110 AD - Claudius Ptolemy

...to present the known world as one and continuous, to describe its nature and position...

(Geographike Uphegesis, Ptolemy)

‘Grand father’ of Digital Earth
"With the Geoscope humanity would be able to recognize formerly invisible patterns and thereby to forecast and plan in vastly greater magnitude than heretofore. The consequences of various world plans could be computed and projected, using the accumulated history." — Buckminster Fuller, 1940

"Geoscope" was a tool for interactive geo-government.
No effective connection (interoperability) between the many data sets required to easily and effectively accomplish these scenarios.

“We have islands of opportunity amidst oceans of information chaos.”

No common vision (information technology leadership) to activate cooperation among the many elements of the technology base and the national and international community.

“We have landed on the moon, we must now understand our footing on Earth.”

Low awareness and little accessibility (easy user interface) by the “common person” to the vast information resources about our planet and its people.

“Even rocket scientists find complex applications involving multiple data sets daunting.”
“...The urgent needs of social development in China will be the biggest impetus for creating "Digital Earth"...As the world's largest developing country, China must play an important role in global sustainable growth. The "Digital Earth" will help promote sustainable growth in China and in turn contribute to the world's sustainable development ...China will expand cooperation with the countries of the world to play an active role in introducing the concept of "Digital Earth," sharing information resources, and creating a digital world”.

China’s Vice-Premier Li Lanqing on November 29 1999 addressing the inaugural Symposium on Digital Earth in Beijing
2005 – ISDE Established by special decree in China

Prof. Lu Yongxiang  Al Gore  Li Lanqing  Prof Guo Huadong
2006 – Inaugural Digital Earth Summit (Auckland, New Zealand)

“..The Digital Earth Summit is timely. There is a growing feeling that we are at an important cross roads of our planet’s history.

We are facing very challenging global issues, from the threat of change to our ecosystem, to a reduction in our biodiversity, the fast depletion of finite resources, and the rise of so many mega cities. Integrated data management can help us meet those challenges...”

Prime Minister Helen Clark - Digital Earth 2006

Youth played a significant role at this event.
“...problems of a global scale and the rate, scale, and complex nature of change is unprecedented and beyond the capability of any one person, organization, or even nation to comprehend and respond to...”

Douglas Engelbart (inventor of the mouse, hypertext, and video conferencing) at Digital Earth 2007.
2007 – 6th International Symposium (Beijing)
2011 – 7th International Symposium (Perth, Australia)
2008 – Digital Earth Journal Launched

New SCI Impact Factor: 1.453

http://www.tandf.co.uk/journals/TJDE
2011 – CEODE opened in Beijing

CEODE = Centre of Earth Observation and Digital Earth, Beijing
- Non-political, non-governmental and not-for-profit international organization, principally for promotion of information exchange, science and technology innovation, education, and international collaboration.

- The purpose of the society is to promote international cooperation on information management and dissemination e.g. in economic and social sustainable development, environmental protection, disaster mitigation, natural resource conservation and enhanced quality of life.
ISDE Executive Committee

**Founding President:**
Prof. Lu Yongxiang (China)

**President:**
Prof. John Alan Richards (Australia)

**Vice Presidents:**
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Richard Simpson (New Zealand)
Prof. Vladimir Tikunov (Russia)
Prof. John Townshend (USA)
Prof. Terence van Zyl (South Africa)
Prof. WANG Changlin (China)
Dr. Peter Woodgate (Australia)
Prof. XU Guanhua (China)

http://www.digitalearth-isde.org
## Mega-initiatives and scales

<table>
<thead>
<tr>
<th></th>
<th>Spatial Scale</th>
<th>Temporal Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Digital Earth</strong></td>
<td>From atomic scale to the size of the earth</td>
<td>From microsecond events (eg. Brownian motion) to age of the earth</td>
</tr>
<tr>
<td></td>
<td>10(^{16})</td>
<td>10(^{22})</td>
</tr>
<tr>
<td><strong>Physiome</strong></td>
<td>Diameter of an ion channel to scale of a human body</td>
<td>From microsecond events (eg. Ion channel gating) to human lifespan</td>
</tr>
<tr>
<td></td>
<td>10(^{9})</td>
<td>10(^{15})</td>
</tr>
<tr>
<td><strong>Human Genome</strong></td>
<td>The human genome has 30,000 genes, each with 3000 bp containing 1000 amino acids.</td>
<td>From atomic events to protein synthesis</td>
</tr>
<tr>
<td></td>
<td>10(^{8})</td>
<td>10(^{5})</td>
</tr>
</tbody>
</table>

Digital Cities
Conceptual
Framework
Digital Cities

• Smart Infrastructure
• Engaging Communities
• Saving Water
• Saving Energy
• Reducing Cost
• Reducing Carbon Footprint

Digital City ‘Ecology’
Digital Cities

- Smart Infrastructure
- Engaging Communities
- Saving Water
- Saving Energy
- Reducing Cost
- Reducing Carbon Footprint

Digital City ‘Ecology’
3D Catchment View – LiDAR, hyperspectral, GIS, sensor data amalgamated and evidently managed.

3D Property View – for home owner, inspectors, Utility staff. Innovative by-products include Rain water harvesting, gardening advise etc.

Tree roots and services (3D pipes parametrically generated from GIS). Viewing on site with iPad – facilitation for Augmented Reality applications.

3D Operations View - with semantic mapping of learning procedures to 3D objects.

Multi-Metaphor example

Visual Water- South East Water (Melbourne) - Nextspace

Feasibility Prototypes
patterns processes
knowledge
metaphors
data
Integrated Systems

DISSEMINATION
SOCIALISATION
AGGREGATION
REPRESENTATION
SIMULATION

metaphors
data
processes
models

Integrated Systems
Evidence driven integrated systems incorporating feedback loops
More robust consultation and inspection

http://www.youtube.com/nextspacenz#p/a/u/0/NBD2QWyBvlg
2012 – Wellington, New Zealand
  - Digital Earth Summit
  - Wellington, New Zealand
  - (Sept 2-4 2012)

2013 – Kuching, Sarawak, Malaysia
  - Digital Earth Symposium

Next Events
Thank you

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