

GIM INTERNATIONAL INTERVIEWS PROF. DR HIROMICHI FUKUI

Digital Earth: Global Citizens of a Truly Global Society

The 4th International Symposium on Digital Earth was held in Tokyo, Japan from 28th to 31st March 2005 (see review 'Digital Earth Facing Challenges' July 2005). The head of the organising committee, Prof. Dr Hiromichi Fukui, agreed to an interview with GIM International in which he expanded upon the concept of Digital Earth.

Could you tell us something about your Geoinformatics laboratory activities?

The Geo-informatics Laboratory at Keio University aims to build a sustainable society despite all the urban and environmental problems. We are establishing a "digital earth"™ as a metaphor for the Earth. This Digital Earth must be able to handle vast amounts of space information and express the Earth in 3D or as a time-series, over multi-resolutions and in real-time. My Geo-Informatics laboratory aims to research the establishment of a Digital Earth (DE) and its utilisation. Specifically, we aim to develop mutually operable Internet GIS technology (GI Systems), develop innovative and viable modelling and simulation technologies on various phenomena in space (GI Sciences) and carry out research on communication, consensus building and policy development using the Digital Earth (GI Services).

In what areas of application is your lab involved?

I have established the International Society for Digital Earth-Japan (ISDE-Japan), a non-profit, non-political NPO to promote the exchange of information, science, innovative technology, education and international collaboration through the network. Research and Development into Digital Earth is not as active as it used to be. This is because of change in political systems and administrations everywhere. However, ISDE-Japan has consistently shown dynamic progress as it has attracted many researchers working for many research institutes, business establishments, governmental organisations and NPOs. And there have been many DE symposiums conducted at regular interval in various parts of the globe.

Can you tell the readers of GIM International something of the background to your ISDE-Japan?

First of all, let me tell you about the background to Digital Earth-DE. Apart from natural disasters such as earthquake and tsunamis, emerging adversities in the 21st century, such as global warming and SARS, are all interrelated, a fact that emerges at a very local level. Conventional sciences will not alleviate these problems. The new approaches associated with the DE concept, the digital information revolution, will help to deal with the emerging risks. The purposes of DE are to gather information, process, distribute, present and archive through ubiquitous computing. The accumulated information in the DE can be restructured with respect to the objectives. Thus understanding of the world and its perceptions will undoubtedly be amplified.

About the DE; based on the critical information existing in its servers, decision-making has been carried out by experts in cyber space at multi-resolution, 3D, in time-series and so on. Digital Earth is a virtual representation of our planet, consisting of all its systems and life forms, mainly human society. Thus it is possible to incorporate the world into cyberspace and visualise disparate natural phenomena and socio-economic activities.

Immeasurable amounts of digital information will be available in the DE-Library project. This information can be shared and mined for any kind of research, from genome research for information on human DNA to any earth surface or subsurface phenomena. Thus DE alone is itself a big science, remote sensing and internet GIS forming its core technologies. It has user-friendly interfaces and interoperability standards. To implement DE, four elements are required. The technologies involved are various real-time monitoring sensors, database interoperability technologies, data mining and merging technologies, multi-dimensional knowledge-based database and knowledge editing, policy authoring, dynamic simulation technology and so on.

What is the role of universities in relation to the geomatics industry and government?

My laboratory has been involved in many projects in collaboration with top geomatics companies in Japan, and we have also done projects with government organisations. Mostly, high-level and competent research is carried out in the laboratories of universities. There exist constant and strong bridges between universities and government.

What is the situation in Japan regarding high-resolution digital images?

There is no problem in gathering high-resolution airborne data over any Japanese archipelago, provided there are no funding constraints.

Currently, many remote sensing service providers are capable of offering 4cm resolution data on cities. Now this data is useful for automatic DEM generation, forest mapping, urban-related applications, updating cadastral maps, facility management, taxation and for homeland security. It has attracted cell-phone industries, car navigation and other domestic usage

Why has Japan not succeeded in developing its own high-resolution satellite?

The situation in Japanese satellite launching technology is not that encouraging. I feel that instead of spending the taxpayers' money in developing launch vehicles which are not yet a successful business in Japan, we should be concentrating on developing satellites with high-resolution sensors capable of offering data in thermal, microwave and other unexplored atmospheric windows. The Japanese remote sensing community is still depending on American, European and Indian satellites.

Please tell our readers about any interesting studies in Geomatics applications undertaken by your centre.

Actually, there is a growing list of interesting on-going projects in my lab. My Digital Asia project is now very viable, through the efforts that I have been making with the help of the research centre. I am working on making a Digital Asia Gateway for human security. The "Risk Communication" project, part of my Digital Asia Communityware project, involves accumulating social data from disparate sources such as newspapers, remote sensing and others. This would help people to actually get information about any happenings, either blocked or released. I have been very successful in mapping the human condition through my Precious Earth project for the Japanese national television network, NHK.

Finally, do you have any message for the readers of GIM International?

I have strong expectations that building Digital Earth and implementing the concept will further enrich us, allowing each of us to become a global citizen and helping us to form a true global society. I also believe that the DE technology will play a key role in socio-economic development, protection of the environment, disaster mitigation and conserving natural resources. All in all, this will definitely improve the living standards of mankind.

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