GLOBAL SPATIAL DATA PROJECTS

Global Mapping

Global Spatial Data Infrastructure (GSDI)

Digital Earth

U. N. Geographic Data Base

GI for Sustainable Development (GISD) (OGC)

1.Digital Earth Concepts

Digital Earth History:

Fathers:

Al Gore

(Bill Clinton)

1999: Beijing, P.R. China

2001: New Brunswick, Canada

2003: Brno, Czech Republic

Digital Earth Definitions

Technological:

Gore: A multi-resolution, three-dimensional representation of the planet, into which we can embed vast quantities of geo-referenced data.
Chen Shupeng, Fukui, Foresman, Guo, Goodchild

Sustainable development oriented:

Beijing Declaration, Brno discussions, Global Society Dialogue, Global Marshal Plan)

Digital Earth

Digital Earth is a concept that aims to incorporate maps and data – ranging from topography and population to weather patterns and migration – into a seamless geospatial system accessible worldwide.

www.digitalearth.gov

www.digitalearth.net.cn

http://digitalearth03.geogr.muni.cz

Digital Earth Concepts

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DE- Digital Earth

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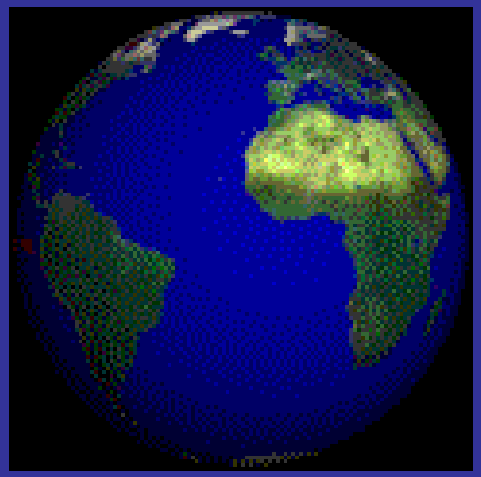
Foresman, Guo

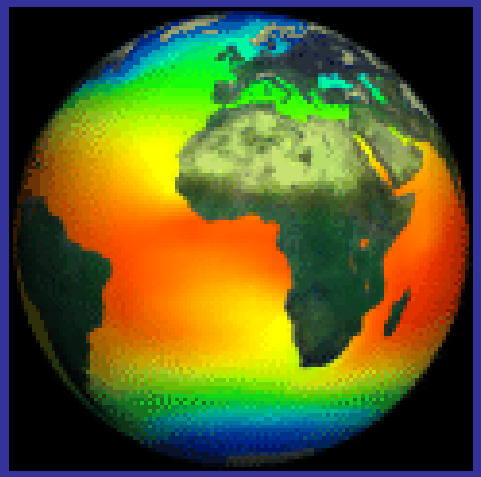
Sustainable development oriented (Beijing Declaration, Brno discussions, Global Society Dialog)

Understanding Digital Earth

Cloud

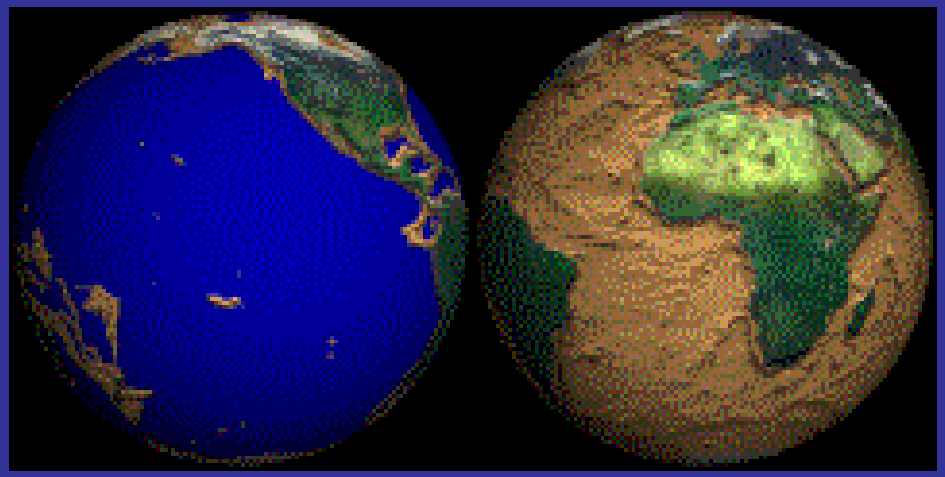


El Nino



Sea water temperature

Vegetation



Earth Surface

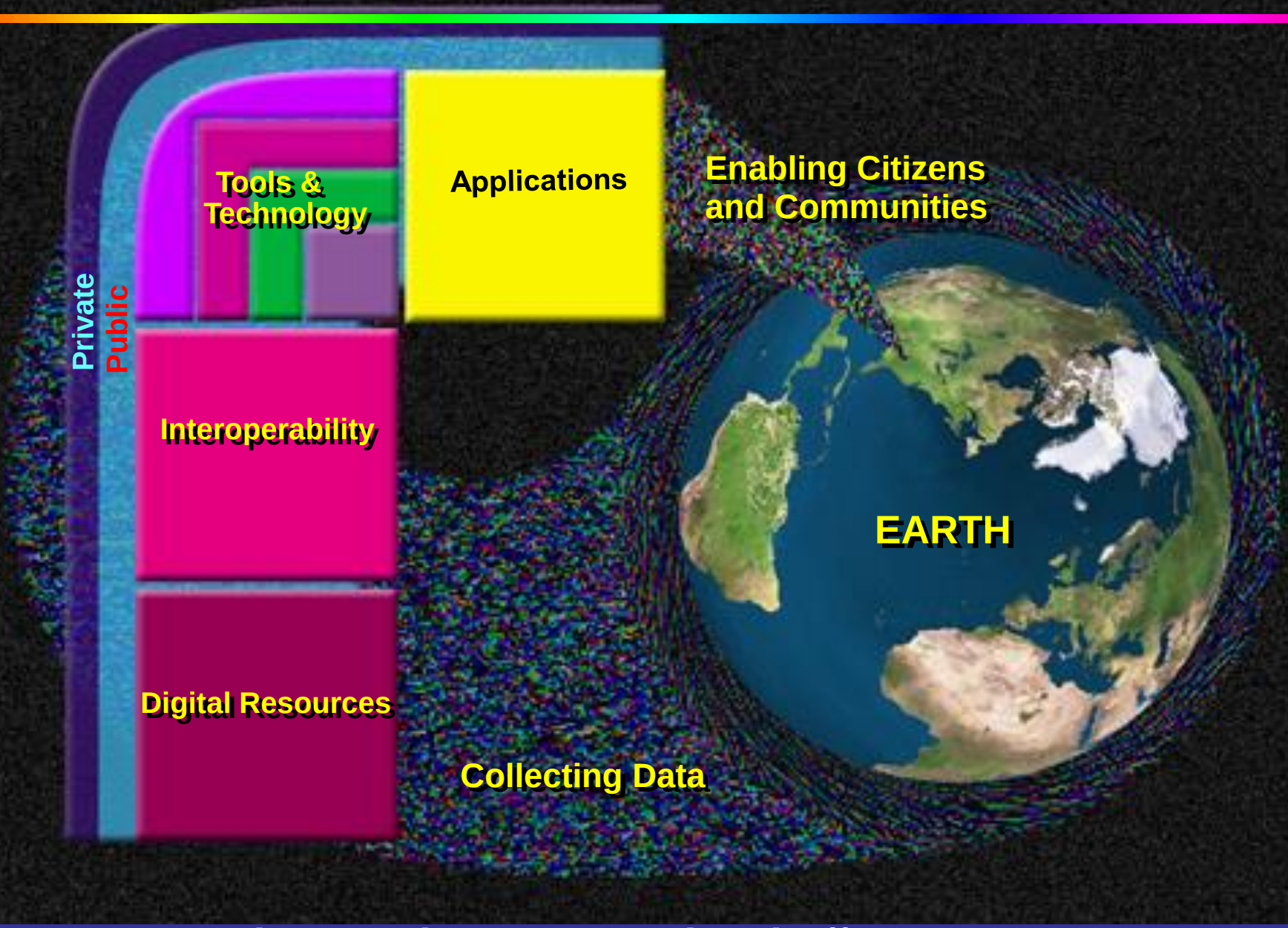
Earthquake

Volcano

Plate Boundary

(http://www.nasm.si.edu/EarthToday)

Understanding Digital Earth



(White paper by NASA Digital Earth office, 2000)

The Digital Earth: Understanding our planet in the 21st Century *by Al Gore*

- Nová vlna **technologických inovací** nám dovoluje sběr, ukládání, zpracování a zobrazování nepředstavitelného množství informací o naší planetě a široké rozmanitosti přírodních a kulturních jevů. Většina těchto informací je "georeferenčních", to znamená, že jsou vztažena k určitému specifickému místu na zemském povrchu.
- Obtížnou součástí využití těchto předností je **záplava geoprostorových informací** – problémem je převedení surových dat do pochopitelných informací.
- **Digital Earth:** vícenásobná zobrazení, třídimenzionální reprezentace planety, při němž využíváme velké množství georeferenčních dat.

Digital Earth - nezbytné technologie

- Počítačové vědy resp. Informatika (Computer Science)
- Obrovské ukládací kapacity pro data (Mass Storage)
- Družicové snímky (Satellite Imagery)
- Širokopásmové sítě (Broadband Networks)
- Interoperabilita (Interoperability)
- Metadata -Realizovat úplný potenciál Digitální Země vyžaduje technologický pokrok v dalších oblastech, zejména automatizované interpretaci snímků, propojování dat z rozmanitých zdrojů, a *inteligentní agenty, kteří mohou nalézti* a propojit informaci na WEBu o jakémkoliv místě na zeměkouli. Už v současnosti je k dispozici dostatečné množství informací, aby proces mohl být úspěšně rozvíjen.

Digital Earth - potenciální aplikace

- **Vedení virtuální diplomacie** (mírové rozhovory v Bosně, simulovaný let nad plánovanou hranicí, stanovaní koridoru)
- ***Boj s kriminalitou*** (pomocí GIS v městě Salinas)
- ***Ochrana zachování biodiversity: (***Camp Pendelton, California, předpověď růstu populace z 1.1 milion v r. 1990 na 1.6 milion v r. 2010. V regionu 200 ohrožených, vzácných rostlin a živočichů. Na základě informací o terénu, půdních poměrech, ročních srážkách, vegetaci, využití půdy a vlastnických vztahů vědci modelovali možné dopady na biodiversitu v regionu

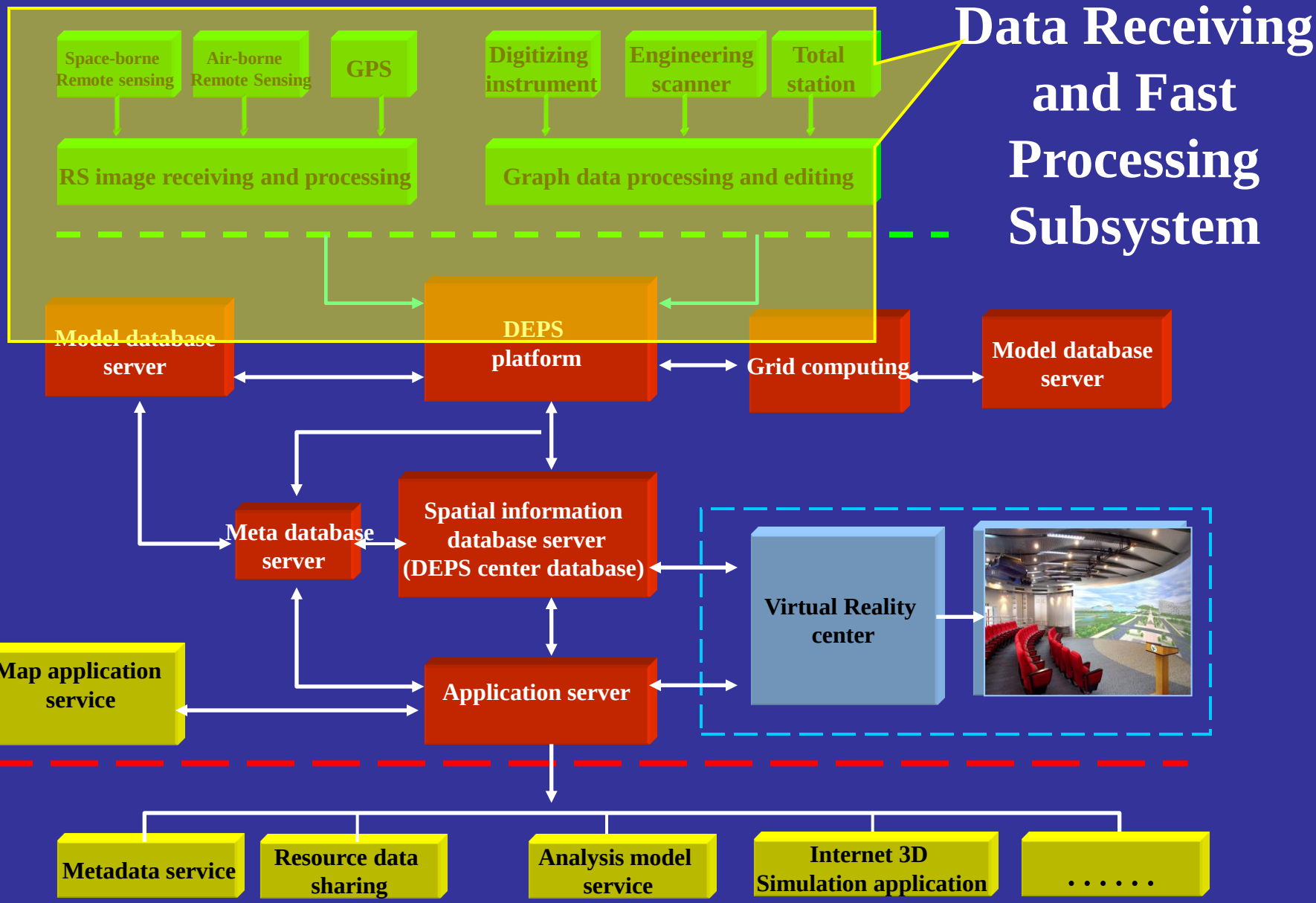
Předpovědi klimatických změn: (odlesňování Amazonských pralesů na základě družicových dat)

Růst zemědělské produktivity: (družicové snímky a GPS pro včasnou detekci nemocí a škůdců a nasazení protiopatření; “farming by the inch."

Background

- **Digital Earth：**
  - **main carrying body of information resource in sustainable development,**
    - **effective way to integrally share the information resource,**
    - **strategic highland in information era**
    - **an essential character in economy and society.**
- **In the late 90's, Digital Earth concept was widely disseminated and quickly developed. Both China and foreign countries had experienced a completely process in the understanding of Digital Earth**
- **Brought out the Digital Earth Prototype System (DEPS) proposal**

二、系统组成与功能


Space-borne Remote sensing
Air-borne Remote Sensing
GPS
Digitizing instrument
Engineering scanner
Total station
RS image receiving and processing
Graph data processing and editing
Data Receiving and Fast Processing Subsystem
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DEPS platform
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Metadata service
Resource data sharing
Analysis model service
Internet 3D Simulation application
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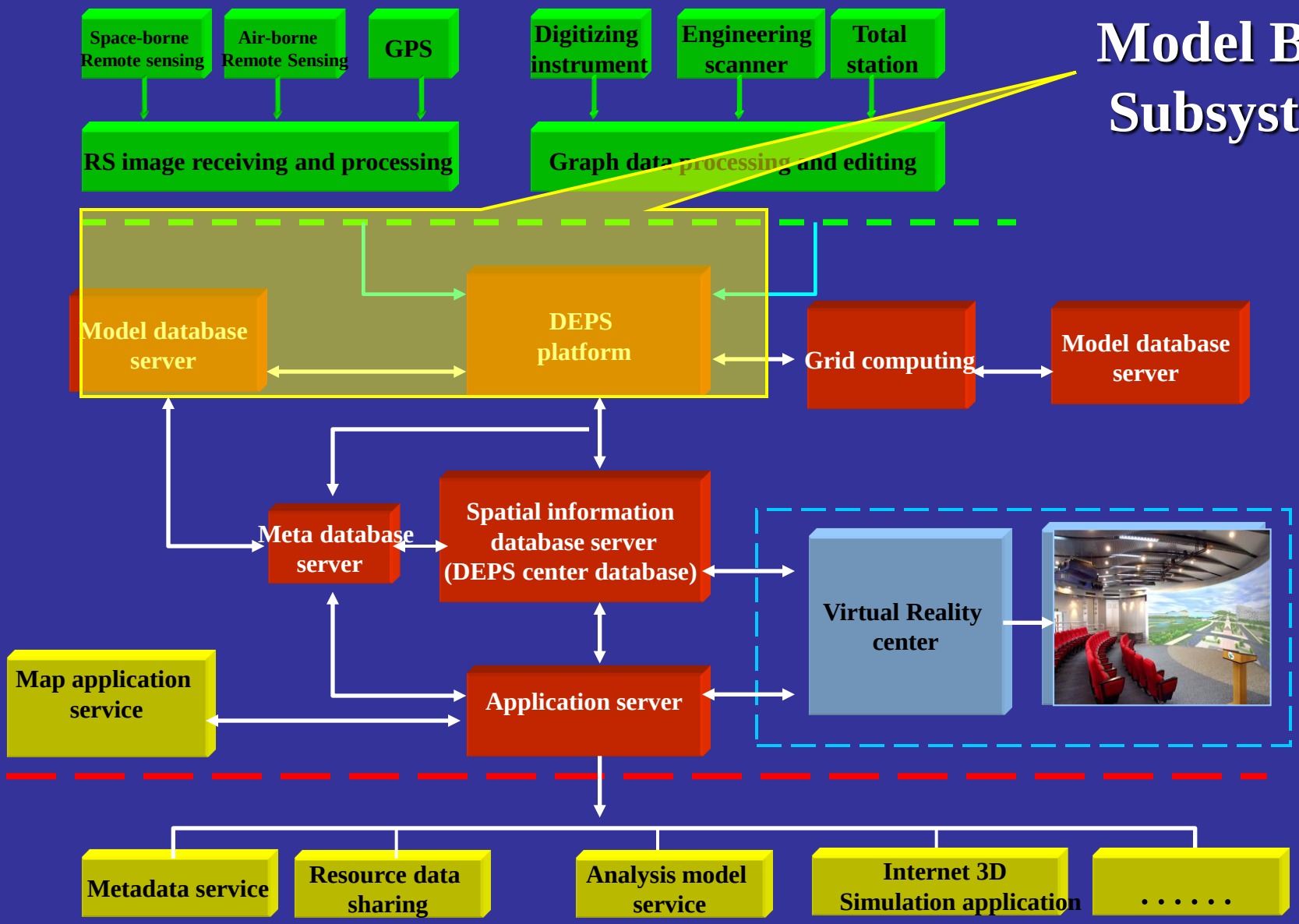
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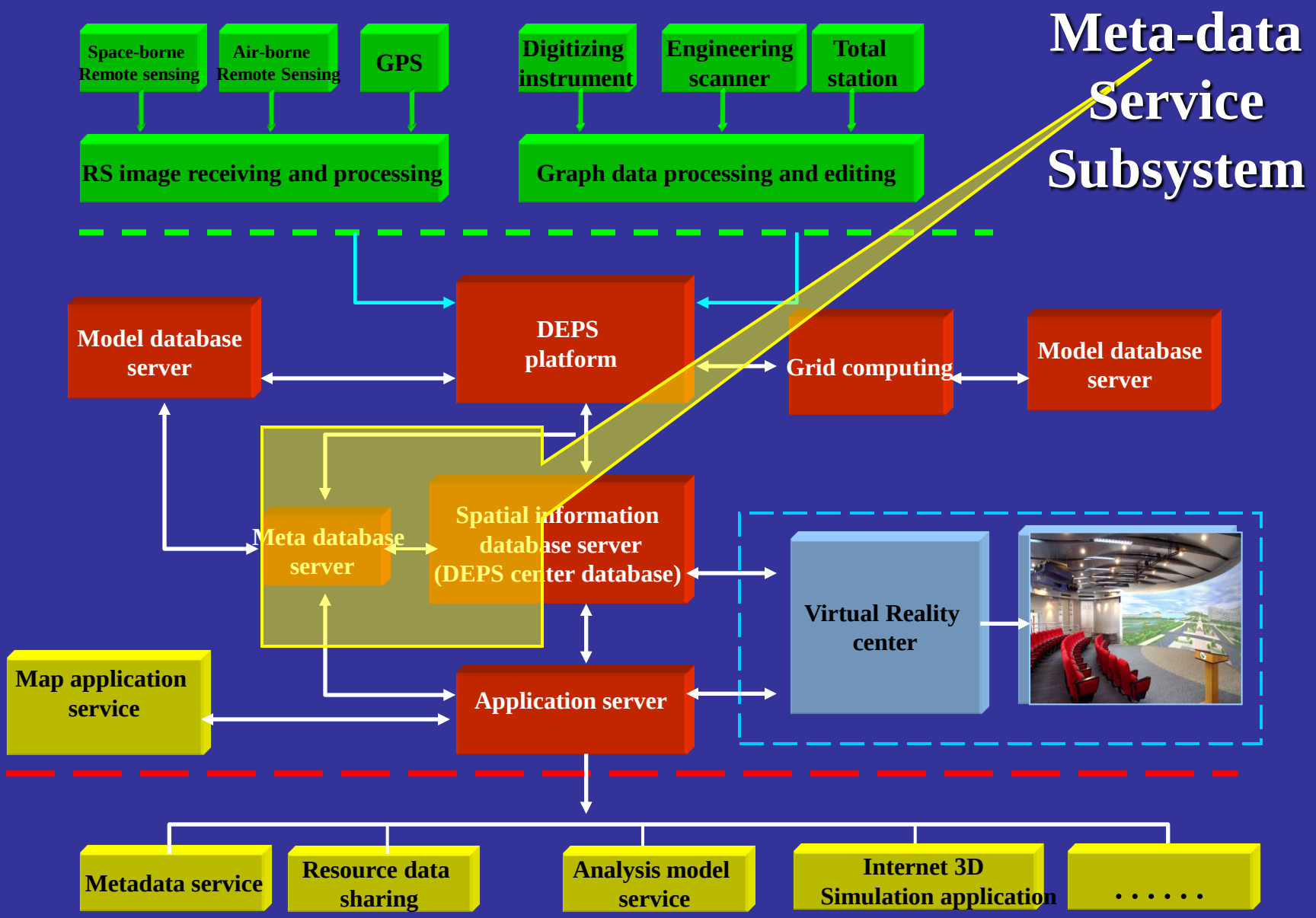
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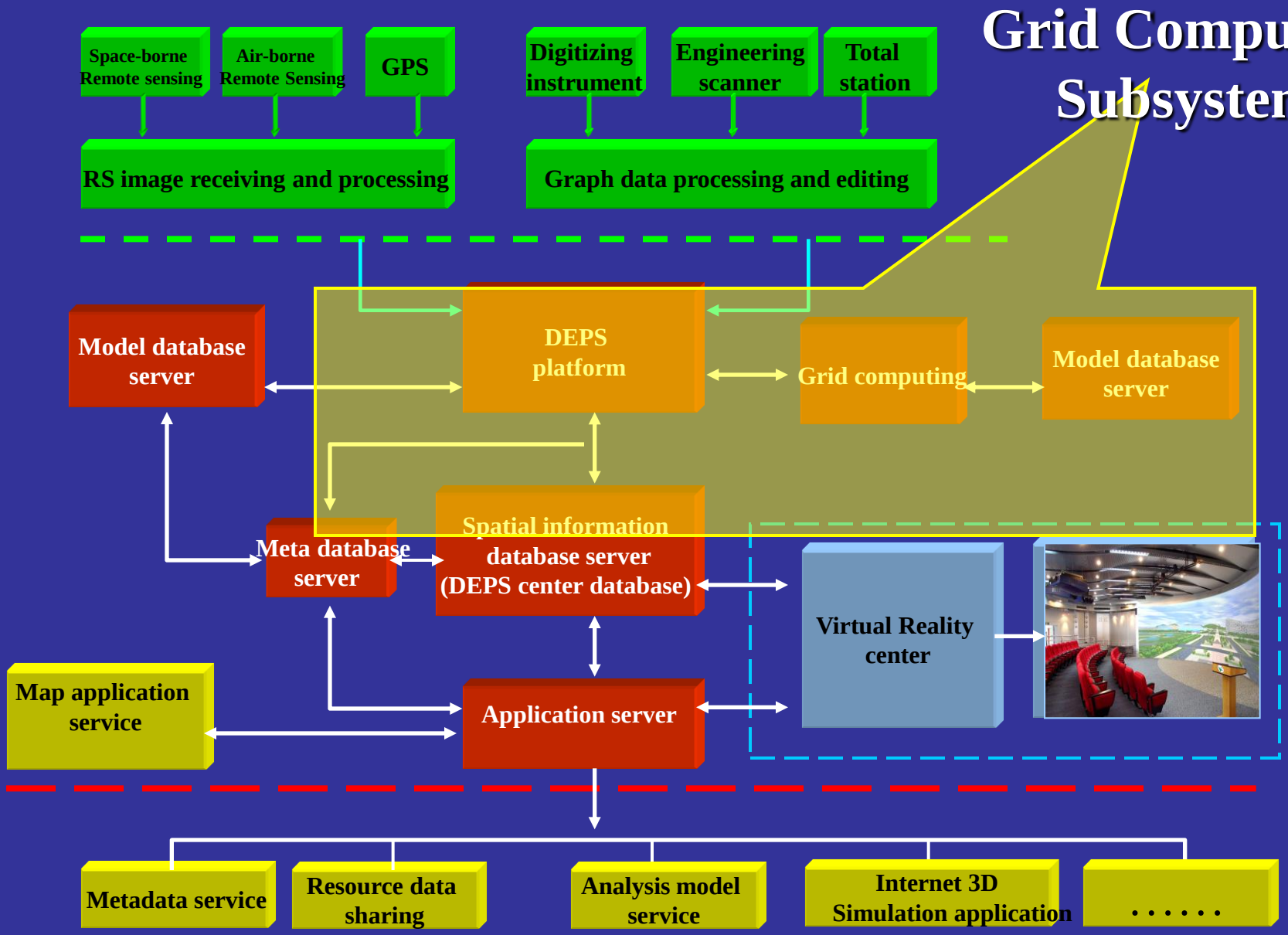
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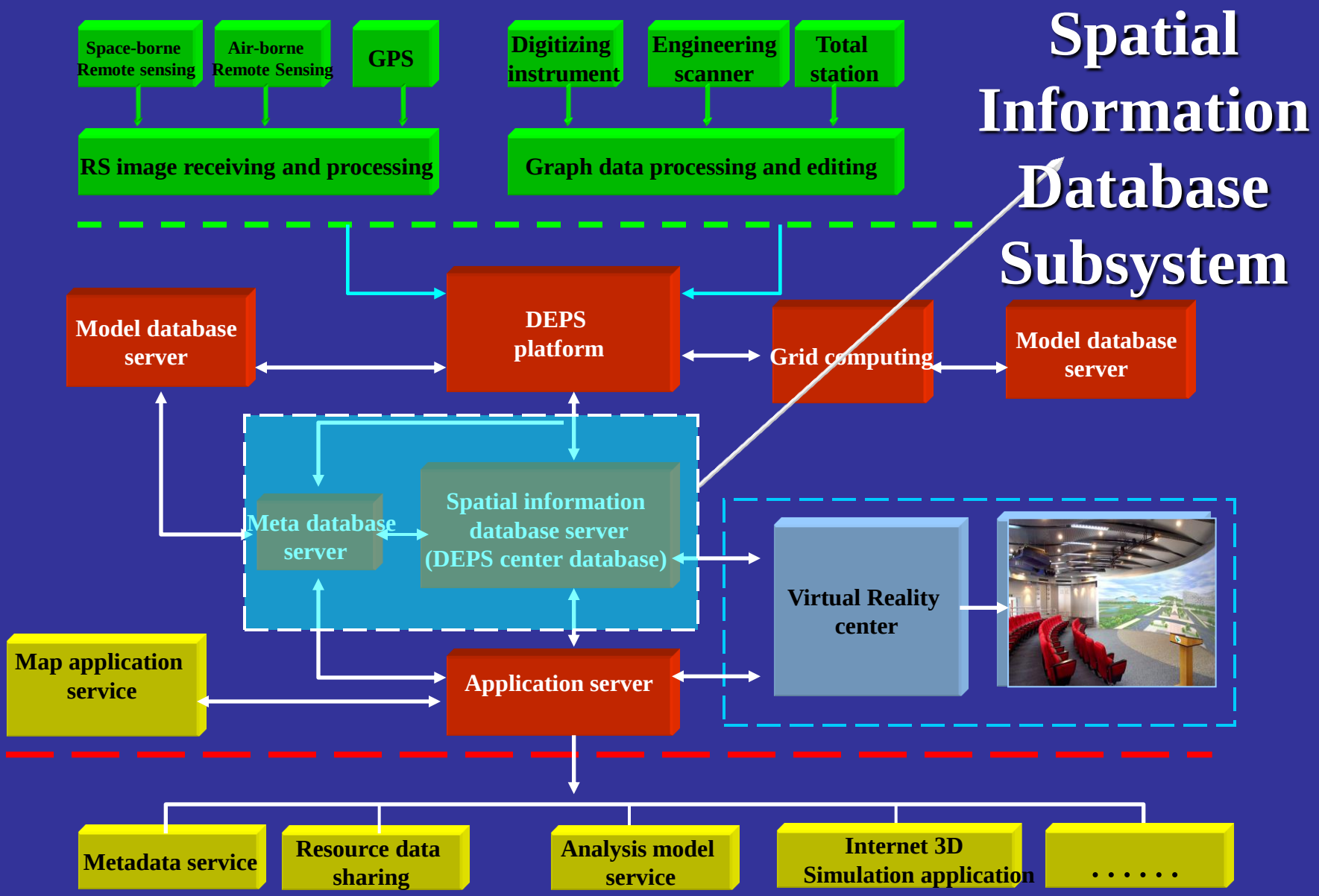
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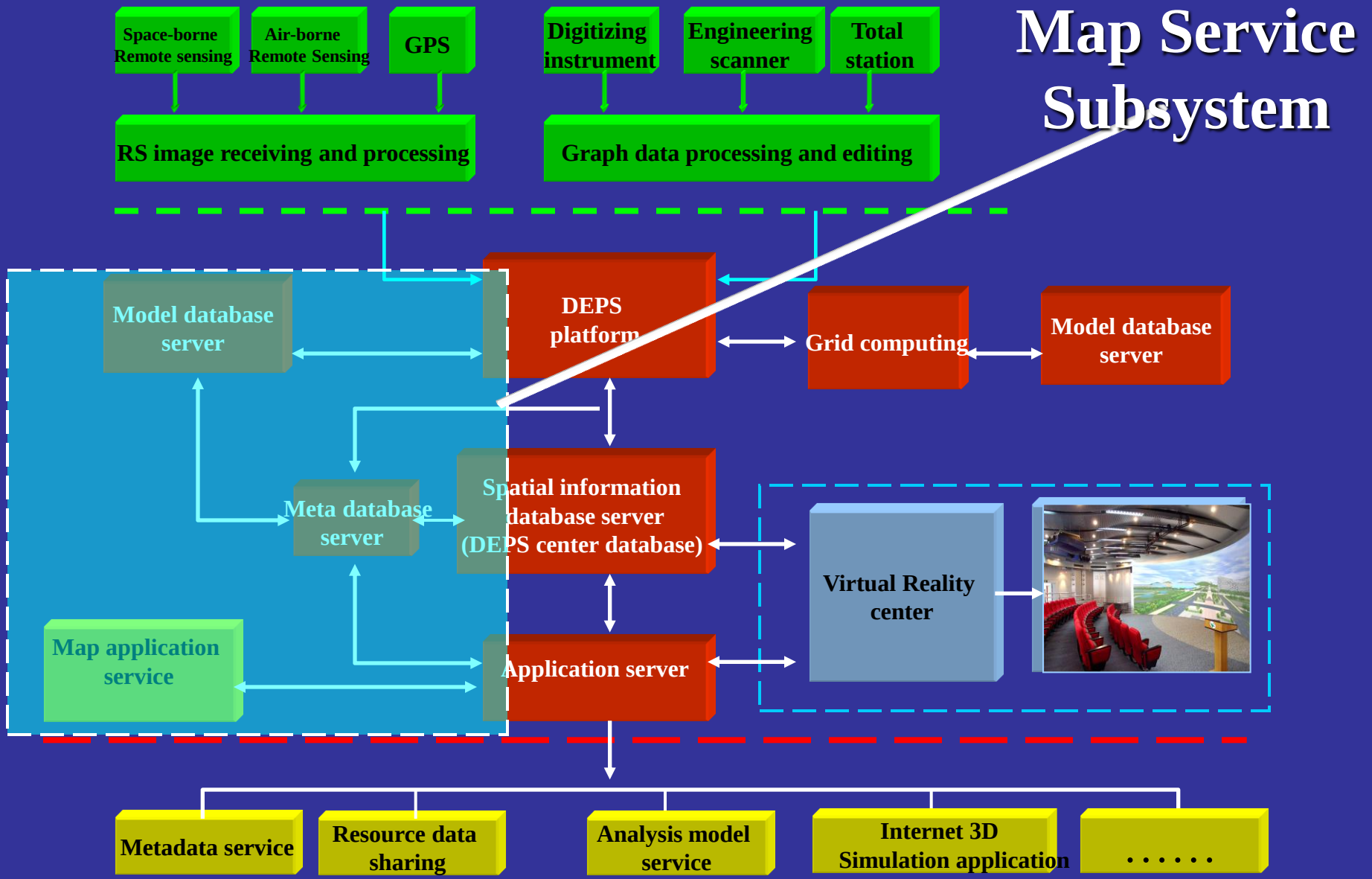
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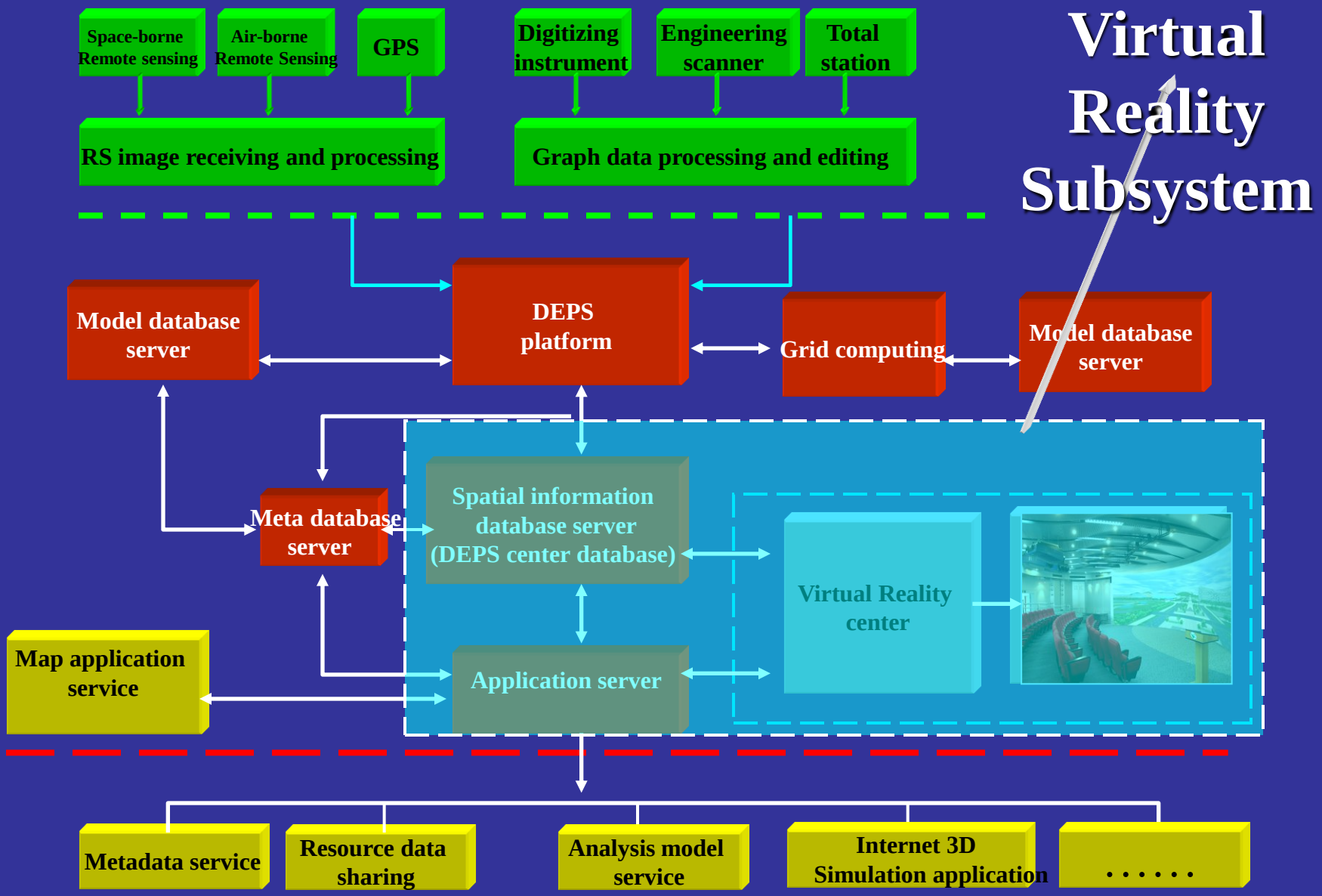
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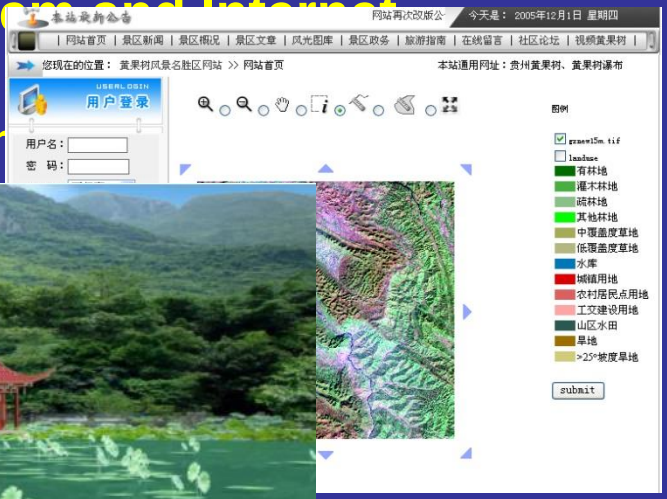
Applications in different areas

- Digital touring
- Digital archaeology
- Digital Olympics
- Dynamic Urban Change Monitoring
- National Standard Digitalization Base

Digital Touring

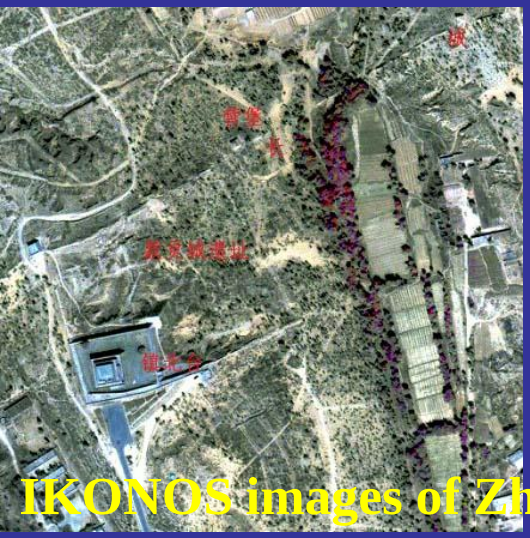
- Digitized and network management of Huangguoshu view designation sector
- development of the 3D simulation syste[illegible] and Internet browsing software
- [illegible] the GIS information in

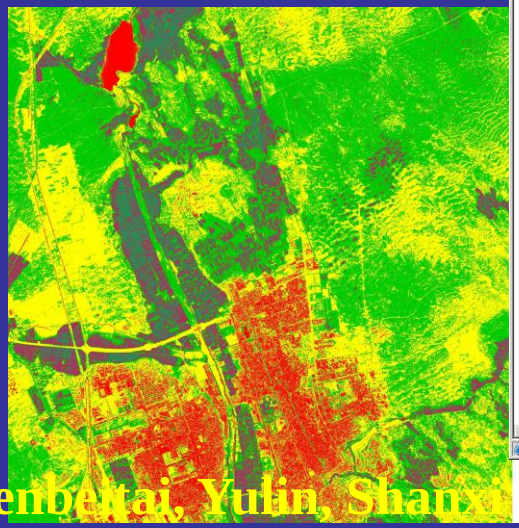


Digital Archaeology

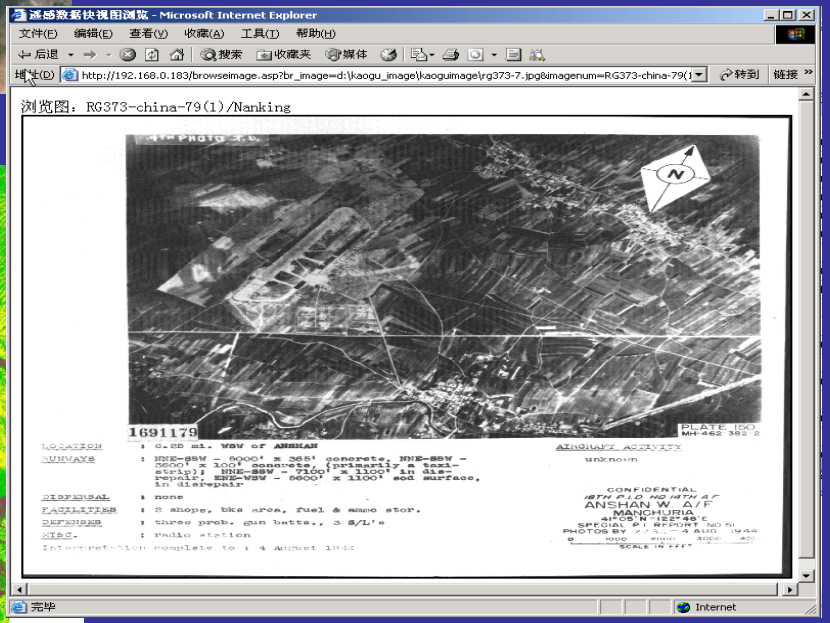
Remote sensing survey of Hailongtun

Remote sensing survey of Tongwancheng





IKONOS images of Zhenbeitai, Yulin, Shanxi and its surrounding environment analysis



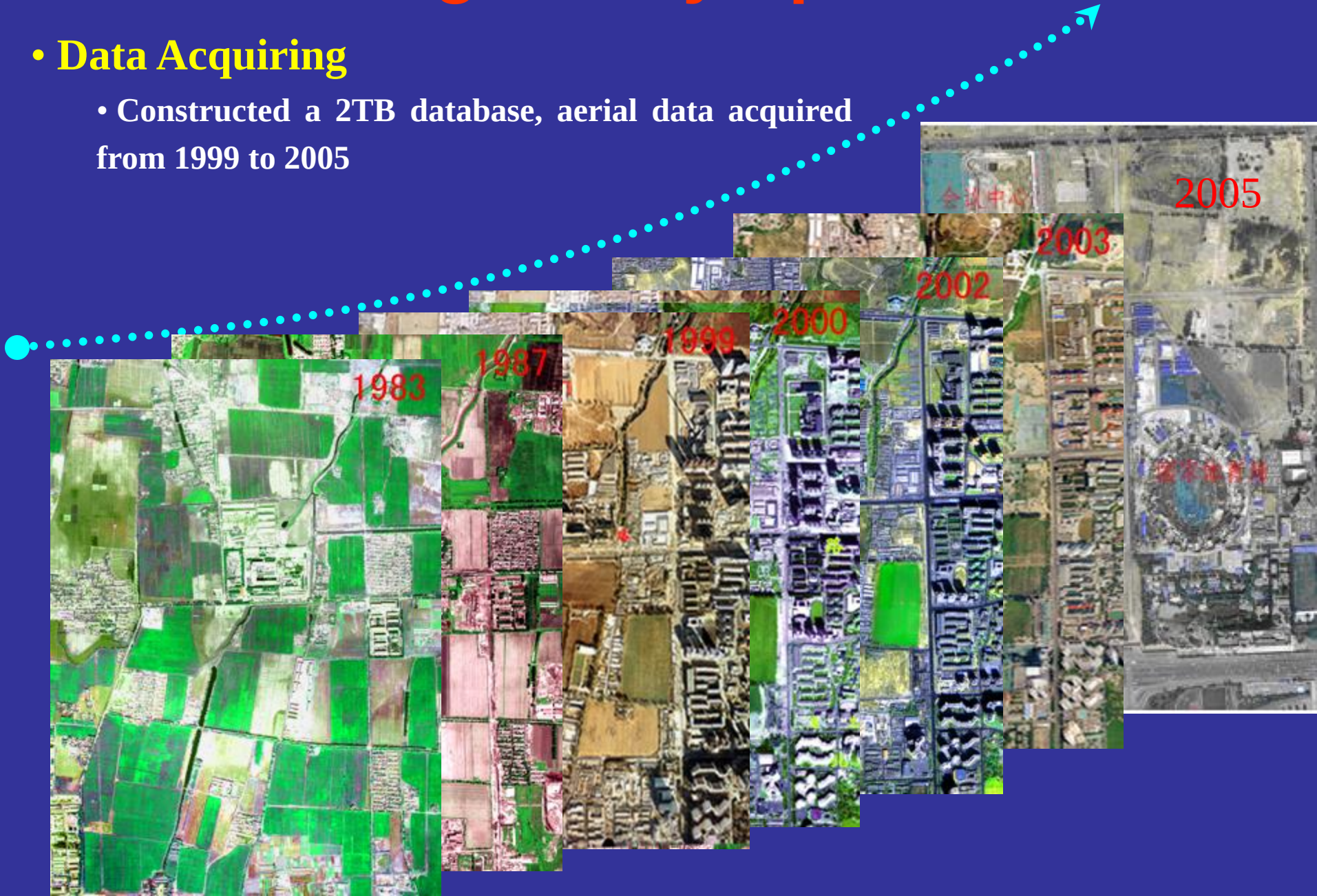
Digitized photo database of World War II

Digital Olympics

Implementation of the dynamically monitoring of the Olympic main venue sector projects and the environment projects in spatial scale;

Digital Olympics

- **Data Acquiring**
  - **Constructed a 2TB database, aerial data acquired from 1999 to 2005**



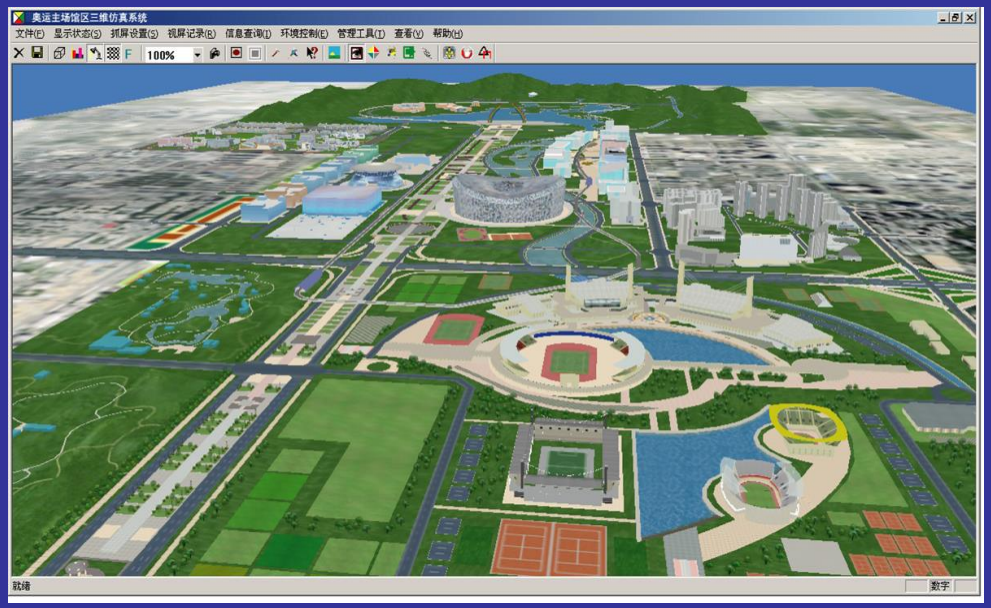
Digital Olympics

1）Development of the 3D visualization scene

2）Implementation of the Internet 3D browsing of the Olympic main venue sectors

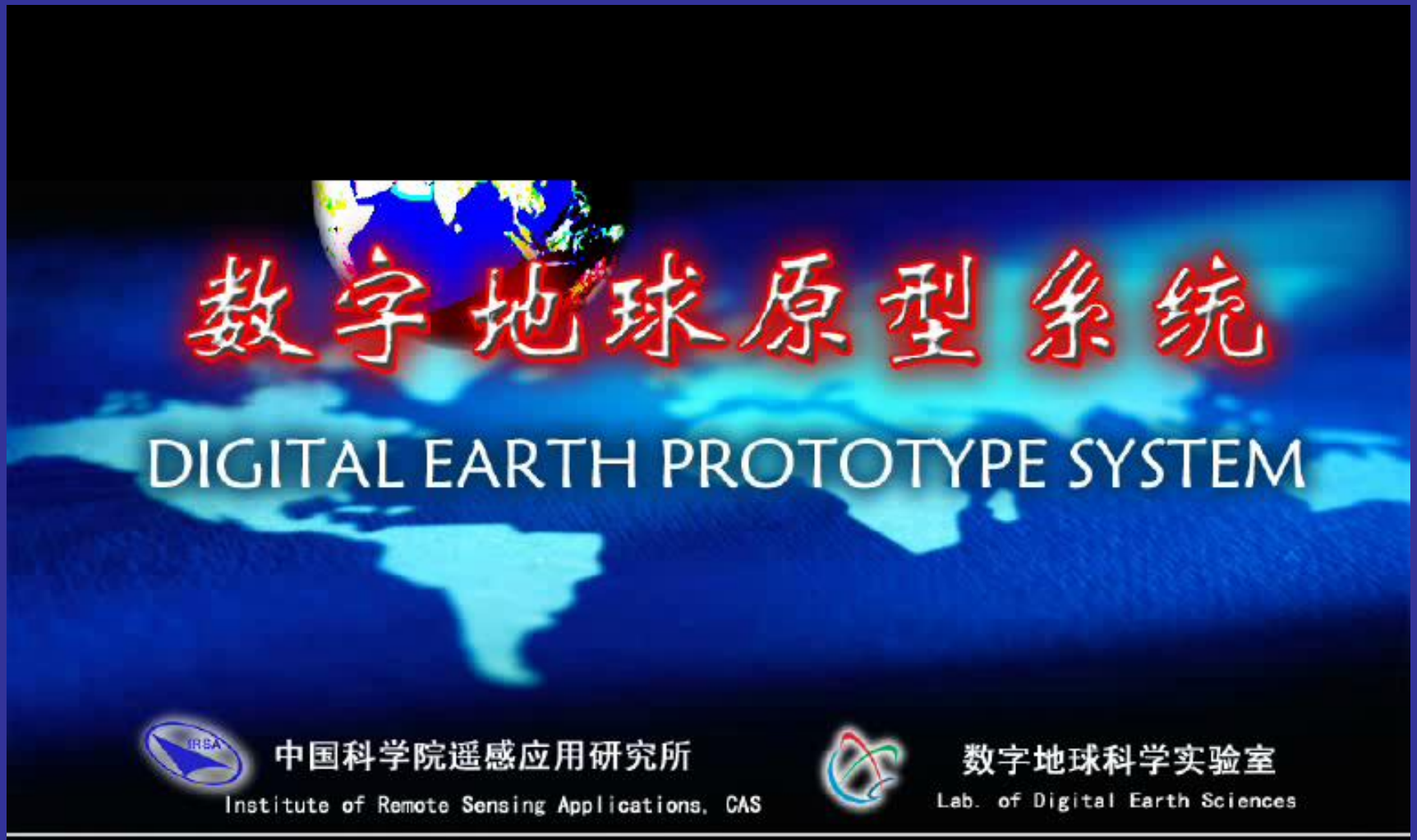
3）Discovery of the key technologies in dynamically monitoring engineering progresses

4）The relating technology research of the 3D E-map developments



Dynamic Urban Change Monitoring

- According to the soil resource management and fundamental construction, using multiple remote sensors, multi-resolution remote sensing data to continuously and dynamically monitor the urban area and assist the updating of the land-use status figure.
- Monitor the land-use variation types,


数字地球原型系统
DIGITAL EARTH PROTOTYPE SYSTEM
中国科学院遥感应用研究所
Institute of Remote Sensing Applications, CAS
数字地球科学实验室
Lab. of Digital Earth Sciences

The initiative envisions a three-dimensional globe that users could click on to access data layers.

Sufficient data depth and breadth would ensure its use by researchers, local, planners, and students.

The project encompasses standards development, idea marketing, and data collection and draws openly on the work of other organizations.

Like GSDI, the Digital Earth initiative (http://www.digitalearth.gov) has contributed to advancing the concepts and technologies that underlie any SDI and by structuring existing information relevant for the implementation of interoperable geographic information and services.

As a matter of fact, the Digital Earth initiative has made important contributions to the GSDI Cookbook.

The 3rd International Symposium on Digital Earth – Information Resources for Global Sustainability.

Knowledge, Networks, Technology, Economy, Society, Natural and Human Resources, Policy and Strategy.