CONTENTS

I. ORGANIZATION OF THE CONFERENCE

A. Terms of reference

1. The Thirteenth United Nations Regional Cartographic Conference for Asia and the Pacific was held at Beijing, China, from 9 to 18 May 1994. The Conference was held in accordance with Economic and Social Council decision 1991/222 of 28 May 1991.

B. Opening of the Conference

2. Mr. Li Lanqing, Vice-Premier of China, inaugurated the Conference and welcomed the participants on behalf of the Government of China. The Executive Secretary of the Conference read the opening remarks on behalf of the Department for Development Support and Management Services of the United Nations Secretariat.

C. Attendance

3. The Conference was attended by 204 representatives and observers of 37 countries and territories, 2 specialized agencies and 3 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.87/1. 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 Twelfth United Nations Regional Cartographic Conference for Asia and the Pacific and as contained in document E/CONF.87/2.

F. Election of officers

6. The Conference elected the following officers:

President: Yang Kai (China)

First Vice-President: Morrison Wabaiat (Vanuatu)

Second Vice-President: Thamnoon Udomsorayuth (Thailand)

Rapporteur: Harvey Jacka (Australia)

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: Cartographic Data Acquisition ..... Item 5 (a), (b), (e)

Committee II: Cartographic Data Manipulation ..... Item 5 (e)

Committee III: Cartographic Data Depiction ..... Item 5 (d)

Committee IV: Policies and Management ..... Items 6 and 7

9. Agenda items 1, 2, 3, 8 and 9 were considered at plenary meetings.

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

Committee I CARTOGRAPHIC DATA ACQUISITION

Chairman: Jose Solis (Philippines)

Vice-Chairman: Alexander Drazhniuk (Russian Federation)

Rapporteur: Tom Ryefield (United States of America)

Committee II CARTOGRAPHIC DATA MANIPULATION

Chairman: Abdul Majid Mohamed (Malaysia)

Vice-Chairman: Mr. O Se Jin (Democratic People’s Republic of Korea)

Rapporteur: W. A. Robertson (New Zealand)

Committee III CARTOGRAPHIC DATA DEPICTION

Chairman: Paul Suharto (Indonesia)

Vice-Chairman: Md. Mahbulbul Karim (Bangladesh)

Rapporteur: E. M. Bos (Netherlands)

Committee IV POLICIES AND MANAGEMENT

Chairman: Mai Thi Nguyet (Viet Nam)

Vice-Chairman: Ram Naresh Singh (Nepal)

Rapporteur: Ms. Susan Dickinson (United Kingdom of Great Britain and Northern Ireland)

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 President and Vice-Presidents, reported that the credentials of all representatives had been found to be in order.

K. Closing of the Conference

13. The Conference, at its final meeting, on 18 May 1994, discussed and adopted the provisional agenda for the Fourteenth United Nations Regional Cartographic Conference for Asia and the Pacific, to be held for five working days in mid-1997, and a draft report and 20 resolutions of the Thirteenth United Nations Regional Cartographic Conference for Asia and the Pacific. The provisional agenda had as its primary focus the contribution of surveying, mapping and charting in support of the implementation of Agenda 21. 1/ The provisional agenda, as adopted, appears as annex IV to the present report. The resolutions aimed at assisting the member States in the region in utilizing thoroughly the opportunities provided by cartographic technology and the applications in the information stream to decision makers. The recommendations were subdivided into four groups titled as follows: General Policy, Transfer of Technology, Institutional Issues, Vote of Thanks.

14. At its closing meeting, the Conference adopted by acclamation a vote of thanks to the Government of China for the hospitality extended to the participants, and to the National Bureau of Surveying and Mapping 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.

1/ Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992, vol. I, Resolutions Adopted by the Conference (United Nations publication, Sales No. E.93.I.8 and corrigendum), resolution 1, annex II.

II. WORK OF COMMITTEE I: CARTOGRAPHIC DATA ACQUISITION

15. The work of Committee I covered portions of agenda item 5: new trends in technology, and their applications. Eighteen papers were presented relating to the following sub-items:

(a) Geodesy;

(b) Surveying and mapping;

(e) Hydrography.

A. Geodesy

16. Under the first sub-item, Geodesy, eight papers were presented. The first paper (E/CONF.87/BP.4), submitted by the Secretariat, addressed the issue of new trends in geodesy applicable for building national geodetic data infrastructures, essential for the development of integrated geographic information systems. The use of the Global Positioning System (GPS) for establishing geodetic infrastructures was described as the most cost-effective application of current technology. The benefits of multiple use of permanently installed GPS geodetic receivers to measure geophysical movements, provide data for differential GPS applications and monitor the status of navigation satellites were examined.

17. The Conference host, China, presented document E/CONF.87/INF/15, which described the introduction of GPS technology by the National Bureau of Surveying and Mapping. This project is being developed in two stages. In the first stage, the aim is to build up the Chinese GPS orbit-tracking station in order to do research work on precise tracking and orbit setting, which could be the base from which to apply differential GPS positioning techniques. In the second stage, the aim is to establish an extensive GPS network. This is expected to be completed by the end of 1995, with data processing and overall adjustment to begin in 1996. China also described the GPS crustal deformation monitoring network in North China in another paper (E/CONF.87/INF/19). North China is the most seismically active area of the country, but plans are under way to establish GPS monitoring stations in more densely populated areas as well.

18. The United States Geological Survey (USGS) is investigating the use of GPS to determine the positions of the camera at the time of exposure associated with 1:40,000-scale aerial photography images (E/CONF.87/L.5). This ability would reduce the cost of establishing the geodetic control on the ground necessary to revise the USGS 1:24,000-scale maps and produce 1:12,000-scale digital orthophotos. The results of USGS projects have shown that positions established in block adjustments of the images controlled with GPS-derived positions of the camera exposure stations, and a reduced amount of ground control, were within 1-2 metres of positions established using GPS ground surveys.

19. A paper (E/CONF.87/L.10) submitted by the National Oceanic and Atmospheric Administration (NOAA) of the United States described a large-scale GPS survey of approximately 20 islands in the central and western Pacific Ocean. The survey established an accurate geodetic network through the Hawaiian islands, American Samoa, the Marshall Islands, the Federated States of Micronesia, the Northern Mariana Islands, and the Pacific Islands (Palau). When the final elements, expected early in the third quarter of 1995, are completed, the results will be

improved GPS-aided air and ship navigation, modern shoreline information for nautical charts, refinement of maritime boundaries, and accurate positioning of 25 island airports.

20. New Zealand is assessing the suitability of its local New Zealand Geodetic Datum 49 (NZGD-49) for the future needs of surveying and mapping (E/CONF.87/L.12). The project will determine the present shape of NZGD-49 with respect to the World Geodetic System 84 (WGS-84). Since New Zealand experiences widespread tectonic earth deformation, a mechanism to maintain a geodetic survey system is necessary, and a high-precision geoid model is required to allow efficient use of new technology, such as GPS, for heighting. Future links between geodetic, topographic and cadastral digital databases are also being planned.

21. WGS-84, developed by the United States Defense Mapping Agency (DMA), provides an accurate global reference frame, earth gravitational model, normal gravity formula, geoid, and transformation constants with 115 local and regional datums covering all seven continents and many islands over major ocean areas (E/CONF.87/L.22). The efforts of DMA in establishing this state-of-the-art modelling of the earth from a geometric, geodetic and gravitational standpoint have resulted in significant improvements in the quality and accuracy of DMA products world wide.

22. Germany submitted paper E/CONF.87/INF/23, which described the Association of South-East Asian Nations (ASEAN) GPS-Project of the European Union. This project was designed to determine the current plate tectonic movements in South-East Asia. The study area is the zone of convergence of three plates, which causes numerous earthquakes and volcanic activity. GPS technology is being utilized to measure the amount of recent plate motion. A network covering an area of about 4,000 kilometres by 4,000 kilometres with 38 points carefully selected during geological surveys will be measured twice in three years. Results for the constant velocity field, which is estimated to be about 3-10 centimetres per year, depending on location, are expected to resolve the relative horizontal motions with an accuracy of about a centimetre per year. Those results will be combined with seismic and geomorphological approaches to evaluate the seismic potential of the different zones and to lead to a uniform interdisciplinary approach to earthquake prediction and natural hazard evaluation.

23. After all papers pertaining to geodesy had been presented, representatives were invited to discuss their respective national reports with regard to geodesy. Distinguished representatives from the following countries responded with information concerning their current status with respect to geodesy: China, Oman, Malaysia, the United Kingdom, the United States, Nepal, Indonesia and Qatar.

B. Surveying and mapping

24. Only two papers were submitted for the second sub-item, Surveying and mapping. The Secretariat submitted document E/CONF.87/BP.8, which addressed cadastral surveying and mapping in the region. In addressing the needs of the region, two broad groups of countries were considered: developed and developing. The category of developing countries was further broken down into three subgroups: Pacific island nations, countries in transition to developed status, and countries at an early stage of economic development. Recognizing that there is no definitive common cadastral solution for the countries of the

region owing to different requirements, there is nevertheless some common ground. Recommendations were made to develop a collation of options for cadastral reform, and a collection of case-studies of cadastral projects in the region for comparison.

25. The Democratic People's Republic of Korea submitted a paper (E/CONF.87/INF/31) that described a project on the surveying of rivers and lakes. As a result of the surveys, two atlases, one for rivers and one for lakes, were compiled. The information is being used for protection of the environment and forecast of the weather to prevent natural disaster by floods, thus providing the preconditions for increasing development of the economy.

26. Under the third sub-item, Hydrography, eight papers were presented. The Secretariat presented document E/CONF.87/BP.1, which detailed new trends in hydrography. Current data-collection and positioning topics included differential GPS, ship trends, swath sounding systems, and laser airborne hydrography. Technological advances were addressed, and geographic information systems (GIS), low-cost digital chart production systems, and the Electronic Chart Display and Information System (ECDIS) were discussed. Legal issues involving hydrography, namely, sovereignty of data ownership, copyright, liability, international standards, and data management, were presented.

C. Hydrography

27. A paper (E/CONF.87/L.3) submitted by the International Hydrographic Bureau (IHB) detailed the progress made in navigational charting since the last Conference. The conclusion reached was that there had been little progress made in this area. IHB has requested official development assistance (ODA) funding for the South China Sea Project and the ASEAN Maritime Operations Management Project. Progress on the International Bathymetric Chart of the Western Pacific (IBCWP) and technical assistance for projects were also discussed.

28. The Electronic Navigational Chart (ENC), a project initiated by the Hydrographic Department of Japan (JHD) in 1992, was discussed (E/CONF.87/WP.4). The project consists of two phases. The first involves the digitization of 900 paper navigational charts produced by JHD. This is expected to take 10 years starting from the beginning of the project. The second phase, which was also implemented in 1992, involves the preparation of the ENC production system. The first ENC will be released by March 1995. JHD indicated a willingness to take part in international cooperation in the field of electronic chart technology, in the interest of maritime safety. JHD is also involved in the preparation of coastal information maps against natural disasters (E/CONF.87/WP.5). Those maps, containing disaster relief information, were initiated in 1991 and when completed will cover the coastal region from Sagami Bay to Suruga Bay.

29. China submitted a report on hydrography (E/CONF.87/INF/13). A historical perspective was presented, followed by the current status of nautical charting in China, and the development of computer-assisted nautical cartography, which began in the 1970s. China has recently added state-of-the-art technology based on Canadian software for nautical cartography.

30. The Coast and Geodetic Survey (C & GS), a component of the National Oceanic and Atmospheric Administration (NOAA) in the United States, has begun a project for the rescheming of its nautical charts (E/CONF.87/L.9). The project involves

standardizing the scales and paper size of charts in conformance with international specifications and standardizing chart projections.

31. DMA of the United States has developed a new concept for defining and surveying a time-invariant bathymetry and suggests the use of a high-accuracy geoid as the new zero reference surface (E/CONF.87/L.18). Currently there are hundreds of vertical datums for both land and ocean areas in use all over the world. For nautical chart datums, the problem is further complicated by a lack of agreement on definitions by different countries. The result has been an adverse effect on international navigation safety. The DMA concept defines a nautical chart vertical datum that is not dependent on time, and involves the capability to compute a geoid of very high accuracy over ocean areas. The availability of GPS facilitates the establishment of this vertical chart datum for depiction on charts. Reversing the survey mode allows charted depths to be displayed in real time during navigation in order to check depth clearances and avoid ship grounding.

32. The United States Navy is building the Navigational Sensor System Interface (NAVSSI) to satisfy the functional and performance specifications proposed by the International Hydrographic Organization (IHO) and the International Maritime Organization (IMO), as presented in document E/CONF.87/L.20. With the providing by GPS of accurate positioning data, the supplying by advanced computing systems of the horsepower to handle large databases of charting data, and the development of United States Department of Defense standards for the exchange of digital data, it is now feasible to develop and deploy the Electronic Chart Display and Information System (ECDIS). To ensure interoperability, Digital Nautical Charts (DNCs) will be distributed using United States Department of Defense standards for vector data as surface ship navigation moves into the digital environment.

33. Discussions were held following the final paper concerning possible resolutions. The United States delegation had previously submitted a draft of a resolution in which the use of the International Terrestrial Reference Frame (ITRF) for scientific applications was recognized, and the adoption of WGS-84 as the reference system for mapping, charting, and navigation was recommended. After much discussion during the Committee I session, distinguished representatives from Australia, Germany, Malaysia, New Zealand and the United States held an ad hoc subcommittee meeting to refine the resolution to the satisfaction of all interested parties. Other resolutions were briefly introduced and discussed and two more have been developed for inclusion in the present report, one for hydrography and one for cadastral surveying and mapping.

34. The Honourable Chairman of Committee I, Mr. Jose Solis of the Philippines, closed Committee I by making a plea to the distinguished representatives to expand their horizons beyond the aspects of the Conference concerning bilateral cooperation in technological and information exchange towards a more global perspective. Mr. Solis asked the Conference to help apply the technology and information gathered for cartographic purposes towards elimination of poverty, strengthening of the strategy for sustainable development, relief from natural disasters, and preservation of the environment in support of Agenda 21 resulting from the Earth Summit, held in Rio de Janeiro, Brazil, in 1992.

III. WORK OF COMMITTEE II: CARTOGRAPHIC DATA MANIPULATION

35. The work of Committee II continued on agenda item 5, on new trends in technology, and their applications. The papers presented were under sub-item (c): Photogrammetry and remote sensing.

36. New trends in technology and their applications to photogrammetry and remote sensing were the subject of document E/CONF.87/BP.11, entitled "From analog to digital", introduced by the Secretariat. The development of photogrammetry and remote sensing was outlined through four distinct phases: plane table, analog, analytical and digital. Major advances were identified and a summary was given of the features of the existing and planned satellite missions. This paper concluded that satellite remote sensing systems had been designed by space agencies through a "top down" approach, inadequately considering user demands. They had been oriented primarily towards research agencies and this area was where the funding had been directed. For cartographic uses, satellite systems, although satisfying positional accuracy, are marginal with respect to detectability and height determination for topographic mapping identification.

37. In comparison with aerial photographic coverage, satellite imagery is much less costly per square kilometre. For the next three to five years, both analytical and digital plotters will exist in parallel. Advances may become possible through automatic aerial triangulation and pattern recognition. The merging of satellite and aerial image data with other GIS data is a special challenge for mapping in the future. A key finding has been that in view of current and future data acquisition possibilities, GIS development is today more of an institutional problem than a technical one.

38. A paper on the use of remote sensing and GIS in planning (E/CONF.87/INF/16) introduced by China indicated a basic method of integrating remote sensing, GIS, and urban planning knowledge. Applications in urban planning were described but major problems have arisen in developing GIS-based urban spatial analysis models. An outline was also presented on the current status of national remote sensing activities in China.

39. In two papers (E/CONF.87/INF/43 and 42), Germany provided details on remote sensing for mapping and the Modular-Opto-electronic Multispectral Scanner (MOMS)-02/02 data. It was advised that for mapping, current digital image restitution technology offers one third the resolution of analytical plotters. With regard to computerization, the evidence is that with integration of data for different uses, cost ratios become beneficial. It was concluded that despite marvellous technical advances made by space technology there are still difficulties in attaining appropriate environmental information for sustainable development. Although only some raw data has been available from MOMS-02/02, it is expected that it will meet standards for mapping at scales of 1:50,000.

40. Systems for data-processing analysis and representation were discussed in a paper (E/CONF.87/BP.7) presented by the Secretariat. Recent advances and future trends in systems for data processing, analysis, representation and communication were reviewed. A key issue identified was the development of a spatial information infrastructure for GIS interoperability. Architectural and functional aspects of a federated spatial multi-database management system was outlined. A GIS spatial browser developed by the Department of Natural Resources Canada was described. It was concluded that digital photogrammetric workstations will over time replace analytical plotters for topographic mapping.

The development of the spatial data infrastructure allows photogrammetric, remote sensing or GIS workstations to communicate with other workstations and to tap into national databases. This enables the user to browse metadata on many servers in a wide area network and to find all the data available relevant to a particular application.

41. The summary and findings provided at the Committee session gave a clear indication that advances in technology were steadily closing the gap between technology and practical user requirements. The challenge for the cartographic community is to keep abreast of those advances and develop them as cost-effective applications in the wide field of cartography. The task now is to direct cartographic advances towards enhancing specific user applications for management and community priorities.

IV. WORK OF COMMITTEE III: CARTOGRAPHIC DATA DEPICTION

42. The work of Committee III also continued on agenda item 5, on new trends in technology, and their applications. Under this item, the following sub-item was discussed: (d) Digital databases geographical and land information systems.

43. The general interest in this topic was well demonstrated by the number of technical reports (21) submitted to the Conference. In addition, several country reports also contained information relevant to the subject of the work of Committee III.

44. A paper submitted by the Secretariat (E/CONF.87/BP.3) presented a general model for the development of a national and regional geographical data infrastructure. Emphasis was laid upon the availability of good-quality, fundamental data sets according to present standards. This is to be considered a national resource. Equally important is the contact with the user community, thus ensuring that the geographical data are effectively applied to real economic, social and environmental issues.

45. The paper presented by China (E/CONF.87/INF/14) presented a clear case of a national GIS: the National Fundamental Geographic Information System (NGIS). This GIS has been under development since 1984 and aims at a digital topographic database suited for various map scales.

46. Another paper submitted by China (E/CONF.87/INF/17) dealt with an urban geographical information system: the Beijing underground pipeline network information system. The system is expected to be operational by the end of 1995.

47. An interesting example of a fully operational digital topographic database was given in the paper prepared by Qatar (E/CONF.87/L.1). During the design of the system great emphasis had been given to the setting up of a broad supportive platform in order to optimize applications.

48. Implementation of spatial data systems definitely requires setting certain standards, for example, for the database, transfer mechanisms and procedures. This was well explained in two papers, submitted by the United States (E/CONF.87/L.6 and 7), that described the National Spatial Data Infrastructure (NSDI) and the Spatial Data Transfer Standard (SDTS). Another paper submitted by the United States (E/CONF.87/L.19) enlightened on standard development by the Defense Mapping Agency for the distribution of digital geographical information in vector format. This standard will support a series of map products such as the Digital Chart of the World.

49. An example of a digital data set for a specific application field was presented in the paper entitled "The challenges of air traffic control graphics for the advanced automation system" (E/CONF.87/L.8) submitted by the United States. Naturally, fast data updating is a vital requirement for this type of work.

50. Recent changes in the direction of the Defense Mapping Agency’s strategy have caused a change in policy - a change from a product-oriented to a data-attentive posture. The paper entitled "The Global Geospatial Information and Services Initiative" (E/CONF.87/L.21) described DMS’s present intentions in the direction of a global geospatial information system.

51. The paper submitted by Cyprus (E/CONF.87/INF/22) described the initiatives for the creation of an integrated database consisting of a survey database, a digital cadastral database and a legal/fiscal database.

52. The need for joint use of geographical information has led in Finland to the development of an electronic data interchange under the United Nations Rules for Electronic Data Interchange for Administration, Commerce and Transport (EDIFACT) standard. This was elaborated upon in the paper presented by Finland (E/CONF.87/INF/24). In addition to some 20 data suppliers at national level, many other subnational organizations provide data to the system as well. Ample attention is given to providing on-line access of users to the databases.

53. Within the national aspirations laid down in 20/20 vision, Malaysia is now putting efforts together to develop the National Land Information System (NALIS). The paper submitted to the Conference by Malaysia (E/CONF.87/INF/26) described the achievements so far. Geographical data from many sources will be integrated in a National Land Data Bank.

54. A paper entitled "The Australia Geographic Database Program, GEODATA", presented by Australia (E/CONF.87/INF/28), gives a clear description of the geographical database developed as a major component of Australia's geographical information infrastructure. Fast delivery times, high quality and matching of user needs are key phrases for the system.

55. Two papers presented by Germany (E/CONF.87/INF/34 and 35 described the work done in Germany on the development of spatial data information systems by the official Surveying and Mapping Authorities and by the joined German mapping enterprises (Geokart). The first group aims at the production of a digital real estate map and that of a digital topographic-cartographic information system.

56. Another paper presented by Germany (E/CONF.87/INF/36) reported on a joint effort of the official survey and mapping organizations in Europe (Commission européene des responsables de cartographic officielle (CERCO)). The working group Multipurpose European Ground-Related Information Network (MEGRIN), established by CERCO, has the specific task of solving problems involving the exchange of digital topographic and cartographic data between the participating institutions and countries in Europe in general. For the time being, the German Institute for Applied Geodesy (IFAG) is acting as a service centre to build up the necessary infrastructure. The project will be based on available international standards.

57. Rapid expanding urban agglomerations from an obvious market for up-to-date integrated land information for designing policies and development programmes for efficient use of urban land. A paper submitted by Germany (E/CONF.87/INF/37) reported on the set-up of a land management information system in the city of Shanghai. German expertise supports the project.

58. China also reported on the production of a National Atlas Series of China (E/CONF.87/INF/12). Five volumes are to be published in paper and electronic form. Another paper by China submitted to the Conference dealt with the development of geographical school maps in China (E/CONF.87/INF/18).

59. Two papers submitted by Japan (E/CONF.87/WP.2 and 3) reported on work at hand in Japan with respect to digital mapping and GIS. For the purpose of updating topographic maps at the scale of 1:25,000, Japan has developed a raster-based revision method. Recognizing the need for adequate basic geographical information to deal with global environmental problems, Japan

proposes that a geographical data set be developed with a ground resolution of 1 kilometre. In addition to the usual topographic items, the data set should also contain information on issues such as vegetation, soils, geology, climate and various economic indices.

60. In conclusion, the following points were repeatedly stressed in papers submitted and in subsequent discussions held during Committee III sessions:

(a) Development of geographical information systems have started by now in many countries and reached the application stage in several countries;

(b) The need for having pre-set standards for the geographical data as well as the need for a clear operational management infrastructure is considered vital for a geographical information system;

(c) International cooperation is a vehicle for exchange of experience and a necessity for achieving standards for the development of regional and global databases;

(d) The development of an efficient geographical information system cannot be achieved if the needs of the user community are not properly taken care of.

V. WORK OF COMMITTEE IV: POLICIES AND MANAGEMENT

61. The work of Committee IV covered agenda items 6 (Human resources development) and 7 (Regional cooperation and technology transfer). Three papers were presented under item 6 and eight papers under item 7.

62. The first paper under agenda item 6, (E/CONF.87/BP.5) was a background document submitted by the Secretariat and presented by the International Cartographic Association (ICA) and addressed the lack of representation of women as well as minority groups at regional and international conferences and seminars on cartography. The paper looked at the broad issue of gender and cartography, with emphasis on the experiences and concerns of Asia and the Pacific. It discussed the promotion of gender equality and encouraged the greater participation of women in societies and committees in the cartographic community; acting as role models, they could encourage more women to enter the discipline.

63. The Secretariat also submitted the second paper under agenda item 6 entitled "Education and training in cartography for Asia and the Pacific" (E/CONF.87/BP.6). It discussed the fact that although many developing countries in Asia and the Pacific had adequate teaching facilities in the traditional cartographic skills, they lacked sufficient expertise in the rapidly developing technological areas of modern spatial information management. The following ideas were raised: having regional training centres; concentrating on training for the provision of spatial information; providing expert advice and modern literature; introducing quality atlases to schools. Recommendations were made for regional workshops: a joint workshop for Asia to be organized by ICA; a pilot workshop following the example of a pilot scheme being run in Viet Nam by ICA-Commission on Education and Training (CET); the formation of active national cartographic associations.

64. Wuhan Technical University of Surveying and Mapping reported on the status and progress of higher education in surveying and mapping in China (E/CONF.87/INF/11), stating that it faced the two big challenges of high technology and a market economy in the present climate of political reform. In the future, graduates would not be assigned jobs automatically but would have to find them independently. The decision had been made (in order to better prepare those graduates) to train at all levels including that of adult education. The main methods by which this would be achieved were through the adjustment and reconstruction of the many different specialties to reduce cross-discipline rivalry; optimization of teaching plans; concentration on course design; reform in management of teaching by means of accrediting excellent results; strengthening links with other international centres of excellence.

65. In a discussion on this paper, New Zealand suggested that there should be an alliance of those in the region with common interests to develop techniques in the collection and handling of spatial information, and also that innovative learning techniques and study tours should be considered. The United Kingdom endorsed these comments.

66. Consideration of agenda item 7 (Regional cooperation and technology transfer) commenced with a background paper submitted by the Secretariat (E/CONF.87/BP.2). It examined the topic of technology in the mapping sciences in the Asia and Pacific region. Two major problems were highlighted: the lack of appreciation by political decision makers of the role of mapping sciences and the lack of access to new technology by indigenous cartographers. Six key

strategies were discussed: education and training; research; dissemination of information; production of technology and equipment; involvement in the International Mapping Sciences Community; regional cooperation. Four actions were outlined in the paper.

67. Representatives from Germany, China and New Zealand added their comments.

68. A paper was presented by the Secretariat (E/CONF.87/BP.9) that depicted the status of world topographic mapping and Digital Elevation Models (DEMs) of dry land as of 1993. The main finding was that there was not 100 per cent coverage of the dry lands in the region in any scale range yet.

69. New Zealand presented the first paper (E/CONF.87/L.15) of a series under the general heading of regional cooperation and technology transfer. This paper gave details of the technical assistance provided by both the New Zealand Department of Survey and Land Information (DOSLI) and the New Zealand Hydrographic Department to the Pacific island nations and other countries in the region. Many of the projects involved training and the transfer of technology, a number have included funding assistance and some disaster response and aid.

70. The last background paper submitted by the Secretariat under agenda item 7 was entitled "Corporate development and technology transfer" (E/CONF.87/BP.10). The main thrust of the paper was that all countries were in transition and that such a situation would offer an ideal chance for regional cooperation. This was a strategic issue, as the successful transfer of new technology was becoming a management challenge. Clear corporate objectives and plans should be instituted and fitted into each country's government policy and objectives. The paper stressed that as all organizations were learning and needed to establish an atmosphere of trust, both within their own organizations and with others, the importance of networking both formal and informal relationships was increasing. The strength for the region lay in its acting not as individual nations but as the Asia and Pacific region team.

71. New Zealand presented a paper (E/CONF.87/L.13) concerning the convening of a United Nations regional cartographic technical meeting to cover both technology and resource management. New Zealand was to proceed with this workshop (aimed at middle managers) to be held in Wellington at the end of 1995. New Zealand would meet the in-country costs and administer the conference but it was seeking additional sponsorship to assist the smaller and less affluent nations in the region in attending.

72. A divisional report (E/CONF.87/L.14) of the Asia South-East and Pacific South-West Linguistic/Geographical Division of the United Nations Group of Experts on Geographical Names was presented by the delegate from New Zealand, Chairman of that Division. A Pacific-centred world map, on the Robinson projection, was issued to all delegations. It was the first such map to use the official "donor" countries' names. The proposal was made to organize a regional toponymic training course to be run in 1995 and to select a shorter name for the Division.

73. China presented a paper (E/CONF.87/INF/9) on the state of legislation in China on matters related to surveying and mapping. The Government pays much attention to the development of such legislation and delegates were issued with a copy of a recent (1992) law during the Conference. This law went into force on 1 July 1993. The paper outlined its scope and content and related future plans, linking the law to the open-door and market reform policies of China.

74. The delegate from China linked this paper to his proposal on the same subject, which was supported by the United Kingdom and Australia. The United Kingdom asked that digital data and GIS be explicitly included in the scope of the draft resolution.

75. The Chairman of Committee IV presented his country's report (E/CONF.87/INF/21) which dealt with existing and planned future capabilities and activities of Nepal's surveying and mapping department. Nepal strongly supports United Nations initiatives for technology transfer and participates in regional cooperation projects, such as that of the Miteri Sanghu Bridge, designed to connect the vertical datum of the Indian subcontinent with that of China. The main future concerns were stated, namely, densification of the geodetic network; extension of new topographic base mapping to western Nepal; a multi-use cadastral system; strengthening of local cadastral surveys; establishing of a land information system; and training of trainers in advanced techniques.

76. The delegate from Germany presented a paper on the establishment of a land information system for Shanghai, China (E/CONF.87/INF/37). This represented a particularly interesting example of technology transfer. The German Agency for Technical Cooperation (GTZ), a governmental organization, is dealing directly with Shanghai's Municipal Land Administration Bureau, representing the State Land Agency (SLA). The aim is to institutionalize improvements in urban land management in China. Objectives were stated to be development of an appropriate Land Management Information System (LMIS); establishment of techniques and procedures for collecting land data and exchanging these with relevant organizations; use of LMIS to enhance land management activities. The presentation highlighted some problems experienced in the early stages of the project concerning approaches to software and system development but drew encouraging conclusions regarding the potential of such a system in China for supporting government policy objectives in appropriate land utilization, sustainable economic development and income generation through land taxes.

77. The United Kingdom presented its national report on cartographic activities in Asia and the Pacific (E/CONF.87/INF/40). The four United Kingdom government agencies had contributed to a wide range of mapping and charting projects in Asia and the Pacific during the period from January 1991 to March 1994.

78. Ordnance Survey (OS) International and the British Geological Survey were involved in map production and training projects in 11 countries as part of the United Kingdom aid programme, on a repayment basis. Military Survey had revised a number of aeronautical charts, produced others in digital form and carried out GPS surveys throughout the region. The Hydrographic Office was continuing its work of preparing and publishing revised and new charts, and of providing advice and training to national hydrographic authorities.

79. The United Kingdom put forward a resolution with respect to the sharing of map information.

80. The document entitled "Where next for government survey and mapping agencies" (E/CONF.87/INF/41) was also presented by the United Kingdom. This paper, written by Ordnance Survey for the International Federation of Surveyors (Fédération internationale des géomètres (FIG)), noted that it was now a time of unparalleled change for government-funded national survey and mapping agencies (NSMAs). Their customers are becoming more demanding while they themselves are under pressure to demonstrate tangible and measurable benefit for their expenditures, and are encountering greater competition from the private sector and have to cope with quite revolutionary changes in technology. The paper

summarized the key factors influencing the future of such NSMAs and sought to predict some of the developments related to geographical and topographic data over the next two decades. It concluded that subject to good leadership, NSMAs had a bright future but might have to change dramatically in the years to come.

81. The Russian Federation presented a paper (E/CONF.87/INF/46) that gave background historical information on cartography in the former Union of Soviet Socialist Republics (USSR) and its successor States over the past 75 years. Verbally it gave an up-to-date account of the status of cartography. In the last two years the situation has changed radically, with the break-up of the USSR into constituent sovereign nations. They are using all the latest techniques in the production and revision of their maps and have several joint projects with other nations; however, in the era of a market economy they need greater assistance along with other States.

82. The Russian Federation requested that the United Nations hold regional seminars for the successor States of the former USSR on GIS and remote sensing activities under United Nations auspices in both Moscow and Central Asia. The Russian Federation would like to participate actively in the setting of such a requirement.

83. The delegate from Sweden gave a verbal account of Sweden’s technological cooperation in the region, and of the need for information in land management in both topographical and cadastral maps. Sweden is cooperating with the Philippines, Viet Nam, Bhutan, the Russian Federation, China and Malaysia on various projects. Sweden also provides on-the-job training, both in the host country and Sweden. Courses in cadastral development and remote sensing are held in Sweden.

84. The Vice-President of FIG presented a report (E/CONF.87/INF/47) entitled "The surveyor, the environment and Agenda 21" at short notice, at the invitation of the President of the Conference. This tied together statements at FIG Permanent Committee meetings up to February 1993 and the recommendations of Agenda 21, emanating from the Rio de Janeiro Earth Summit of June 1992. The paper had been written for the FIG Conference in March 1994 but was used in the context of this Committee (IV) to produce a resolution for the Thirteenth United Nations Regional Cartographic Conference for Asia and the Pacific to endorse. The representative of FIG put his proposals in the context of the great environmental challenges that faced the world and highlighted such issues as access to and exchange of information. He stressed the importance of non-governmental organizations in facilitating necessary changes and the fact that "dysfunctional institutional frameworks" often created barriers. Physical and social sciences must get closer together; and experts on spatial information, surveyors and cartographers were vital means to achieve this.

85. The Executive Secretary and Chief of the Sustainable Development and Environmental Management Branch of the Department for Development Support and Management Services of the United Nations Secretariat presented the report of the Secretariat on its activities in relevant fields (E/CONF.87/CRP.1) since the Twelfth United Nations Regional Cartographic Conference for Asia and the Pacific. This updated delegates on the progress in implementing actions tasked to the United Nations at that Conference and the impact of changes in organization and budgetary arrangements at the United Nations. Technical cooperation projects were in general now more decentralized to regional commissions such as the Economic and Social Commission for Asia and the Pacific (ESCAP), with the Department for Development Support and Management Services of the United Nations Secretariat playing a more upstream role as countries

strengthened their execution capacity. There was also now a shift to "new age" projects, broader in scope and requiring only limited but focused cartographic inputs. Funding was harder to come by, as was shown in a table at the end of the paper.

86. In 29 of the 33 resolutions passed at the Twelfth United Nations Regional Cartographic Conference for Asia and the Pacific, United Nations follow-up was requested. Of these 29, only 12 have been fully addressed, owing to lack of funds. Delegates were invited to refer to other resolutions of previous Conferences and to reports presented at the Thirteenth Conference before deciding how to address any other outstanding issues.

VI. RESOLUTIONS ADOPTED BY THE CONFERENCE

A. List of resolutions

General policy

1. Support for surveying and mapping activities in the region
2. Fourteenth United Nations Regional Cartographic Conference for Asia and the Pacific
3. Attendance at future United Nations Regional Cartographic Conferences for Asia and the Pacific
4. Pacific small island developing States
5. Access to information for development
6. Role of surveying, mapping and charting in the implementation of Agenda 21
7. Women in cartography

Transfer of technology

8. Adoption of a geocentric reference system
9. Hydrographic surveying and nautical charting
10. Cadastral surveying and mapping in the Asia and Pacific region
11. National surveying and mapping authorities
12. GIS standardization
13. Capacity-building for Agenda 21
14. Legislation on surveying and mapping
15. Geographical names

Institutional issues

16. Permanent regional GIS infrastructure committee
17. Geographical information and land information systems
18. Organizational development to meet the priorities of Agenda 21
19. Institutional frameworks for geospatial data management

Vote of thanks

20. Vote of thanks

B. Texts of resolutions

General policy

1. Support for surveying and mapping activities in the region

The Conference,

Concerned about the continuing environmental degradation at global, regional, national and subnational scales,

Mindful of the continuing growth of population, particularly in urban areas in developing countries, with all its problems such as poverty, unemployment, lack of adequate shelter and pressure on the environment,

Mindful also of the risks of natural resource depletion in the world if timely measures are not taken,

Recalling the need for a much greater public awareness concerning the above matters as well as the need for action to achieve sustainable development,

Acknowledging the fundamental importance of technical cooperation at both global and regional levels, programme coordination and experience-sharing between countries of the region to meet the goals of Agenda 21, 2/ which is a blueprint for sustainable development,

Convinced that such development cannot take place efficiently without proper inventory and monitoring of human and land resources in their proper spatial geographical context,

Aware of the effective and cost-efficient role surveying, mapping and charting play in the registering, monitoring and depicting of earth-related phenomenon and the powerful role of maps and map-related images in the information stream to decision makers, planners and the public at large,

1. Calls upon the cartographic disciplines to share their experiences and to join their efforts to contribute to the solution of the problems mentioned above;

2. Calls upon existing international scientific and professional organizations to continue to offer support wherever possible;

3. Urges Governments and international organizations to fully support cartographic efforts that contribute to the alleviation of recognized environmental degradation and human predicaments;

4. Recommends that the United Nations continue to support surveying and mapping activities in the region;

5. Also recommends that donor countries and non-governmental organizations offer expertise and facilities to support developing countries in

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2/ Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992, vol. I, Resolutions Adopted by the Conference (United Nations publication, Sales No. E.93.I.8 and corrigendum), resolution 1, annex II.

capacity-building (manpower development and technology transfer) in the surveying and mapping disciplines.

2. Fourteenth United Nations Regional Cartographic Conference for Asia and the Pacific

The Conference,

Recognizing the contribution of the United Nations Regional Cartographic Conferences for Asia and the Pacific as essential for capacity-building, transfer of technology and technical cooperation and for the promotion of global and regional strategies for sustainable development,

Mindful of the efforts made by the countries of the region to formulate and implement action programmes to fulfil the strategy for sustainable development and, consequently, of the drafting of the Agenda 21 of individual countries,

Recognizing the important contribution made by the United Nations Regional Cartographic Conference for Asia and the Pacific to strengthening technical cooperation and transfer of technology within the countries and economies of the region in the light of rapid technological advances,

Noting with appreciation that the background papers presented at the Thirteenth United Nations Regional Cartographic Conference for Asia and the Pacific were informative and effective in establishing a framework for subsequent discussions on related agenda items and for future agendas,

Expressing its appreciation for the commendable work of the United Nations Secretariat, especially the Sustainable Development and Environmental Management Branch of the Department for Development Support and Management Services, in preparing for the Conference and providing the necessary resources to facilitate its accomplishment, and commending also its increased level of cooperation with international scientific and professional organizations,

Bearing in mind the conclusions and recommendations contained in the report of the Working Group of the Thirteenth United Nations Regional Cartographic Conference for Asia and the Pacific on future regional cartographic conferences,

1. Recommends that the Economic and Social Council should convene the Fourteenth United Nations Regional Cartographic Conference for Asia and the Pacific in mid-1997, with a primary focus on the contribution of surveying, mapping and charting in support of the implementation of Agenda 21;

2. Also recommends that the United Nations should continue to provide the secretariat for future United Nations Regional Cartographic Conferences for Asia and the Pacific and sponsor the preparation of background papers, the selection of which should be done with the assistance, inter alia, of international and professional organizations;

3. Further recommends that financial resources should be allocated by the United Nations within existing resources to host a United Nations Regional Cartographic Conference for Asia and the Pacific that is five days long.

3. Attendance at future United Nations Regional Cartographic Conferences for Asia and the Pacific

The Conference,

Recognizing that this Conference is designed to cover Asia and the Pacific,

Noting with concern that the least developed and other developing countries with low per capita income were not adequately represented at the Twelfth and Thirteenth United Nations Regional Cartographic Conferences for Asia and the Pacific,

Recommends that the United Nations assist the least developed and other developing countries with low per capita income to attend future Conferences through direct financial assistance, within existing resources, and encourage them to submit reports on their special needs along with their country reports.

4. Pacific small island developing States

The Conference,

Recalling the Declaration at Barbados 3/ and the Programme of Action for the Sustainable Development of Small Island Developing States, 4/ adopted by the Global Conference on the Sustainable Development of Small Island Developing States, held at Bridgetown, Barbados, from 25 April to 6 May 1994,

Acknowledging the critical contribution of surveying, mapping and charting and related technologies to predicting and alleviating the potential for environmental damage,

Noting with concern that both the Twelfth and Thirteenth United Nations Regional Cartographic Conferences for Asia and the Pacific were attended by very few of the small island developing States of the Pacific,

Aware of the financial difficulties involved in attending this Conference,

Conscious that owing to their exclusive economic zone boundaries, these States are responsible for environmental management of extensive ocean areas of the Pacific region,

Recognizing the special benefits that are being realized by the less affluent countries from the technical advances in cartography and related disciplines that have been reported at this Conference,

Appeals to the United Nations to assist the Pacific small island developing States by:

(a) Redirecting financial assistance to help with costs for attending future Conferences within existing resources;

3/ Report of the Global Conference on the Sustainable Development of Small Island Developing States, Bridgetown, Barbados, 26 April-6 May 1994 (A/CONF.167/9) (United Nations publication, forthcoming), chap. I, resolution 1, annex I.

4/ Ibid., annex II.

(b) Including special agenda items relevant to such States;

(c) Facilitating, inter alia, group workshops and seminars between Conferences.

5. Access to information for development

The Conference,

Acknowledging that Governments have a right to withhold, restrict or recover the cost of spatial information in the national interest, and for security reasons,

Recognizing that many national and international agencies and organizations have a need to hold and use spatial data to ensure effective action in member States related to economic and social well-being and development,

Noting that satellite-based systems now allow comprehensive spatial data sets to be independently compiled by extranational agencies,

Concerned that the costs of compiling and maintaining such data sets are likely to remain prohibitively high for some member States and organizations, particularly the smaller and/or more vulnerable member States,

1. Calls upon relevant authorities in member States to authorize their national survey and mapping agencies to make more widely available, in timely, affordable and appropriate form, such spatial information as is needed by national and international agencies and organizations to enable United Nations resolutions to be effectively implemented;

2. Urges all member States and agencies possessing spatial data sets with potential value to the economic and social welfare of other member States and national and international agencies and organizations to continue their efforts to improve the means of making such data sets available to all;

3. Recommends that the access to information start with making small-scale maps and geographical data of one-kilometre resolution available to interested countries.

6. Role of surveying, mapping and charting in the implementation of Agenda 21

The Conference,

Emphasizing the importance of Agenda 21 as the blueprint for sustainable development, its defined roles for the surveying, mapping and charting community, and the responsibility of all institutions and organizations to support its objectives,

Recognizing the relevance of surveying, mapping and charting in implementing Agenda 21,

Recommends that national surveying and mapping organizations, institutions and professionals, when reviewing and revising their list of corporate

responsibilities, and their objectives and work plans, heed the directives of Agenda 21 regarding, inter alia:

(a) Access by individuals to appropriate information, and encouraging public awareness and participation by making information widely available, as set forth as well in the Rio Declaration on Environment and Development; 5/

(b) Developing/strengthening legal frameworks for land management, and access to land resources and land ownership (chapter 3 on combating poverty);

(c) Increasing exchange of information between institutions (chapter 5 on demographic dynamics and sustainability);

(d) Undertaking national inventory of land resources to establish a land information system (chapter 7 on promoting sustainable human settlement development);

(e) Creating efficient and accessible land markets by improving land registry systems and streamlining land transaction procedures (chapter 7 on promoting sustainable human settlement development);

(f) National mapping programmes (chapter 10 on an integrated approach to the planning and management of land resources);

(g) Developing integrated information systems for environmental monitoring, accounting and impact analysis (chapter 12 on managing fragile ecosystems: combating desertification and drought);

(h) Developing methodologies for establishment of databases, description of land uses (chapter 14 on promoting sustainable agriculture and rural development);

(i) Developing and maintaining databases for assessment and management of coastal areas, and adequate coastal and ship-routing charting for navigational safety (chapter 17 on protection of the oceans);

(j) Transformation of existing information into forms more useful for decision makers (chapter 40 on information for decision-making).

7. Women in cartography

The Conference,

Recognizing the important role women play in surveying, mapping and charting,

Noting the underrepresentation of women at professional and educational conferences and in networking activities,

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5/ Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992, vol. I, Resolutions Adopted by the Conference (United Nations publication, Sales No. E.93.I.8 and corrigendum), resolution 1, annex I.

Recommends that national surveying, mapping and charting organizations create increased opportunities for women to participate in such activities and to create opportunities for women for career advancement.

Transfer of technology

8. Adoption of a geocentric reference system

The Conference,

Recalling resolution 4, on regional geodetic reference systems, of the Twelfth United Nations Regional Cartographic Conference for Asia and the Pacific,

Recognizing the emergence of the Global Positioning System as a key geodetic technique which can be employed to strengthen or complete national geodetic infrastructures,

Noting the current use of the World Geodetic System 84 (WGS-84) for mapping, charting and navigation by many nations world wide, and its adoption by the International Civil Aviation Organization (ICAO) and the International Hydrographic Organization (IHO), for aeronautical charting and nautical charting respectively,

Bearing in mind that the International Terrestrial Reference Frame (ITRF) is recommended by the International Association of Geodesy (IAG),

Cognizant of the convergence of these two systems over time and the ongoing evolution of global geodetic reference systems,

Recommends that all countries in the region adopt a geocentric reference system, as soon as practicable.

9. Hydrographic surveying and nautical charting

The Conference,

Recalling resolution 9, on hydrographic surveying and nautical charting, of the Eleventh United Nations Regional Cartographic Conference for Asia and the Pacific, and resolution 6, on promotion of hydrographic surveying and nautical charting services in the region, of the Twelfth United Nations Regional Cartographic Conference for Asia and the Pacific,

Noting with concern that a significant lack of adequate hydrographic surveying data and nautical charts is a serious impediment to the sustainable development of the maritime nations of the Asia and Pacific region,

Noting that the rate of economic development in the region is threatened by this lack of data, as reflected in the hindrance of efforts in such areas as improvement of port facilities, expansion of maritime trade, growth of tourism and recreational maritime activities, and delineation of offshore maritime boundaries,

Bearing in mind that a lack of adequate hydrographic survey data and nautical charts has a direct effect on safety of navigation, and that a number

of recent maritime accidents have resulted in damage to the marine environment and coastal ecology,

Noting with satisfaction the initiative of the hydrographic offices of countries of the Association of South-East Asian Nations (ASEAN) with regard to the identification of the need for a maritime operations management project aimed at improving the safety of navigation,

Recognizing that the International Hydrographic Organization (IHO) continues to promote the proposal for a South China Sea Project (SCSP) to significantly improve the charts of this area of heavy maritime traffic,

Recognizing also that the project documentation drafted by the Hydrographic Office of the Philippines for the proposed South China Sea Project has been revised through cooperation among the member States of the East Asia Hydrographic Commission,

1. Recommends that the Economic and Social Commission for Asia and the Pacific (ESCAP) vigorously support the International Hydrographic Organization initiative for the proposed South China Sea Project by assisting in the identification of available resources, so that the project may move forward as a matter of priority;

2. Also recommends that the Economic and Social Commission for Asia and the Pacific and the International Hydrographic Organization identify available resources to establish an Association of South-East Asian Nations maritime operations management project, as a second priority.

10. Cadastral surveying and mapping in the Asia and Pacific region

The Conference,

Recalling the conclusions derived from the Food and Agriculture Organization of the United Nations (FAO)/International Federation of Surveyors (FIG) round-table meeting and "Cadastral reform in rural economies in transition", held in Melbourne, Australia, in March 1994, just prior to the FIG Congress,

Bearing in mind that cadastral systems are not an end in themselves but are essential in order to support an efficient land market, and the provision of social justice, and to improve productivity, as well as to facilitate the efficient management of the environment,

Recognizing the need for all countries in the region to have an effective user-based cadastral system that is appropriate to local needs, as basic infrastructure for the sustainable management of land, the optimization of agrarian production, and the security of citizens,

Acknowledging that some countries of the region have limited funds, education and training, and limited ability to support sophisticated cadastral systems,

Convinced that the countries of the region should have access to and use of new cadastral technology where appropriate, as long as cadastral systems are both economically and technically sustainable,

Noting that a number of countries in the region are undertaking or planning cadastral reform,

Aware of the different levels of development of the countries of the region, as well as of difference in needs, culture, policy and law, and of the variation in effectiveness of national cadastral systems and capacity,

Recognizing that every country of the region may have different requirements for cadastral systems, but that there is sufficient commonality among the needs of countries,

1. Recommends that the United Nations with the expert assistance of the International Federation of Surveyors (FIG) and other relevant organizations support the preparation of a regional and global compilation of optional components of a cadastre, including legal aspects, land policy, institutional arrangements, technology and economics;

2. Also recommends the preparation of case-studies of cadastral systems and cadastral reforms, so that countries of the region engaged in establishing or reforming a cadastre may become aware of various options and learn from the successes and failures of others.

11. National surveying and mapping authorities

A

The Conference,

Recalling the recommendation of the Twelfth United Nations Regional Cartographic Conference for Asia and the Pacific that Global Positioning System observations should be introduced into suitable photogrammetric block adjustment programmes to provide control for surveying and mapping in a more economical manner,

Recognizing the developments in the availability and operability of the Global Positioning System in aerial survey flying with respect to determining camera station coordinates,

Noting that such data can be used in aerial triangulation adjustment with a significant reduction of ground survey requirements for photogrammetric control,

Recommends to national surveying and mapping authorities the use of an in-flight Global Positioning System for the determination of camera coordinates, as soon as practicable.

B

The Conference,

Recognizing the continued development and application of digital photogrammetric data-collection systems, and the need for national surveying and mapping authorities to plan their longer-term equipment,

Noting that as digital photogrammetric data-collection systems develop, they will have evident advantages over analytical systems,

Recommends that member countries, in planning for equipment, note that in the future digital photogrammetric data-collection systems will become more and more applicable, while for the time being analog, analytical and digital photogrammetric data-collection systems and instrumentation will continue to be used in parallel for mapping and map revision.

12. GIS standardization

The Conference,

Noting the rapid development of mapping and geographical information systems in recent years,

Recognizing the need for efficient data acquisition for mapping and geographical information systems,

Emphasizing the importance of the standardization of mapping and geographical information systems for their further development and cost efficiency,

Encourages member nations in the region to participate in international geographical information system (GIS) standardization efforts.

13. Capacity-building for Agenda 21

The Conference,

Recognizing the contribution that surveying, mapping and charting can make to a Government's strategic priorities and objectives in resource management and land development and to Agenda 21,

Recognizing also the role of new technology in enhancing the effectiveness and productivity of survey and mapping organizations,

Noting the need for greater opportunity in the region to share knowledge and experience so as to facilitate the transfer of technology,

Conscious that a well-focused programme covering both applied technology and user needs would enable a workshop to share and develop knowledge on surveying, mapping and charting applications relevant to sustainable development,

Conscious also of the difficulties of small island developing States and others in assessing the appropriate applications of technology for meeting both national and United Nations objectives and strategies for sustainable development,

Noting New Zealand's agreement and capability to organize such a workshop,

Recommends that a mid-term workshop on the contribution that applied cartographic technology can make to sustainable development be held in 18 months' time in New Zealand.

14. Legislation on surveying and mapping

The Conference,

Recognizing the importance of legislation on surveying and mapping for legal administration and the further development of cartography in all countries,

Recognizing also the need for the exchange of experiences on the drawing-up and implementation of laws or regulations on surveying and mapping,

Noting that many countries have promulgated laws or regulations on surveying and mapping and gained rich experience in their implementation,

Recommends that:

(a) Legislation should be one of the important topics for future cartographic conferences;

(b) The United Nations facilitate the organization of special seminars or symposia for legislation on surveying and mapping;

(c) The United Nations facilitate the collection of existing laws or regulations on surveying and mapping from all countries and publish a special issue of World Cartography on surveying and mapping legislation.

15. Geographical names

The Conference,

Recognizing the importance of the international standardization of geographical names based on national standardization programmes of member countries,

Noting that such national programmes are based on sound toponymic knowledge and the importance of geographical names as a significant identification layer in national land information and geographical information systems,

Acknowledging the great benefit to participating countries resulting from the last training course on toponymy in Indonesia in 1989, particularly the formation of geographical names authorities, the inclusion of toponymy in technical syllabuses and the carrying out of place-names surveys,

Acknowledging also the great interest expressed by member countries of the Asia South-East and Pacific South-West Division of the United Nations Group of Experts on Geographical Names at the Seventh Meeting of the Division held in Beijing, 7 and 8 May 1994, on the need for a further training course on toponymy,

Recommends that the United Nations sponsor another course on toponymy to be held in the region some time in the period 1995-1996, within existing resources.

Institutional issues

16. Permanent regional GIS infrastructure committee

The Conference,

Noting the rapid development and progress of geographical information systems in all countries in past years,

Bearing in mind that geographical information systems form a fundamental part of the information industry,

Recognizing the urgent need for regional and global geographical information system cooperation and the necessity for experience exchange and technology transfer on geographical information systems,

Recommends that within a year from now, with the initial administrative support of the United Nations Secretariat, directorates of national survey and mapping organizations in the region form a permanent committee to discuss and agree on, inter alia, geographical information system standards, geographical information system infrastructure and institutional development, and linkage of the prospective committee with related bodies in the world.

17. Geographical information and land information systems

The Conference,

Recognizing the need for the development, implementation and proper use of geographical information and land information systems for the sustainable development of urban infrastructure and urban land use,

Realizing that in some member countries, these activities have evolved in separate organizations without intensive coordination, as a result of existing laws and national security that must be respected,

Appreciating that such work is promoted by national and international scientific and professional societies in the cartographic field,

Recommends that through the United Nations (the Economic and Social Commission for Asia and the Pacific) and within available resources an international group of experts be established to provide recommendations on standardizing data exchange formats, and on facilitating the exchange of digital cartographic data, and to initiate the study of the technical means by which geographical information-related databases can best be integrated at the international level.

18. Organizational development to meet the priorities of Agenda 21

The Conference,

Recognizing the new priorities for sustainable development as set out in Agenda 21 and the changing services required of surveying and mapping organizations,

Recognizing also the pressures for organization reform in countries in the region and the growing requirements of developing functions and services to meet new-age needs,

Noting the importance of corporate management development in surveying and mapping organizations to ensuring relevant vision, mission, strategy and planning for a changing future,

Noting also the relevance of the processes and techniques now applied in the general management field,

Conscious that all countries in the region are at some stage of transition from traditional organizational systems to systems transformed through new technology,

Conscious also of the value of countries' working cooperatively in the region to exchange information and use each other's experience and capability to advance institutional and organizational development,

Recommends that the United Nations assist in the establishment of a regional network to facilitate the assessment and priority of organizational development to encourage more effective transfer of technology in the region,

19. Institutional frameworks for geospatial data management

The Conference,

Recognizing the past and ongoing level of investment in geospatial data and the importance of those data to the development and care of infrastructure and natural resources,

Recognizing also that effective creation, management and use of digital geospatial data require an authorized national institutional framework with agreed protocols of standards, availability and exchange of data,

Aware that the lack of an effective institutional framework causes inexorable waste of resources through duplication and incompatibility, and of the cost of flawed planning decisions because of incompatible, incomplete or inadequate geospatial data,

Noting that an effective institutional framework for geospatial data management with support at the highest possible level of government is essential for national development and natural resource care and management, and that the unacceptable cost of not achieving this arrangement will increase with time,

1. Recommends that the United Nations be requested to establish, and make known the availability of, an expert consultative and facilitation service available to countries seeking external assistance in achieving an effective geospatial data institutional framework;

2. Also recommends that countries with national, professional or environmental associations invite those associations to become involved in developing or reforming their institutional frameworks;

20. Vote of thanks

The Conference,

1. Expresses its heartfelt gratitude to the Government of China for hosting the Conference and for the hospitality extended to all participants in the Thirteenth United Nations Regional Cartographic Conference for Asia and the Pacific through the National Bureau of Surveying and Mapping;

2. Expresses its deep appreciation to the Secretariat for the excellent substantive servicing provided to the Conference and to the National Organizing Committee for the outstanding arrangements made for the Conference;

3. Expresses its sincere appreciation to the President of the Conference and to the Chairpersons of the technical committees for the excellent manner in which the Conference was conducted;

4. Expresses its thanks to the other officers of the Conference and to the staff of the United Nations, including the editors, interpreters, translators and secretarial support staff for their dedicated work;

5. Acknowledges the highly successful and progressive results of the Conference.

Annex I

LIST OF PARTICIPANTS

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

AUSTRALIA

Representative

Mr. Harvey JACKA, Executive Director, Australian Geological Survey Organization

Alternates

Mr. Andrew CLARKE, Assistant General Manager, Australian Survey and Land Information Group
Mr. Ron FURNESS, Australian Institute of Cartographers and Royal Australian Navy (RAN) Hydrographic Service
Mr. Brian GOODCHILD, Executive Officer, Committee for Geographical Names in Australia, Australian Survey and Land Information Group

AZERBAIJAN

Representative

Mr. Soultanov ADIL, Chief of Service, Chairman of the State Committee of Geodesy and Cartography

Alternate representative

Mr. Najuiey AZAD, Vice-Chief of Service, Azerbaijan National Committee of Geodesy and Cartography

BANGLADESH

Representative

Brigadier Mohammed Mahbubul KARIM, Surveyor-General of Bangladesh, Survey of Bangladesh

CHINA

Representative

JIN Xiangwen, Director-General, National Bureau of Surveying and Mapping (NBSM)

Alternates

YANG Kai, Deputy Director-General, National Bureau of Surveying and Mapping (NBSM)
RUAN Ping, Chief, Department of Treaty and Laws, Ministry of Foreign Affairs

Adviser

CHEN Junyong, Chief Engineer, National Bureau of Surveying and Mapping (NBSM)

Experts

BAI Bo, Director, Division of International Cooperation, National Bureau of Surveying and Mapping (NBSM)
BU Qingjun, Deputy Director, Bureau of Surveying and Mapping, Headquarters of General Staff
CAI Liqun, Engineer, Department of Planning, Ministry of Construction
CHEN Fuxiao, Deputy Director, Bureau of Secretariat, General Office of the State Council
CHEN Hongyun, Director, Division of Surveying and Mapping, Department of Navigation Security, Marine Headquarters
CHEN Shoucai, Senior Engineer, China National Administration of Coal Geology, Ministry of Coal Industry
CHEN Yugui, Director, Administrative Office, Department of International Cooperation, Ministry of Construction
CHENG Ye, Chief, Cadastre Division, Institute of China Land Investigation, State Land Administration
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LI, Deputy Chief Engineer, National Information Centre of Surveying and Mapping
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LIU Sihan, Director, Division of Comprehensive Planning, National Bureau of Surveying and Mapping
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Dr. Judith MONTE, Geographic Specialist, Map Procurement Division, Department of State
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Mr. G. A. ANDREASSEND, Principal Government Land Surveyor
Mr. S. C. LEUNG, Government Land Surveyor
Mr. H. CHAN, Chief Land Surveyor

C. Specialized agencies

United Nations Educational, Scientific and Cultural Organization (UNESCO)	Mr. S. TAKEI, Head, UNESCO Beijing
International Hydrographic Bureau	Mr. Ron FURNESS RAN Hydrographic Service

D. International scientific organizations

International Cartographic Association (ICA)	Dr. Tositomo-KANAKUBO Vice-President, ICA; Japan Map Centre
	Mr. Ron FURNESS Australian Institute of Cartographers
International Society of Photogrammetry and Remote Sensing (ISPRS)	Professor G. KONECNY Director, Institute for Photogrammetry and Engineering Surveys
International Federation of Surveyors	Mr. Peter BYRNE Vice-President
	Dr. Ray HOLMES Member of the Executive Bureau; Congress Director

E. Secretariat of the Conference

Executive Secretary	Ms. Beatrice LABONNE Chief, Sustainable Development and Environmental Management Branch Division of Economic Policy and Social Development Department for Development Support and Management Services
Deputy Executive Secretary	Mr. Valeri MOSKALENKO Sustainable Development and Environmental Management Branch Division of Economic Policy and Social Development Department for Development Support and Management Services

Annex II

AGENDA

1. Opening of the Conference.

2. Election of the President and other officers of the Conference.

3. Organizational matters:

   (a) Adoption of the rules of procedure;

   (b) Adoption of the agenda;

   (c) Establishment of technical committees, and election of Chairmen and Rapporteurs;

   (d) Organization of work;

   (e) Credentials of representatives to the Conference.

4. Country reports on the current status and issues of surveying, charting and mapping at the national level: needs and requirements versus reality in the region.

5. New trends in technology, and their applications:

   (a) Geodesy;

   (b) Surveying and mapping;

   (c) Photogrammetry and remote sensing;

   (d) Digital databases, geographical and land information systems;

   (e) Hydrography.

6. Human resources development.

7. Regional cooperation and technology transfer.

8. Provisional agenda for the Fourteenth United Nations Regional Cartographic Conference for Asia and the Pacific.

9. Adoption of the report of the Conference.

Annex III

LIST OF DOCUMENTS

Document symbol	Title	Agenda item
E/CONF.87/1	Provisional agenda	3 (b)
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E/CONF.87/INF/3	Advance information regarding general arrangements of interest to the participants	
E/CONF.87/INF/4	Provisional allocation of agenda items and proposed schedule for the Conference	3 (d)
E/CONF.87/INF/5	Provisional list of documents	3 (d)
E/CONF.87/INF/6	Provisional list of participants	3 (d)
E/CONF.87/INF/7	Draft report of the Conference (to be published)	9
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E/CONF.87/INF/9	Legislation on surveying and mapping in China (submitted by China)	5
E/CONF.87/INF/10	Progress by surveying and mapping science and technology in China (submitted by China)	4
E/CONF.87/INF/11	Status and prospects of higher education in surveying and mapping in China (submitted by China)	6
E/CONF.87/INF/12	Compilation and publication of the National Atlas Series of China (submitted by China)	5 (b)
E/CONF.87/INF/13	National charting in China (submitted by China)	5 (e)
E/CONF.87/INF/14	New development of the National Fundamental Geographical Information System (submitted by China)	5 (d)

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E/CONF.87/INF/15	Application and development of GPS technology in fundamental surveying and mapping work in China (submitted by China)	5 (a)
E/CONF.87/INF/16	Integrated utilization of remote sensing and GISs in urban planning (submitted by China)	5 (c)
E/CONF.87/INF/17	Introducing GIS technology in city surveying organization (submitted by China)	5 (d)
E/CONF.87/INF/18	Development of school maps in China (submitted by China)	5 (b)
E/CONF.87/INF/19	Establishment of GPS crustal deformation monitoring network in North China (submitted by China)	5 (a)
E/CONF.87/INF/20	Aspects of new technology (GIS and GPS) and hydrographic developments (submitted by Oman)	4
E/CONF.87/INF/21	Future activities on surveying and mapping of Survey Department (submitted by Nepal)	4
E/CONF.87/INF/22	New trends in technology and their applications: geodesy (submitted by Cyprus)	5 (a)
E/CONF.87/INF/23	The ASEAN GPS-project of the European Union (submitted by Germany)	5 (a)
E/CONF.87/INF/24	The geographic information market in Finland: EDI-based data services (submitted by Finland)	5 (d)
E/CONF.87/INF/25	Cartographic activities in Malaysia, 1990-1993 (submitted by Malaysia)	4
E/CONF.87/INF/26	Digital databases, geographical and land information systems: a Malaysian experience (submitted by Malaysia)	5 (d)
E/CONF.87/INF/27	Mapping in Australia: an overview (submitted by Australia)	4
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E/CONF.87/INF/36	The contribution of Germany to the project MEGRIN of the official mapping organizations of Europe (submitted by Germany)	5 (d)
E/CONF.87/INF/37	Improvement of urban management by the establishment of a land information system in Shanghai (submitted by Germany)	5 (d)
E/CONF.87/INF/38	Mapping and surveying activities, 1991-1993 (submitted by Singapore)	4
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E/CONF.87/INF/41	Where next for government survey and mapping agencies (submitted by United Kingdom of Great Britain and Northern Ireland)	5 (d)
E/CONF.87/INF/42	First examinations on the cartographic potential of MOMS-02/D2 data (submitted by Germany)	5 (c)
E/CONF.87/INF/43	Mapping and remote sensing: the backbone of environmental information systems in developing countries (submitted by Germany)	5 (c)
E/CONF.87/INF/44	Country report of the Republic of the Philippines (submitted by Philippines)	4
E/CONF.87/INF/45	Macau: a new phase in development (submitted by Portugal)	4
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E/CONF.87/INF/47	The surveyor, the environment and Agenda 21 (submitted by FIG)	7
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E/CONF.87/INF/49	Prospects and problems of earth remote sensing (submitted by the Russian Federation)	5 (c)
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E/CONF.87/L.1	Qatar’s digital base map database (submitted by Qatar)	4
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E/CONF.87/L.3	Accurate and detailed navigation charts: essential basis for maritime trade in East Asia and the Pacific (submitted by IHB)	5 (e)
E/CONF.87/L.4	Cartographic activities in Thailand (submitted by Thailand)	4
E/CONF.87/L.5	Mapping applications of the global positioning systems on airborne platforms (submitted by United States)	5 (e)

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E/CONF.87/L.8	The challenges of air traffic control graphics for the Advanced Automation System (submitted by United States)	5 (d)
E/CONF.87/L.9	The Coast and Geodetic Survey's nautical chart rescheming plan (submitted by United States)	5 (e)
E/CONF.87/L.10	Precise satellite survey results in revised position for the Northern Mariana Islands (submitted by United States)	5 (a)
E/CONF.87/L.11	Cartographic activities in New Zealand, 1991-1994 (submitted by New Zealand)	4
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E/CONF.87/L.13	United Nations cartographic technical meeting (submitted by New Zealand)	7
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E/CONF.87/L.18	A new concept for defining and surveying time-invariant bathymetry (submitted by United States)	5 (e)
E/CONF.87/L.19	A product exchange format for the Defense Mapping Agency's vector products (submitted by United States)	5 (d)

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E/CONF.87/L.21	The Global Geospatial Information and Services Initiative (submitted by United States)	5 (d)
E/CONF.87/L.22	World geodetic system 1984: a three-dimensional reference frame for global mapping, charting and geodetic applications (submitted by United States)	5 (a)
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E/CONF.87/BP.5	Gender and cartography (submitted by the Secretariat)	6
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E/CONF.87/BP.8	Cadastral surveying and mapping: new trends in technology and their applications (submitted by the Secretariat)	5 (b)
E/CONF.87/BP.9	The world’s mapping, geodetic control, remote sensing and geographic information systems, 1993 (submitted by the Secretariat)	5
E/CONF.87/BP.10	Corporate development and technology transfer (submitted by the Secretariat)	7
E/CONF.87/BP.11	From analog to digital (submitted by the Secretariat)	5 (c)

Conference room paper

E/CONF.87/CRP.1	The Department for Development Support and Management Services of the United Nations Secretariat technical cooperation activities for surveying, mapping, charting and remote sensing in the Asian and Pacific region (submitted by the Secretariat)	7

Annex IV

PROVISIONAL AGENDA FOR THE FOURTEENTH UNITED NATIONS REGIONAL CARTOGRAPHIC CONFERENCE FOR ASIA AND THE PACIFIC

1. Opening of the Conference.

2. Election of the President and other officers of the Conference.

3. Objectives of the Conference.

4. Organizational matters:

   (a) Adoption of the rules of procedure;

   (b) Adoption of the agenda;

   (c) Establishment of technical committees, and election of Chairmen and Rapporteurs;

   (d) Organization of work;

   (e) Credentials of representatives to the Conference.

5. United Nations and country reports on the implementation of the resolutions of the Thirteenth United Nations Regional Cartographic Conference for Asia and the Pacific.

6. Reports on the contribution of surveying, mapping and charting to support of the implementation of Agenda 21:

   (a) Environmental management, including of the oceans, and disaster mitigation, reporting and documenting;

   (b) Public access to and exchange of information;

   (c) Land reform, land management and development;

   (d) Demography, human settlements policies;

   (e) Desertification and land degradation;

   (f) Human resources development;

   (g) Safety of maritime and air navigation, including hydrographic surveys and nautical charting;

   (h) Other applications of surveying and mapping to support the implementation of Agenda 21.

7. Reports on the regional implementation of the Programme of Action for the Sustainable Development of Small Island Developing States; Declaration at Barbados.

8. Policy and management of national survey activities in the field of surveying and mapping.

9. Technical cooperation and transfer of technology.

10. Review of achievements of the Conference and provisional agenda for the Fifteenth United Nations Regional Cartographic Conference for Asia and the Pacific.

11. Adoption of the report of the Fourteenth United Nations Regional Cartographic Conference for Asia and the Pacific.