Cartography and GIS in Non-Standard Situations

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不出戶，知天下
不窺牖，見天道。
(老子)

Without leaving home, you can know the whole world; without looking out of the window, you can tell the ways of Heaven. (Lao Zi)
Introduction
What have we done?

The world has become a small place

We have conquered Earth

Sometimes we behave as if we own it
Standard Situation

• According to the textbook we have
  – Clear problem description and understanding
  – Good data
  – Working software
  – Functioning infrastructure
  – Knowledgeable personnel
  – Time
Non-Standard Situation

• When disaster strikes
  – Shock and chaos
  – Missing or incompatible data
  – Software problems
  – Breakdown of infrastructure
  – Lack of experts
  – Lack of time
The Flood (a long time ago)
Galtür avalanche (23 February 1999)

- 31 casualties
- Worst avalanche disaster in Austria

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Mars Climate Orbiter (23 Sep 1999)

Destroyed due to a navigation error on entry into Martian atmosphere
Looking back
From a Description of the Earth to Earth Observation and Mobile Systems

From ancient times  To the present time
GIS Software

Data Input → Database → Analysis

Output & Visualization

Data Structures

Vector: Arc/Node Structure
Raster: Quadtree
GIS and Decision Support Systems

- Data Input
- Database
- Analysis
- Output & Visualization

- Geographic Information Science
- Full integration of vector and raster data
- Full integration of attribute and geometry data in geo-databases

Theoretical Foundation

Spatial Modeling

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gEo-Government
gEo-Government

e-Government

gEo-Government

Geo-data policy
Goal of gEoGovernment

- To successfully and effectively establish and provide (geo-)information services.
- Build geo-information infrastructures
Outlook
Current Situation

• GIS tools sufficiently well developed
• GIS servers (the network is the system)
• Location based services (LBS)
• Volunteered geographic information (VGI)
Dangers

• Uncritical use of geo-data and geo-information technology
  – Navigation systems
  – Web-maps

• “Digital Divide” between the Haves and Have-nots
... and Potential

• Societal penetration
  – Ubiquitous GIS
  – Education and training

• Tool for early warning and emergency management

• Contribution to tackling global (environmental) issues
Quality Issues

Open Street Map

Reference Map
Modularization of GIS

• Function components on the Web
• Open systems and interfaces
• Function brokers (in analogy to metadata clearinghouses)
• Thin GIS clients with thick functionality
“Natural” GIS

• Full consideration of uncertainty in representation and analysis of spatial phenomena because...

• We do not live in a binary (black and white) world, and uncertainty is rather the rule than the exception
Finally
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“Without leaving home, you can know the whole world”— if you have a GIS.

Thank you