GIS for Earth Resources and National SDI

Toshikazu Okuyama[1]; Yoichi Kashiwase[2]; Arinobu Tsushima[3]; Kohei Nakaochi[4]; Kenichi Yamazaki[2]

[1] DynaxTakamatsu
; [2] MMEC; [3] Dynax Takamatsu; [4] DynaxTakamatsu

http://www.mmec.co.jp/jp/Top.htm

Geospatial services and data dissemination through the Internet is getting more and more popular in conjunction with the progress in standardization activities at ISC TC/211, Open Geospatial Consortium. Inc, specifications, W3C etc., Especially, growing availabilities of geospatial data such as MASA Digital Earth and comprehensive geospatial software/services such as Google earth, Google Map demonstratively taught users the power of geo-referencing to configure various types of information.

Currently on the internets, huge amounts of information are accumulated in the form of documents such as HTML, PDF, POT and images. Original web concentrate Interchange of documents, not data. Humans are capable of using the Web to carry out their own tasks by reading the Web pages. However, a computer can not accomplish the same tasks without having human direction because web pages are designed to be read by people not by computers. W3C semantic web activities are one evolving approach to extend principles of the Web from documents to data. The semantic Web try to provide a common framework that allows data to be shared and reused across applications and community boundaries. This story is not limited to HTLM documents only but most of Geospatial information usually provided in the form of Maps. Technology trend of GIS and National Spatial Data Infrastructure emphasize the importance of sharing geospatial data and reuse across applications and community boundaries. This requires a method different form traditional one to represent geospatial knowledge.

Coal Mine Analyst (CMA) is a collection of tools for coal resource evaluation covers data conversion, geological modeling, coal seam modeling, volume calculation and quality evaluation and maintenance. The feature of geological evaluation is to require lots of intermediate steps to calculate final results. This means most of geological database are comprised of not a single transactional database but several of mutually isolated databases such as boring database, surface geology database, cross section database and so on. Visual representation of each information like geological maps, cross sections, resource distribution maps are easily readable by human. However, it is not easy a computer reads one dataset and calculate to produce next step interim product. Our vision to design CMA is about two things. It is about common framework for integration of data drawn from diverse sources. It is also about data conversion and work flow management tools to bridge several databases which store original data set obtained direct observation/measurement of target objects, interim products and final dataset to represent resource distribution. In our model, it is important to develop lots of tools to produce next step knowledge from original dataset by logical and numerical calculation. Major steps are (1) develop boring database to (2) correlation of geological strata (3) create cross section and 3D dataset to represent seamless coal seam distribution (4) calculate coal resource distribution (5) resource evaluation scenario / system to support decision makers (6) visualization of final analytical results. Usually different data models and representations are adopted among the above 6 steps. And this makes it difficult to successfully manage integrity of data stored in different databases and to share data among different applications. To overcome these issues and reach our design goal we widely adopted GIS and IT standard specifications and develop all tools on top of single GIS platform.