

THE FUTURE OF GIS



Getting Started With GIS

Chapter 10

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GIS Futures

- Future data
- Future hardware
- Future software
- Future issues

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Theme of the book

- GIS's place in understanding geographic distributions and their mapping and prediction in the real world.
- So what does the future hold for GIS?

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Speculating on GIS's future is valuable because of:

- ❖ Planning for the purchase of hardware and software.
- ❖ Geographic information science, a new science that is used to design future information systems.
- ❖ Expansion into new fields and application areas, discovering new uses and solving problems.

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So why speculate?

- ♥ May get something right!
- ♥ Most of tomorrow's systems are under development now.
- ♥ Some of tomorrow's systems already exist, but are not diffused through the hierarchy of potential users.

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FUTURE DATA

Compared to 10 years ago:

- ♥ Acquiring data for a new GIS is no longer a major problem.
- ♥ GPS has become a major sources of new GIS data, and comes increasingly from integrated GPS/GIS systems.
- ♥ Digital map images such as scanned maps and air photos are often used as a background image for cross-layer registration and update.


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GIS/GPS Integration



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In-Vehicle Navigation Systems



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Trends in GIS Data

- ✓ Remote sensing will become an important source of GIS data as the cost of data falls and new sorts of data arrive.
- ✓ Data exchange will become more common and has been facilitated by exchange standards.

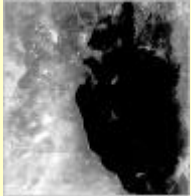

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Future Data

- DOQ
- DRG
- EOS
- Landsat 7
- SPOT
- Radarsat
- CORONA
- SIR
- JERS
- ERS

™ Commercial 1-5 meter

™ GPS to GIS

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FUTURE HARDWARE

Major influences on GIS

- Advanced GIS work has been influenced significantly by the workstation.
- GIS has quickly incorporated distributed systems and databases.
- The microcomputer has allowed GIS to be applied to new fields and has improved GIS education.
- The mobility of portable GIS and GPS systems has revolutionized GIS use.

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The four revolutions

- © Workstation
- © Microcomputer
- © Network
- © Mobility

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Future data distribution: On demand, at time of use.

- NASA's EOSDIS: The DAACs
- Project Alexandria
- Vendors
- Census 2000

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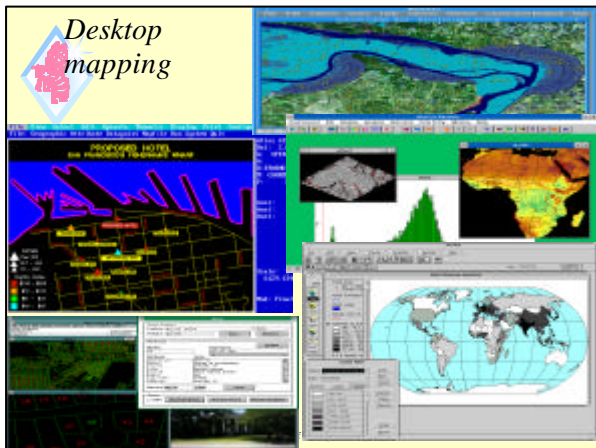
Some of the future is NOW!

- Desktop mapping. "Business Geographics."
- Real high end power.
- GIS/GPS integration.
- IVNS (in-vehicle navigation system)
- Rapidly maturing market with broad public acceptance and knowledge
- The Web. More than data delivery.

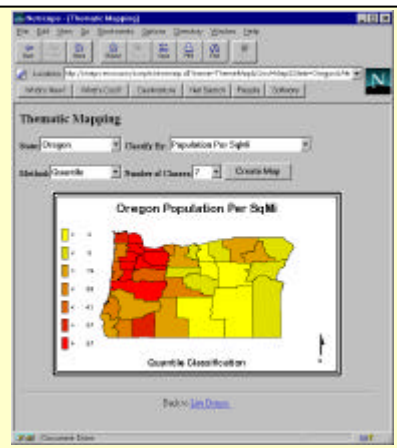
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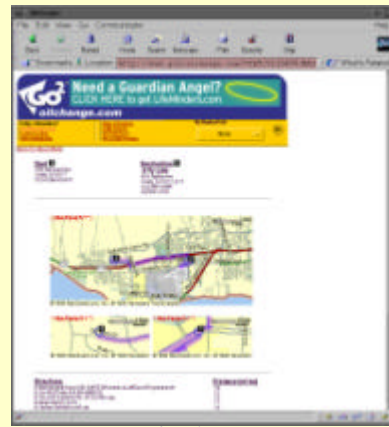
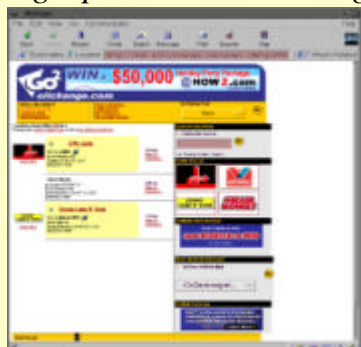
Desktop mapping

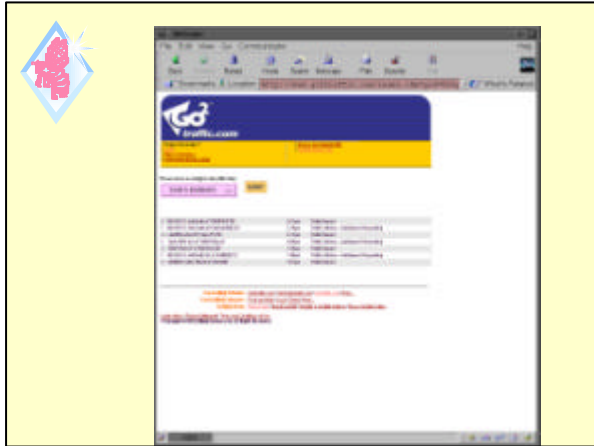


The Web: Beyond data, metadata, toward information



Geographic web-searching





The Web:
TMS from
the census
bureau

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Future Software

- o Scientific visualization tools
- o Automated vision tools
- o Fourth dimension
- o Spatial analysis tools (e.g. S+)
- o Beyond the WIMP (windows, icons, menus and pointers) Desktop
- o Hyperinteractivity
 - o Multisensory input
 - o Multisensory output

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GIS Improvements

- Improvements in the user interface have substantially altered GIS "look and feel."
- Basic data differences such as raster vs. vector have disappeared as GISs have become more flexible.
- Object-oriented programming and databases are likely to improve GIS.
- GIS software is now easier to install and maintain.

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GIS Trends

- Many GIS databases are now distributed over local or wide area networks.
- Multimedia and hypermedia will play a growing role in GIS, especially in help and training systems.

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Evolving metaphors

- v Extending the GUI
 - v Magic Cap
 - v Geographers Desktop

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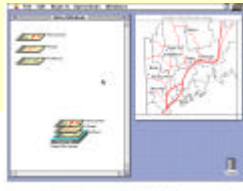
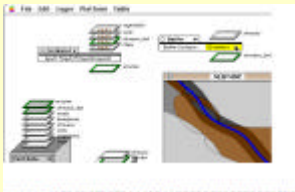


Evolving metaphors

Extending the GUI

Magic Cap

Geographers Desktop



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Hyperinteractivity

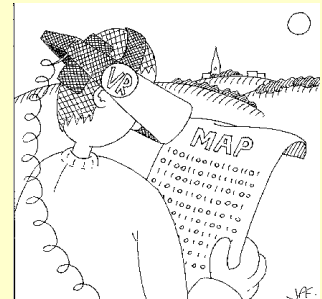
Input

- Touch
- Gloves
- Sensors

- Sight
- Vision tracking
- Cameras

- GIS as clothing
- GIS via the Web

- Moving
- Static



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Wearable computers come of age

Evolution of Steve Mann's "wearable computer" invention



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GIS R & D

- GIS user needs are both for small one-person systems and large multiperson systems.
- GIS software research is active and continues to build new developments.
- GIS will become increasingly interoperable as concepts, user interfaces, and functions become more standardized.

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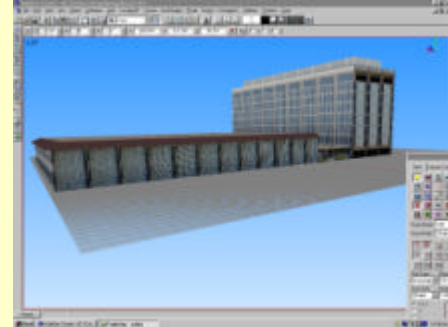
Future GISs

- Scientific visualization and computer graphics will be increasingly integrated with GIS capabilities
- Animated maps
- Interactive maps
- Augmented reality

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Future Environments VRML

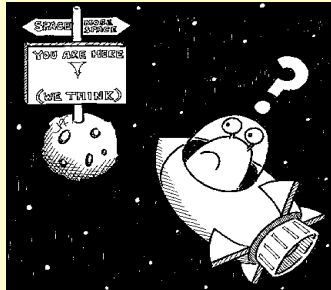


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Future issues

- New users
- Privacy
- Data ownership
- GI Science & Technology



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Future Issues

- ✓ Privacy will become a critical issue for GIS as use expands to legal applications.
- ✓ Data ownership will remain critical to GIS, with a delicate balance between public and private GIS data.
- ✓ GIS research is threatened by a lack of funding and should be protected by the GIS community.

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Data ownership

- ❖ COFUR & FOIA are US, not global
- ❖ Copyright and publishing (Bits not atoms)
- ❖ Global data inequalities
- ❖ The Bit Police?

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New user communities

- ▲ Archeology
- ▲ Epidemiology
- ▲ Law
- ▲ K-12 Education
- ▲ etc.
 - ▲ *Simpler systems?*
 - ▲ *Specialty systems?*

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Scientific visualization and computer graphics will be increasingly integrated with GIS capabilities, especially animated and interactive maps.

GIS is critical to new scientific trends, especially multidisciplinary research, global systems study and the scientist as advocate.

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GIS education

- ✦ Has not been standardized, but has produced a great variety of learning environments and teaching materials.
- ✦ NCGIA Core Curricula

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*A GIS is already more than a **system***

What in the world is a "GIS"?

—Item on the Internet's comp.infosystems.gis FAQ.

geographic(al) information system: (1) A set of computer tools for analyzing spatial data: (2) A special case of an information system designed for spatial data: (3) An approach to the scientific analysis and use of spatial data: (4) A multibillion dollar business.

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GIS is an approach to science

"the generic issues that surround the use of GIS technology, impede its successful implementation, or emerge from an understanding of its potential capabilities."

(Goodchild, 1992)

Geographic Information Science is research both *on* and *with* GIS.

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"Computing is not about computers any more. It is about living."

Nicholas Negroponte, Founding Director of MIT's Media Lab. Being Digital (1995), p. 6.

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GIS is not about systems any more. It is about geography.

More potential than most other sciences for the tools and the science to go above and beyond technology.



What Next?

- The future of GIS is in your hands
- As a GIS analyst you have the capability to use or misuse the power that GIS brings to the world's problems.

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