UNIT 24 - GIS MARKETPLACE

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Compiled with assistance from Doug Banting, Ryerson Polytechnical Institute, Toronto

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For Information that Supplements the Contents of this Unit:

[Links to the following resources have been omitted.]

- Current GIS Market (Chrisman/U of Washington) -- Important issues (e.g. data structure, database management, functions/operations); GIS World Chart and unaddressed issues; object oriented programming; etc.

The following papers address GIS in the workplace:

- The Evolving GIS Workplace (Daniel/Geographer's Craft)
- Identifying GIS for What its Worth (Daniel/Geographer's Craft)
- Looking and Thinking Beyond the Department (Daniel/Geographer's Craft)
- Well Connected Geographics (Daniel/Geographer's Craft)
- Web GIS Sites -- Directories and listings; "how to" resources; web GIS sites.
- "Web GIS: Toy or Tool?" Resource List (Thoen)

- EXAM AND DISCUSSION QUESTIONS
- NOTES

Current information on GIS vendors and products are available in several publications. Trade journals are also a source of current information. You may want to assign an exercise in which students will assess different products on the characteristics that are discussed here.

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A. INTRODUCTION

Purpose

- to review current GIS marketplace
- products change all the time
  - unfortunately this means the material in this unit will become outdated quickly
  - sources for updating this material are provided in the References
- no intention to evaluate/compare/recommend
  - different application areas are dominated by GISs of different functionality, approach
  - even within application areas, capabilities vary widely
  - different sets of capabilities meet different needs
  - needs of each GIS installation vary widely
- no list can be exhaustive
  - recent surveys list around 1,000 "GIS" vendors
  - vagueness of definition of GIS makes it difficult to draw the line

B. MARKET POTENTIAL

- many reports indicate the rapid growth of the GIS market

C. PRODUCT CHARACTERISTICS

- GIS products can be evaluated and compared on a multitude of different aspects
  - different characteristics are important for different applications and users
- variables to compare are include:

Data model

- vector, raster or "integrated"

Platforms

- range from Macintosh and PC to workstations to mainframes
  - programs which work on micro-computers are generally very limited in their ability to handle large databases

- most major GIS programs now operate on several different platforms

Cost

- cost ranges from free (several public domain GISs, e.g. GRASS from US Army Corps of Engineers) to tens of thousands of dollars for the major commercial programs

Domain

- related to cost

- commercial products represent major investments in product development by a private company
  - are designed to meet market needs and generally respond fairly quickly to changing needs
  - are usually well supported by easily accessed customer service departments
  - are regularly updated and enhanced

- public domain refers to the ownership of the software, however, practically speaking, it implies low cost but often a low level of support
  - public domain programs can be freely copied and shared
  - further listings of GIS-type products are published regularly in many newsletters and journals

- includes:
  - raster based systems: GRASS - U.S. Army Corp of Engineers
  - vector based systems:
    - MOSS - U.S. Bureau of Land Management
    - SAGIS - National Park Service
    - ODYSSEY - developed at the Harvard Lab, now available from Department of Geography, University of Washington
    - ROOTS - Laboratory for Computer Graphics and Spatial Analysis, Harvard University

- a third type of program are the educational programs which have been developed as teaching tools
  - these programs general have significant limitations on the size of the database
  - work on micro-computers
  - are very low cost
  - include extensive tutorial materials
  - are updated regularly
  - are not supported by extensive customer service departments

- includes:
  - IDRISI - from Clark University

- OSU MAP - from Ohio State University

Performance issues

- systems can be arranged on three performance dimensions, each identified with one corner of an equilateral triangle
  - corner 1 - volume of data
  - corner 2 - richness of functionality
  - corner 3 - speed of response
- no system can optimize for all three
  - current systems choose two to optimize, sacrifice the third
- any system can be positioned somewhere in the triangle depending on what combination of factors it tries to optimize
  - the nearer to a corner, the more that factor is important or optimized in the system
- "linear" (i.e. network) systems typical of AM/FM-type applications, need fast response, large volume, but can sacrifice functionality to achieve them
  - locate between corners 1 and 3
- "Choropleth" systems are those in which most objects are areas
  - primary applications are with demographic, socio- economic and natural resource data
    - for demographic and socioeconomic, areas are reporting zones
    - for natural resources, areas are defined by homogeneous attributes
  - these systems focus on integrity of polygon topology rather than the connectivity of vector nets
- applications in these areas require sophisticated analysis - simple query is relatively unimportant
  - users can often afford to wait for product
  - richness of functionality, volume of data more important than fast response to query
  - these systems fall between corners 1 and 2
- "Precision" systems are those in which absolute locations and boundaries must be identified
  - these are large scale (high resolution) with lot boundaries, streets as double lines - "parcel" database
  - analysis is unimportant
  - mapping (subdivision plans) is very important
  - these systems need large volume, low functionality, fast response not necessary
  - CAD (computer assisted design) and computer mapping packages are adequate, topological database model not essential
  - these are at corner 1

Query/product mode

- as noted previously, applications tend to be focused along a continuum of from strictly query oriented systems to strictly product oriented systems

Ease of integration

- some GIS programs will import several different types of files from other programs but do not provide export facilities
- on the other hand, some GIS programs are designed specifically to operate in parallel with other programs and external databases

Training needs

- some programs are easy to operate, some require week long training programs
- it is important to note that large, complex command structures are not necessarily a design flaw
    - knowledgeable users will appreciate the flexibility and adaptability of these large programs
    - also, ease of learning is not necessarily always a positive characteristic
        - e.g. many statistical packages do not have simple "idiot-proof" interfaces specifically because their designers wish to ensure that only users who are knowledgeable about the statistical methods will understand how to access them

User interface

- different types of interface were reviewed in Unit 18

Maintenance

- frequency of updates, cost

Potential for creativity

- some programs allow many, flexible "tools" that can be combined in innovative ways to deal with problems not foreseen by the program's designers

D. VENDORS' PRODUCTS

GIS products and vendors

- note: GIS Sourcebook, 1989 includes an excellent summary of current GIS products and vendors listing cost, date first introduced, support, data structures, functionality
    - an update will be published in 1990 and it may continue to be an annual publication

REFERENCES

American Farmland Trust, 1985. A Survey of Geographical Information Systems for Natural Resource Decision Making, Washington. Useful if fugitive survey.

GIS Sourcebook, 1989, GIS World, Fort Collins, CO. Includes an excellent summary of current GIS products and vendors

listing cost, date first introduced, support, data structures, functionality. An update will be published in 1990 and may continue to be an annual publication.

Tomlinson, R.F., 1987. "Review of North American Experience of Current and Potential Uses of GIS," International Journal of Geographical Information Systems, 1(3):203- 218.

Wheate, R., 1988. "GIS/Image Processing: A Summary of Software Packages Available for the PC," Operational Geographer, 14:30-33. Excellent review of PC software, including image processing.

Several useful papers appear in the proceedings of an Atlanta GIS conference in 1986, published as Proceedings of GIS Workshop by ASPRS, Falls Church, VA:

Caron, L. and J. Merchant, 1986. "Geographic information systems for non-urban local-level jurisdictions: existing alternatives," p. 110

Fleet, H., 1986. "SAGIS: a full-function public-domain GIS for micro and minicomputers," p. 301.

Reeve, C. and J. Smith, 1986. "The varied viewpoints of GIS justification: a survey of vendors and users," p. 396.

EXAM AND DISCUSSION QUESTIONS

1. Describe the "linear", "choropleth" and "precision" views of the world used in this unit.

2. Why are there so few vector-based GISs designed for small computers (e.g. PC)?

3. Describe the three-corner scheme used in this unit, and explain the nature of each corner or pole. Why is it not possible to develop a system which optimizes all three measures of performance?

4. Compare several different GIS products across the range of characteristics listed in this unit. Make some conclusions about the applications each of the products would be best suited for.

Last Updated: August 30, 1997.