

TWELFTH UNITED NATIONS REGIONAL CARTOGRAPHIC CONFERENCE FOR ASIA AND THE PACIFIC

Bangkok, 20–28 February 1991

Vol. I. – Report of the Conference



UNITED NATIONS

Department of Technical Co-operation for Development

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NOTE

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

The proceedings of the Twelfth United Nations Regional Cartographic Conference for Asia and the Pacific, held at Bangkok, Thailand, from 20 to 28 February 1991, 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/F.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/F.86.I.11) for the Tenth Conference; E/CONF.78/4 (Sales No. E.87.I.13) and E/CONF.78/4/Add.1 (Sales No. E/F.88.I.18) for the Eleventh Conference.

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I. ORGANIZATION OF THE CONFERENCE

A. Terms of reference

1. The Twelfth United Nations Regional Cartographic Conference for Asia and the Pacific was held at Bangkok from 20 to 28 February 1991. The Conference was held in accordance with Economic and Social Council decision 1987/136 of 28 May 1987.

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 Cooperation for Development.

C. Attendance

3. The Conference was attended by 186 representatives and observers of 40 countries and territories, the Economic and Social Commission for Asia and the Pacific, 8 specialized agencies and 4 intergovernmental and international scientific organizations. The list of participants appears as annex I to the present report.

D. Agenda

4. The Conference adopted its agenda as contained in document E/CONF.83/1. The agenda, as adopted, appears as annex II to the present report.

E. Adoption of the rules of procedure

5. At its first plenary meeting, the Conference adopted, without change, its Rules of Procedure, as adopted by the Eleventh United Nations Regional Cartography Conference for Asia and the Pacific and as contained in document E/CONF.83/2. 1

F. Election of officers

6. The Conference elected the following officers:

President: Lieutenant-General Methee Smutharak (Thailand)

First Vice-President: Yang Kai (China)

Second Vice-President: Ugen Takchhu (Bhutan)

Rapporteur: Wee Soon Kiang (Singapore)

G. Organization of work

7. 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 such an exhibition could take place only if there was an understanding that the sole responsibility for the content of the exhibited cartographic products rested entirely with the delegations exhibiting their products and that the Secretariat was in no way responsible for the content of the exhibited material. 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

8. 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

9. Agenda items 1, 2, 3, 4, 9, 10 and 11 were considered at plenary meetings. A working group, comprising the chairmen of the technical committees was established to consider agenda item 10.

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

Committee I CARTOGRAPHIC DATA ACQUISITION AND SUPPORTING ACTIVITIES

Chairman: Jacub Rais (Indonesia)

Vice-Chairman: Mohamed Abdul-Majid (Malaysia)

Rapporteur: Wonik Kim (Republic of Korea)

Committee II CARTOGRAPHIC DATA MANIPULATION

Chairman: Renato B. Feir (Philippines)

Vice-Chairman: B. N. Shrestha (Nepal)

Rapporteur: Takahiro Sato (Japan)

Committee III CARTOGRAPHIC DATA DEPICTION

Chairman: Graham Lindsay (Australia)

Vice-Chairman: Mahbub Karim (Bangladesh)

Rapporteur: William Robertson (New Zealand)

Committee IV POLICIES AND MANAGEMENT

Chairman: Victor Jashenko (USSR)

Vice-Chairman: George Waston (Canada)

Rapporteur: John Porter (Australia)

I. Documentation

11. A list of the documents submitted to the Conference appears as annex III to the present report. The technical papers are to be published in a separate volume, after review and editing, as proceedings of the Conference.

J. Report on credentials

12. 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.

K. Vote of thanks

13. At its closing meeting, the Conference adopted by acclamation a vote of thanks 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.

II. SUMMARY OF PLENARY MEETINGS

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

14. The Conference considered 18 reports submitted by countries and areas under item 4. They are:

Australia	E/CONF.83/INF.7
China	E/CONF.83/INF.11
France	E/CONF.83/L.38
Germany*	E/CONF.83/INF.14
Hong Kong	E/CONF.83/INF.48
Indonesia	E/CONF.83/INF.29
Japan	E/CONF.83/L.10
Malaysia	E/CONF.83/INF.37
Myanmar	E/CONF.83/INF.44
Nepal	E/CONF.83/INF.38
New Zealand	E/CONF.83/L.22
Philippines	E/CONF.83/INF.49
Korea, Republic of	E/CONF.83/INF.35
Singapore	E/CONF.83/INF.33
Thailand	E/CONF.83/INF.21
United Kingdom of Great Britain and Northern Ireland	E/CONF.83/L.51
United States of America	E/CONF.83/L.24
Union of Soviet Socialist Republics	E/CONF.83/L.17

* Through accession of the German Democratic Republic to the Federal Republic of Germany with effect from 3 October 1990, the two German States have united to form one sovereign State. As from the date of unification, the Federal Republic of Germany acts in the United Nations under the designation of "Germany".

Item 10. Provisional agenda of the Thirteenth United Nations Regional Conference for Asia and the Pacific

16. An informal working group was formed to discuss proposals for items to be included in the agenda of the Thirteenth United Nations Regional Cartographic Conference for Asia and the Pacific. The Working Group recommended that the Thirteenth Conference should be held at Bangkok in early 1994 and that the duration should be seven working days.

17. The Working Group recognized the importance of the regional conferences as a focal point for regional cooperation and possible transfer of technology and expertise. Accordingly, the agendas of the previous conferences were reviewed in the light of needs and requirements of the region and a proposal submitted to the plenary meeting of the Conference.

18. Material discussions were held, stressing that themes for future conferences should look forward rather than report on past accomplishments. In view of the impact of technology and its bearing on policy, economy and development in the surveying, charting and mapping fields, the Conference recommended that the provisional agenda for the Thirteenth United Nations Regional Cartographic Conference should be grouped under the following headings:

(a) Current status and issues of surveying, charting and mapping on the national level, needs and requirements versus reality in the region;

(b) New trends in technology, and their applications;

(c) Human resources development;

(d) Regional cooperation and technology transfer.

19. In addition, the provisional agenda will include items dealing with the organization of the Conference and with country reports.

20. Under this item the Conference, recognizing the increasing rapid developments in technology, recommended that:

(a) The Conference should be held at three-year intervals as was practised from the First to the Ninth Conference instead of at the four-year intervals, as adopted since the Tenth Conference. It was recommended that the Thirteenth United Nations Regional Cartographic Conference for Asia and the Pacific should be held in early 1994, taking into consideration that the next Congress of the International Federation of Surveyors (FIG) was scheduled to take place in March 1994 in Australia;

(b) A technical meeting be held prior to the Thirteenth Conference. In this connection, New Zealand offered, subject to final approval of the Government, to host the venue for this meeting in 1993 on a date to be announced. The United Nations Secretariat was to be approached to secure financial assistance for the technical meeting.

21. Thirty-three draft resolutions were presented to the Conference and were subsequently adopted. (For the text of the resolutions, see chapter VII.)

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

22. The work of Committee I covered agenda item 5. Twenty papers were presented relating to the following sub-items:

- (a) Conventional and satellite geodesy;
- (b) Acquisition of cartographic data from airborne and space platforms;
- (c) Surveys for mapping and drafting;
- (d) Hydrographic surveying and nautical charting.

23. On the first sub-item, six papers were presented. A background paper (E/CONF.83/BP.7), submitted by the Secretariat, reviewed the current status of devices and systems for data capture, such as total stations, satellite positioning systems, photogrammetric work stations, remote sensors, line digitizers and raster scanners, emphasizing their technical characteristics and recent developments. Phenomenal advances have been made in recent years in the Global Positioning System (GPS) and remote sensing, and it is expected that future developments will improve the visibility, resolution and accuracy of space sensors and transmitters. New developments in data storage technology were also emphasized, especially those involving optical discs. A report (E/CONF.83/L.11) submitted by Japan dealt with the development of marine geodetic controls, based on the result of precise geodetic observations made by the Japan Hydrographic Department using satellite geodesy techniques and emphasizing the need for determination of the regional geodetic systems.

24. The first DORIS receiver (Doppler Orbitography and radar positioning integrated by satellite) was launched successfully in January 1990 by France (E/CONF.83/L.39). A global network of 36 tracking stations is now fully operational, and the first measurements are already available and significant. They can be improved before mid-1992 with the launching of the complete DORIS system.

25. Research on the employment of the Global Positioning System (GPS) by the Institut géographique national (IGN) is oriented on the cinematic GPS (1 fixed antenna, 1 "running" antenna) with results of the same degree of accuracy as the static GPS (E/CONF.83/L.41).

26. The first applications will be for small local networks (size 30 sq km) auxiliary points in geodesy and the use of GPS in aerial survey. The time spent in the field or during computations will be significantly reduced (E/CONF.83/L.42).

27. The United States of America submitted a paper (E/CONF.83/L.31), describing the development of the Defense Mapping Agency (DMA) of the World Geodetic System 84 (WGS-84), representing the DMA's state-of-the-art modelling of the earth from a geometric, geodetic and gravitational standpoint. The WGS-84 replaces its predecessor, WGS-72, and relates to 83 local geodetic datums through a distribution of 1,591 Doppler points spread over six continents common to both systems, thus contributing towards the simplification of global mapping and charting.

28. Germany,* in its paper E/CONF.83/INF.19, gave details on the establishment of a new European Reference Frame (EUREF), coordinated by the International Association of Geodesy (IAG) and CERCO (Commission européenne des responsables de cartographie officielle). EUREF is based on the International Terrestrial Reference Frame (ITRF-88), and agrees with WGS-84, which is based on NNSS Doppler results only, to within 1 metre. The paper details the various EUREF-GPS campaigns undertaken in 1989 and 1990 connecting selected points in the various European triangulation networks with the North American networks, via precise GPS, laser ranging, and very long baseline interferometry (VLBI) observations. Owing to the huge dataset generated, the paper further mentioned that data processing via its newly developed receiver independent exchange format (RINEX) is still ongoing, and a final evaluation cannot be given for the present.

29. In consideration of agenda item 5(b), the Secretariat presented a document (E/CONF.83/BP.5) in response to a recommendation at the Eleventh Conference that a revision be undertaken on the guideline it had previously prepared on standard technical specifications for aerial photography. The specification covers technical requirements and standards of equipment, performance and recommended procedures for the procurement of aerial photographs with proper metric qualities for photogrammetric applications, including analytical triangulation, stereotriangulation and map compilation, as well as conventional photogrammetric compilation for cadastral, topographic and special purpose maps, for natural resources evaluation and inventory.

30. The Soviet Union submitted a document (E/CONF.83/L.19) describing the application of Soviet remote sensing data for studies of natural resources and mapping purposes. Currently the USSR uses mainly two types of optical cameras, the KFA-1000 and MK-4 for remote sensing and data acquisition. One image of the MK-4 camera covers an area of 33,000 sq km, while one image of the KFA-1000 camera has a resolution of 5 m and covers an area of 5,000 sq km. The Soviet Union applies remote sensing data for more than 300 different fields. Satellite data are supplied to more than 1,000 organizations and exported to 60 countries.

31. Topographic applications of data from the SPOT satellite was the subject of a document (E/CONF.83/L.40) introduced by France. The mapping process undertaken by IGN of France involves the following phases: block space triangulation, photogrammetric stereoplotting, photo identification and completion and map editing. Depending on the purpose, the products can be line maps or image maps, regular maps or study maps. Digital terrain models can be generated from SPOT stereopairs in order to produce background ortho-images.

32. Operational remote sensing capabilities was the subject matter of a document (E/CONF.83/INF.15) submitted by Germany which described the role of the Government, universities, government laboratories and private industries in the total operational remote sensing capabilities of the country.

33. Indonesia, in its paper on remote sensing use (E/CONF.83/INF.43) provided statistics on cloud coverage in the past 10 years of sensing in Indonesia and on the application of remote sensing in various fields at national as well as provincial levels.

34. Another paper discussed aerial photography surveys in Indonesia using GPS positioning and Wild RC-20 camera with forward motion compensation (E/CONF.83/INF.42) and presented the first experience in the use of kinematic GPS in two aerial photography missions in 1990. To overcome the very high cost of establishing ground control in forested areas and rugged terrain, the use of GPS in the aircraft seemed promising and would be considered as an operational procedure in future aerial photography missions.

35. The International Hydrographic Organization started off agenda item 5(d) by giving, in its paper E/CONF.83/L.4, the current status of hydrographic surveying and nautical charting in the Asia and the Pacific region. Of the 52 coastal States of the Asia and Pacific region, 33 per cent have no national hydrographic surveying capabilities, 36 per cent have some capabilities, and only 31 per cent have reasonably adequate to fully developed capability. While these figures indicate that the regional status for Asia and the Pacific is much in line with the overall world-wide status, three of the eight world maritime areas assessed as having the most inadequate nautical charts are found in the Asian region. The representative of IHO stressed the willingness of IHO to provide assistance to coastal States of the region for the establishment or strengthening of their own hydrographic capabilities. The value of regional cooperation in the selection and maintenance of equipment and the need for cooperation in a survey of the South China Sea were also stressed.

36. In document E/CONF.83/L.18, the USSR stressed the importance of topographic mapping of the sea bottom, especially in areas of intensive shelf growth. As a result of the shelf survey, topographic maps, which will be a continuation of land maps, can in fact be produced, showing bathymetric data, bottom vegetation, sea fauna and soil types. These maps can be used by many professionals such as geodesists, geologists, navigators and designers of various hydrotechnical facilities, as well as by mineral exploration and fishing companies for their own specific areas of application.

37. The Intergovernmental Oceanographic Commission (IOC), in its document E/CONF.83/L.33, described its activities in coordinating international efforts in ocean mapping such as the General Bathymetric Chart of the Oceans (GEBCO), the International Geological/Geophysical Atlases of the Atlantic and Pacific Oceans (GAPA), the International Bathymetric Chart of the Mediterranean (IBCM), of the Caribbean Sea and Gulf of Mexico (IBCCA), of the West Indian Ocean (IBWIO), of the Central Eastern Atlantic (IBCEA) and of the Western Pacific (IBCWP). As soon as each sheet of the large-scale regional bathymetric projects is completed, IOC also intends to digitize their contours to improve the GEBCO digital atlas, which is being produced from the smaller-scale GEBCO series.

IV. WORK OF COMMITTEE II: CARTOGRAPHIC DATA MANIPULATION

38. The work of Committee II covered agenda item 6 on cartographic data recording, compilation and manipulation, which included the following sub-items:

- (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 handicapped and weak-sighted, and the International Map of the World on the Millionth Scale (IMW)).

A. Large-scale topographic mapping

39. A paper entitled "Large-scale urban base mapping in the Metro Manila region, conducted in cooperation between the Government of the Philippines and the Government of Japan" (E/CONF.83/L.15) was presented jointly by Japan and the Philippines. It showed that precise maps, especially large-scale maps, were essential for making effective plans to solve various types of urban problems. The production of 1:10,000 maps covering the Metro Manila region was planned by the Government of the Philippines. The mapping project was conducted under technical cooperation between the two Governments. As a result, four types of maps on scale 1:10,000 were produced: contoured maps, planimetric maps, land-use maps and land-condition maps.

40. China reported on activities for large-scale topographic mapping in a paper entitled "Mapping and map publication in China" (E/CONF.83/INF.12). In the same paper China discussed the production of Tactile maps for the blind. The USSR voiced a desire for technical cooperation in the preparation of tactile atlases.

41. A paper entitled "Production of topographic base maps in South-East Asia: some thoughts and considerations" (E/CONF.83/INF.17) was presented by Germany. It discussed a number of factors that might have influenced the production of topographic maps in South-East Asia, inter alia, the base national mapping programmes, the impact of new technologies on the production of base maps, i.e. the geographic information systems, the computer-aided mapping systems, the rapid mapping systems and global positioning systems; and the need for training of personnel in advanced technology and use of modern equipment.

B. Small-scale topographic mapping

42. No paper was submitted on this subject.

C. Cadastral mapping

43. Germany presented a paper on problems of cadastral map digitization (E/CONF.83/INF.20). The paper discussed the concept of digitization of cadastral maps, and the utilization of DAVID as the most economical method, while at the same time taking into consideration functional requirements needed for the proper establishment of geometrical bases.

44. In the paper "Mapping and surveying to support land administration in Thailand: the first six years of the land titling project" (E/CONF.83/INF.6) Australia reported on the first phase of the project. The results so far have provided an information base for the accelerated issuance of land title deeds.

D. Navigational and bathymetric charting

45. The International Hydrographic Organization presented a paper entitled "Status of International (INT) Charts" (E/CONF.83/L.5). The paper explained the concept of INT charting, which was to achieve standardization in the format and symbols used by all countries in producing standard INT charts, rather than having several different national charts of the same area. It also reported on the status of medium- and large-scale INT charts in the Asia and Pacific area.

46. The presentation was commended and further cooperation by the nations concerned was encouraged.

E. Thematic mapping

47. A paper on the mapping of socio-economic characteristics by value-by-area cartograms (anamorphic maps) was presented by Germany (E/CONF.83/INF.18). The paper dealt with the development of new information techniques and the implementation of various types of geographic information systems (GIS) in society. It pointed out the problem of mapping socio-economic data, with regard to the spatial bias of the cartographer and to the demographic bias of the statistician and the need to develop new representations to mount information on population appropriately onto the maps.

F. Special mapping (including mapping for the handicapped and the International Map of the World on the Millionth Scale (IMW))

48. Japan presented a paper entitled "Preparation of the National Atlas of Japan: Revised Edition" (E/CONF.83/L.12). The paper explained that the 1977 Atlas was revised because the relationship between foreign countries had become more significant, and with recent progress in dissemination of information, map information had risen in importance. The revised national atlas of Japan was based on every kind of reliable data, totalling 235 thematic maps and covering 14 fields, among them physical features, climate, land development and conservation, population, social condition, education and culture.

49. A paper "The global problem of underdevelopment and its cartographic interpretation in complex atlases" (E/CONF.83/L.20) was submitted by the USSR. The paper was dedicated to the task of mapping present-day global problems in complex atlases of large areas (continents and subcontinents). This task involved creating cartographic works new in conception, structure and substance. It proposed indexes for cartographic interpretation of global problems of underdevelopment. The creation of global regional geographical atlases of reference type was currently a difficult task; at the first stage it was reasonable to work out the methodology of representing contemporary global problems on maps after the example of popular scientific cartographic products.

50. France submitted a paper on the utilization of SPOT in forest inventory (E/CONF.83/L.43), which discussed the results of a study to assess the role of the SPOT-HRV (haute résolution visible) data in forest inventory planning and to set up the best possible combination between the available information levels: ground and aerial photos and satellite images. The study was conducted in an area of over 40,000 hectares in South Mali.

51. At the end of the presentation a recommendation was proposed for the standardization of specifications for the International Map of the World.

G. Country reports

52. The Committee considered and deliberated on 21 reports submitted by participating countries.

53. The report of several countries on digital and numerical cadastral mapping stimulated vivid discussions among the delegates. The pros and cons as well as the legal implications of the methodology were discussed in detail.

V. WORK OF COMMITTEE III: CARTOGRAPHIC DATA DEPICTION

54. Committee III covered agenda item 7, on cartographic data retrieval, analysis, depiction, presentation and product generation. Under item 7, four sub-items were considered:

- (a) Map and chart reproduction, publishing and printing;
- (b) Digital databases;
- (c) Land and geographic information systems (LIS/GIS);
- (d) Specifications and standards.

55. A document entitled "Image processing techniques for digital ortho-photo production" (E/CONF.83/L.34) was presented by the representative of the United States, which stated that digital ortho-photos offered great potential to computer-aided cartography, for which reason attention was now being directed towards improving the efficiency of the techniques and designing a production system.

56. Another document under this sub-item entitled "Direct printing of digital imagery" (E/CONF.83/INF.9) was presented by Australia.

57. Under the second sub-item, "Digital databases", 12 papers were presented.

58. The first presentation, by the United States, "ARC digitized raster graphics and their application" (E/CONF.83/L.25) indicated that as a database, ARC-digitized raster graphics (ADRG) were well on the way to providing a wide range of raster background data, and that many data were also available for public sale.

59. The document entitled "Digital cartographic data products and activities of the United States Geological Survey" (E/CONF.83/L.26) gave indication that the Geological Survey was the prime source of many kinds of digital cartographic data of the United States and its outlying areas. These data included (a) digital line graph data; (b) digital elevation model data; (c) land-use and land-cover data; and (d) geographical names data.

60. The document "Implementing a cartographic database to enable automation" (E/CONF.83/L.29), submitted by the United States, described the extent of current automation at the Aeronautical Chart Branch (ACB) of the National Ocean Service, and evaluated the feasibility of introducing further automated solutions with regard to various types of charts.

61. The document entitled "The Digital Chart of the World project" (E/CONF.83/L.27) outlined efforts of the Defence Mapping Agency of the United States to produce the digital chart of the world. Standards to be followed are being developed in cooperation with the United Kingdom, Canada and Australia.

62. The United States also presented a document on "The United States Geological Survey/United States Bureau of the Census cooperative Digital

Mapping Project: a unique success story" (E/CONF.83/L.35), describing the establishment of a 1:100,000 scale transportation and hydrography digital database which is now a part of the National Digital Cartographic Data Base (NDCDB) maintained by the Geological Survey.

63. A paper presented by France entitled "Cartographic research agenda in the 1990s development of cartographic databases" (E/CONF.83/L.45) explained the constitution of a database and subsequent research to be undertaken for more efficient database development.

64. Indonesia presented a paper entitled "Digital mapping and topographic databases aspects in the development of spatial information systems in Indonesia" (E/CONF.83/INF.30), which described the need to create a digital topographic database, as GIS applications are increasing, and to perform spatial data analysis. The data would mostly be used by planners.

65. The paper "Digital map data: a component of geographic and land information systems" (E/CONF.83/L.36) was presented by the United Kingdom. The paper explained the difference between LIS and GIS and touched on storage of data, types of users of data, frequency of use, accessibility to data, protection of integrity, copyright and updating. After the presentation, representatives of New Zealand, France and Malaysia supplemented the discussion.

66. The paper "IHO Data Centre for Digital Bathymetry" (E/CONF.83/L.6) was presented by the International Hydrographic Organization. It urged that all echo-sounding data collected be forwarded to the IHO Data Centre for Digital Bathymetry, at the National Geophysical Data Center, Boulder, Colorado, United States and indicated that data would be available free of charge to IHO member States.

67. Background papers (E/CONF.83/BP.1, BP.2, BP.8) were presented by the Secretariat. These papers were prepared by a group of experts in implementation of resolutions adopted at the last Conference.

68. The third sub-item, dealing with land and geographic information systems (LIS and GIS), was delineated in six papers. A paper entitled "The Bangkok Land Information System Project: a strategy for designing an integrated land information system for a large third world city" (E/CONF.83/INF.22) was submitted by Australia and described the main objectives of the project as being the upgrading of cadastral maps, and the land information system, and analysing the different aspects of management.

69. Two papers (E/CONF.83/BP.9 and E/CONF.83/BP.6) were introduced by the Secretariat: one, entitled "Cartographic data display", described the developments in data display; the second paper was entitled "GIS the micro-computer and modern cartography".

70. The paper entitled "How to benchmark your Geographic Information System" (E/CONF.83/L.28) was presented by the United States. It described the results of independent evaluation of GIS technology.

71. "The development of the Geographical Information System in Indonesia" (E/CONF.83/INF.31), submitted by Indonesia, described the development of the System in Indonesia through a Land Resource Evolution and Planning (LREP) project which was completed at the end of 1990. The Government is now negotiating with the Asian Development Bank the financing of the second phase of that project.

72. The fourth sub-item considered in Committee III was "Specifications and standards". Under this item, the first two papers were presented by the Secretariat, entitled "Action on resolution 13: exchange of digital cartographic data" (E/CONF.83/BP.3); and "Digital geographic interchange standards" (E/CONF.83/BP.10).

73. Approaches to spatial database transfer standards (E/CONF.83/L.32) was the subject of a paper delivered by the Secretary-General of the International Cartographic Association (ICA). The paper described the ICA Congress at Mexico and the subsequent efforts by a working group regarding spatial database transfer standards. The paper also indicated cooperative activities at the regional level, or international level, to identify common features among the various transfer standards, with the possibility of developing interlinkages between some of them.

74. Representatives from Singapore, Indonesia and Canada also addressed issues and efforts made in the area of data exchange and their own systems.

75. France presented a paper (E/CONF.83/L.47) which described data integration and exchange format.

76. The paper entitled "Mapping, charting and geodetic standardization activities within the United States Department of Defence" (E/CONF.83/L.30), described current initiatives within the standards programme of the Defence Mapping Agency System Centre.

77. "Specifications for the international bathymetric charts produced under the IOC regional mapping projects" (E/CONF.83/INF.25), submitted by the Intergovernmental Oceanographic Commission, described the technical specifications in international bathymetric charts produced under regional mapping projects.

78. Australia presented a paper "A new Australian standard for spatial data transfer" (E/CONF.83/INF.8).

79. "Standards and specifications of surveying and mapping in China" (E/CONF.83/INF.13) concerned the surveying and mapping standards and specifications introduced in China.

80. Following the technical papers, 19 countries presented their country reports describing the developments of digital databases, data exchange, improvement in digital techniques and map production automation.

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

81. Committee IV covered agenda item 8, entitled "Management of national mapping and charting programmes". The following sub-items were considered:

- (a) Education and training;
- (b) National programmes;
- (c) Sales and distribution of maps, charts and digital products;
- (d) Geographical names.

82. Committee IV also covered agenda item 9, entitled "Technical assistance and transfer of technology".

83. Apart from the papers submitted by the various nations and organizations, the Secretariat submitted a number of papers, including one prepared by the Workshop on Training and Transfer of Technology in Digital Cartographic Data and Evaluation of Systems for Digital Mapping (E/CONF.83/BP.4). This paper summarized the work done following resolution 20 of the Eleventh United Nations Regional Cartographic Conference for Asia and the Pacific. The Workshop listed a number of packages available as an aid to education and training but stressed that, "while videos have a role to play, their inflexibility and the inevitable problems of updating their content made them only minor tools in solving a major problem".

84. The Workshop stressed the importance, particularly in the Asia and Pacific region, of education and training in spatial information management at all levels - from basic technician and operator skills, through broader technician training to graduate and post-graduate courses. In conclusion, it recommended that the present Conference should urgently address the overall problem of training and education at all levels.

85. A questionnaire on the availability of training programmes (E/CONF.83/L.1) resulting from resolution 21 of the Eleventh Conference has been sent to all member countries by the Secretariat. Delegates were asked to provide any additional information that they felt was appropriate to the study.

86. In a discussion on this paper, the International Hydrographic Organization (IHO) advised that it published a list of courses offered in hydrography, which should be made available to the Secretariat to avoid duplication of effort. The International Institute for Aerospace Surveys and Earth Sciences (ITC) indicated that its courses were no longer restricted to teaching technology and now included management training. The ICA stated its willingness to organize workshops within any country of the Asia and Pacific region. Indonesia suggested that the Department of Technical Cooperation for Development should investigate the need for information management training for surveying and mapping institutions.

87. The Secretariat's paper on technical cooperation activities for surveying, mapping, charting and remote sensing within the Department of Technical Cooperation for Development (E/CONF.83/L.2) detailed the aims of the

Infrastructure Branch. It indicated that the emphasis was placed on increased self-reliance of the recipient government organizations, and that the Department was available to offer technical advice to requesting countries on all surveying and mapping issues. A brochure entitled "Into the 1990's: at the service of developing countries", prepared by the Department, was distributed to the delegates highlighting the relationship of the Department to member nations.

A. Education and training

88. The International Federation of Surveyors (FIG) submitted a publication, released in 1990, on the exchange of surveying personnel (E/CONF.83/L.37), which stressed the importance FIG placed on this technique in the transfer of expertise to developing countries. Member nations are being encouraged to exchange academic staff, graduated and experienced surveyors, trainees and students. The representative of FIG reminded the Conference that the International Association for the Exchange of Students for Technical Experience (IAESTE) was the principal organization that should be approached for assistance in the exchange of personnel for trainees. He also drew attention to the classification of the United Nations Educational, Scientific and Cultural Organization on educational qualifications for surveyors and cartographers, which are considered to be too low. There is concern that this could restrict the assistance offered to developing countries by the United Nations for surveying and mapping education.

89. The United Kingdom submitted a paper detailing the training facilities in that country for overseas students in surveying and mapping (E/CONF.83/L.52 and INF.28), indicating that there was increasing emphasis on management of spatial information.

90. Representatives were advised by IHO of the role of the FIG/IHO International Advisory Board on Standards of Competence for Hydrographic Surveyors (E/CONF.83/L.7) and their necessary education and training. The need was stressed for graduates of hydrography courses to receive continued training and supervision once they had returned from their studies to their respective countries. In the Asia and Pacific region, three hydrographic courses had been accredited in Australia, India and Japan, with students from the region also being accepted at the Model Course of the International Maritime Organization in Italy.

91. Australia provided an insight into the development of a national strategy for education and research in land and geographic information systems in that country (E/CONF.83/INFO.10). The strategy was prepared under the auspices of the Australasian Urban and Regional Information Systems Association (AURISA) in conjunction with a wide cross-section of representatives of the LIS/GIS arena. It was stressed that information datasets should be made available to teaching institutions, and because of the rapid developments occurring, regular workshops needed to be sponsored. There was considerable benefit seen in nations establishing a professional association to deal specifically with land information matters.

B. National programmes

92. New Zealand delivered a paper (E/CONF.83/L.23) detailing recent changes in its surveying and mapping authority. It highlighted the trends in Great Britain and Australasia for Governments to demand that surveying and mapping functions be carried out on a cost-recovery basis, applying the user-pays principle. The New Zealand authority must show that it is performing a service different from that of the private sector, in order to justify its existence. Its reorganization has required the application of corporate, financial and quality management techniques, with emphasis being placed on the automation of procedures and the removal of duplication.

93. In commenting on this paper, the representative of the United Kingdom indicated that his country had a target for full cost-recovery within the next five years and stressed that the purpose was not simply to reduce service to the public but to change the emphasis to satisfying the client's needs rather than those of surveyors and mappers.

94. Canada presented a paper on the role of the Canadian Government in GIS (E/CONF.83/INF.41), which stressed the importance of cooperation in the collection and exchange of geographical data with the provinces, private industry and universities. The challenges ahead for Canada include efficient data acquisition, and establishment of standards for accuracy and integrity.

C. Sales and distribution of maps, charts and digital products

95. While no paper was presented under this item, the representative from New Zealand referred the Conference to an earlier paper (E/CONF.83/L.23) which had shown that his organization recovered 50 per cent of the cost of map production from map sales. As a result of large increases in the unit selling cost of products, demand had fallen by 40 per cent, but this had been more than compensated by the increased revenue from the higher prices. The representative also referred to a recent World Bank report indicating that land registers could be self-funding if properly managed and, if linked with the national surveying and mapping organization, could help to subsidize those activities. This was further evidence of the value of the registration, valuation, surveying and mapping functions of a nation being co-located within one jurisdiction.

D. Geographical names

96. A paper submitted by France (E/CONF.83/L.49) on the topic of geographical names indicated that, in accordance with the recommendations of the United Nations Group of Experts on Geographical Names, a guide book on map toponyms had been prepared in French for Europe, and that phonetic conventions had been established for local names in New Caledonia in response to the challenge that local names were being lost. In addition, France was continuing with its

toponymic data bank which would be completed in 1993 and would contain 1.6 million toponyms.

97. In 1986, the Toponymy Commission of the Institut géographique national published a book, World Countries and Capitals. Copies of this work were distributed to delegates and they were asked to update the relevant entries for their countries.

98. In its submitted paper entitled "Standardization of undersea feature names" (E/CONF.83/L.8), IHO advised the Conference of a publication on the standardization of names (BP-0006) and of the Gazetteer of Geographical Names of Undersea Features (BP-0008). Representatives were reminded that, in naming features outside a country's national waters, approval should be sought from IHO.

99. As a result of resolution 20 of the Eleventh Conference, a Training Workshop on Geographical Names was held in Indonesia in 1989. In commenting on its report on the Workshop (E/CONF.83/INF.32), Indonesia noted the involvement of journalists in the group and the positive publicity received from this move.

100. As Chairman of the United Nations Group of Experts on Geographical Names for the Asia and Pacific region, the representative of Malaysia delivered a report (E/CONF.83/INF.36) on the proceedings of the regional Division over the past four years. He recorded that Australia and New Zealand had been incorporated within the Group, and that further editions had been published of the physical and political maps of the region at scale 1:7,000,000. Two gazetteers were produced (concise and regional); however he said these did not contain information from all member nations as yet.

E. Technical assistance and transfer of technology

101. The International Hydrographic Organization submitted a paper entitled "Hydrographic technical assistance" (E/CONF.83/L.9) which advised the Conference of its Bureau's offer of experts to visit any member nation, on request and at no cost to that nation, to advise on hydrographic issues.

102. The representative stated that a Technical Assistance Coordination Committee (TACC) has been formed in conjunction with FIG to coordinate the development of hydrographical capabilities within nations, and it was considered that the Asia and Pacific region should establish at least one regional centre with the capability to service and maintain hydrographical equipment.

103. In its paper on technical cooperation (E/CONF.83/L.14), Japan detailed its involvement in providing technical cooperation in surveying and mapping, hydrography and geological surveys. Technical cooperation activities included provision of training courses, dispatch of experts, assistance in launching of projects and provision of equipment and materials to requesting countries.

104. A final paper, submitted by the USSR (E/CONF.83/INF.45), described the technical cooperation in that country associated with the production of a

series of maps of farming lands, including large-scale cadastral maps used for tax purposes and the delineation of land occupier rights.

Notes

1/ In the text of the Rules of Procedure, see also Eleventh United Nations Regional Cartographic Conference for Asia and the Pacific, vol. I, Report of the Conference (United Nations publication, Sales No. E.87.I.13), annex III.

VII. RESOLUTIONS ADOPTED BY THE CONFERENCE

A. List of resolutions

1. Thirteenth United Nations Regional Cartographic Conference for Asia and the Pacific
2. Preparatory work for future conferences
3. Global positioning system
4. Regional geodetic reference systems
5. Survey laws
6. Promotion of hydrographic surveying and nautical charting services in the region
 - (a) Hydrographic surveying and nautical charting of the South China Sea
 - (b) Development of hydrographic surveying and nautical charting capabilities
 - (c) Maintenance of hydrographic surveying equipment
 - (d) Status of hydrographic surveying and nautical charting
7. Monitoring of mean sea level changes
8. Acquisition of cartographic data from airborne and space platforms
9. Remote sensing
10. National atlases
11. International Map of the World
12. Topographic base mapping and using aerial photogrammetry, Global Positioning System and geoid
13. Mapping socio-economic data
14. Large-scale topographic mapping for urban areas
15. Training programmes in geographic information systems
16. Raster-vector-data
17. Specifications for aerial photography
18. Sustainable development
19. Access to information for development

20. Information gathering exchange
21. Land information development assistance
22. Regional cooperation and coordination in remote sensing
23. Civil aeronautical charts preparation
24. Geographical names
25. Training needs
26. Urban infrastructure
27. Effective development assistance
28. Consolidation of registration, valuation and surveying functions
29. Education levels for surveying and mapping
30. Establishment of land information systems coordinating committees
31. Exchange of personnel
32. Establishment of management courses
33. Coordination in the development of geographical and land information systems

B. Texts of resolutions

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

The Conference,

Recognizing the fundamental importance of surveying, mapping and charting infrastructure 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 Thirteenth United Nations Regional Cartographic Conference for Asia and the Pacific in the first half of 1994.

2. Preparatory work for future conferences

The Conference,

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

Noting that the United Nations Secretariat, especially the Cartographic and Remote Sensing Unit in the Department of Technical Cooperation for Development should be commended for its work in preparing for the Conference and providing the necessary resources to facilitate its accomplishment, and should also be commended for the increased level of cooperation with international scientific and professional organizations,

Recommends that:

(a) The United Nations should continue to provide the Secretariat for future United Nations regional cartographic conferences and to sponsor the preparation of background papers;

(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.

3. Global Positioning System

The Conference,

Recognizing the continued development of applications of the Global Positioning System for kinematic positioning,

Recognizing further that such positioning is useful in determining precise aircraft exposure stations during aerial photography,

Noting that international tests have confirmed the feasibility of the Global Positioning System to reduce ground control requirements and to significantly reduce the costs in mapping operations,

Recommends to the national survey and mapping authorities to note procedures for precise positioning by the Global Positioning System of aerial photographic exposures when taken with suitable cameras for such purposes,

Recommends further that such observations should be introduced into suitable photogrammetric block adjustment programmes to provide the necessary control for mapping in a more economical manner.

4. Regional Geodetic Reference Systems

The Conference,

Recognizing that the world geodetic system WGS-84 established by the United States of America, has been accepted world wide as a new reference system for geodetic surveys,

Recognizing further that this system has been derived from transit Doppler satellite observations taken before 1984 with an accuracy of ± 1 metre,

Noting that such an accuracy is suitable for medium- and small-scale mapping, but not for the requirements of future geodetic systems for monitoring movements of the Earth's crust and for large scale mapping needs,

Noting further the need for linking different national geodetic reference systems for the transportation of digital cartographic data,

Alerting national survey and mapping authorities that a new regional reference system is established on the basis of a new regional programme of observing fiducial reference stations in addition to those existing in Japan and Australia by means of laser ranging and very long baseline interferometry,

Recommends that these fiducial reference stations should be supplemented by a densification network using Global Positioning System observations in all countries of the region.

5. Survey Laws

The Conference,

Recognizing the need for the introduction of survey laws on a national level,

Noting that such laws must consider the use of modern surveying and mapping technology such as the Global Positioning System, electronic distance measurement, total stations, analytical aerial photogrammetry, digital mapping and geographical information systems with data in numerical form,

Noting further that the formulation of such a law has been compiled in the United Arab Emirates for Dubai Municipality under the auspices of a project supported by the United Nations Centre for Human Settlements (Habitat),

Recommends that the United Nations Secretariat request a copy of this draft law from the United Nations Centre for Human Settlements (Habitat).

Recommends further that the draft law should be distributed by the United Nations to the member States of the region for consideration and for adoption in a form suitable for the requirements of the member States.

6. Promotion of hydrographic surveying and nautical charting services in the region

A. Hydrographic surveying and nautical charting of the South China Sea

The Conference,

Recalling resolution 9 of the Eleventh United Nations Regional Cartographic Conference for Asia and the Pacific,

Noting the importance and urgency of producing charts of the South China Sea based on modern hydrographic data, as confirmed by the East Asia Hydrographic Commission,

Recommends that the Economic and Social Commission for Asia and the Pacific, in conjunction with the International Hydrographic Organization and appropriate institutions in the region, should prepare a project formulation framework for a hydrographic survey of the South China Sea with the assistance of the member States of the East Asia Hydrographic Commission, the United Nations Development Programme and other donor agencies.

B. Development of hydrographic surveying and nautical charting capabilities

Recalling resolution 9 of the Eleventh United Nations Regional Cartographic Conference for Asia and the Pacific,

Recognizing that only some maritime countries of the region have sufficient resources to conduct hydrographic surveys and produce nautical charts of the maritime areas for which they have responsibilities,

Recognizing further that the lack of adequate surveying data and nautical charts seriously retard the economic development of the maritime nations of the Asian and Pacific region, not only in respect of the safety of shipping but also in the protection of the marine environment and coastal ecology, the improvement of port facilities, the development of fishery industries, the exploitation and management of offshore living and non-renewable resources, the delimitation of offshore maritime boundaries and the growth of tourism and recreational maritime authorities,

Taking note that the International Hydrographic Organization has made provision to provide expert advice on the development of appropriate national and regional hydrographic services upon request by any developing country,

Recommends that countries without adequate hydrographic surveying and nautical charting capabilities should request the International Hydrographic Organization to provide expert advice on the preparation of a project formulation framework for the development of a hydrographic service suited to their requirements and existing resources,

Further recommends that the Economic and Social Commission for Asia and the Pacific, in conjunction with the International Hydrographic Organization and appropriate institutions in the region, should sponsor a hydrographic seminar/workshop of senior administrators from the Asia and Pacific region,

Also recommends that the United Nations Department of Technical Cooperation for Development, in conjunction with the Economic and Social Commission for Asia and the Pacific and the International Hydrographic Organization should:

(a) Consider creating a post of United Nations/IHO regional hydrographic technical adviser in the secretariat of the Economic and Social Commission for Asia and the Pacific;

(b) Consider awarding fellowships to suitable students from developing countries to attend courses in hydrographic surveying and nautical charting;

(c) Report progress at the Thirteenth United Nations Regional Cartographic Conference for Asia and the Pacific.

C. Maintenance of hydrographic surveying equipment

The Conference,

Recalling resolution 9 of the Eleventh United Nations Regional Cartographic Conference for Asia and the Pacific,

Recognizing that large areas of the continental shelves and exclusive economic zones of many countries in the Asia and Pacific region remain inadequately or are not at all surveyed and that many nautical charts of the region are obsolete or inadequate,

Recognizing also the difficulties that developing countries have in maintaining specialized hydrographic surveying equipment,

Considering that modern hydrographic surveying requires the use of relatively expensive vessels and specialized equipment, operated and maintained by trained hydrographic surveyors and maintenance technicians, and that trained nautical cartographers are required to compile and maintain nautical charts,

Recommends that the Economic and Social Commission for Asia and the Pacific, in conjunction with the International Hydrographic Organization and appropriate institutions in the region should explore the possibility of preparing projects and, if practicable, prepare projects to strengthen existing regional mechanisms, such as the Committee for Coordination of Joint Prospecting for Mineral Resources in Asian Offshore Areas (CCOP), in order to provide capabilities for maintaining surveying equipment and to train maintenance and nautical cartographic personnel from countries in the region.

D. Status of hydrographic surveying and nautical charting

Recalling resolution 9 of the Eleventh United Nations Regional Cartographic Conference for Asia and the Pacific,

Noting that the International Hydrographic Organization, in January 1991, published, at the request of, and in cooperation with, the Department of Technical Cooperation for Development, the first edition of Status of Hydrographic Surveying and Nautical Charting Worldwide, (SP-55),

Noting further that this report is based on incomplete information,

Requests the Department of Technical Cooperation for Development to distribute the report Status of Hydrographic Surveying and Nautical Charting Worldwide (SP-55) as widely as possible,

Recommends that coastal States in the Asia and Pacific region should give urgent study to the publication and should communicate any changes required and any new information needed to complete the report to the International Hydrographic Bureau in Monaco by 1 January 1992,

Requests the International Hydrographic Organization to issue updated editions of SP-55 at regular, two-yearly intervals and report on its status to the Thirteenth United Nations Regional Cartographic Conference for Asia and the Pacific.

7. Monitoring of mean sea level changes

The Conference,

Recognizing the concern of a number of nations within and adjacent to the Asia and Pacific region with regard to possible acceleration of the rise of absolute mean sea level and the effects that would result,

Bearing in mind that for absolute mean sea level measurement, tide gauge measurements must be accompanied by precise geodetic measurement of tectonic plate movement in the vertical,

Recommends that the United Nations through the Department of Technical Cooperation for Development should support the monitoring of absolute mean sea level change in the Asia and Pacific region by means of joint programmes involving oceanographic and geodetic measurements,

Recommends further that the Department of Technical Cooperation for Development should coordinate such programmes with other international efforts.

8. Acquisition of cartographic data from airborne and space platforms

The Conference,

Recognizing the importance of remote sensing for topographic and thematic mapping,

Noting the urgent need in developing countries for accelerated access to new data sets from satellite remote sensing systems,

Recalling the limited use of optical remote sensing from satellite altitudes in most tropical countries and especially those located in regions close to the Intertropical Convergence Zone,

Realizing the potential of synthetic aperture radar data to overcome the gaps of information in those areas of persistent cloud cover,

Further noting the advance in the development of radar capability on orbiting satellites for fully covering tropical areas, which can optimize the application of radar data from space platforms,

1. Recommends that the United Nations through the Department of Technical Cooperation for Development, should develop a training programme on the application of radar image interpretation to optimize the use of such data in developing countries;

2. Further recommends that steps be initiated to facilitate access to radar data from satellite through expert group meetings with participants from satellite launching countries and developing countries;

3. Requests the Department of Technical Cooperation for Development to report during the Thirteenth United Nations Regional Cartographic Conference for Asia and the Pacific on progress made on implementation of the present resolution.

9. Remote sensing

The Conference,

Recognizing the documented importance of satellite remote sensing and space photography for cartography and related activities in support of accelerated socio-economic development,

Noting the role and contribution of the satellite launching countries for integrating satellite remote sensing into national mapping programmes especially in developing countries,

Further noting that many developing countries are not in the position of funding the evaluation and assessment of cost, reliability and utilization of commercially available remote sensing data,

Recognizing further the economic impact in the use of new satellite remote sensing data sets and the need for the developing countries to properly plan the integration of remote sensing data into the national development strategy,

1. Recommends that the United Nations should establish a focal point to compile, with the assistance of space launching States and organizations, information on new data sets and the conditions and modalities under which such data can be obtained;

2. Urges the Department of Technical Cooperation for Development to organize the dissemination of such information to the developing countries.

10. National atlases

The Conference,

Recognizing the importance of knowing the exact condition of a country in order to formulate effective national developmental plans, assess socio-economic conditions and deal with global environmental effects,

Noting that only several member States in the Asia and Pacific region are producing small-scale atlases,

Taking into account that arbitrary and unilateral alterations of territorial boundaries shown on published maps and atlases should not be legally valid unless these are recognized by the United Nations,

Recommends that the United Nations should encourage all member States to produce updated national atlases, and should provide assistance to these States in this endeavour.

11. International Map of the World

The Conference,

Recalling resolution 15 of the Eleventh United Nations Regional Cartographic Conference for Asia and the Pacific on the International Map of the World on the Millionth Scale (IMW),

Realizing that the above-mentioned resolution recommends that the United Nations should no longer continue to monitor the IMW programmes, and that countries producing 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,

Recognizing the aggressive support given by States Members of the United Nations to production of the IMW chart on standard specifications,

Further recognizing that the 1962 Bonn specifications have been rendered obsolete by the development of new methods and technologies of surveying and mapping,

Recommends that the United Nations, through the Department of Technical Cooperation for Development, should initiate and support the establishment and publication of standard specifications for the IMW.

12. Topographic base mapping and use of aerial photogrammetry, the Global Positioning System and geoid

The Conference,

Recognizing that topographic base mapping is a prerequisite for the planning, development and management of natural resources,

Noting that a significant amount of work still remains to be done in producing and updating of topographic base maps at national level, and that new technologies, such as the Global Positioning System and computer-aided mapping, can significantly assist in development planning,

Noting further that the Global Positioning System requires the knowledge of the shape of the geoid before it can be used to establish an elevation control for mapping, and that computer-aided mapping in an operational environment requires regular maintenance,

Recognizing the importance of providing assistance, especially to developing countries, in the maintenance of highly specialized equipment in surveying and mapping,

Recommends to the national survey and mapping authorities that:

(a) Studies should be initiated to determine the shape of the geoid over large unmapped areas of the region in an economic manner;

(b) Global Positioning System flights should be combined with aerial photography on a routine basis so that the need for ground control is reduced to a minimum,

(c) Adequate annual funding should be provided for regular maintenance of CAM equipment and software updates.

13. Mapping socio-economic data

The Conference,

Noting the rapid increase of geographic information systems and the related inclusion of spatial resources and environmental data,

Recognizing that the spatial planning for national and regional development must be based on the evaluation of resources and environmental data as well as on socio-economic data,

Recognizing further that the visualization of such data in maps provides the best means to assess areas of spatial development potentials and conflicts,

Recommends to the countries of the region that:

- (a) Stronger efforts should be made to integrate a socio-economic data basis into geographic information systems;
- (b) Standards for this integration should be developed in cooperation with the cartographic, demographic and economic sections of United Nations;
- (c) Special attention should be directed to develop and use appropriate representations of socio-economic data for displays and thematic maps;
- (d) More attention should be given to the problem of updating the socio-economic data files within the geographic information systems and their resultant maps.

14. Large-scale topographic mapping for urban areas

The Conference,

Recognizing that many major urban areas in the Asia and Pacific region have various types of urban problems, and solutions of such problems are eagerly expected for further and sound development of the region,

Also recognizing that up-to-date large-scale maps that reflect precise conditions of urban areas are indispensable for the preparation of effective plans to solve urban problems, as well as of well-balanced urban and regional development plans,

Noting that only several urban areas in the Asia and Pacific region are covered by up-to-date large-scale maps,

Recommends that the United Nations encourage all Member States to produce updated large-scale maps for urban areas, and to provide assistance to the States in this endeavour.

15. Training programmes in geographic information systems

The Conference,

Recalling resolution 11 of the Eleventh United Nations Regional Cartographic Conference for Asia and the Pacific addressing issues on land information and geographical information systems,

Recognizing that modern cartography is evolving very rapidly as a result of the information revolution driven by advances in computer and telecommunication technologies,

Taking into account the dramatic changes in the spatial information technologies,

Appreciating the information provided through the document submitted by the Secretariat dealing with spatial information management in cartography, 1/

Noting with concern the lack of adequate training facilities in geographical information system technology especially for individuals from developing countries,

Noting further with appreciation the initiative taken by the International Cartographic Association and the United Nations Department of Technical Cooperation for Development to establish a training programme in geographical information system technology,

1. Recommends that the efforts in elaborating such a training programme should be continued, taking into account related activities as well as basics of technology and management considerations;

2. Requests the International Cartographic Association and the United Nations to report on the progress made in this matter to the Thirteenth United Nations Cartographic Conference for Asia and the Pacific.

16. Raster-vector-data

The Conference,

Recognizing that the methods of digital mapping technology have been developed considerably to provide maps as digital outputs on various displays and output media,

Recognizing further that digital imaging, digital image conversion of photographs and of digital raster display and output facilities have also been developed,

Noting that there is enhanced use in contributing raster and vector information,

Recommends that Member nations should consider the use of such raster-vector combined products for the purposes of enhancing the status of information and improving updating capability in the context of geographic information systems.

1/ E/CONF.83/BP.2.

17. Specifications for aerial photography

The Conference,

Noting that in 1970, specifications for aerial photography were published in World Cartography, 2/ and that an updated version was introduced to the present Conference in a background paper submitted by the Secretariat, 3/

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, especially in the inflight use of the Global Positioning System and image motion compensation,

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

18. Sustainable development

The Conference,

Recognizing the importance of development in achieving both economic benefits and environmental quality,

Noting that the report of the World Commission on Environment and Development, Our Common Future 4/ laid stress on relieving poverty and improving the environment as major global priorities,

Requests the Department of Technical Cooperation for Development to study and report to the Economic and Social Council on the role of survey and charting and mapping organizations in enabling forms of resource management that will achieve sustainable development.

19. Access to information for development

The Conference,

Recognizing that access to data is an essential support for the establishment and maintenance of effective land information systems to assist sustainable development,

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

3/ E/CONF.83/BP.5.

4/ Our Common Future, report of the World Commission on Environment and Development (the "Brundtland report"), (Oxford University Press, 1987).

Noting that in almost every country, there is some restriction that prohibits or impedes current or future users from having full access to land registries, map series or databases,

Resolves to encourage public agencies in Member countries to open their registries, map series, and databases, to the greatest extent possible, in order to enhance the application of multi-purpose land information systems.

20. Information gathering exchange

The Conference,

Recognizing the rapid development of a wide variety of technology, applications, and procedures related to survey, mapping and land information,

Noting that ready availability and access to such information can enable more effective and cost-efficient development,

Noting further the expressed need at this Conference for more timely opportunities for the exchange of information,

Requests the Department of Technical Cooperation for Development to investigate and report on the establishment of a reference network of sources of information, references, indexes, expertise and advice in the region, and to facilitate an exchange of information through meetings, seminars and modern communication methods.

21. Land information development assistance

The Conference,

Recognizing the potential for the growth of many overlapping but independent land information systems in Member countries,

Noting the approach on technical assistance for the transfer of technology by the International Hydrographic Bureau,

Requests the Department of Technical Cooperation for Development to develop a procedure in the region so that, on request, a Member country can receive advice on establishing national coordination and planning for the integrated development of land and geographic information systems.

22. Regional cooperation and coordination in remote sensing

The Conference,

Recognizing that remote sensing and related geographic information system technologies are emerging as essential tools for sustainable natural resources development and environment management, including disaster monitoring,

Noting that remote sensing has been in use in the Asia and Pacific region for natural resource management and environmental monitoring for many years and that the countries in the region have high investment in establishing national remote sensing centres and programmes,

Further noting that despite rapid development and application of technologies in the region, many developing countries, particularly the least developed, landlocked and small island countries with limited resources are still unable to share in the benefits of the technology owing to formidable problems in financial and institutional aspects as well as to lack of expertise,

1. Recommends that coordinated effort for remote sensing development in the region through technical cooperation among developing countries, technology transfer through education and training and information exchange mechanisms, such as those initiated by the ESCAP/UNDP Regional Remote Sensing Programme, should be continued and expanded with the funding support of the United Nations Development Programme during its next development cycle, 1992-1996;

2. Further recommends that the Economic and Social Commission for Asia and the Pacific should continue to execute the Regional Remote Sensing Programme under the present networking modality with countries in the region and in association with the Department of Technical Cooperation for Development and the Food and Agricultural Organization of the United Nations;

3. Urges the Economic and Social Commission for Asia and the Pacific to strengthen the cartography and remote sensing activities within the Commission's secretariat by means of appropriate staff and requisite funding to ensure continuation of cooperation and coordination within the region in the field of remote sensing and geographic information system technology.

23. Civil aeronautical charts preparation

The Conference,

Recognizing that current standards exist for the preparation of civil aviation aeronautical charts,

Recommends that the Department of Technical Cooperation for Development should encourage member States of the region to follow the specifications and standards of the International Civil Aviation Organization.

24. Geographical names

The Conference,

Recalling resolution 18 of the Eleventh United Nations Regional Cartographic Conference for Asia and the Pacific,

Recognizing the importance of national programmes of geographical names standardization,

Recognizing further the progress achieved in the standardization of geographical names by member countries of the Division of Asia South-East and Pacific South-West,

1. Endorses the decision of the member countries of the Division of Asia South-East and Pacific South-West of the United Nations Group of Experts on Geographical Names to elect New Zealand as the divisional representative. This decision was taken during the ad hoc meeting of member countries on 25 February 1991 at the venue of the Twelfth United Nations Regional Cartographic Conference for Asia and the Pacific, Bangkok;

2. Records with appreciation the invaluable contributions of Malaysia as the outgoing divisional representative.

25. Training needs

The Conference,

Recognizing that rapid developments in the industry will stretch limited resources of expertise beyond their capacity,

Noting the inadequate stage of survey and mapping education and training in relation to emerging new technology in most countries in the region,

Requests the Department of Technical Cooperation for Development to produce a report on the needs, form and accreditation of education, continuing professional development and training at all levels to meet the developing role of survey and mapping organizations.

26. Urban infrastructure

The Conference,

Recognizing the major increases in world population currently being projected by numerous world authorities,

Noting that huge population increases will occur in many large cities in the region that may already be stretched to capacity,

Requests the Department of Technical Cooperation for Development to study and report to the Economic and Social Council on the role of, and action that can be taken by, survey and mapping organizations to assist in the early planning and implementation of information systems and infrastructure to cope with this urban population increase.

27. Effective development assistance

The Conference,

Recognizing the wide range of assistance available for development,

Noting the increasing likelihood that hardware, systems and techniques can be introduced without sufficient adaptation and consideration of the special national administrative, economic and cultural environment,

Requests the Department of Technical Cooperation for Development to investigate and develop a set of guidelines relating to the appropriate transfer of technology in the survey, charting and mapping fields.

28. Consolidation of registration, valuation and surveying functions

The Conference,

Recognizing the benefits to be gained by the co-location of the land registration, valuation, surveying, mapping and remote sensing functions within the same jurisdiction,

Noting the opportunities this creates for efficient acquisition of data, establishment of accuracy and integrity standards, unique parcel identification and cost-recovery of the total land information system activities,

Recommends that the United Nations, through the Department of Technical Cooperation for Development, should encourage nations of the region to either consolidate land registration, valuation, surveying, mapping and remote sensing functions within the one jurisdiction, or establish close liaison between these functions, thus opening exchange of data.

29. Education levels for surveying and mapping

The Conference,

Recognizing that the educational requirements for personnel in the surveying and mapping community extends to university degree and post-graduate qualifications,

Believing that current classification of educational requirements of the United Nations Educational, Scientific and Cultural Organization is set only at the college level for surveying and mapping,

Recommends that the Department of Technical Cooperation for Development should request the United Nations Educational, Scientific and Cultural Organization to modify its classification to properly reflect the current situation in the surveying and mapping industry.

30. Establishment of land information systems coordinating committees

The Conference,

Recognizing that land information systems require input from a wide cross-section of the community,

Noting that frank and open cooperation is vital for the efficient development of such systems and that there is a need to maintain this cooperation in both the collection and dissemination of data, in the coordination of research, in the establishment of national priorities and in the standardization of data and equipment,

Recommends that the United Nations, through the Department of Technical Cooperation for Development, should encourage the establishment of a land information system coordinating committee within the countries of the region by establishing a model for dissemination to each national organization.

31. Exchange of personnel

The Conference,

Recognizing that there is a need for the exchange of information on technology and methods in the surveying and mapping fields at all levels, including student, technician, graduate surveyor and lecturer,

Further recognizing that the transfer of skills can be achieved effectively by the exchange of personnel between countries,

1. Recommends that the United Nations, through the Department of Technical Cooperation for Development should adopt the International Federation of Surveyors guidelines for the exchange of surveying and mapping personnel between nations;

2. Recommends further that Department of Technical Cooperation for Development offer a supporting programme for these exchanges.

32. Establishment of management courses

The Conference,

Noting the changing environment in the production of cartographic products from conventional maps to integrated, geo-referenced information,

Further noting the trend in government organizations towards a more production-oriented environment in producing and managing such information, and the need in the surveying and mapping industry for trained managers and policy decision makers,

1. Recommends that management courses/workshops for surveying and mapping organizations should be organized on a regular basis;

2. Further recommends that adequate financial support should be given by the Department of Technical Cooperation for Development to enable managers of surveying and mapping organizations in developing countries to attend such courses and workshops.

33. Coordination in the development of geographical and land information systems

The Conference,

Recognizing the proliferation of information systems and data bases likely to develop in member countries over the next term,

Noting the savings and improved efficiency that will arise from coordination and rationalization of land and geographic information development,

Noting further the particular importance of linking to indexes of land ownership, to spatial data and valuation, and to other land related indexes,

Recommends that a report under the auspices of the United Nations on the benefits and methods of coordinating the development of land information systems should be made available to the Governments of all member countries in the region.

Annex I

LIST OF PARTICIPANTS

A. States Members of the United Nations or members of the specialized agencies

AUSTRALIA

Representative

Mr. Grahame LINDSAY, General Manager, Australian Surveying and Land Information Group

Alternate

Mr. John PORTER, Surveyor-General of South Australia, Chairman of the Australian Inter-Governmental Advisory Committee on Surveying and Mapping

Observers

Mr. Barry MILLIKEN, Manager, Land Technologies Division, BHP Engineering, Wollongong, New South Wales

Mr. Peter BYRNE, Representative of the Institute of Surveyors

Mr. Garry MATHIESON, Technical Adviser on the Bangkok Land Information System, Thailand Land Titling Project, Bangkok

Mr. William CARTWRIGHT, Representative for the Australian Institute of Cartography and the Royal Melbourne Institute of Technology, Melbourne, Victoria

Mr. Chris GRANT, Australian Team Leader, Thailand Land Titling Project, Bangkok

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BANGLADESH

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BHUTAN

Representative

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Mr. K. B. TAMANG, Section Officer, Cartography, Survey of Bhutan, Thimphu

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Mr. Marcel FRIGON, Acting Director, Surveys, Mapping and Remote Sensing Sector, Department of Energy, Mines and Resources, Ottawa

CHINA

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Prof. YANG Kai, Deputy Director-General, National Bureau of Surveying and Mapping

Deputy representative

Mr. YANG Guanqun, Deputy Representative of China to the Economic and Social Commission for Asia and the Pacific
Mrs. ZHUO Wen, Senior official, Department of Law and Treaties, Ministry of Foreign Affairs

Alternate

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Prodromos VASSILIOU, Cartographic Officer and Geographer, Department of Lands and Survey

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Alternate

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Deputy representative

Mr. Matti JAAKKOLA, Director, Finnish National Board of Survey, Helsinki

FRANCE

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Mr. Pote LUAPHONG, Chief, Photogrammetry Section, Operation Division, Agricultural Land Reform Office
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Colonel Cha-Um INTAGON, Chief, Geodesy and Geophysics Division, Royal Thai Survey Department
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Advisers

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Mr. Evgeni GOROHHOV, Expert of V/O SOJUZKARTA
Mr. Vladimir MICHANINE, Expert, All Union Institute
Mr. Sergei PINAEV, Ministry of Foreign Affairs
Mr. Vladimir TARASIK, Technical Director, All Union Institute

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VANUATU

Representative

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Mr. Sero KUAUTONGA, Senior Cartographer, Department of Land Survey

VIET NAM

Representative

Mr. NGUYEN Van Su, Director-General, State Department of Cartography

Deputy representative

Mr. TO Quang Thinh, Director, Remote Sensing Centre

B. Associate members of the Economic and Social Commission
for Asia and the Pacific

HONG KONG

Representative

Mr. Gordon ANDREASSEND, Principal Government Land Surveyor, Survey
and Mapping Office

Mr. LEUNG Shou-Chun, Government Land Surveyor, Buildings and Land
Department

C. Specialized agencies

International Civil Aviation
Organization (ICAO)

Mr. E. P. LYSAKOV, Technical
Officer, Asia and Pacific Office,
Bangkok

International Hydrographic Organization

Rear-Admiral Sir David HASLAM
President of the Directing
Committee

International Hydrographic Bureau

Captain I. A. ABBASI
Professional Assistant
(Hydrography)

Intergovernmental Oceanographic
Commission

Rear-Admiral Sir David HASLAM

Mr. Ben SEARLE, Consultant

Mekong secretariat

Mr. Heng THUNG
Remote Sensing Expert

Mr. Boonyakiat SAENGWAN
Computing Expert

Société navale française de formation
et de conseil (NAVFCO)

Mr. Jean Michel FICHANT
French Naval Adviser, Paris

Mr. Yves GUILLAM, Hydrographic
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D. International scientific organizations

International Federation of Surveyors

Mr. Juha TALVITIE, President

International Cartographic Association

Mr. D. R. F. TAYLOR, President

Mr. D. T. PEARCE, Secretary-General

International Institute for Aerospace
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Dr. Mustafa RADWAN

Mr. A. H. POLDERMAN

International Society of Photogrammetry
and Remote Sensing (ISPRS)

Prof. G. KONECNY, Vice-President

E. Representatives of United Nations Secretariat

Economic and Social Commission for Asia
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Expert on Remote Sensing,
Information Specialist

Department of Technical Cooperation
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Mr. Karl-Heinz SZEKIELDA,
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F. Secretariat of the Conference

Executive Secretary

Mr. Kadri EL ARABY
Chief, Infrastructure Branch
Natural Resources and Energy
Division
Department of Technical
Cooperation for Development

Deputy Executive Secretary

Mr. Valeri MOSKALENKO
Cartography Unit
Infrastructure Branch
Natural Resources and Energy
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Cooperation 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 on the progress made since the Eleventh Conference.
5. 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.
6. 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 the International Map of the World on the Millionth Scale (IMW)).
7. 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) Geographical information systems;
 - (e) Specifications and standards.
8. Management of national mapping and charting programmes:
- (a) Education and training;
 - (b) National programmes;
 - (c) Sales and distribution of maps, charts and digital products;
 - (d) Geographical names.
9. Technical assistance and transfer of technology.
10. Provisional agenda for the Thirteenth United Nations Regional Cartographic Conference for Asia and the Pacific.
11. Adoption of the report of the Conference.

Annex III

LIST OF DOCUMENTS

<u>Document No.</u>	<u>Title</u>	<u>Agenda item</u>
E/CONF.83/1	Provisional agenda	3(b)
E/CONF.83/2	Draft rules of procedure	3(a)
E/CONF.83/INF.1	Documentation for the Conference Note by the Secretariat	
E/CONF.83/INF.2	Advance information regarding general arrangements of interest to the participants	
E/CONF.83/INF.3	Provisional list of participants	
E/CONF.83/INF.4	Provisional list of documents	
E/CONF.83/L.1	Questionnaire: availability of training programmes (submitted by the Secretariat)	8(a)
E/CONF.83/L.2	Technical cooperation activities for surveying, mapping and remote sensing in the Department of Technical Cooperation for Development (submitted by the Secretariat)	9
E/CONF.83/L.3	Report of the International Hydrographic Organization (submitted by the International Hydrographic Bureau)	4
E/CONF.83/L.4	Status of hydrographic surveying and nautical charting in Asia and the Pacific (submitted by the International Hydrographic Bureau)	5(d)
E/CONF.83/L.5	Status of International (INT) Charts (submitted by the International Hydrographic Bureau)	6(d)
E/CONF.83/L.6	IHO Data Centre for digital bathymetry (submitted by the International Hydrographic Bureau)	7(b)

<u>Document No.</u>	<u>Title</u>	<u>Agenda item</u>
E/CONF.83/L.7	FIG/IHO International Advisory Board on standards of competence for hydrographic surveyors (submitted by the International Hydrographic Bureau)	8(a)
E/CONF.83/L.8	Standardization of undersea feature names (submitted by the International Hydrographic Bureau)	8(d)
E/CONF.83/L.9	Hydrographic technical assistance (submitted by the International Hydrographic Bureau)	9
E/CONF.83/L.10	Cartographic work in Japan, 1986-1989 (submitted by Japan)	4
E/CONF.83/L.11	Establishment of marine geodetic controls and the World Geodetic System (submitted by Japan)	5(a)
E/CONF.83/L.12	On the preparation of the <u>National Atlas of Japan</u> (submitted by Japan)	6(f)
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* Paper withdrawn for technical reasons.

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