DEM's along with the accuracies obtained were given and the importance of storing digital terrain data was stressed.

58. In the paper, "Digital map information in Japan" (E/CONF.78/L.25), Japan described a method used by the Geographic Survey Institute to collect land use information in digital format for a comprehensive National Land Development Plan. The paper described the standard regional grid and mesh code system (primary, secondary and tertiary) and the methodology for encoding the digital information relating to land use and human activities within each parcel. The aim of the survey is to prepare a 10-metre grid base for these data and to develop an appropriate classification scheme.

E. Conventional and digital cadastral mapping

59. Japan presented a paper entitled "Digital information system for cadastral survey" (E/CONF.78/L.30). The paper described a digital information system for cadastral survey introduced by the National Land Agency of Japan. The system was based on the use of personal computers or micro-computers. The paper outlined the components of the system and explained the advantages and disadvantages of the system.

60. A paper entitled "Application of quadrees for fast geometric access to cadastral data" (E/CONF.78/L.52) was submitted by the Federal Republic of Germany. The paper debated the use of various structuring schemes for large- and small-scale data bases and advanced the idea that a highly complex data base was not necessary for a wide range of applications. In cadastral applications, access was primarily made via an object identification code, such as a parcel number. However, for addressing large volumes of data a structure which had a geometric index code could be used to access the individual objects via the object identification codes, permitting access to geometric points, lines and areas. During the creation of storage units the principle of successive cell division (quadtree method) was used for application in high density areas.

F. Land information systems

61. Finland reported on the development of the Finnish geographic information system (FINGIS) for management of numerical spatial data in "FINGIS: software and data manipulation" (E/CONF.78/L.6). The system, which had been developed since 1975, was divided into four parts: data creation, updating, data manipulation and output. Applications had shown FINGIS to be a powerful geographic information software tool. Future development would concentrate on user-friendly error correction, polygon and tabular data management and 3D functions. Finland also submitted a paper, "Computer-assisted map production and an approach to integrated land information systems" (E/CONF.78/L.7) which outlined moves by the National Board of Survey to obtain an integrated LIS system that would support a wide variety of user needs. A draft set of standards had been developed and should be ready for implementation by 1990.

62. A paper was presented by Thailand entitled "Technical progress in the land titling project: Thailand" (E/CONF.78/L.61). The paper described the main objectives of the project as being to accelerate the issue of title deeds (currently only one land holder in six had full title); produce base and cadastral maps covering major metropolitan and urban areas; and develop a national system of valuation. The project which was expected to take 20 years to complete was being supported by a World Bank loan and a grant from the Australian Development Assistance Bureau. The Agency carrying out the work was the Department of Lands, of the Ministry of Interior. The current status and technical operations required to complete the project were described. The paper stimulated considerable discussion from the floor.

63. The United States presented a paper entitled "A prospective case for a national land data system: recent developments at the Census Bureau and the United States Geological Survey" (E/CONF.78/L.37). The paper described a new data base developed jointly by the Bureau of the Census and the Geological Survey based on 1:100,000 scale USGS map data and basic census data. That data base could provide

the potential for developing a national land data system. The paper also proposed a method for testing the concept and outlined the potential benefits of such a system to a wide variety of user groups.

64. The paper entitled "Digital base maps compilation for geographic information system development in the framework of land resources evaluation and planning programme of Indonesia" (E/CONF.78/L.53) was presented by Indonesia. The paper described an initiative to develop a land resources data base, a geographic information system (GIS) for land resources planning and the training of manpower in computerized data management and GIS.

65. The Union of Soviet Socialist Republics presented a paper entitled "Lessons from digital topographic mapping system experience" (E/CONF.78/L.55). The paper debated the capabilities of the automated cartographic system ACS 1 as applied to large-scale topographic mapping (1:500- to 1:5,000-scale). The salient components of a digital topographic mapping system capable of combining information derived from photogrammetric and tacheometric subsystems were described. The Union of Soviet Socialist Republics also submitted a paper entitled "Centres of surveying, mapping and cartographic information and automated cartographic system as user of services" (E/CONF.78/L.56). The paper described the data base management responsibilities of a regional centre of surveying, mapping and cartographic information, the main purposes of that centre being the guaranteed preservation of data, effective updating and editing and selection and circulation of data in a format ordered by the customer. The paper stressed that the most important aspects of a successful data base related to its organization and structure. A scheme for organizing, structuring and managing geodetic, photogrammetric and cartographic data bases was described.

66. At the request of the Executive Secretary, the paper entitled "Report of the meeting of the Ad Hoc Group of Experts on Cadastral Surveying and Land Information Systems" (E/CONF.77/L.1, 2 January 1985), presented to the Third United Nations Regional Cartographic Conference for the Americas was summarized by the President of ISPRS.

G. Thematic mapping

67. A paper, "Development and problems of choropleth mapping for regional planning" (E/CONF.78/L.14), was presented by the Federal Republic of Germany. The paper analysed choropleth mapping as a tool for regional planning, including a summary of medium- and small-scale regional publications (atlases) that best illustrated the application of choropleth maps. The major problems associated with choropleth mapping were identified as the choice of (a) reference areas; (b) object classification; and (c) map functions. Solutions to those problems and theoretical issues that required further study were discussed.

68. The paper entitled "Computer aided mapping system for land classification mapping" (E/CONF.78/L.31), submitted by Japan, discussed the application of modern computer controlled laser scanning and plotting systems to the production of multi-color thematic maps from color coded manuscripts. The paper concluded that the use of laser scanning and plotting techniques for thematic mapping were very promising and offered many advantages over conventional techniques. However, production costs were currently high using available systems and techniques.

69. A paper entitled "Implementation of the North American datum (NAD) of 1983 into the National Ocean Survey (NOS) aeronautical charting program" (E/CONF.78/L.34) was presented by the United States of America. The paper outlined the problems encountered by the Aeronautical Charting Division in converting the geographic position file system to the new, adjusted NAD-83. Specific problems identified were: the determination of datums used with the original source material, the need to resurvey approximately 150 airports, the identification of air traffic control information that needs to be converted and the graphic adjustment of some existing charts.

70. Indonesia presented a paper entitled "Manual and digital cartography in the geological research and development centre of Indonesia - a status report", (E/CONF.78/L.54). The report described the tasks required to produce and publish 1:100,000 and 1:250,000-scale geological and geophysical maps of Indonesia, stressing the process of using aerial photographs to update base map materials for remote areas. Automation techniques were described, and the status of geologic mapping in Indonesia, as of March 1986, was tabulated.

71. The paper, "The map of recent vertical crustal movements for the USSR territory by geodetic data" (E/CONF.78/L.57), was presented by the Union of Soviet Socialist Republics. The paper described the mapping of recent vertical crustal movements derived from the results of repeated leveling on the territory of the USSR. Data from 298 loops that had been releveled were computed and the absolute quantities of the speeds of crustal movements were determined. That data formed the basis for the compilation of a map depicting isolines of recent vertical crustal movements.

V. WORK OF COMMITTEE III: CARTOGRAPHIC DATA DEPICTION

72. The work of Committee III covered agenda item 7 on cartographic data depiction, which included the sub-items:

- (a) Conventional and digital map and chart production and publishing;
- (b) Reproduction and printing.

73. A paper entitled "Cartographic data depiction - digital/conventional", (E/CONF.78/BP.3), submitted by the Secretariat was presented by G. Konecny on behalf of the author, J. Zarzycki, who could not attend the Conference. The theme of the paper was to review the various areas of application of the digital data acquisition method and to evaluate whether it was cost effective when used purely for digital mapping purposes. Based on that background paper, the delegates made a number of comments and exchanged views concerning the subject-matter. The representatives of the United States, the United Kingdom and the Federal Republic of Germany imparted their experiences on the application of digital data collection and all of them informed the Committee of their concurrence with the author. A specific example of an experience was mentioned by the representative of the Federal Republic of Germany, that digital data collection by the manual method for digital mapping was four times more cost effective than the automated method. It was later concluded that digital data collection could successfully be used for derived mapping, map revision, aeronautical charting, simulations and digital information data base, etc; nevertheless, digital data acquisition was not cost effective exclusively for digital mapping purposes.

74. The representatives of the Netherlands and the Union of Soviet Socialist Republics stressed the need to include user requirements in specifications for digital mapping. The delegations of Ecuador and the Federal Republic of Germany expressed the need for the integration of data bases. The representative of the United Kingdom noted that an infrastructure must be available before digital mapping could be introduced in a developing country. The delegation of New Zealand mentioned that digital mapping systems could be successfully implemented in developing countries, provided such infrastructure was available. The representatives of Finland and the Federal Republic of Germany concurred with that statement. The United States delegation raised the importance of standardization of digital formats.

75. Although no paper was submitted under the topic "Reproduction and printing", the Committee had a very lively and fruitful deliberation. In response to questions raised by the representative of India on the number of colours to be used in map printing, the United Kingdom, the USSR and New Zealand discussed the advantages of using four colours in terms of cost, time and accuracy and it was agreed that four colours were adequate and produced very good aesthetic results and were highly economical. The representative of India further requested to know whether some countries had automated registration of plates in the map printing process. It was understood that the registration of plates was commonly carried out manually and not automatically. While discussing map reproduction, the maximum factor to enlarge from microfiches to hard copy was asked. An elaborate exchange of experience on this matter was made by the representatives of New Zealand, the United Kingdom, the Federal Republic of Germany, the United States, Australia and

France and the conclusion reached was that microfiches and microfilms, and for that matter video discs, should be used for archives, browsing and viewing and not as map reproduction means, since the manipulation of those films could not be done without loss of information.

VI. WORK OF COMMITTEE IV: POLICIES AND MANAGEMENT OF NATIONAL MAPPING AND CHARTING PROGRAMMES

76. Committee IV covered agenda item 8, entitled "Policies and management of national mapping and charting programmes". The following sub-items were considered: (c) Geographical names; (d) training and education.

77. Apart from the papers submitted by the various countries the secretariat submitted a background paper on the main item, policies and management of national mapping and charting programmes (E/CONF.78/BP.4), prepared by C. W. Youngs, Secretary-General of the International Federation of Surveyors (FIG), and presented by C. H. Weir, President of FIG. The paper was prepared with the following statement in mind: "These conferences are the only ones in which the level of discussion and the attendance is at the executive and management levels, which is in line with the social and economic aims rather than the scientific and scholarly aims of most international professional associations".

78. The paper touched mainly on four topics: establishment of national programmes, map specifications, training and education, and sales and distribution. The primary concern of national agencies was to ensure that their development programmes were designed to support the economic and social development policies and strategies of their nations. It was suggested that a central national authority with a mandate to dwell upon national surveying and mapping strategy and to co-ordinate the efforts of separate agencies should be established by each country. The paper stressed the importance of including surveying, mapping and land information systems in national economic and social development plans. Apart from touching on the development of a national surveying and mapping strategy and of common standards, the collection, maintenance and storage of data elements which served as a common base for all mapping programmes should be centralized, with the remainder left largely to decentralized establishments but with strong communication links between organizations. The main obstacles facing mapping and charting agencies were a shortage of adequately trained and experienced personnel, and foreign aid programmes needed to focus on training and transfer of technology rather than on direct execution of projects.

A. Geographical names

79. Malaysia submitted a paper (E/CONF.78/L.59) on the divisional report of the United Nations Group of Experts on Geographical Names for the Division of Asia, South-East, and Pacific, South-West. The paper touched on the ongoing programme of geographical names standardization in that complex linguistic/cultural division. It mentioned the collaboration on a regional basis on several projects, such as publication of the divisional map of the region, the compilation of gazetteers and the holding of training courses. The speaker mentioned that since January 1983 two divisional meetings had been held, on 2 October 1984 and 3 September 1986, but expressed disappointment that only four or five countries had participated, adding, however, that the courses organized on toponymy had been a success. He opined that non-participation was due to financial considerations and hoped that countries which could not participate should contribute through correspondence. The representative of the United States commended the efforts of Malaysia on the names standardization programme and requested information on the availability of the gazetteer. Malaysia replied that a copy was available at hand.

80. The Executive Secretary of the Conference brought to the attention of the session the reports of the United Nations Group of Experts on Geographical Names on the work of its eleventh session, held at the United Nations Office at Geneva from 15 to 23 October 1984 (ESA/RT/C/GN/9), and on the work of its twelfth session, held at the United Nations Office at Geneva from 28 September to 7 October 1986 (ESA/RT/C/GN/10).

B. Training and education

81. Poland submitted a paper on proposals concerning long- and short-term professional training of technical personnel in developing countries (E/CONF.78/L.11). The paper related to various training programmes. The Polish governmental organization, GEOKART, offered training facilities at the secondary technical, engineering university and doctoral university levels. It was mentioned that from 1983 GEOKART had been organizing in developing countries, free of charge, short-term training courses covering practically all branches of geodesy and cartography. Poland was happy to announce that GEOKART's proposition was still valid. On a query from Kuwait whether there was a possibility of tailoring a programme to the needs of the participating country, the representative of Poland replied that programmes for special needs and levels of groups of participants could be so modified or so created as to satisfy the needs of the country concerned. The representative of Indonesia wanted to know whether scholarships were offered to attend those programmes. The representative of Poland replied that scholarships for long-term study were awarded by the Polish Government and the costs concerned for short-term training organized in the developing countries were divided into two parts. The first part was covered by the Polish Government and the cartographic organization, GEOKART, and the second by the country concerned. The amount to be borne by the concerned country would depend upon the kind of currency in which the payment was made. The Philippines wanted to know how the language problem was overcome. In reply it was stated that for long courses of four to five years leading to a bachelor's or master's degrees, the Polish language was taught, whereas in the short-term courses English, French, Russian and German were the medium of instruction.

82. The People's Republic of China submitted a paper on the present situation of education for surveying and mapping in China (E/CONF.78/L.39). China had schools at three levels devoted to surveying and mapping education. The Wuhan Technical University of Surveying and Mapping, in collaboration with the International Institute for Aerospace Survey and Earth Sciences (ITC), was planning to establish a rural survey and management training centre which was expected to be started in the year 1988. China also undertook correspondence courses so that in-service personnel could utilize that facility to improve their knowledge and skills. The representative of the Philippines wanted to know what kinds of courses were offered by the correspondence method of training. China said that correspondence courses covered all subjects related to surveying and mapping; field-work was undertaken on the job, because the students were mostly employed by surveying and mapping agencies. The students also attended various centres in China for short practical training, lectures, laboratory work, discussions etc.

83. Indonesia submitted a paper entitled "Land information systems: a challenge to surveying education and training programmes in Indonesia" (E/CONF.78/L.58). The Bandung Institute of Technology offered degree/undergraduate programmes in surveying which would include land information systems (LIS). Another paper was

presented by Indonesia on training and education in surveying and mapping (E/CONF.78/L.60). Apart from higher education, Indonesia had a new task in training and education at the technician level. However, it was mentioned that the training and education institute still faced problems of qualified staff, equipment, books and lack of funds.

84. The paper submitted by the Netherlands (E/CONF.78/L.65) was entitled "Geomatics: a key to country development?". It was prepared and presented by the Chairman of the Department of Photogrammetry of ITC, who also represented the Netherlands. Geomatics was defined as a descriptor of the science that pertained to the application of computer and communication technology to the capture, organization, management and application of spatial information. The paper raised questions as to how the industrialized countries were responding, what should be the response of developing countries and how ITC was responding. The Chairman stated that the departmental mission was to contribute directly and significantly to the leadership and performance of institutions engaged in the production of geographical/topographical information in response to development needs. The representative of India raised a question whether lectures at the graduate and post-graduate levels were being prepared on video tapes and whether these video tapes or copies thereof could be made available to participating developing countries for use in their educational institutions. The representatives of the Netherlands replied that the courses were being modernized and the latest audio-visual aids in imparting education would be utilized.

85. The United Kingdom submitted a paper on training in survey and mapping for overseas students in the United Kingdom (E/CONF.78/L.71), which stated that the United Kingdom provided adequate training at technician level, diploma courses and degrees, in all disciplines of surveying. Special mention was made of the middle-management techniques training at the North-East London Polytechnic. It was mentioned that training could be provided under the United Kingdom's aid programme to developing countries or on a repayment basis. Training officers could also be sent overseas to train in the developing countries' institutions.

86. The Federal Republic of Germany presented a paper dealing with the 25 years of the Federal Republic of Germany's technical assistance and transfer of technology in the fields of surveying and mapping (E/CONF.78/L.26). The paper pointed out that the Federal Republic of Germany supported co-operation in establishing educational institutions in surveying and mapping in the form of partnerships and that it provided technical continuing education of 3 to 15 months' duration in the form of seminars and courses in cadastral surveying, land information systems, remote sensing and cartography. A special school (IPO) for training photogrammetric operators was located at Stuttgart. The Federal Republic of Germany also provided training at technical level, diploma courses and doctorates in all disciplines of surveying.

VII. RESOLUTIONS ADOPTED BY THE CONFERENCE

A. List of resolutions

1. Twelfth United Nations Regional Cartographic Conference for Asia and the Pacific
2. International Union of Surveys and Mapping
3. Co-ordination between mapping and remote sensing organizations in member countries
4. Development of satellite positioning systems
5. Specifications for aerial photography
6. Support to remote sensing activities within ESCAP
7. Information gathering systems
8. Remote sensing data for developing countries
9. Hydrographic surveying and nautical charting
10. Early warning systems in disaster potential areas
11. Land information and geographical information systems
12. Background papers for future conferences
13. Exchange of digital cartographic data
14. Reports of the status of world mapping
15. International Map of the World on the Millionth Scale (IMW)
16. Thematic mapping
17. Evaluation of systems for digital mapping
18. Geographical names
19. Training course in toponymy
20. Training in modern technology in the developing countries
21. Availability of training programmes
22. Production of photo maps and orthophoto maps
23. Vote of thanks

B. Texts of resolutions

1. Twelfth United Nations Regional Cartographic Conference for Asia and the Pacific

A

The Conference,

Recognizing the fundamental importance of surveying, mapping and charting infrastructures as an essential element of economic and social development of all nations,

Further recognizing the important contribution made by the Regional Cartographic Conferences for Asia and the Pacific for the benefit of all countries and territories of the region,

Bearing in mind the conclusions and recommendations contained in the report of the working group on future regional cartographic conferences,

Recommends that the Economic and Social Council should convene the Twelfth United Nations Regional Cartographic Conference for Asia and the Pacific in the first half of 1991.

B

The Conference,

Noting that the objectives of the Twelfth Regional Cartographic Conference for Asia and the Pacific will not be fulfilled unless most developing countries of the region are in a position to participate,

Realizing the inability of some countries and territories from the region to attend the Conference for economic reasons,

Recommends that the United Nations should provide possible financial assistance, within existing available resources, to interested developing countries of the region to enable them to be represented at the Conference and that a procedure should be established under which the countries could apply for such assistance.

2. International Union of Surveys and Mapping

The Conference,

Noting, that three international scientific societies concerned with technical exchanges of information in surveying and cartography, namely the International Cartographic Association, the International Federation of Surveyors and the International Society for Photogrammetry and Remote Sensing, have formed an International Union of Surveys and Mapping,

Recognizing that there is great value in co-ordinated technical exchanges by scientific societies,

Recognizing further that the newly created International Union of Surveys and Mapping intends to convene the first Union Congress in 1992 to assess the current status and the future needs for spatial information systems,

Recommends that the United Nations Department of Technical Co-operation for Development should co-operate in the preparation and organization of the proposed Congress.

3. Co-ordination between mapping and remote sensing organizations in member countries

The Conference,

Noting that there is a close similarity and complementarity between the activities of cartography and remote sensing,

Recognizing that in some member countries these activities have evolved in separate organizations without intensive co-ordination,

Recognizing further that owing to this lack of co-ordination duplication of effort occurs,

Recommends to the member countries, that they should undertake studies and steps how best to harmonize and co-ordinate cartographic and remote sensing activities at the national level.

4. Development of satellite positioning systems

The Conference,

Noting the advances made in the development of satellite positioning systems in various countries of the world,

Recognizing the advantages of such systems in speeding up and attaining greater precision in the work of control surveys in member countries,

Recommends that the capability should be completed with the minimum of delay, and that the resultant data should be made available to users in all nations.

5. Specifications for aerial photography

The Conference,

Noting that in 1970 specifications for aerial photography were published in World Cartography, 1/

1/ World Cartography, vol. X (United Nations publication, Sales No. E.70.I.4).

Recognizing that these specifications have been used widely in technical projects in developing countries,

Recognizing further that new advances have been made in the technical progress of aerial photography,

Recommends that the United Nations, through the Department of Technical Co-operation for Development, should support the updating and the publication of such specifications in a revised form.

6. Support to remote sensing activities within the Economic and Social Commission for Asia and the Pacific

The Conference,

Recognizing the increasing importance of satellite remote sensing for cartography and related activities in support of socio-economic development,

Noting the role and contribution of the Economic and Social Commission for Asia and the Pacific in the field of satellite remote sensing in creating the Regional Remote Sensing Programme and ensuring the execution of the programme, funded by the United Nations Development Programme,

1. Recommends that the General Assembly, within existing available resources, should give serious priority consideration to the establishment of a professional post for the Cartography and Remote Sensing Subprogramme in the Economic and Social Commission for Asia and the Pacific;

2. Suggests that the appointee be given responsibilities for formulating and directing additional effective remote sensing activities in the Asia and Pacific region;

3. Further recommends that these activities should include the continuation of the existing Regional Remote Sensing Programme.

7. Information gathering systems

The Conference,

Noting that many countries are impeded in their technical development owing to the lack of access to information relating to survey techniques and equipment that may possibly be available in the developed countries,

Further noting that many developing countries do not possess the funds or the facilities to evaluate the cost, reliability and utilization of information gathering systems that are developed as commercial ventures,

Recommends that a reference system should be established under the auspices of the United Nations, to which all nations may have access, that both developed and developing countries with information of this nature should make it available to the United Nations and that developed countries should also make available assessments and reports covering the latest developments in information gathering systems with estimates of costs where these are available.

8. Remote sensing data for developing countries

The Conference,

Noting the growing concern in respect of the commercialization of satellite remote sensing data, which thus imposes serious economic restraints on developing countries wishing to utilize fully these data to support their national programmes of mapping and resource development,

Urges the countries conducting satellite programmes to consider the concern of developing countries in respect of the high cost involved in purchasing the satellite data and suggests that ways be sought to assist the developing countries to utilize this new technology while operating within the constraints of their limited budgets.

9. Hydrographic surveying and nautical charting

The Conference,

Recalling the recommendations of the Group of Experts on Hydrographic Surveying and Nautical Charting ^{2/} on the vital and urgent need of developing coastal States to establish or strengthen their hydrographic services,

Recognizing that such services are essential in developing coastal States for providing the modern hydrographic data that are required to improve safety standards through the updating of navigational charts, to facilitate the exploitation of offshore hydrocarbon and mineral resources, to enable port administration and port development to be organized economically to meet local requirements, to assist in possible marine pollution control and to permit the accurate determination of maritime boundaries and enable effective coastal zone management,

Realizing that despite the full support and endorsement of such international bodies as the United Nations regional cartographic conferences, the International Maritime Organization, the International Hydrographic Organization and the International Federation of Surveyors and the recommendations of the Group of Experts in 1978, very little has been achieved in the developing coastal States for establishing or strengthening their hydrographic services since that time,

Noting that the world-wide study of hydrographic surveying and nautical charting undertaken by the International Hydrographic Bureau on behalf of the United Nations revealed large areas considered to be badly charted or not surveyed and charted at all,

Further noting that the world maritime community would benefit considerably by the development and improvement of hydrographic services in developing countries at both national and regional levels,

^{2/} See Second United Nations Regional Cartographic Conference for the Americas, Mexico City, 3-14 September 1979, vol. I, Report of the Conference (United Nations publication, Sales No. E.81.I.4), annex IV.

Recommends that:

(a) Developing coastal States, in consultation with the International Hydrographic Organization and the International Maritime Organization, should seek international funding, and be given every assistance by financing agencies, including the United Nations Development Programme, the World Bank and other development banks as well as industrialized countries, under bilateral or multilateral arrangements, for the development of hydrographic surveying and charting programmes including the establishment and strengthening of hydrographic services;

(b) Coastal States in the Asia and Pacific region should give their full support to the scheduled joint IMO/IHO Seminar/Workshop in Hydrographic Surveying and Nautical Charting to be held at Bangkok in March 1987;

(c) The United Nations should arrange, within existing resources, further similar regional seminars in developing countries.

10. Early warning systems in disaster potential areas

The Conference,

Recognizing that there are specific areas of the world where potential natural disaster conditions exist,

Noting that technology is available in the developed countries to provide early warning systems concerning potentially dangerous conditions,

1. Recommends that action should be taken to identify the areas of major potential risks in the world that can be affected by these natural phenomena, and to develop a system to enable the use of data collected from space, which can be used in forecasting natural disasters;

2. Further recommends that in such potentially dangerous regions an increased density of receiving stations should be established to permit steady monitoring of the risk conditions, with the full support and assistance of the commercial companies that manage and deal with the manipulation of this type of data.

11. Land information and geographical information systems

The Conference,

Recognizing that as competition for the world's resources continues and as land-related problems expand in their complexity and content, Governments have recognized the need for accurate, timely information in dealing with them; also, that advances in computer technology permit the generation and manipulation of more and more information at increasingly low costs, and that, as a result, the last decade has seen an intense interest in the development of computerized land information and geographical information systems around the world, the rapid escalation of which is expected to continue into the next decade,

Recognizing further that world-wide interest in land information systems is a relatively recent phenomenon, and most systems around the world are just being developed and there is a need today to begin an evaluation of these systems; and that there is further need to establish monitoring systems and bench-marks so that future evaluations may provide more useful results,

Realizing that the development, implementation and proper use of land information and geographical information systems in developing countries will promote, as set out in the Preamble and Article 55 of the Charter of the United Nations:

- (a) "Social progress and better standards of life in larger freedom;
- (b) "Higher standards of living, full employment, and conditions of economic and social progress and development;
- (c) "Solutions of international economic, social, health and related problems; and international cultural and educational co-operation",

Noting that such work is being promoted by international scientific and professional societies in the cartographic field such as the International Federation of Surveyors, the International Cartographic Association and the International Society for Photogrammetry and Remote Sensing; however, comprehensive guidelines are lacking (particularly in developing countries) for the definition, planning, implementation, management and evaluation of such systems,

Noting further that resolution 13 of the Tenth United Nations Regional Cartographic Conference for Asia and the Pacific 3/ has not been fully implemented,

1. Recommends that the Economic and Social Council should initiate measures to prepare an in-depth study on the principal features and the different variations in the use, design, implementation and management of land information and geographical information systems;
2. Recommends also that information should be gathered on the various hardware available and that this information be communicated in a standard format to interested parties;
3. Recommends further that funding for such a study should be provided by the United Nations within existing resources;
4. Recommends further that the results of the study should be published by the United Nations and that this study should be made in close co-operation with the said professional societies.

3/ Tenth United Nations Cartographic Conference for Asia and the Pacific, Bangkok, 17-28 January 1983, vol. I, Report of the Conference (United Nations publication, Sales No. E.83.I.18), chap. VII.

12. Background papers for future conferences

The Conference,

Recognizing that background papers presented at the Eleventh United Nations Regional Cartographic Conference for Asia and the Pacific were very informative and effective in establishing a background for subsequent discussions on related agenda items,

Noting that the United Nations Secretariat should be commended for introducing this concept and for providing the necessary resources to facilitate its accomplishment,

Recommends that:

- (a) The United Nations should continue to sponsor the preparation of background papers for future United Nations regional cartographic conferences;
- (b) The selection of authors for the background papers should be accomplished in collaboration with the international scientific and professional organizations;
- (c) Financial resources should be allocated by the United Nations, within existing resources, for this purpose.

13. Exchange of digital cartographic data

The Conference,

Considering:

- (a) The increasing capabilities that exist in the world to capture and receive digital cartographic data from satellites;
- (b) The ongoing creation of collections of data bases in digital form from existing maps;
- (c) The ongoing construction of software systems which utilize digital cartographic data;
- (d) The need for the nations of the world to be able to efficiently exchange digital cartographic data;

Recommends:

- (a) The convening by the United Nations of an international group of experts to recommend a standardized, universal data exchange format to facilitate the exchange of digital cartographic data;
- (b) Promotion of the use of the format in all nations of the world;
- (c) Initiation of a study of the technical means by which geo-related data bases can best be integrated on a national level.

14. Reports on the status of world mapping

The Conference,

Recognizing the need for cartographers to know of the existence of printed topographic maps and files of digital data containing topographic map data for the nations of the world and further recognizing that no central source provides reports on the status of topographic maps and digital data files,

Noting the great value of the work performed by the Cartographic Unit of the Department of Technical Co-operation for Development of the United Nations Secretariat in compiling and publishing periodically world status reports on various cartographic coverage,

Recommends that the United Nations should:

(a) Collect data on the status of printed and available topographic maps in the nations of the world at scales from 1:20,000 and smaller from its member nations;

(b) Publish at regular intervals information on the status and availability of printed topographic maps;

(c) Collect data on the existence of files of digital data containing topographic map data;

(d) Publish at regular intervals information on the status and availability of files of digital data containing topographic map data.

15. International Map of the World on the Millionth Scale (IMW)

The Conference,

Considering the findings of the report of study by the United Nations Ad Hoc Group of Experts on the International Map of the World on the Millionth Scale, 4/ which was prepared in fulfilment of resolution 9 on the future of the International Map on the Millionth Scale adopted by the Third United Nations Regional Cartographic Conference for the Americas, 5/

Recommends that:

(a) The United Nations should no longer continue to monitor the IMW programmes;

4/ E/CONF.78/BP.6.

5/ Third United Nations Regional Cartographic Conference for the Americas, New York, 19 February-1 March 1985, vol. I, Report of the Conference (United Nations publication, Sales No. E.85.I.14), chap. VII.

(b) Those countries that elect to produce millionth scale maps as part of their national map series should continue to be encouraged to use the Bonn 1962 IMW specifications for this purpose;

(c) The United Nations IMW map collections should be maintained in the United Nations Dag Hammarskjöld Library in New York.

16. Thematic mapping

The Conference,

Recognizing the importance and necessity of thematic maps for national and regional social and economic development,

Recognizing further that spatial planning of this type of development can only be achieved by monitoring the social and economic characteristics of the population,

Noting the progress that has been made in this field by some member States in the Asia and the Pacific region,

Recommends that:

(a) More attention should be directed to the mapping of the socio-economic characteristics of population as essential elements within the complex environment;

(b) More use should be made of the computer-assisted mapping techniques to create cartographic information for planning decisions;

(c) Consideration should be given to connect socio-economic thematic mapping with national and regional information land and geographical information systems.

17. Evaluation of systems for digital mapping

The Conference,

Noting the availability of turn-key interactive graphic systems from various manufacturers,

Recognizing that these systems can be used for purposes of computer-assisted cartography and digital mapping for land information or geographic information systems,

Further recognizing that computer-assisted cartography and digital mapping are important technical innovations for improved production of maps, charts and terrain information systems in both developed and developing countries,

Recommends that the United Nations should take note of evaluations being made in scientific and professional societies in the field of cartography and support, on the basis of this, an evaluation of existing systems and make this evaluation available to member countries.

18. Geographical names

The Conference,

Recalling resolution 15 A, of the Ninth United Nations Regional Cartographic Conference for Asia and the Pacific, 6/

Recognizing the importance of geographical names standardization in national mapping programmes,

Recognizing further that progress has been made towards the standardization of geographical names in the Division of Asia, South-East, and Pacific, South-West, of the United Nations Group of Experts on Geographical Names,

Recommends that member countries of the Division make all possible efforts to participate in the activities of the Division, or by contributions via correspondence to the Divisional Chairman.

19. Training course in toponymy

The Conference,

Recalling resolution 16 of the Third United Nations Regional Cartographic Conference for the Americas, 5/

Taking account of the success of the First Pilot Course in Toponymy, held in Indonesia in 1982,

Recalling also the success of a similar United Nations course held in Morocco for the Arabic-speaking countries in 1985,

Considering that the demand for such a course still exists among the member countries of the region covered by the Economic and Social Commission for Asia and the Pacific,

Recommends the holding of a second course in a member country of the Economic and Social Commission for Asia and the Pacific and requests the United Nations to seek appropriate funding for such a course.

20. Training in modern technology in the developing countries

The Conference,

Recognizing the need for imparting training to a larger number of professionals engaged in the fields of surveying and cartography, especially in the developing countries,

6/ Ninth United Nations Regional Cartographic Conference for Asia and the Pacific, Wellington, New Zealand, 11-22 February 1980, vol. I, Report of the Conference (United Nations publication, Sales No. E.81.I.2), chap. VII.

Realizing the need and importance today of training in the fields of digital mapping and satellite geodesy,

Noting that television-video is a powerful tool in training and is efficient and convenient in reaching the remotest areas of member countries,

1. Recommends that the United Nations Department of Technical Co-operation for Development should be encouraged to prepare an inventory of video-tapes for training at all levels in the various modern technologies of surveying, cartography, digital mapping, satellite geodesy, reproduction and printing, and that this inventory should be updated regularly with advances in technology;

2. Also recommends that the updated inventory should be made available to member nations on an annual basis;

3. Further recommends that the Department of Technical Co-operation for Development should promote the use of such tapes wherever feasible in technical assistance projects of the United Nations Development Programme.

21. Availability of training programmes

The Conference,

Noting that there are a number of countries offering education and training programmes in surveying and mapping, including possible funding to obtain such education and training,

Further noting that such information may not be available to all member nations, especially those which may need the education and training,

Recommends that:

(a) The United Nations should compile this information on the type/kind of education and training available in the different countries, the duration, and the possible funding that may be available to support such studies;

(b) This information should be disseminated to member countries.

22. Production of photo-maps and orthophoto-maps

The Conference,

Recognizing that photo-maps and orthophoto-maps are an effective means of producing as well as updating topographic base maps, particularly at large scales,

Noting that aerial photographs and orthophoto-maps are, in some countries not freely available,

Urges member countries to produce photo-maps and orthophoto-maps for use as map substitutes.

23. Vote of thanks

The Conference

1. Expresses its heartfelt thanks to the Economic and Social Commission for Asia and the Pacific for the excellent arrangements and services provided for the Conference;
2. Expresses its gratitude to Her Royal Highness Princess Maha Chakri Sirindhorn for having graced the Conference with her presence;
3. Further expresses its deep appreciation to the Government of the Kingdom of Thailand for the hospitality extended to the participants;
4. Also expresses its appreciation to the President and the officers of the Conference for the way in which they have conducted the meeting and its gratitude to the officers and staff of the United Nations Secretariat for their hard work.

Annex I

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Search and Rescue, Bangkok

D. International scientific organizations

International Federation of Surveyors (FIG)	Mr. C. H. Weir, President
International Cartographic Association (ICA)	Mr. Joel L. Morrison, President
International Society for Photogrammetry and Remote Sensing (ISPRS)	Mr. Gottfried Konecny, President
International Hydrographic Organization (IHO)	Admiral F. Fraser, President
International Geographical Union (IGU)	Ooi Jin Bee, Vice-President
Scientific Committee on Antarctic Research (SCAR)	Mr. C. Veenstra, Director

E. Representatives of United Nations Secretariat units

Economic and Social Commission for Asia and the Pacific	Mr. P. J. Bakker, Chief Mineral Resources Section
	Mr. A.P. Kadushkin, Economic Affairs Officer Mineral Resources Section Natural Resources Division

F. Secretariat of the Conference

Executive Secretary	Mr. Max C. de Henseler, Chief Cartography Unit Department of Technical Co-operation for Development
Deputy Executive Secretary	Mr. Dmitry S. Votrin Cartography Unit Department of Technical Co-operation for Development

Annex II

AGENDA

1. Opening of the Conference.
2. Election of the President of the Conference.
3. Organizational matters:
 - (a) Adoption of the rules of procedure;
 - (b) Adoption of the agenda;
 - (c) Election of officers other than the President;
 - (d) Organization of work;
 - (e) Credentials of representatives to the Conference;
 - (f) Establishment of technical committees.
4. Country reports and reports on the progress made since the Tenth Conference.
5. Cartographic data acquisition and supporting activities:
 - (a) Conventional and satellite geodesy;
 - (b) Acquisition of cartographic data from space;
 - (c) Aerial photography and other remote sensing activities;
 - (d) Surveys for mapping and charting;
 - (e) Hydrographic surveying and nautical charting;
 - (f) Development of digital data bases.
6. Cartographic data manipulation:
 - (a) Conventional and digital large-scale topographic map compilation;
 - (b) Conventional and digital small-scale topographic map compilation;
 - (c) Conventional and digital charting compilation;
 - (d) Compilation of small-scale maps and charts, the International Map of the World on the Millionth Scale (IMW), national and regional atlases etc.;
 - (e) Digital terrain models;
 - (f) Conventional and digital cadastral mapping;

- (g) Land information systems;
 - (h) Map revision techniques;
 - (i) Thematic mapping.
7. Cartographic data depiction:
 - (a) Conventional and digital map and chart production and publishing;
 - (b) Reproduction and printing.
 8. Policies and management of national mapping and charting programmes:
 - (a) Matters related to the establishment of national programmes;
 - (b) Map specifications;
 - (c) Geographical names;
 - (d) Training and education;
 - (e) Map and chart sales and distribution policies and practices.
 9. Technical assistance and transfer of technology.
 10. Provisional agenda for the Twelfth United Nations Regional Cartographic Conference for Asia and the Pacific.
 11. Adoption of the report of the Conference.

Annex III

RULES OF PROCEDURE

CHAPTER I. REPRESENTATION AND CREDENTIALS

RULE 1

Each State participating in the Conference shall be represented by a head of delegation and such other accredited representatives, alternate representatives, experts and advisers as may be required.

RULE 2

The credentials of representatives and the names of alternate representatives, experts and advisers shall be submitted to the Executive Secretary of the Conference if possible not later than 24 hours after the opening of the Conference. The credentials shall be issued either by the Head of the State or Government or by the Minister for Foreign Affairs.

RULE 3

The President and the Vice-Presidents shall examine the credentials and report to the Conference without delay.

RULE 4

Pending a decision of the Conference on their credentials, representatives shall be entitled to participate provisionally in the Conference.

CHAPTER II. OFFICERS

RULE 5

The Conference shall elect a President, two Vice-Presidents and a Rapporteur from among the representatives of the States participating in the Conference.

RULE 6

The President shall preside over the plenary meetings of the Conference. He shall not vote but may designate another member of his delegation to vote in his place.

RULE 7

If the President is absent from a meeting or any part thereof, a Vice-President designated by him shall preside. A Vice-President acting as President shall have the same powers and duties as the President.

CHAPTER III. SECRETARIAT

RULE 8

The Executive Secretary of the Conference appointed by the Secretary-General of the United Nations shall act in that capacity in all meetings of the Conference. He may appoint a deputy to take his place at any meeting.

RULE 9

The Executive Secretary or his representative may at any meeting make either oral or written statements concerning any question under consideration.

RULE 10

The Executive Secretary shall provide and direct such staff as is required by the Conference. He shall be responsible for making all necessary arrangements for meetings and generally shall perform all other work which the Conference may require.

CHAPTER IV. CONDUCT OF BUSINESS

RULE 11

Representatives of a majority of the States participating in the Conference shall constitute a quorum.

RULE 12

In addition to exercising the powers conferred upon him elsewhere by these rules, the President shall declare the opening and closing of each plenary meeting of the Conference, direct the discussion at such meetings, ensure observance of these rules, accord the right to speak, put questions to the vote and announce decisions. He shall rule on points of order and, subject to these rules of procedure, shall have complete control over the proceedings.

RULE 13

The President may, in the course of the discussions, propose to the Conference the closure of the list of speakers or the closure of the debate. He may also propose the suspension or the adjournment of the meeting or the adjournment of the debate on the item under discussion. He may also call a speaker to order if his remarks are not relevant to the matter under discussion.

RULE 14

The President, in the exercise of his functions, remains under the authority of the Conference.

RULE 15

During the discussion on any matter, a representative may at any time raise a point of order, which shall be immediately decided by the President in accordance with these rules of procedure. A representative may appeal against the ruling of the President. The appeal shall be immediately put to the vote and the President's ruling shall stand unless overruled by a majority of the representatives present and voting. A representative raising a point of order may not speak on the substance of the matter under discussion.

RULE 16

During the discussion of any matter, a representative may move the adjournment of the debate on the item under discussion. Any such motion shall have priority. In addition to the proposer of the motion, one representative shall be allowed to speak in favour of, and one representative against, the motion.

RULE 17

During the course of the debate, the President may announce the list of speakers and, with the consent of the Conference, declare the list closed. The President may, however, accord the right of reply to any representative if, in his opinion, a speech delivered after he has declared the list closed makes this desirable. When the debate on an item is concluded because there are no other speakers, the President shall declare the debate closed. Such closure shall have the same effect as closure by decision of the Conference pursuant to rule 18.

RULE 18

A representative may, at any time, move the closure of the debate on the item under discussion, whether or not any other representative has signified his wish to speak. Permission to speak on the motion shall be accorded only to two speakers opposing the closure, after which the motion shall be put to the vote immediately.

RULE 19

1. No one may address the Conference without having previously obtained the permission of the President. Subject to rules 15 to 18, the President shall call upon speakers in the order in which they signify their desire to speak.

2. Debate shall be confined to the question before the Conference and the President may call a speaker to order if his remarks are not relevant to the subject under discussion.

3. The Conference may limit the time allowed to speakers and the number of times the representative of each State may speak on a question; permission to speak on a motion to set such limits shall be accorded only to two representatives in favour of and to two opposing such limits, after which the motion shall be put to the vote immediately. In any event, the President shall limit interventions on procedural questions to a maximum of five minutes. When the debate is limited and a speaker exceeds the allotted time, the President shall call the speaker to order without delay.

RULE 20

Proposals and amendments shall normally be introduced in writing and submitted to the Executive Secretary of the Conference, who shall circulate copies to the delegations. As a general rule, no proposal shall be discussed or put to the vote at any meeting of the Conference unless copies of it have been circulated to all delegations not later than the day preceding the meeting. The President may, however, permit the discussion and consideration of amendments or motions as to procedure even though these amendments or motions have not been circulated or have only been circulated the same day.

RULE 21

A proposal, amendment or motion may be withdrawn by its sponsor at any time before voting on it has commenced, provided that it has not been amended. A proposal or a motion thus withdrawn may be reintroduced by any representative.

RULE 22

When a proposal or an amendment has been adopted or rejected, it may not be reconsidered unless the Conference, by a two-thirds majority of the representatives present and voting, so decides. Permission to speak on the motion to reconsider shall be accorded only to two speakers opposing the motion, after which it shall be put to the vote immediately.

CHAPTER V. VOTING

RULE 23

Each State participating in the Conference shall have one vote, and the decisions of the Conference shall be made by a majority of the representatives present and voting.

RULE 24

For the purpose of these rules, the phrase "representatives present and voting" means representatives casting an affirmative or negative vote. Representatives who abstain from voting shall be considered as not voting.

RULE 25

The Conference shall normally vote by show of hands, but any representative may request a roll-call, which shall be taken in the English alphabetical order of the names of the States participating in the Conference, beginning with the delegation whose name is drawn by lot by the President.

RULE 26

After the President has announced the commencement of voting, no representative shall interrupt the vote except on a point of order in connection with the actual process of voting. Explanations of their votes by representatives may, however, be permitted by the President either before or after the voting. The President may limit the time to be allowed for such explanations.

RULE 27

Parts of a proposal shall be voted on separately if a representative requests that the proposal be divided. Those parts of the proposal which have been approved shall then be put to the vote as a whole; if all the operative parts of a proposal have been rejected, the proposal shall be considered rejected as a whole. For the purpose of this rule, the word "proposal" shall be considered as including amendments.

RULE 28

When an amendment is moved to a proposal, the amendment shall be voted on first. When two or more amendments are moved to a proposal, the Conference shall first vote on the amendment furthest removed in substance from the original proposal and then on the amendment next furthest removed therefrom, and so on until all the amendments have been put to the vote. Where, however, the adoption of one amendment necessarily implies the rejection of another amendment, the latter amendment shall not be put to the vote. If one or more amendments are adopted the amended proposal shall then be voted on. A proposal is considered an amendment to another proposal if it merely adds to, deletes from or revises part of that proposal.

RULE 29

If two or more proposals relate to the same question, the Conference shall, unless it decides otherwise, vote on the proposals in the order in which they were submitted. The Conference may, after each vote on a proposal, decide whether to vote on the next proposal.

RULE 30

All elections shall be held by secret ballot, unless otherwise decided by the Conference.

RULE 31

1. If, when one person or one delegation is to be elected, no candidate obtains the required majority in the first ballot, a second ballot shall be taken, which shall be restricted to the two candidates obtaining the largest number of votes.

2. In the case of a tie in the first ballot among the candidates obtaining the second largest number of votes, a special ballot shall be held for the purpose of reducing the number of candidates to two. In the case of a tie among three or more candidates obtaining the largest number of votes, a second ballot shall be held; if a tie results among more than two candidates, the number shall be reduced to two by lot.

RULE 32

If a vote is equally divided on matters other than elections, a second vote shall be taken after an adjournment of the meeting for 15 minutes. If this vote is also equally divided, the proposal shall be regarded as rejected.

CHAPTER VI. OFFICIAL AND WORKING LANGUAGES

RULE 33

Chinese, English, French and Russian shall be the official languages of the Conference, and English and French the working languages of the Conference.

RULE 34

Speeches made in one of the official languages of the Conference shall be interpreted into the other such languages. A representative may speak in a language other than a language of the Conference if the delegation concerned provides for interpretation into one such language.

CHAPTER VII. SOUND RECORDINGS

RULE 35

Plenary meetings of the Conference and committee meetings shall have sound recordings and such recordings shall be kept by the Secretariat in English only.

CHAPTER VIII. PUBLIC AND PRIVATE MEETINGS

RULE 36

The plenary meetings of the Conference and the meetings of its committees shall be held in public unless the body concerned decides that exceptional circumstances require that a particular meeting be held in private.

CHAPTER IX. COMMITTEES

RULE 37

The Conference may establish such committees as may be necessary for the performance of its functions. Items relating to the same category of subjects may be referred to the committee dealing with that category of subject.

RULE 38

Each committee shall elect its own Chairman, Vice-Chairman and Rapporteur.

RULE 39

In so far as they are applicable, these rules shall apply to the proceedings of the committees. A committee may dispense with certain language interpretations.

CHAPTER X. OBSERVERS

RULE 40

Representatives of associate members of the Economic and Social Commission for Asia and the Pacific that are not independent States may participate, without the right to vote, in the deliberations of the Conference and its committees.

RULE 41

1. Representatives of the specialized agencies invited to the Conference may participate, without the right to vote, in the deliberations of the Conference and its committees, on the invitation of the President or the Chairman of a committee, as the case may be, on questions within the scope of their activities.

2. Written statements of such specialized agencies shall be distributed by the Secretariat to the delegations at the Conference in the languages and in the quantities that such statements are made available to the Secretariat.

RULE 42

1. Observers designated by other intergovernmental organizations and non-governmental organizations invited to the Conference may participate, without the right to vote, in the deliberations of the Conference and its committees and, on the invitation of the President or the Chairman of a committee, as the case may be, may make oral statements on subjects in which these organizations have a special competence.

2. Written statements of such organizations on subjects in which they have a special competence and which are related to the work of the Conference shall be distributed by the Secretariat in the languages and in the quantities that such statements are made available to the Secretariat.

CHAPTER XI. AMENDMENTS

RULE 43

These rules of procedure may be amended by a decision of the Conference.

Annex IV

LIST OF DOCUMENTS

<u>Document No.</u>	<u>Title</u>	<u>Agenda item</u>
E/CONF.78/1	Provisional agenda	3 (b)
E/CONF.78/2	Provisional rules of procedure	3 (a)
E/CONF.78/3 and Add. 1-6, 8-9	Draft report of the Conference	11
E/CONF.78/4	Report of the Conference	11
E/CONF.78/3/Add.7	List of participants	
E/CONF.78/3/Add.10	List of documents	
E/CONF.78/INF/1	Documentation for the Conference	
E/CONF.78/INF/2	Advance information regarding general arrangements of interest to the participants	
E/CONF.78/INF/3	Provisional list of documents	
E/CONF.78/INF/4	Provisional list of participants	
E/CONF.78/INF/5	Message from Mr. Xie Qimei, Under-Secretary-General, Department of Technical Co-operation for Development	
E/CONF.78/INF/6	Opening address by the Executive Secretary of the Conference	
E/CONF.78/INF/7	Election of officers	3 (c) and (f)
E/CONF.78/L.1*	Chart prepared by computer-aided system for nautical chart compilation (submitted by Japan)	6 (c)
E/CONF.78/L.2*	Current status of electronic chart display system in Japan (ECDIS) (submitted by Japan)	6 (c)
E/CONF.78/L.3*	Observation project of the Japanese geodetic satellite AJISAI (submitted by Japan)	5 (a)

* Abstract available in French only.

<u>Document No.</u>	<u>Title</u>	<u>Agenda item</u>
E/CONF.78/L.4	Mapping activities in Finland (submitted by Finland)	4
E/CONF.78/L.5*	Global positioning system at work (submitted by Finland)	5 (a)
E/CONF.78/L.6*	FINGIS: software and data manipulation (submitted by Finland)	6 (g)
E/CONF.78/L.7*	Computer-assisted map production and an approach to integrated land information systems (submitted by Finland)	6 (g)
E/CONF.78/L.8*	Low cost digital mapping and data management for upgrading residential projects (submitted by Finland)	6 (a), (i)
E/CONF.78/L.9*	Background information on the International Federation of Surveyors (submitted by the International Federation of Surveyors)	9
E/CONF.78/L.10	United Nations technical co-operation activities in surveying, mapping and charting, with special emphasis on Asia and the Pacific (submitted by the United Nations Secretariat)	9
E/CONF.78/L.11	Proposals concerning long- and short-term professional training of technical personnel in developing countries (submitted by Poland)	8 (d)
E/CONF.78/L.12	Institutionalization of information systems for the purpose of listing and evaluating data relevant to the environment: a contribution to international aid and national development in "threshold countries" and countries of the third world (submitted by the Federal Republic of Germany)	5 (c)
E/CONF.78/L.13*	Hydrographic surveying and nautical charting (submitted by the Federal Republic of Germany)	5 (e)
E/CONF.78/L.14*	Development and problems of choropleth mapping for regional planning (submitted by the Federal Republic of Germany)	6 (i)
E/CONF.78/L.15	Digital elevation models for the orthophoto map (submitted by the Federal Republic of Germany)	6 (e)

<u>Document No.</u>	<u>Title</u>	<u>Agenda item</u>
E/CONF.78/L.16**	Le système mondial de positionnement par satellites: GPS (submitted by France)	5 (a)
E/CONF.78/L.17**	Le potentiel des images SPOT pour la cartographie topographique et numérique (submitted by France)	5 (b)
E/CONF.78/L.18**	SPOT: un regard sur la terre pour une meilleure gestion de nos ressources (submitted by France)	5 (b)
E/CONF.78/L.19**	Le satellite SPOT et les spatiocartes (submitted by France)	5 (b)
E/CONF.78/L.20**	Propositions de typologie et de terminologie pour la cartographie sur fond d'image (submitted by Japan)	5 (b)
E/CONF.78/L.21**	Cartographie à grande échelle dans les pays neufs (submitted by France)	6 (a)
E/CONF.78/L.22*	Standardization of digital mapping (submitted by Japan)	6 (a)
E/CONF.78/L.23*	Cartography work in Japan, 1982-1985 (submitted by Japan)	4
E/CONF.78/L.24*	Report by the Government of Japan on technical co-operation (submitted by Japan)	9
E/CONF.78/L.25*	Digital map information in Japan (submitted by Japan)	6 (e)
E/CONF.78/L.26	Twenty-five years of the Federal Republic of Germany's technical assistance and transfer of technology in the fields of surveying and mapping (submitted by the Federal Republic of Germany)	9
E/CONF.78/L.27	Satellite laser ranging with mobile systems - MTLRS verification and results (submitted by the Federal Republic of Germany)	5 (a)

** Abstract available in English only.

<u>Document No.</u>	<u>Title</u>	<u>Agenda item</u>
E/CONF.78/L.28	Geometrical and logical encoding of field data for large-scale topographical mapping using self-recording tacheometers and electronic graphic data processing (submitted by the Federal Republic of Germany)	6 (a)
E/CONF.78/L.29	10 years of practical experience in digital large-scale topographic map compilation (submitted by the Federal Republic of Germany)	6 (a)
E/CONF.78/L.30	Digital information system for cadastral survey (submitted by Japan)	6 (f)
E/CONF.78/L.31	Computer aided mapping system for land classification mapping (submitted by Japan)	6 (i)
E/CONF.78/L.32	Digital data formats (submitted by the United States of America)	5 (f)
E/CONF.78/L.33	Processing and exchange of digital bathymetry (submitted by the United States of America)	5 (f)
E/CONF.78/L.34	Implementation of the North American datum of 1983 into the National Ocean Survey (NOS) aeronautical charting program (submitted by the United States of America)	6 (i)
E/CONF.78/L.35	The aeronautical chart automation project - data base concept (submitted by the United States of America)	6 (c)
E/CONF.78/L.36	Mark II: the next step in digital systems development at the United States Geological Survey (submitted by the United States of America)	5 (f)
E/CONF.78/L.37	A prospective case for a national land data system: recent developments at the Census Bureau and the United States Geological Survey (submitted by the United States of America)	6 (g)
E/CONF.78/L.38	Report on the progress of surveying and mapping in the People's Republic of China during 1983-1986 (submitted by the People's Republic of China)	4
E/CONF.78/L.39	Present situation of China's education in surveying and mapping (submitted by the People's Republic of China)	8 (d)

<u>Document No.</u>	<u>Title</u>	<u>Agenda item</u>
E/CONF.78/L.40	Mapping in Korea (submitted by the Republic of Korea)	4
E/CONF.78/L.41	Indonesia-Australia co-operation in remote sensing (submitted by Indonesia)	9
E/CONF.78/L.42	Cartographic activities in Nepal (submitted by Nepal)	4
E/CONF.78/L.43	Progress report on cartographic activities in Thailand (submitted by Thailand)	4
E/CONF.78/L.44	Philippine country report (submitted by the Philippines)	4
E/CONF.78/L.45	Report on cartographic activities in New Zealand, 1983-1986 (submitted by New Zealand)	4
E/CONF.78/L.46	Report on cartographic activities of the United States of America (submitted by the United States of America)	4
E/CONF.78/L.47	Report on mapping and surveying activities in the Republic of Singapore, 1983-1986 (submitted by Singapore)	4
E/CONF.78/L.48	Cartographic activities in Malaysia, 1984-1986 (submitted by Malaysia)	4
E/CONF.78/L.49	Report on survey and mapping activity in Indonesia, 1982-1986 (submitted by Indonesia)	4
E/CONF.78/L.50	Radar/laser survey and mapping in Indonesia - an experiment (submitted by Indonesia)	5 (c)
E/CONF.78/L.51	High resolution synthetic aperture radar data of Indonesia (submitted by Indonesia)	5 (c)
E/CONF.78/L.52	Application of quadtrees for fast geometric access to cadastral data (submitted by the Federal Republic of Germany)	6 (f)

<u>Document No.</u>	<u>Title</u>	<u>Agenda item</u>
E/CONF.78/L.53	Digital base maps compilation for geographic information system development in the framework of land resources evaluation and planning programme of Indonesia (submitted by Indonesia)	6 (g)
E/CONF.78/L.54	Manual and digital cartography in the geological research and development centre of Indonesia - a status report (submitted by Indonesia)	6 (i)
E/CONF.78/L.55	Lessons from digital topographic mapping system experience (submitted by the Union of Soviet Socialist Republics)	6 (g)
E/CONF.78/L.56	Centres of surveying, mapping and cartographic information and automated cartographic system as consumer of service (submitted by the Union of Soviet Socialist Republics)	6 (g)
E/CONF.78/L.57	The map of recent vertical crustal movements for the USSR territory by geodetic data (submitted by the Union of Soviet Socialist Republics)	6 (i)
E/CONF.78/L.58	Land information systems: a challenge to surveying education and training programmes in Indonesia (submitted by Indonesia)	8 (d)
E/CONF.78/L.59	Divisional report of the United Nations Group of Experts on Geographical Names, for the Division of Asia, South-East, and Pacific, South-West (submitted by the Asia, South-East, and Pacific, South-West, Division of the United Nations Group of Experts on Geographical Names)	8 (c)
E/CONF.78/L.60	Training and education in surveying and mapping in Indonesia (submitted by Indonesia)	8 (d)
E/CONF.78/L.61	Technical progress in the land titling project: Thailand (submitted by Thailand)	6 (f)
E/CONF.78/L.62	Activities of the French Institut Geographique National in Asia and the Pacific since the last United Nations Regional Cartographic Conference (1983) (submitted by France)	4

<u>Document No.</u>	<u>Title</u>	<u>Agenda item</u>
E/CONF.78/L.63	Cartographic activities in Ethiopia (submitted by Ethiopia)	4
E/CONF.78/L.64	Remarks and suggestions on transfer of technology in the field of mapping with the use of remotely sensed data (submitted by Poland)	9
E/CONF.78/L.65	Geomatics: a key to country development? (submitted by the Netherlands)	8 (d)
E/CONF.78/L.66	Surveying and mapping in the USSR - Country report (submitted by the Union of Soviet Socialist Republics)	4
E/CONF.78/L.67	Country report (submitted by the Federal Republic of Germany)	4
E/CONF.78/L.68	A review of the development in surveying and mapping in Hong Kong - 1983 to 1987 (submitted by Hong Kong)	4
E/CONF.78/L.69	Topographic surveys and mapping activities in India (1983-1985) (submitted by India)	4
E/CONF.78/L.70	Information sur les activites de GEOKART couvrant la periode 1983-1986 (submitted by Poland)	9
E/CONF.78/L.71	Training in survey and mapping for overseas students in the United Kingdom (submitted by the United Kingdom)	8 (d)
E/CONF.78/L.72	United Kingdom national report on cartographic activities in Asia and the Pacific, December 1982-September 1986 (submitted by the United Kingdom)	4
E/CONF.78/L.73	The Queensland educational model for surveying, mapping and land information studies in Australia (submitted by Australia)	8 (d)
E/CONF.78/L.74	Report on the progress in surveying and mapping in Australia during 1983-1986 (submitted by Australia)	4

<u>Document No.</u>	<u>Title</u>	<u>Agenda item</u>
<u>Background papers</u>		
E/CONF.78/BP.1	Cartographic data acquisition and supporting activities (submitted by the Secretariat)	5
E/CONF.78/BP.2 and Add.1	Cartographic data manipulation in the computer age (submitted by the Secretariat)	6
E/CONF.78/BP.3	Cartographic data depiction - digital/conventional (submitted by the Secretariat)	7
E/CONF.78/BP.4	Policies and management of national mapping and charting programmes (submitted by the Secretariat)	8
E/CONF.78/BP.5	A system approach to the design of land information systems (submitted by the Secretariat)	6 (g)
E/CONF.78/BP.6	Report of the meeting of the United Nations <u>Ad Hoc</u> Group of Experts on the International Map of the World on the Millionth Scale (IMW) (submitted by the Secretariat)	6 (d)
E/CONF.78/BP.7	Status of the world topographic and cadastral mapping (submitted by the Secretariat)	4
<u>Conference room papers</u>		
E/CONF.78/CRP.1	Provisional schedule and allocation of agenda items to plenary and committees	3 (d)
E/CONF.78/CRP.2	3rd South-East Asian Survey Congress	9
E/CONF.78/CRP.3	Australia Surveys	4
<u>Other</u>		
ESA/RT/C/GN/9	Report of the United Nations Group of Experts on Geographical Names on the work of its eleventh session	8 (c)
ESA/RT/C/GN/10	Report of the United Nations Group of Experts on Geographical Names on the work of its twelfth session	8 (c)

<u>Document No.</u>	<u>Title</u>	<u>Agenda item</u>
E/CONF.77/L.1	Report of the Meeting of the <u>Ad Hoc</u> Group of Experts on Cadastral Surveying and Land Information Systems	6 (f), (g)
E/CONF.77/L.12	Status of hydrographic surveying and nautical charting world wide	5 (e)