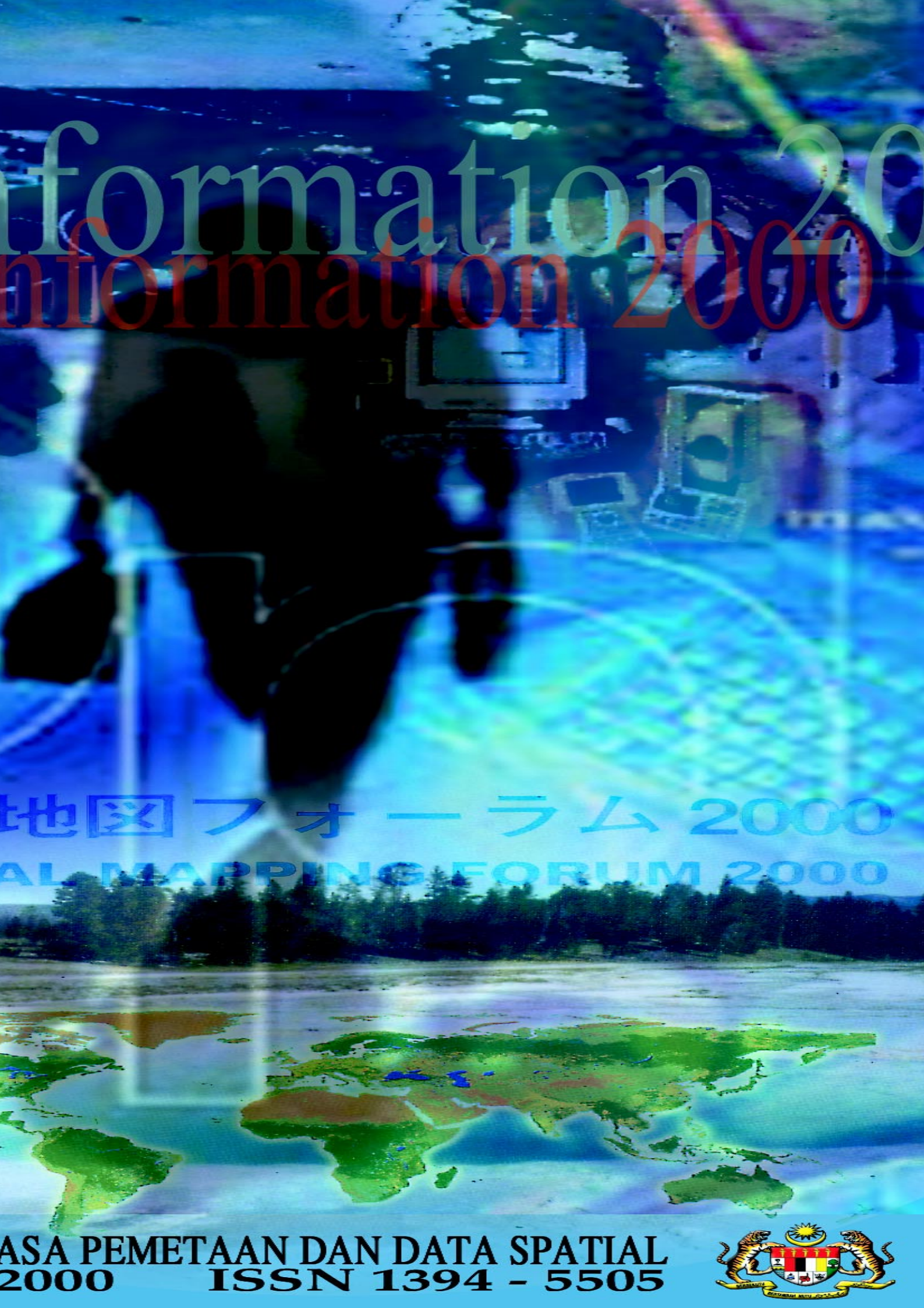

ASA PEMETAAN DAN DATA SPATIAL
2000

ISSN 1394 - 5505

Sidang Pengarang

MAKLUMAN

Buletin GIS diterbitkan dua (2) kali setahun oleh Jawatankuasa Pemetaan dan Data Spatial Negara. Sidang pengarang amat mengalu-alukan sumbangan berbentuk artikel dan laporan bergambar mengenai perkembangan Sistem Maklumat Geografi di Agensi Kerajaan, Badan Berkanun dan Institut Pengajian Tinggi. Segala pertanyaan dan sumbangan boleh dikemukakan kepada :

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50578 Kuala Lumpur.

JAWATANKUASA PEMETAAN DAN DATA SPATIAL NEGARA

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14. Universiti Teknologi MARA (co- opted)
15. Universiti Sains Malaysia (co- opted)
16. Jabatan Laut Sarawak (co- opted)

Kandungan

Dari Meja Pengarang

Dunia sekarang berada di dalam era teknologi maklumat yang sedang berkembang dengan pesatnya. Memandangkan Sistem Maklumat Geografi (GIS) merupakan cabang daripada teknologi maklumat, ianya perlu dimanfaatkan sepenuhnya oleh manusia.

Kita lihat kini bahawa impak GIS semakin meluas dalam semua bidang yang menggunakan maklumat geospatial misalnya dalam pengurusan sumber, perancangan gunatanah dan beberapa lagi aplikasi geosains.

Sehubungan dengan ini, keluaran buletin pada kali ini cuba menampilkan pengalaman Jabatan Tanah dan Ukur Sabah di dalam mengimplimentasikan GIS di jabatannya. Prestasi sesebuah organisasi dalam menjalankan aktiviti dan meningkatkan kelebihan dayasaingnya daripada orang lain akan ditentukan oleh keberkesanan dan kecekapan sistem pengurusan maklumat dalam organisasi tersebut. Oleh yang demikian, tidak hairanlah mengapa pihak Jabatan Tanah dan Ukur Sabah telah berusaha ke arah pengimplimentasian GIS. Keluaran kali ini turut memuatkan laporan terkini mengenai perkembangan 'Malaysian Active GPS System (MASS)' yang telah dibangunkan semenjak tahun 1998.Selain daripada itu, laporan mengenai beberapa seminar yang berkaitan GIS yang telah diadakan di sepanjang tahun 2000 turut disertakan termasuk maklumat seminar ataupun persidangan yang akan diadakan di sepanjang tahun 2001 sama ada di dalam atau di luar negeri. Sebagai rujukan pembaca, disenaraikan juga buku-buku berkaitan GIS yang terdapat di Perpustakaan Universiti Malaya.

Memandangkan minat yang mendalam yang telah ditunjukkan oleh pelbagai pihak terhadap teknologi GIS, ianya merupakan faktor pendorong kepada pihak sidang pengarang untuk meneruskan usaha dalam menyebarkan dan mengumpul maklumat khusus berkaitan GIS. Sokongan yang padu daripada pengguna maklumat GIS dalam memberikan maklum balas terutamanya yang berkaitan pengimplementasian GIS di agensi masing-masing amat dihargai.

Di sini pihak sidang pengarang ingin menyeru agar mana-mana pihak sama ada agensi kerajaan atau swasta dan para akademik tampil menyumbangkan hasil karya, laporan penyelidekan dan sebagainya yang berkaitan sistem maklumat geografi. Semua sumbangan tersebut hendaklah dihantar kepada Ketua Editor, Buletin GIS sama ada secara bersurat atau e-mail kepada,Ketua Editor, cheong@jupem.gov.my.

Sekian. ■

Ketua Editor
Buletin GIS

SEMINAR TAHUNAN KEJURUTERAAN GEOINFORMASI

Bertempat di IDEAL Conference Center, Universiti Putra Malaysia (UPM), Serdang, Selangor, pada 6 dan 7 November 2000 yang lalu telah berlangsung Seminar Tahunan Kejuruteraan Geoinformasi. Seminar ini merupakan kali ke 4 diadakan dan merupakan anjuran bersama Institusi Pengajian Tinggi Awam dan Seksyen Ukur Tanah, Institut Jurukur Malaysia. Pada seminar kali ini, UPM telah diberi mandat untuk menjadi tuan rumah.

Seminar ini telah dirasmikan oleh Y.B. Tan Sri Datuk Kasitah Gaddam, Menteri Tanah dan Pembangunan Koperasi Malaysia

Melalui seminar ini, golongan professional yang terdiri daripada para 'practitioner' serta akademik yang bergiat cergas dan aktif dalam disiplin geoinfomasi dan geoinformatik telah berjaya dikumpulkan bagi mewujudkan satu forum ke arah perkongsian maklumat ukur, pemetaan, sistem maklumat geografi dan sistem maklumat tanah. Seminar ini telah mendapat sambutan penyertaan yang menggalakkan baik sebagai peserta mahupun sebagai pembentang kertas kerja.

Sebanyak lebih daripada 60 kertas kerja yang merupakan projek cadangan, projek dalam perlaksanaan dan hasil penyelidekan telah berjaya dibentangkan yang mana skopnya meliputi bidang geoinformasi dan geoinformatik.

Secara keseluruhannya, seminar ini telah berjaya mencapai matlamatnya dalam menyebarkan maklumat dan menampilkan isu-isu terkini dan kemajuan dalam bidang geoinformasi dan geoinformatik.

Berikut adalah diantara kertaskerja yang telah dibentangkan pada seminar berkenaan:

1. **ISO Certification for the GIS: will it ensure quality** byNordin Ahmad,Geoinfo Services Sdn. Bhd.

2. **Pembangunan Pakej Pengajaran GIS Menggunakan Teknologi Multimedia** oleh Mohd. Fikri Ismail dan Ghazali desa, UTM

3. **Pembangunan Aplikasi Sistem Maklumat Geografi (GIS) Untuk Pengurusan Masjid (GISmas)** oleh Masiri Kaamin dan Norkhair Ibrahim, UTM

4. **Managing River Landscape With GIS** by Nurul Salmi Abdul Latip, USM

5. **Pemetaan Berasaskan Web: satu pendekatan internet di dalam Sistem Maklumat Geografi** oleh Eran Sadek Said md Sadek dan Wan Mohd. Naim Wan Mohd, UTM

6. **Pembangunan GIS Untuk Pengurusan, Pengawalan dan Pencegahan Penyakit Malaria** oleh Zulkepli Majid dan Razali Tompang, UTM

7. **Why is 3D GIS Difficult to Realize** by Alias Abdul Rahman and Jane Drummond, UTM

8. **Preparation of Flood Hazard Risk Map : GIS and remote sensing Approach** by Rahaya Mamat, Shattri Mansor,Abdul Rashid Mohamed Shariff, Ahmad Rodzi Mahmud dan Abd. Halim Ghazali

9. **Geographical Information System (GIS) and remote Sensing in Landslide Prediction** by Sharifah Nazatul Shima Syed Omar, Shattri Mansor, Husaini Omar, Abdul Rashid Mohamed Shariff dan Ahmad Rodzi Mahmud

10. **Processing Planning Applications By Geographical Information System (GIS)** by Abbas Abdul Wahab, Jabatan Perancang Bandar dan DesaandShattri Mansor, Nordin Ahmad and AbdulRashid Mohamed Shariff, UPM ■

MALAYSIAN ACTIVE GPS SYSTEM (MASS) PROJECT – CURRENT STATUS

by
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& Chang Leng Hua
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Department of Survey and Mapping,
Malaysia

1. Introduction

The Malaysian Active GPS System (MASS), consists of fifteen (15) Permanent GPS Stations and a Geodetic Data Processing Centre (GDPC) for the processing and distribution of the GPS data. It is a project carried out by the Department of Survey and Mapping Malaysia (DSMM) under the 7th Malaysian Plan to fulfill her role as the sole custodian of the Malaysian Spatial Reference Frame. There were multiple objectives for the establishment of this MASS network (Fig. 1), among them were :

- Realisation and continuous improvement of the International Terrestrial Reference Frame (ITRF).
- Realisation and continuous improvement of the Malaysian Spatial Reference Frame.
- Absolute sea level determination
- Enable the monitoring of the deformation of the earth
- Facilitate the studies on the ionospheric model and the determination of the atmospheric water vapour content.
- Application for the geodynamic and scientific studies

The core products of the MASS is the data collected from the permanent GPS stations:

- Daily 24 hours GPS carrier phase and code observations, on both frequencies, for all satellites in view
- GPS navigation messages and status information

Other products which could be derived are as follow:

- Highly precise GPS satellite ephemeris
- Earth rotation parameters
- Ionospheric and atmospheric information
- Coordinates and velocities of the permanent GPS stations

2. MASS Network

There are fifteen permanent GPS stations within MASS which continuously tracking all 'visible' satellites. They were designed and constructed over the 1998 fiscal year. This network of permanent GPS stations formed the 'Zero-order' geodetic network for the country and were tied to the ITRF.

Fig. 1: Malaysian Active GPS System Network

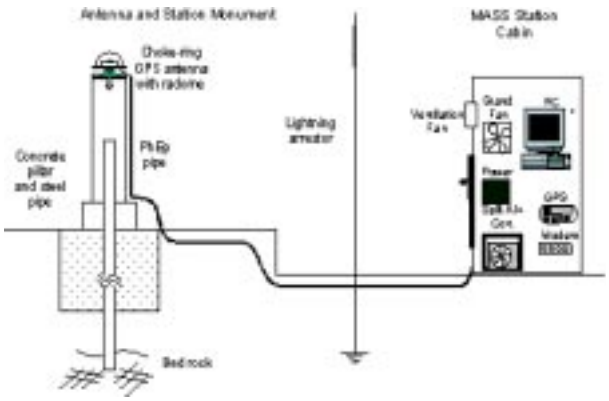

Fig. 2: Configuration of a MASS Station with Cylindrical Concrete Pillar

In all these permanent GPS stations, Trimble 4000 SSI receiver were installed at twelve (12) sites, and the other three were the Trimble 4000 SSE receiver. As for the antenna, two types of antenna were used, namely the Trimble L1/L2 Choke Ring Antenna that minimize the effects of multipath signals and the Trimble Micro-centred L1/L2 Geodetic Antenna.

Depending on the location and the design of the monument, there are a total of four types of pillars/ markers erected over the permanent GPS stations. In ten sites, the cylindrical concrete pillar (ccp) were constructed on stable sediments by means of piling to bedrock (Fig.2). At four other sites, cylindrical steel pillar (csp) were build and attached to concrete slap either on top of a building or above the pavement (Fig.3). As for the Getting and Bukit Pak Apil stations the markers were build on top of the Tide Gauge house and Bedrock respectively (Fig.4 & 5).

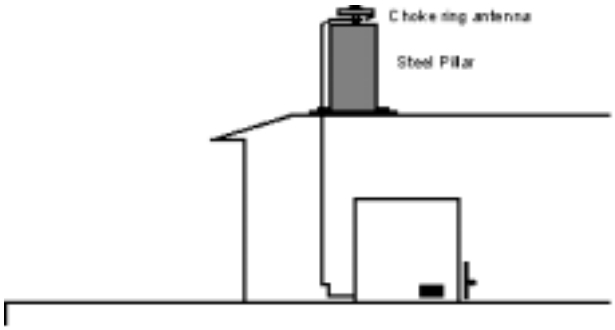

Fig. 3 Configuration of a MASS Station with Cylindrical Steel Pillar

The GPS receiver is connected to a personal computer for the storage of data. For that purpose, Trimble Universal Reference Software (URS) is used to log GPS data in DAT format. The measurement interval is set at 30 seconds interval and its data is compressed before it is transferred to the Central Processing Centre.

For the communication with the Central Processing Centre, the transferring of data is carried out through the internet. Integrated Services Digital Network (ISDN) is being used for the communication as it is by far the most reliable in carrying large amounts of data and can be set-up much easily.

Fig.4 Configuration of a MASS Station on Tide Gauge

3. Central Processing Centre

The Central Processing Centre which is known as the Geodetic Data Processing Centre (GDPC) has been set-up with the following objectives:

- Data reception
- Processing and integrity monitoring
- Data archive
- Data retrieval

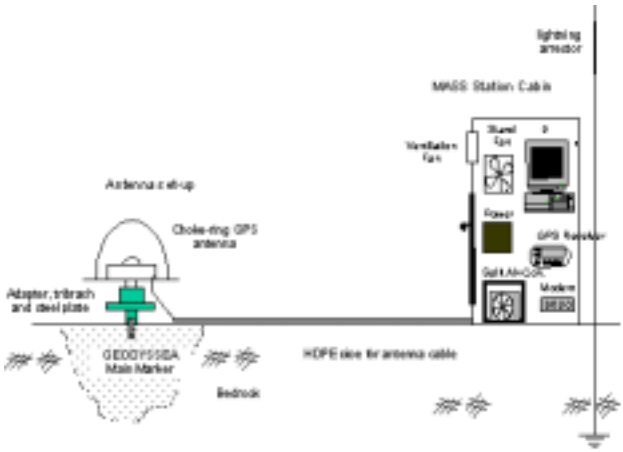

Fig. 5 : Configuration of a MASS Station on bedrock

At the GDPC, the data is download from the remote permanent GPS stations twice a day through the internet. The interval for downloading might be shortened in future to allow a much faster availability of data to the public. As soon as the data is received, it will be processed to check and verify data integrity, quality, completeness and conformance to RINEX format and standard. Any data that fail to meet these criteria are held back from the public. All data after fourteen days cycle will be stored and archived in storage media for future reference and usage. As soon as the data were processed, it will become available to the public via the internet. Detail on the downloading procedures will be published soon in the near future. Data and ancillary information about the MASS station sites are also set to the standard and specification of the International GPS Service (IGS).

4. Potential Application of MASS

4.1 Single receiver positioning

In this concept, a user can carry out a survey with only one and mapping work such as GIS systems Integration, Map completion etc. The MASS Station will act as a reference point and will provide data for measurements in the differential and relative mode.

4.2 Establishing a Global Reference Frame

The MASS Station GPS data will be contributed to IGS so as to realise a precise reference frame for the country. Through this continuous observations, the reference frame could be constantly refined, yearly coordinates by epoch and velocities could be produced, and thus a consistent and stable national reference frame of international standard is maintained.

4.3 Transportation and Recreation

With an active reference system, one can think of many applications where the GPS data could be used to provide reference for various kind of transportation and recreation activities. With the ultimate goal of providing data in realtime, transportation monitoring is of great potential by providing real time positioning, vehicle tracking and reporting and setting up of the intelligent transport system. Fishing, boating, bike touring and hiking could be more enjoying just by knowing that you are constantly on course.

4.4 Environmental and Deformation Monitoring

Sea level could be monitored over the years to provide environmental assessment so as to allow our coast and marine activities to be protected and preserved. Deformation monitoring will contribute to a better maintenance of our infrastructure and land use.

5. Conclusion

It is a very tough and tedious task in the implementation of this project since it involves the development of several hardware and software The personnel do not only need to have knowledge in geodesy, but also in electronics computer, telecommunication and some software programming. With the establishment of the MASS Network, a global reference frame can be realised for the whole country of Malaysia. The public will be able to make use of the GPS data for various kind of application in surveying, mapping and other scientific activities and research.

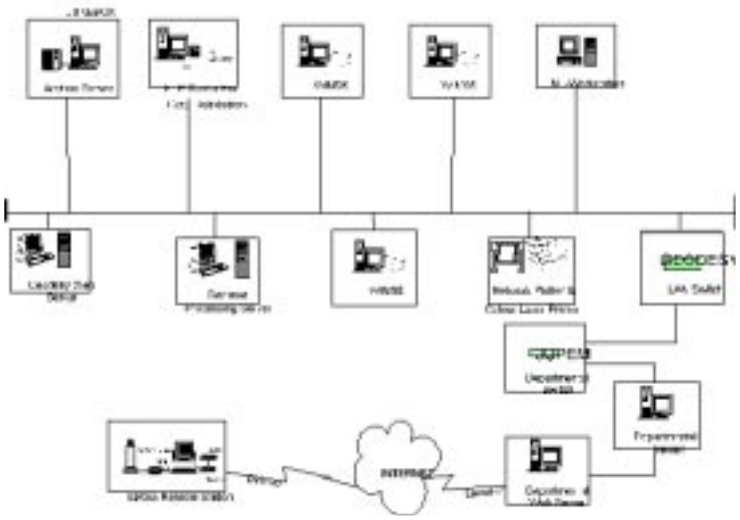

Fig.6: Geodetic Data Processing Centre

GLOBAL MAPPING FORUM 2000

by
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The Global Mapping Forum 2000 was held at the International Conference Center Hiroshima in Hiroshima City, Japan from 28 to 30 November 2000. The Forum which provided an excellent opportunity for National Mapping Organizations (NMO) to exchange views and information on issues of mutual interest had attracted a total of 250 participants from 33 countries. The Permanent Committee on GIS Infrastructure for Asia and the Pacific (PCGIAP), a regional forum of NMO took advantage of this Forum to hold its Seventh Executive Board Meeting on 26 November 2000, two days preceding the Global Mapping Forum. On November 30 afternoon, after closing the Forum, a meeting for Working Group 3 on data policy was held. This Forum is the third of this kind following Gifu City in 1997 and Sioux Falls in 1998.

Professor John E. Estes, the President of International Steering Committee of Global Mapping (ISCGM) declared open the Forum and the Welcome Address of Mr. Yuzan Fujita, the Governor of Hiroshima Prefecture was read. Dr. Jiro Kondo, Professor Emeritus of University of Tokyo and Dr. Tadatoshi Akiba, the Mayor of Hiroshima City both delivered keynote Addresses. Dr. Kondo reviewed the history of Global Mapping initiative and stressed the importance of global geographic data for global environmental researches. The Mayor Akiba, on the other hand, introduced the history of Hiroshima. He further stated the significance of this Forum being held in Hiroshima referring to the fact that life of vegetation is a symbol of survival of Hiroshima and also a symbol of global environment.

Background

In the early 1990's, the Ministry of Construction of Japan, recognizing the capability of computer technology in data processing, planned to apply it to produce three-dimensional cartographic information and to develop global map as well. Consequently, the first international workshop of global map was then held at Izumo city in April, 1994 to discuss the feasibility of the idea. A resolution was formed to produce a global geographic information at a scale of 1:1 000 000 which covers the land surface of the earth with approximately 1km grids. The first Global Mapping Meeting was subsequently held in Tsukuba in February 1996. Among important matters worked out in this Conference was establishing the Secretariat of the International Steering Committee for Global Mapping, electing Dr. John E. Estes, Director of Remote Sensing Research Unit, University of California as a chairperson, and setting up the Secretariat at the Geographical Survey Institute of Japan.

The level of participating countries are categorized as follows:
Level A: Besides producing its own country's Global Map, a member country in this level also provides assistance to produce Global Map of Level C's country. The developed countries are in this level.
Level B: A member country produces its own Global Map. The developing countries are in this level.
Level C: A member country provides assistance to Level A countries for preparation of Global Maps. A selected number of developing countries and poor countries are in this level.

It is recognized that the United Nations' support is crucial to enable successful participation and implementation of the Global Mapping project. With a letter of endorsement from the Director of Statistics Bureau of the United Nations, the ISCGM appealed to the national mapping organizations throughout the world for the cooperation and participation in Global Mapping Project. The needs for Global Mapping and its related projects were further discussed at the Cambridge Conference in July 1999, with the representatives from 73 national mapping organizations.

As of August 2, 1999, 70 countries were enrolled in the ISCGM and approximately 60 % of the whole land surface (91,330,000 km2) had been covered with global maps. When taking into account another 35 countries that are presently considering joining the ISCGM, then a further 31,399,900 km2 will be covered with the Global Maps, in which case approximately 80% of the total global land surface will be covered with the Global Maps. As of December 2000 25, 2000, eighty one countries/regions were

enrolled in the ISCGM and another 35 countries/ regions were considering joining the ISCGM. The 81 countries are now in the process of developing Global Map of their countries.

Actors in Global Map comprise of three categories:

1. Data providers – The national mapping gencies.
2. Project management – The ISCGM and its Secretariat.
3. Users – That may comprise the end-users as well as value-adders.

Paper Presentations

Fifty papers were presented in six oral sessions and one poster session. Besides Reports on the development of Global Mapping from member countries, the topics of the Forum were more focused on applications of global geographic datasets. Dr. Bambang Rudyanto presented one of the interesting papers from the Asian Disaster Reduction Center (ADRC) on "Development of Internet GIS System and Standardization from Global Mapping".

The improved reliability of disaster information from satellite image data due to the recent advanced image processing technology, enables us to obtain various disaster information via remote sensing at anytime and any place. However, a system immediately contributing to disaster management for disaster mitigation, has not been of discussed. Much attention has been paid to technological breakthrough by the satellite image data providers while those working for the disaster management have not been actively exposed to or involved in this field. It is also hard to use disaster information from the satellite image for actual disaster management without overlaying it to general geographic data such as topography and natural condition, and social situation including population, buildings and infrastructure. Furthermore, high cost and skills to be acquired for introducing GIS application have discouraged utilization of disaster information via GIS.

To solve this problem, ADRC has developed VENTEN (Vehicle through Electric Network of disasTer gEographic InformatioN). The background of VENTEN development, its system and data to be processed are discussed, and the possibility of utilizing VENTEN for disaster management is analyzed in this paper.

Mr. Hisashi Mori from the Japanese Infrastructure Development Institute presented a paper on "Study of Advanced Technology for use of Global Geographic Information System". In order to establish the methods for applying the Global Map to the global environmental issues, this study aims to develop the technology necessary for the policy making on river control, disaster counter measure and food security using GIS through combining social and natural environmental data with the Global Map. The study area covers the whole Ganges river basin and its surrounding enclose in a rectangle are extending from 20-40 degrees in the northern latitude and 70-100 degrees in the eastern latitude. The area includes territory of India, Bangladesh, Nepal, Bhutan, Myanmar, Pakistan and Tibet/China mainly. In a paper "Information Technology and Natural Disaster Management in India", Dr. Alok Gupta outlined the use of GIS to manage natural disaster in India, which is considered as the world's most disaster prone country. It has witnessed devastating natural disasters like droughts, floods, cyclones, earthquakes, landslides and others.

Similarly, Mr. Shahidullah touched on the application of Global Map for flood forecasting and monitoring in Bangladesh. Bangladesh is a flood prone Country where there is recurrence of flood, almost every year, which cause severe damages to the life and properties. Main cause of flood is due to heavy onrush of water coming from the upper riparian countries through major river systems of the region. Heavy rainfall within the country is also responsible for generating the flood runoff. The lowland topography of the country makes it highly vulnerable to flood disaster. He admitted that Bangladesh can not take appropriate measure to mitigate the sufferings due to mainly non-availability of flood data. In his paper, an attempt has been made to describe briefly the use of global map for monitoring the flood data.

In a paper "The Global Spatial Data Infrastructure Initiative and Global Map", Mr. Derek Clarke, the GSDI Steering Committee Chairman stated that in most of the developed countries, it is widely acknowledged that spatial information is part of the national infrastructure. Developing countries are perhaps not as advanced with this but are starting to realize the importance of spatial information for the development of their countries.

These national initiatives are going beyond just establishing databases for specific projects but towards harnessing the information resources of all government departments and agencies. This new direction is geared to minimize duplication of effort and data between agencies. This requires national policies and infrastructures. There is no doubt that spatial information at the national level should be the priority of all countries.
He also reiterated that many issues, such as atmospheric pollution, global warming and water catchment management, do not know national

boundaries and transcend the national interest. These global issues require harmonious spatial information at the regional and global level. To make decisions on global issues requires spatial information appropriate for these purposes. He suggested that this information must be shared and integrated across national boundaries.

Global Map Version 1.0

The highlight of the Forum was a declaration of release of the Global Map version 1.0. Japan which helped other countries like Laos, Nepal, Sri Lanka and Thailand have completed and officially released the data from ISCGM's new website http://www.iscgm.org on 28 November 2001. Data can be downloaded for non-commercial use. The Secretariat of ISCGM was glad and relieved by the much-awaited release of Global Map. Some issues related to project planning and product specifications were finally overcome.

Conclusion

Through the presentations of technical papers, it is obvious that many countries are very close to completing development of Global Mapping of their countries following leading countries. It also became clear that user societies have big expectations to the Global Mapping data for regional development planning, disaster mitigation, resources management and global environmental researches. It is also crucial that the requirements of three actors be adequately satisfied to ensure the continuing success of Global Mapping development.

* Those interested to get the proceedings of Global Mapping Forum 2000, please contact the writer ■

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CALENDAR OF EVENTS

DATE	EVENT	SITE	CONTACT
2-5 Feb 2001	ICORG 2000 – International Conference on "Remote Sensing and GIS/GPS"	Hyderabad, AP India	Prof.Dr.Murali Krishna Iyyanki F: +91-40-339-7648 E: iyyanki@icorg.org
7-9 Feb 2001	4th Annual International Conference and Exhibition onGeographic Information Science	New Delhi, India	Sanjay Kumar P: +91-118-452-7044, 444-0831, 4554335 E: info@MapIndia.org, E: Sanjay.Kumar@csdms.org E: Sanjay.Kumar@ gisdevelopment.org
12-14 Feb 2001	Asia Geospatial Teknologi Conference	Kuala Lampur, Malaysia	Dan Laney P: +1-305-667-4705 F: +1-305-667-7840 E: tda@mfmgroup.com
13-15 Feb 2001	OICC Conference on "GIS Application in Planning & Sustainable Development"	Cairo, Egypt	Org. of Islamic Capitals & Cities P: +9662-6981-953 F: 6981-053 E: oiccorg@icc.net.sa
19-22 Feb 2001	GIS 2001"Branching Out: Spatial Technology Goes Mainstream	Vancouver, Canada	Matt Ball P: +1-303-544-0594 F: 544-0595 E: mball@aip.com
8-9 Mar 2001	AM/FM/GIS Conference	Hyderabad, India	P: +91-40-331-4141 F: 40-330-6770 E: sukuki@hd1.vsnl.net.in

DATE	EVENT	SITE	CONTACT
8-9 Mar 2001	International Organization for Standard (ISO) 12th Plenary of TC 211"Geographic Information/ Geomatics"	Lisbon, Portugal	Bjornhild Saeteory P: +4722-59-6716 F: 59-6733 E: nts-it@tbl-nts.nsmail.telemax.no
12-16 Mar 2001	1st International Symposium on Robust Statistics and Fuzzy Techniques in Geodesy and GIS	Zurich, Switzerland	Prof.Dr. A.Carosio P: +41-1-633-3055 F: +41-1633-1101 E: sek@geod.baug.ethz.ch
19-22 Mar 2001	FIG 10th International Symposium on"Deformation Measurements"	Anaheim, USA	P: +1-909-392-2591/F: 392-2464 E: cwhitaker@mwd.dst.ca.us
23-27 Apr 2001	ASPRS Annual Conference "Gateway to the New Millenium"	St. Louis, USA	P: +1-301-493-0290 F: 493-0208 E: meetings@asprs.org Prof.Stanley Morain E: smorain@spock.unm.edu
24-27 Apr 2001	Permanent Committee on GIS Infrastructure for Asia and the Pacific PCGIAP meeting	Tsukuba Japan	P: +81-298-64-4514 E: tsuji@gsi-mc-go-jp
11-13 May 2001	Centenary of Federation Surveying and Mapping Conference	Canberra, Australia	P: +61-2-6257-3299
20-22 Jun 2001	Symposium on ASIA GIS 2001 "Collaboration through GIS in the Internet Era"	Tokyo, Japan	Secretariat ASIA GIS 2001 P: +81 3 5452 6413 F: +81 3 5452 6414 E: agis@skl.iis.u-tokyo.ac.jp
6-10 Aug 2001	"ICC 2001" The 20th International Cartographic Conference	Beijing, China	LOC for ICC 2001 P: +86-10-6834- 6614/F: 6831-1564 E: icc2001@sbsm.gov.cn
12-14 Sep 2001	First Annual Meeting of the Remote Sensing and Photogrammetry Society "Geomatics, Earth Observation and the Information Society"	London, UK	E: rss@nottingham.ac.uk
5-9 Nov 2001	22nd Asian Conference on Remote Sensing (ACRS2001)	Singapore	ACRS 2001 Organizing Committe E:acrs2001@crisp.nus.edu.sg
8-9 Nov 2001	Symposium "Geodetic, Photogrammetric and Satellite Technologies – Development and Integrated Application"	Sofia, Bulgaria	Georgi Milev E: pmilev@argo.bas.bg

INSTITUTIONAL ISSUES FOR GIS IMPLEMENTATION: SABAH'S EXPERIENCE

Prepared by:
Doria Tan Yun Tying
Jabatan Tanah dan Ukur Sabah

1. Objective of Paper

The last decade of the 20th Century has seen the public sector of Malaysia soared in leaps and bounds towards office automation and computerisation within the government departments. In Sabah, the government has responded promptly to the rapid development of Information Technology where Master Plans and committees have been put in place to ensure cohesive advancement towards greater development. This paper relates the Sabah's experience in bringing the agencies responsible for geospatial data collection together in a collaborative manner and systematic approach to address pertinent issues related to geospatial data.

2. Rationale for Institutional Change

Prior to 1998, geospatial related data has been maintained by many agencies mainly to assist in their respective mapping activities with some form of GIS/ CAD (Computer Aided Drawing) systems for data collection.

Although there were already a number of committees addressing IT issues which at the same time covers for GIS (where need arises), the needs for GIS was not properly addressed. There was a failure to recognise that GIS is by it self a specialised discipline that requires specific attention. With the same committees deployed for GIS activities resulted in usually more concerns hardware and software components (system specifications). This approach failed to address more important issues such as data standards, overlapping responsibilities in maintaining Framework Data which resulted in much short-comings in the State GIS implementation contributed to:-

- no suitable forum to discuss GIS specifically since members were not well versed with the subject matter;
- the efforts to address GIS implementation issues was ad-hoc and not continuous;
- most committees were represented by the same agencies and persons and hence probably non-efficient;
- there were too much time involved by mapping agencies to attend different meetings covering similar subject and no-GIS related;
- there was no correlation nor collaboration between committees:
- lack of control to curb duplicating efforts on GIS data acquissition;

The institutional change was brought about by: Firstly, the framework policies adopted by both State and Federal Govenments; and secondly the realisation by GIS doers that there should be consolidated efforts and to incept a high level comittee to drive optimum results in GIS activities.

Firstly, the prominent documentation (*both have been adopted by the State Government in 1997 as the framework police for public sector)* and events towards realising this goal are as follows:-

Jan 1997 Kemajuan	Pekeliling PentadbiranAwam (PKPA) 1/97	Paragraph 18 calls creation for the of **a Jawatankuasa Penyelaras NaLIS Negeri (JPNN)** to oversee the development of Land Information Systems (LIS) within the public sector.
mid- 1997	State Public Sector InformationTechnology Master Plan 1 (ITMP)	(Vol.1 Recommendation 18, pg.33) call for the creation of a state GIS committee for "closer coorperation And coordination" (Vol. 1 Recommendation 18. Pg.36) identifies "to facilitate the reinvention of the government through strategic deployment of information and multimedia technologies". This has resulted in among others, the formation of the Sabah IT Council and a Science and Technology Unit who proposed, among others, that public data should be organised underfour **data hubs,**

Secondly, the agencies in their respective GIS implementation have encountered similar institutional issues impeding GIS inroads as follows:-

- **Cultural impediment** is perhaps most serious where the users community being at the driving seat, needs an uplift to be at par with technology evolution. Most often than not, the old mindset still accepted data, reports and the like, in hardcopy format instead of digital;

- **Human Resources** in GIS and training needs is fundamental but yet very much lacking largely due to lack of awareness at certain level. In the current state of matter, most GIS personnel on-the-job, such as SystemAdministrator are without formal IT background;

- **Data Custodianship** is guarded with much care and the sharing of digital data is kept to the minimal ;

- **Data Standard** for GIS was not defined and where cross-agency data sharing do occur,it is found that spatial data cannot be easily used by other GIS platform;

- Insufficient exposure to the latest develop ment and breakthrough in GIS;

- Existing committees are more often than not, emphasised on hardware and software specifications of a particular GIS project but less on technicality issues like data category, feature coding, compatibility, etc.

- Unparalleled development and progress among the agencies has created 'holes' in the State Geographic Data Model. Some datasets are probably either incomplete or not suitable to other Users. Data sharing is also made complicated and inter-agency dataset normalisation difficult.

Perhaps among the relevant stand point, it is the spin offs from an incredible explosion in information technology advancement which has dawn on a new era where:-

- Electronic Government System, IT departments became the in-thing.

- User expectation is more sophisticated so much as that the public sector needs consistent upgrading.

- Demand for better quality product;

- The new luxury of internet allow users' fingertip access to all information;

It was envisaged that a streamlined institution framework with correlation between and among the disciplines would serve as a suitable platform to chart overall capacity building of geospatial Systems in the State and to address issues cohesively in an integrated manner.

On the development of a State Framework Data Model and Data Standards for spatial features, Sabah; via Lands and Surveys Department in its capacity as the NaLIS (Sabah) Secretariat, is pursuing these subjects via the National institutions under NaLIS. For this, ten (10) departments from Sabah; (inclusive of 2 Federal departments) have participated in the derivation of the Malaysian Framework Data model and Data Standards.

3. Background of SGDC

Sabah Geographic Data Coordination Working Committee, in short SGDC, has its roots in the State Remote Sensing Committee (SRSC). SRSC was in existence from 1990 formed by the State Investment Committee (SIC) and has played active roles in coordinating remote sensing projects statewide.

In line with the rapid development of IT and the adoption of the two documentation, the Secretary of Natural Resources (as chairman of SRSC) has proposed to the lands and surveys Department (Secretariat of SRC) September 1997, to study and propose how SRSC can participate and function under the newly setup SITC institutional framework.

4. The Rationale for a New committee

The inception of a new committee was proposed in line with NaLIS proposal for a Jawatankuasa Penyelaras NaLIS Negeri (JPNN) and the setting up of a State GIS Committee contained in the Sabah IT Master Plan with membership expanded from the SRSC while following the requirements of PKPA 1/97.

It was further proposed that the new committee, SGDC would have **dual function** i.e. as Jawatankuasa Penyelaras NaLIS Negeri (JPNN) due to similarity in role and function. Hence SGDC fits into both the National framework

(NaLIS) and State framework (Sabah IT Master Plan).

SGDC has provided the opportunity as the right forum to discuss policies and GIS related issues as The Working Committee on IT deployment in the Public Sector under SITC cannot covers in details such issues.

The role of SGDC encompasses all the issues related to the use and management of digital spatial data sets and its institutional implications. The mission of the committee is to provide the lead in the efficient and effective management and use of land information by:

1. Addressing all and related, geographic or spatial based data issues that affects the state.

2. Supoort and promote the development and implementation of national geographic imformation guideline and standards.

3. Providing a forum for the sharing of experiences in geographical imformation management.

5. Institutionnal Framework for GIS

The institutional framework of SGDC is placed strategically within the existing State framework.SITC, and established a direct link with the National framework -under Jawatan kuasa Penyelaras NaLIS (JPN). Sub-committees or Working ' Groups with specific dicipline were estallished with participation from technical personnel (doers) .

SGDC was formally approved by the SITC on February 1998 and had its inaugural meeting on 16 June 1998 and has formed four Working Group namely:-

- Data Provider;
- Data Standard;
- Data Pricing; and
- Legal Framework.

Later, a NaLIS Technical Commttee was formed to oversee the conceptualisation and implementation of a NaLIS Pilot project for Sabah.

The Terms of References [TOR] for SGDC, the Technical Committee and the four sub-committees were formally adopted along with the membership endorsement as follows :-

SABAH GEOGRAPHIC DATA CO-ORDINATION WORKING COMMITTEE

The Term of Reference for Sabah Geographic Data Coordination Working Committee is as follows:-

1. To formulate guidelines and regulations on activities pertaining to the manage ment and use of geographic information.

2. To ensure all GIS project implementation are in compliance with the guidelines and regulations approved by Sabah IT Council (SITC).

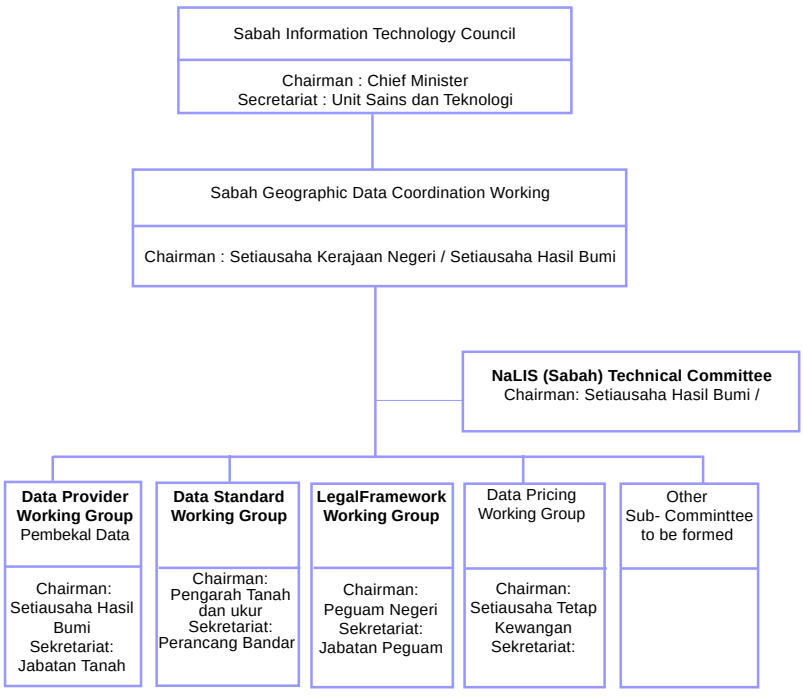
3. To interact with other bodies or working committees having interest in the genera tion, collection, use and transfer of geo graphic data.

4. To promote GIS and related technology in Sabah

5. To identify, clarify and overcome existing barriers to inter-govenmental and inter-agency co-operation in data sharing.

6. To carry out the roles and functions of the JPNN ("**State NaLIS Co-Ordination Committee"),** as instructed in PKPA 1/97.

INSTITUTIONAL STRUCTURE



The participating membership of SGDC is a combination of SRSC members and PKPA 1/97 requirement as follows:-

1. Setiausaha Hasil Bumi {Chairman}
2. Pengarah Tanah dan Ukur {Secreteriat}
3. Pengarah Perhutanan
4. Pengarah Pertanian
5. Pengarah Perikanan
6. Pengarah Pembangunan Ekonomi Negeri
7. Pengarah Kerja Raya
8. Pengarah Pengairan dan Saliran
9. Pengarah Perancang Bandar dan Wilayah
10. Pengarah Perkhidmatan Komputer Negeri
11. Peguam Besar Negeri
12. Pengarah Unit Sains dan Teknologi
13. Setiausaha Tetap Kementerian Kewangan
14. Setiausaha Tetap Kementerian Pembangunan Perindustrian
15. Setiausaha Tetap Kementerian Pertanian dan Perikanan
16. Setiausaha Tetap Perkhidmatan Sosial
17. Setiausaha Tetap Kementerian Kerajaan Tempatan dan Perumahan
18. Setiausaha Tetap Kementerian Perhubungan dan Kerja Raya
19. Setiausaha Tetap Kementerian Pelancongan Dan Pembangunan Alam Sekitar
20. Bendahari Negeri, Jabatan Bendahari Negeri

NaLIS [SABAH] TECHNICAL COMMITTEE

The Term of Reference for JawatanKuasa Technical NaLIS [Sabah} is as follows:-

- To implement NaLISA (Sabah) in conformance to NaLIS project criteria and supplemented with vision and strategy of SGDC and SITC.
- To co-ordinate with Ministry of Land and Co-operative Development on procurement of Equipment for NaLIS project.
- To co-ordinate and overcome impediment to collaborative activities among participating Agencies.
- To monitor the development of NaLISA (Sabah) version 1.0 to meet requirements of NaLIS project criteria and the strategy of SGDC and SITC.

The participating membership of the Technical Committee is as follows:-

1. Setiausaha Hasil Bumi {Chairman}
2. Pengarah Tanah dan Ukur {Co-Chairman/ Secretariat}
3. Majlis Perbandaran Kota Kinabalu
4. Pengarah Perhutanan
5. Pengarah Pertanian
6. Pengarah Kerja Raya
7. Pengarah Pengairan dan Saliran
8. Pengarah Perancang Bandar dan Wilayah
9. Pengarah Kajibumi
10. Pengarah Perangkaan
11. Pengarah Perikanan
12. Kementerian Tanah dan Pembangunan Koperasi
13. Pasukan Projek NaLIS
14. Pengarah Perkhidmatan Komputer dan Negeri {Co-opted}
15. Pengarah Sains dan Teknologi {Co-opted}

DATA PROVIDER WORKING GROUP

The Term of Reference for Data Provider Working Group is as follows:-

- To formulate guideline and regulation on jurisdiction in handling land and geo graphic based data as well as to identify, clarify and overcome barriers to data sharing.
- To research and formulate guideline and regulation on use of spatial and non-spatial tools such as platform, format, etc.
- To provide technical advisory services on geographical data management as well as to assist in conforming to guideline and regulation approved by the Central Committee.
- To inculcate skills and expertise in GIS and related technology.
- To interact with other Working Groups in area of common or overlapping jurisdiction pertaining to geographic data.

The participating membership of this Working Group is as follows:-

1. Setiausaha Hasil Bumi {Chairman}
2. Pengarah Tanah dan Ukur {Secre tariat}
3. Setiausaha Tetap Kementerian Kerajaan Tempatan dan Perumahan
4. Pengarah Perhutanan
5. Pengarah Pertanian
6. Pengarah Perikanan
7. Pengarah Perancang Ekonomi Negeri
8. Pengarah Yayasan Sabah
9. Pengarah Perancang Bandar dan Wilayah
10. Pengarah Penyiasatan Kajibumi
11. Pengarah Perkhidmatan Komputer Negeri
12. Pengarah Kerja Raya
13. Pengarah Jabatan Air
14. Pengarah Pengairan dan Saliran
15. Pengarah Taman-Taman Sabah
16. Pengarah Hidupan Liar
17. Pengarah Unit Sains dan Teknologi
18. Pengurus Besar Telekom Malaysia Berhad
19. Pengurus Besar Lembaga Lektrik Sabah

DATA STANDARDS WORKING GROUP

The Term of Reference for Data Standards Working Group is as follows:-

- To construct and maintain a common data directory, data standards and guideline for the preparation of metadata for the State of Sabah.
- To formulate guideline and regulation on the use of a common data standards e.g. feature coding in GIS Systems.
- To provide technical advisory services on data standards as well as to assists in con forming to guideline and regulation ap proved by the Central Committee.
- To interact with other Working Groups in area of common or overlapping jurisdic tion pertaining to geographic data.

The participating membership of this Working Group is as follows :-

1. Pengarah Tanah dan Ukur {Chairman}
2. Pengarah Perancangan Bandar dan Wilayah {Secretariat}
3. Pengarah Perhutanan
4. Pengarah Pertanian
5. Pengarah Perikanan
6. Pengarah Perkhidmatan Komputer Negeri
7. Pengarah Kerja Raya
8. Pengarah Pengairan dan Saliran
9. Pengarah Jabatan Air
10. Pengarah Unit Sains dan Teknologi

DATA PRICING SUB-COMMITTEE

The Term of Reference for Data Pricing Working Group is as follows:-

1. To formulate guideline and regulation for basis for data pricing computation.

2. To establish and maintain Data Pricing for digital and hardcopy dataset for the state of Sabah.

3. To study cost-benefit and implications in the process of creation of wealth to the State of Sabah from geographic information.

4. To interact with other Working Groups in area of common or overlapping jurisdiction pertaining to geographic data.

The participating membership of this Working Group is as follows:-

1. Setiausaha Tetap Kementerian Kewangan {Chairman}
2. Bendahari Negeri, Jabatan Bendahari Negeri {*Secretariat*}
3. Setausaha Hasil Bumi
4. Pengarah Perancangan Ekonomi Negeri
5. Pengarah Tanah Dan Ukur
6. Pengarah Perhutanan
7. Pengarah Pertanian
8. Pengarah Perikanan
9. Pengarah Pengairan Dan Saliran
10. Pengarah Perkhidmatan Komputer Negeri
11. Jabatan Peguam Besar Negeri
12. Pengarah Unit Sains Dan Teknologi

LEGAL FRAMEWORK SUB-COMMITTEE

The Term of Reference for Legal Framework Working Group is as follows:-

1. To formulate policy and regulation pertaining to the transfer, use, keep and maintaining geographical data.

2. To study and propose legislative needs to address the silence relating to transaction of geographic data for both digital and hardcopy format in the area of :

- Copyright
- 'Illegal' re-production of dataset of piracy cyber security and
- other relevant issues

3. To effect regulatory measures and to provide definition on :

- Liability and accountability,
- Piracy and
- Other relevant issues relating to useable constraint.

4. To interact with other Working Groups in area of common or overlapping jurisdiction pertaining to geographic data.

The participating membership of this Working Groups is as follows:-

1. Peguam Besar Negeri {Chaiman}
2. Jabatan Peguam Besar Negeri {Secretariat}
3. Setiausaha Hasil Bumi
4. Pengarah Tanah Dan Ukur
5. Pengarah Perhutanan
6. Pengarah Pertanian
7. Pengarah Perikanan
8. Pengarah Perancangan Ekonomi Negeri
9. Pengarah Unit Sains Dan Teknologi
10. Sabah Law Association

6. NaLIS Implementation in Sabah

Through the active involvement of Lands and Surveys Department Sabah in the various National NaLIS Committees, the department has proposed to the SGDC for NaLIS implementation in Sabah in view of the impending benefits for the State since the objectives of NaLIS are in line with that of SGDC. The goals and objectives of adopting this pilot project under the SGDC framework includes:-

- To develop an inventory [metadata] of all development data in the state;

- To promote wider audience & usage of geospatial information over Sabah.Net and Internet;

- To develop a "single window" access to all Data Providers and Data Users;

- To integrate with State Electronic Government Systems

Under the NaLIS Pilot Project, ten[10] Land Related Agencies {Agensi Berkaitan Tanah[ABT]} have been selected. The selection was based on the criteria that they have GIS data.

The concept of NaLIS (Sabah) project is to develop a distributed but 'virtually integrated' **Natural Resource Data Repository** using VPN technology to create NaLIS [Sabah] cloud riding on top of the existing Sabah. Net communication infrastructure as depicted in the diagram.

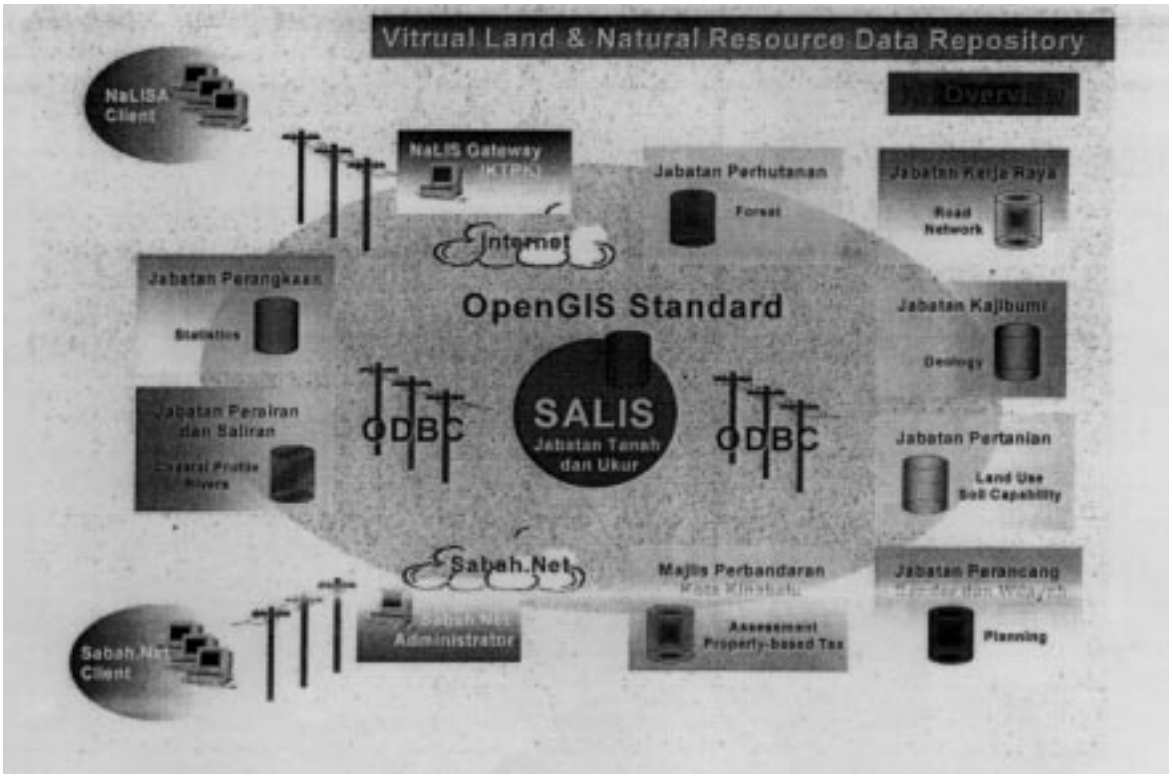
7. Conclusions

With this state institutional framework, the SGDC is given the mission to address the challenges of managing geospatial data. **Information age** presents a new set of problems, challenges and issues that are never around before.

This point onwards, it is no longer just data acquisition methodology or data currency maintenance but rather who maintain what, use what standards and so on in mutual benefiting manner, ready for sharing. Then come issues in the of integrated data dictionary, access rights, system security and a host of others to be digested.

Overall, managing information from different agencies covering the whole State of Sabah shall prove to be most challenging in the effort towards achieving the Natural Resources Data Repository.

With the implementation of NaLIS [Sabah] pilot project, the **SGDC Institutional Framework** put in-placed is timely to serve the GIS community in the state better ■



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GEOGRAFI

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