Geographic Information Systems (GIS) in Planning and Resource Management

Geomatics into the near future: pitfalls and opportunities

ENVS 6189 3.0 – Closing Session
Session Purpose:

To discuss the unique opportunities for Environmental Studies students in the future of Geomatics in Canada.
Uncertain Trajectories:

Natural Resources

Pollution  Biodiversity  Population  Technology  Science

Global Warming  Globalized Economy  Geographic Change Is Accelerating
The Promise of Geomatics:

“Geomatics is a key discipline for the 21st century.”

“The ability to acquire, represent, use and disseminate spatially referenced data will transform most sectors of the emerging information economy.”

GEOIDE Updated Strategic Plan

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Driver of Change in Geomatics:

**Markets** – rapid advances driven by profit and issues of technology transfer, IP and other R&D issues are typically managed to the advantage of those with market-place power.

**Technology** – Spatial and analytic resolution increasing, horizontal agency broadening as a result of Internet proliferation. However, advances in productivity alone may not be the catalyst for Geomatics to reach its next level of potential.

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Generic Skills for Geomatics:

Knowledge Areas – skill sets and knowledge areas that are the foundation of Geomatics related activities were developed through extensive Canadian consultations.

<table>
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<tr>
<th>Business Skills</th>
<th>Technical Skills</th>
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<tr>
<td>Financial statement analysis</td>
<td>Geodasy</td>
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<td>Contract negotiation</td>
<td>Geographic Information Systems (GIS)</td>
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<td>Proposal, report and science paper writing</td>
<td>Global Positioning Systems (GPS)</td>
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<td>Marketing</td>
<td>Computer Aided Drafting systems (CAD)</td>
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<td>The ability to secure funding</td>
<td>Computer hardware and software</td>
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<td>Leadership and management skills</td>
<td>Data visualization and interpretation</td>
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<td>Team skills</td>
<td>Data formats and transfer</td>
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<td>Presentation skills</td>
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<td>Project management skills</td>
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Sources: HRDC, 2001

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Canadian Geomatics Workforce:

2001: 2B dollar market
27,000 employed (5K in public)

2004: 3B dollar market
32,000 employed in private sector

NB: Over 80% of Geomatics workforce now has university level education. 1991 only 15% had declared a university education.

Sources: HRDC, 2001
GIS in Perspective:

Projected Global IT Spending by 2005: $2.6 Trillion

Projected Global GIS Spending by 2005: $60 Billion ~2.3% of all IT spending

Figures Include:
- Software
- Hardware
- Infrastructure
- Salaries
- Services
- Data

Sources:
- ibSystems, 2000
- IDG News Service, 2001
- ESRI Canada 2003

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Effect of Globalization on Geomatics?

**BusinessWeek online**  
Feb 3rd, 2003

‘The New Global Job Shift’
The next round of globalization is sending upscale jobs offshore. They include basic research, chip design, engineering—even financial analysis.

**TORONTO STAR**  
Feb 24th, 2003

‘Outsourcing’ climbs up the job ladder’
It began as a way to harness cheap overseas labour And it's evolved -- can an out-sourced CEO be far off?

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Computing Evolution:

Small Hardware
Wireless Internet
Interoperable
Embedded
Evolution of GIS Platform:

- Stand-alone
- Distributed
- Networked
- Interoperable

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Enabling Technologies:

Computers
(Cost, Speed, Size, Mobile...)

Networks
(Faster, Wireless)

Internet
(New Standards, Growth)

GIS Software
(Enterprise-Scaled Suites)
Better Accuracy:

- Thermal
- Radar
- Multi-spectral
- Hyper-spectral

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More Precise Measurements:

Before

After

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18

Data Form and Availability:

90’s

Spatial Analysis

10-15%
Attribute Building

~75%
Data Conversion:

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So where are we?
The Myopia of Over-Specialization:

When faced with pressures of evolutionary competition, most species survive not by generalizing, that is doing many things well, but by specializing and exploiting a narrow ecological niche. … this new competitive advantage also makes the “specialist” less versatile and more vulnerable to change.

Organizational Analogy:

“Silos and Stovepipes”

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The Trap of Optimization:

Our ability to solve societal problems will be limited primarily by our lack of imagination in seizing opportunities rather than trying to optimize solutions.

The Law of Inefficiencies
Kevin Kelly

A reliance on optimization or emphasis on continued “refinement” rarely leads to needed “reform”
The Need for Ingenuity:

...Solutions to the major problems of our time ... require a radical shift in our perceptions, our thinking, our values... a change of paradigms as radical as the Copernican revolution...

- Fritjof Capra
  *The Web of Life*

Ingenuity consists not only of ideas for new technologies ... but, more fundamentally of ideas for better institutions and social arrangements...."  

- T. Homer-Dixon
  *The Ingenuity Gap*
Time for New Thinking:

“We are confronted with insurmountable opportunities” Walt Kelly

• Geomatics is a key discipline for the 21st century but should be grounded in principles directed toward societal relevance;

• Advancing Application of Geomatics is not a technical exercise as much as it is a social activity.

• Geomatics Professional must have solid foundation in technical knowledge, domain knowledge specific to area of practice and ability to manage processes and relationships;
Exploration of Undiscovered Country:

Geomatics is a Constellation of Disciplines

Learning context of Environmental Studies is Trans and Interdisciplinary – uniquely positions ES students to contribute to evolution of the application of GIS

Domestication of the unknown means departing (temporarily) from the successful known.

End.

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