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GLOBAL MAPPING NEWSLETTER 18

The Permanent Committee on Spatial Data Infrastructure for the Americas - PCIDEA

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The recommendation included in Resolution Three out of the 6th UNRCC for the Americas (New York, 1997) to establish a permanent committee dedicated to attend GIS/SDI issues in the continent, is now a reality. In fact, it was one of the relevant outcomes obtained with the International Seminar on NSDI and the Workshop on Geographic Metadata, organized in Bogota, Colombia at the Geography Institute "Agustin Codazzi", with support from the infoDev Program (World Bank), the US Federal Geographic Data Committee -FGDC and the Pan American Institute for Geography and History –PAIGH.

There, 208 delegates from 21 nations, representing North, Central and South America as well as the Caribbean Islands, signed the agreement by which PC-IDEA is established (see photo). Mr. Santiago Borrero (Colombia) and Ms. Guadalupe Lopez (Mexico) respectively were elected as inaugural President and Vice-President. Provisional statutes were also adopted, following the experience achieved by the PCGIAP. Three working groups were organized: (i) Technical issues; (ii) Legal and Economic affairs and (iii) Communications and SDI awareness.

The new committee is expected to significantly contribute to stimulate the work of various regional organizations and institutions interested in the promotion of information technologies and spatial data infrastructures, development of a common geodetic reference system and improvement of the decision-making process by providing new spatial data sets, focusing on the direct relation between information availability, economic growth and sustainable development.

PC-IDEA guiding principles are addressed to foster the production and use of spatial data of the Americas; to formulate regional policy concerning spatial data in order to promote economic and social development; to attend sustainable development information needs and to harmonize production of spatial data and information applications in the context of relevant global spatial data initiatives, such as GSDI and Global Map.

The next PC-IDEA Meetings will be held in New York city, just before the 7th UNRCC for the Americas and in Cartagena, Colombia along with GSDI 5 Conference and the 8th ISCGM Meeting.

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Exchange Mechanism for Global Mapping

Following is a summary of the report by Ms.Teresa Cristina Veiga of Instituto Brasileiro de Geografia e Estatística - IBGE, Brazil who carried out a research at the Geographical Survey Institute from February 21st. to April 20th. 2000 under the fellowship of Science ad Technology Agency, Japan.

A Global Map (GM), or a group of global digital geographic datasets, is the product of the Global Mapping Project, which main objective is to develop and provide easy and open access to global digital geographic information, at a 1:1 million scale, to facilitate the implementation of global agreements and conventions for environmental protection, for monitoring environmental phenomena and for encouraging sustainable development.

The first phase of the Project, up to year 2000, involves gathering digital geographic information, at global map scale, organized into thematic layers, or coverages, either in vector form (baseline features) or raster form (elevation, land cover, land use and vegetation), through international cooperation of national mapping organizations.

The Brazilian territory is covered by a set of 46 sheets (or tiles) from the International Chart of the World at 1 to 1 million (1:1,000,000) scale (CIM), which are produced by the Brazilian Institute of Geography and Statistics (IBGE), that joined the Global Mapping Project in 1999.

The project of converting the 1:1,000,000 paper sheets to digital format, named CIM Project has been built based on Intergraph MGE structure on ODBC/ACCESS system but for being used by the Global Map Project, however, these files need to be compatible with Global Map specifications and converted to VPF format.

The main purpose of the research realized together with GSI was to evaluate the best solution for using existent digital data from IBGE's CIM Project, in order to produce Global Map tiles of Brazilian territory in VPF format. For the purpose of this research, only vector format layers were considered.

CIM project and GM project databases are different and structured diversely. Some attributes and features related to a Global Map coverage are similar to the ones of CIM project; others are contained in different layers or just don't exist.

Features from CIM project are comprised on 7 categories. A full correspondence among layers of categories was not encountered. In some categories like drainage and transportation many features are compatible, but in others like boundaries and population centers there was some difficulty for making the correspondence with Global Map mandatory features, like the coast line which doesn't exist as a separate feature on CIM Project.

The distribution of spatial objects or features among categories is also not the same in both projects. "Dam/weir" included in the "drainage" coverage of Global map project, for example, must be extracted from the category "work and building (structures)" from CIM Project.

While Global Map specifications foresee the features representing the vector data model comprising of three spatial objects: points, edges and faces, besides text, CIM project works with 6 different spatial objects, point, line, area boundary, area centroid, closing line and text centroid.

The topological structure used inside Intergraph MGE environment doesn't configure an area or a polygon with attributes but, instead, an area boundary associated with a centroid which contains the attributes of the polygon represented by this area boundary.

In order to fulfill the requests of a final product which fits with Global Map specifications, some extra initial work must be done with CIM files to overcome incompatibilities and avoid future troubles. This work implies in adaptation, separation and aggregation of features and attributes in different layers.

The first alternative affordable to accomplish this task by the time of the research, using SDTS module inside Intergraph MGE System, to create a VPF file output which can be used by another System, failed because the existent version of Intergraph MGE Modules, at IBGE, is working based on an ODBC/ACCESS database system, and SDTS module requires a different database schema system.

The second, using Bentley GEOEXCHANGE System, to create an ARC/INFO file or an ARCVIEW "shape" file to be used for further conversion to VPF was successful. The structure of features names, attributes and codes from CIM Project, in Portuguese, were maintained and converted to Eng-

lish and to Global Map specifications on the process.

A file representing a single CIM sheet containing all categories and a representative number of features was selected from the CIM digital database in order to test the behavior of different features (objects) using GeoExchange conversor. Graphic features were connected to its attributes, codified and topologically structured.

It's not necessary to build a new project for GeoExchange if a MGE project is already structured. It is necessary only to open the file to be converted, on GeoExchange, to open the existent MGE project and to select the variables to be exported. GeoExchange exports, separately, each feature contained on the file.

The first problem faced was the way the feature name is written in the database structured for CIM Project, in Portuguese. Intergraph MGE and the Microsoft ACCESS internal structures allow the use of blank spaces but ArcInfo "import command" doesn't recognize it. GeoExchange, on the conversion process, maintain the original name and doesn't allow any change or edition. As soon as the features are exported it is necessary to edit their names, eliminating or substituting the blank spaces.

Island point feature doesn't exist on CIM Project database as a separate entity. For Global Map project it will represent all islands with less than 1 square km. This subject must be better evaluated because all islands which appears on CIM database are composed by an area boundary with an area centroid containing the attributes, independently of their size.

The Global Map boundary feature "coast line" doesn't exist as a separate feature on CIM database but as an attribute of a political administrative boundary line feature. In this way it will be possible to make a specific query to export it separately. The same problem occurs with ocean/sea boundary feature. At the CIM database "ocean" is an attribute of a "permanent water body" area centroid feature from the category Hydrography. By querying and "complexing" it with the area boundary feature it is possible to create a new feature to be exported to the Global Map coverage "political boundaries".

The digital database derived from CIM cartographic originals was built on Lambert Conformal Conic Projection, with Córrego Alegre Datum, using the unit "degrees, minutes and seconds" for longitude and latitude coordinates, and working unit of 10000 UOR per km (Units of Resolution or the smallest unit of accuracy at which a point can be located within a design area) for measurements. Degrees, minutes and seconds had to be converted to decimal degrees and the units of resolution from km to m using the conversion factor 0,001 meters.

A new project, based on MTD structure built on Intergraph MGE environment, with a database in English, following GM specifications for features and attributes was built to be used in the future for exporting directly to Global Map. It could facilitate the conversion process, eliminating some steps. The names of the features in the proposed database are proper to conversion without blank spaces. Global Map feature code was added to the project structure as an attribute once MGE code structure doesn't allow code repetition for different feature objects in Global Map structure elements.

Point and line features hardly presented any problem on the conversion. Polygon features, meanwhile, were object of some struggle before being properly exported and used on the next steps. Polygons, had to be edited and tested many times, in different ways, to find the right way to use them in the sequence of conversion procedures from MGE to ArcInfo, through GeoExchange, and latter to VPF through "VPFKit". For being exported from Intergraph MGE system, the area boundaries need to be "complexed" with the area centroids to generate a "face" type output required by Global Map specifications. GeoExchange, however, don't export completely these polygons when they have other polygons (holes) inside, like lakes on islands or islands on lakes. It's necessary to separate and edit separately these features before exporting, which complicates automation procedures.

To convert CIM Project files to the tiles with GM specifications, ARCINFO software was used as an intermediary step. After exporting the selected features from CIM files, through GeoExchange, to the ArcInfo .E00 or shape file formats, it is necessary to import them into ArcInfo coverages. The conversion process to VPF, uses the "VPFKit for Global Map" built with the Production Line Tool Set (PLTS) from ESRI.

It will be very useful and helpful for Global Map CIM Project if a solution to convert digital data directly from Intergraph MGE to VPF format could be found, through Intergraph VPFPS (Vector Product Format Production System) or other direct conversion process.

Global Map Japan

Geographical Survey Institute, Japan completed preparing a "Global Map Japan" in June 2000 and submitted it to ISCGM Secretariat. The Secretariat started its distribution to researchers along with Global Maps Thailand and Philippines.

Followings are the brief summary of the process of the "Global Map Japan" data production.

Polygon, line and attributes of Boundaries Layer (administrative area, political boundaries line and coastline) were converted from existing "Digital Map 200,000" (vector-form digital map data derived from 1:200,000 paper maps) to "Global Map Data Dictionary for ArcInfo" format in accordance with "Global Map Specifications."

As for Hydrography Layer (inland water area and river/stream line), base maps were specially prepared for image scanning from existing 1:1,000,000 paper maps, and were digitized into raster image data using line scanner. These raster data were converted into vector-style "Global Map Data Dictionary for ArcInfo " format. Attributes were added at the same time.

Transportation Layer and population center data were digitized in the same manner.

Above four Layers were converted into VPF (Vector Product Format) structure from ArcInfo files using a software originally developed.

Land Cover Layer was produced by converting Global Land Cover Characterization dataset.

For Vegetation Layer, existing Clustered Vegetation file produced by Environment Agency of Japan was converted into 30 second cell data.

As for Land Use Layer, revised existing Digital National Land Information (Land Use) data, which had produced by using GSI 1/50,000 Topographic maps, were converted into 30 second grid data.

Elevation Layer was produced from existing 250m grid Digital Elevation Model into 30 second cell data.

These four Layers were divided into Global Map Tiles, and header files were added to each Tile. These files were stored in "raster" directory in accordance with Global Map Specifications.

Metadata files were created for each layer, and stored in each layer's directory.

Application to Global Mapping Forum 2000

Global Mapping Forum 2000 will be held at International Conference Center Hiroshima in Hiroshima City from 28 to 30 November this year. Details of the Forum were covered on the 17th issue of the Global Mapping Newsletter. People who wish to participate in the Forum shall complete the registration form attached, and send it to the ISCGM Secretariat by postal mail, fax or E-mail.

Global Map and Related Meetings

Followings are Global Map and related meetings. Information on related meetings will be highly appreciated.

2000

- **16-23 July, Amsterdam, Netherlands**
  19th ISPRS Congress
- **7-8 September, Reston, USA**
  11th Plenary Meeting of ISO/TC211
- **27-29 September, Ispra, Italy**
  CEOS 2000 WGISS-11
- **26 November, Hiroshima, Japan**
  PCGIAP Executive Board Meeting
- **28-30 November, Hiroshima, Japan**
  Global Mapping Forum 2000

2001

- **8-9 March, Lisbon, Portugal**
  12th Plenary Meeting of ISO/TC211
- **24-27 April, Tsukuba, Japan**
  7th PCGIAP Meeting
- **22-24 May, Cartagena, Colombia**
  5th GSDI Meeting
- **25 May, Cartagena, Colombia**
  8th Meeting of ISCGM

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