SPATIAL VISION GROUP

M E M O R A N D U M

DATE: February 14, 2014

TO: Vancouver GIS User Group - Session Participants

FROM: Bill Johnstone, Spatial Vision Group, Inc.

RE: Notes from our Group Workshop: *Sharing Our Knowledge About The Geospatial Revolution: Where Are We At? What Is To Come?*

1. OVERVIEW

For the February 12 meeting of the Vancouver GIS User's Group (VGISUG), we organized a brainstorming session to address the topic: "***Sharing Our Knowledge About The Geospatial Revolution: Where Are We At? What Is To Come?***" In the weeks leading up to this session, the VGISUG Steering Committee developed sets of questions, ideas and worksheets. Our session agenda was as follows:

1. Startup: The ground rules were laid out (5 minutes). Each station used large Post-It sheet on one of the walls. The participants had their own post-it notes and pens so that they could add their ideas to to each sheet.
2. Two Facilitated Input Cycles: The participants were assigned to one of the topics and we ran two ten minute rapid-fire sessions. The faciltators and participants provided their inputs. After the first session, everyone (except the facilitator) rotated one topic and we all provided input again.
3. Free-For All Input Cycle: After the first two cycles were completed, the participants were allowed to add ideas to whichever of the remaining questions they hadn't answered yet.
4. Reporting/Discussion: Once all of the input was gathered, each facilitator provided a summary of the results and findings for their topic. We then opened up the floor to a more general discussion.

The handout developed for the session is provided in Appendix A. The results of the session are summarized in the sections below. Additional ideas and questions were also submitted by Martin Feuchtwanger and are provided in Appendix B.

The general consensus was that this was an interesting exercise and the facilitators and participants asked for copies of the results (presented below in this memo). Thank you to the VGISUG facilitators and to the participants for making this a successful event.

Bill J.

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2. QUESTION 1 – HOW ARE WE CURRENTLY MEASURING THINGS?

2.1. Inputs

- What measurement methods and sensor webs do you use?
- Key data interchange formats?

  Food for Thought: Satellite, airborne-manned (e.g., LiDAR), airborne-unmanned, terrestrial (vehicles as sensors), road sensors, instruments on infrastructure, people as sensors, social media

2.2. Results

- LiDAR - airborne
- LiDAR - terrestrial
- LiDAR - building interior
- LiDAR - bathymetry
- SONAR
- GPS
- Road sensors
  - Sensors in road used to identify when to salt road
- AutoCAD DXF
- Shapefile
- LAS (LASer file format) - LiDAR
- KML
- OpenStreetMap
- Terrestrial LiDAR for 3D modeling
  - Built environment (buildings, machines)
- Time Series Data
  - Pre-Load (DB) projected (not necessarily) growth-yield as arrays
- River flow, depth and suspended sediment
  - Time series hydrograph
- Time series pressure transducers
- Live cams
  - E.g. street intersections
- Box of sensors on a taxi/bus moving in time and space
  - Temperature, radiation, CO_2
  - Has GPS
- Twitter
  - Often has a time and a location (but how important is that info? →Maybe in natural disasters, e.g. earthquake)
  - FME 2014 has Twitter Translator
- LiDar – mobile
- Bluetooth sensor on moving objects to estimate travel time
  - E.g. time to destination
- ESRI time tool – just simple visualization
- GPS
  - Travel time analysis

3. QUESTION 2 - HOW CAN WE SAY "WHERE" IN RICHER WAYS? DITTO FOR "WHEN"?

3.1. Inputs

- Which GIS products currently provide 3D and/or time capabilities? Are they "full" 3D or really just 2.5D?
- How do you link/load time-series data (x,y,z,t) into your geospatial databases?

  Food for thought: *Many of the current three-dimensional capabilities we use come from CAD products. Time products?*

3.2. Results

- GPX file format
  - x, y, z, t
- ArcGIS 3D Analyst
- AutoDesk Maya
- AutoDesk Revit
- Bentley Microstation
- VirtualGeo
- netCDF
- Grass: 2.5 D?
- Still mostly 2.5 D
- 3D – nothing new, all really poor, lots of data movement
- Why time?
  - Flood
  - Traffic
- Siteworks
  - Road design
- Need processing power – cloud?
- Time as polygon attribute in Post GIS
- How to interact? Select?
- MATLAB: time-dependent data and SURFER
- ArcScene "Raster" 2.5 D?
- Trimble Sketch-up ("Free!")
  - Pro $?
- XML → 3D?
- Bentley
- Infraworks (Infraworx?)
  - AutoDesk
- Blender Open-souce of Maya?
- ESRI – time field
  - Day, week, second
- Minesite: Van company mining
- Google Earth to render
  - Trimble sketch-up
- SURFER: 3D volumetric, water, column, time!
- "True 3d"
  - Gemcom software mining
  - FME
- ArcGIS: Spatial Analyst
  - True intersections in 3D – e.g. spheres (slow)

4. QUESTION 3 - WHAT IS ON YOUR "MUST HAVE" SHOPPING LIST? (WE BET SOME OF THEM ARE FREE)

4.1. Inputs

- What building blocks to you use today? Products, databases, languages, ...
- Interesting / emerging tools that are almost there?

  Food for thought: *What are the key software elements you need to do your work? ... not just the main GIS SW.*

4.2. Results

- ArcGIS
- Smallworld
- Safe Software FME
- Google Earth
- Google Chart Tools
- Google Maps API
- AutoDesk, AutoCAD
- Oracle & Oracle Spatial
- DB2
- Informix
- Smallworld VMDS
- Enthought Python
- J2EE
- JavaScript
- Android SDK
- R
- Mathematica
- MATLAB
- SciPy
- GeoServer
- eSpatial
- QGIS
- Processing
- VISIO
- Sparx Systems Enterprise Architect
- Would like:
  - Open source alternative to FME (with GUI)
- Don't like:
  - ESRI/MS/Autodesk
  - Data as PDF
- Python supported by many GIS
- Google Map – Streetview
- Open office spreadsheet
- Excel
- MapInfo
  - Mining industry
- RASS
- Web Mapping
- Map Guide (open source)
- MS Access
- PostGIS (Open Source)

- SQL
- GDAL – OGR open source alternative to FME (subset of functions)
- Formats
  - CSV
  - XML
  - JSON
- Future: No SQL

5. QUESTION 4 - THERE ARE LOTS OF NEW SCIENTIFIC DATA VIZ AND BIG-DATA TOOLS OUT THERE.

5.1. Inputs

- Is advanced visualization a big deal for GIS practitioners?
- What are some leading tools for this? Is it more than just good cartography?

  Food for thought: There are some pretty cool data-visualization, big-data, and scientific data visualization tools out there…which ones have you seen or been amazed by?

5.2. Results

- IBM Business Intelligence
- Oracle Business Intelligence Enterprise Edition (OBIEE)
- WebFocus
- SAS Enterprise Business Intelligence
- QlikTech
- Tableau
- PowerPivot
- Mayavi
- Paraview
- JavaScript InfoVis
- D^3 - Data Driven Documents - trendy JavaScript stuff

6. QUESTION 5 - GEOSPATIAL IS NOW BEING BROUGHT TO THE PUBLIC AT LARGE. IS THIS A GOOD THING?

6.1. Inputs

- Unleashing geospatial to the public at large: scary or powerful?
- What are good examples of public GIS? social media GIS? Others?

  Food for Thought: Should we be concerned about those with little or no training on map projections, precision and accuracy? or about the spatial analyses conducted using these new tools?

6.2. Results

- Examples
  - Of issues…
  - Of collaboration…
  - …citizen science
- Yes
  - New ideas?
  - Free fieldwork?
  - Community empowerment?
  - Number of GPS-enabled smartphones – getting kids involved?
  - Easier to make maps of "free" data that is traditionally only tabular format
  - Chance of expanding the GIS industry (maybe)

- Awareness
- Buy-in
- Broader use
- Improving management and response to environmental and natural hazards
- Resource allocation (moving consumer goods, products, etc.)
- Brings people together
- Inventions in learning
- Discovering the world
- Imagination
- Gather people in community by putting people in certain "location" → offer useful locational information
- Limitless possibilities for socially progressive citizen science
- Data source integration e.g. Google Earth with historic airphotos or new Landsat/NDUI etc.
- "Free" data collection can be very useful, where lots of data is needed in heterogeneous area
- Navigational apps
    - Gets you where you're going when GPS & Wi-Fi connected and data is up-to-date data

- No
    - How to make foolproof?
    - I.e. "Projection disasters", "outdated maps", "safety issues?"
    - Many GIS being <u>used</u> and <u>compiled</u> by folks <u>not</u> understanding data quality or spatial referencing systems
    - Assuming web map data is more accurate than it really is – old data?
    - GPS change the industry
    - GIS professional jobs perhaps disappearing: rather than being a professional but viewed as a tool since everyone knows how to use it.
    - Errors leading to safety problems
    - Privacy
    - Geo-caching
    - Security threats
    - I.e. misused by terrorist groups
    - Inacurate data
    - Maps are only as accurate as the data they come from…someone with little experience in data collection within the public may not produce the most accurate map, creating a false representation.
    - Eager citizen scientists disturb sensitive habitat and endangered species trying to capture photographs/geo-spatial data to help scientists
    - E.g. Kids "tagging" a nerd with their GPS-enabled phone for everyone to follow and bully
    - E.g. People taking a photo of garbage and tagging it as an endangered bird
    - Delusion
    - Non-real
    - Hard to manage data amounts
    - Navigation apps
        - Gets you costs when out of range of GPS and Wi-Fi
        - Out-of-date data
    - "Absolute" trust in some online things is sometimes bad
    - As more people involved in using spatial information, may want to add or editi existing information
        - End up having wrong info and wrong coordinates info

7. QUESTION 6 - HOW RELEVANT HAS GIS BEEN TO CANADIANS?

7.1. Inputs

- Has GIS become an important tool in Canadian society?
- How and why?

  Food for thought: Canada has experienced a number of major technological and natural disasters in the last few years. Did GIS professionals play an important role in these events? Could we in future?

7.2. Results

- Examples
- Calgary Floods (2013)
- Lac Mégantic Rail Accident (2013)
- Manitoba Pipeline Fire (Otterburne, MB)
- Slave Lake - Wildland-Urban Interface Fire (2011)
- Toronto Ice Storm (2013)
- Katrina roof tops
- Role fo individuals/public (macro/micro)
- Google Maps – data sucks
- USGS vs. DataBC/Geoconnections
  - Data availability and quality
- KML
  - Funding silo-ed data / data quality → Getting better
- Advances in GIS will improve our ability to manage…
- Better "marketing" of GIS
  - Awareness
- Internet – "Truth", "Agendas"
  - Barrier to moving forward: "How do I qualify the source?"
- Social media
  - Crowdsourcing
- Predictive/Common Operating Picture/Forensic
- Emergency response planning
  - Routing
  - Inventory of equipment/resources (and people)

8. QUESTION 7 - WHAT IS THE NEXT BIG BIG THING?

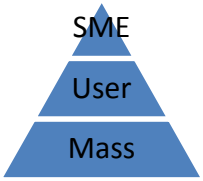
8.1. Inputs

- Which markets are now fully mature? Which markets are just starting?
- Where do you see GIS in the next 5 years?

  Food for Thought: Apple Computer, Inc. just had its 30 year anniversary. The GIS industry has changed significantly in the same period. What does the future hold for GIS?

8.2. Results

- Federal Government
- Provincial Government
- Regional Government
- Municipal Government
- Military
- Utility: Power

- Utility: Communications
- Utility: Water & Waste
- Transportation
- Pipelines
- Navigation / Shippping
- Agriculture / Food
- Mining
- Forestry
- Energy: Oil, Gas, Coal, Wind
- Law Enforcement
- Emergency Response
- Business: Marketing
- Business: Sales
- Business: Logistics
- Business: Banking
- Health: Services, Epidemiology
- Travel
- Conservation
- Environmental: Habitat and Species
- Smart phones
- 

- Innovator
- Early Adopter
- Mature

- What is "The Next Big Big Thing"?

Appendix A Session Handout

Session handout shown on the next page.

Sharing Our Knowledge About the Geospatial Revolution: Where Are We At? What Is To Come?

Vancouver GIS User Group Meeting - February 12, 2014
Your MC: Bill Johnstone, Spatial Vision Group

Introduction: For this month's Vancouver GIS User Group meeting, we'd like to take an unconventional approach. VGISUG members collectively have a large body of knowledge about the current state and current best practices of the geospatial industry, its databases and applications. We might even have a few ideas about emerging trends. We'd like to try to facilitate the sharing of some of our knowledge and ideas between our peers.

1. GIS, Measurement & Sensor Webs	How are we currently measuring things?

- What measurement methods and sensor webs do you use?
- Key data interchange formats?

Food for Thought: Satellite, airborne-manned (e.g., LiDAR), airborne-unmanned, terrestrial (vehicles as sensors), road sensors, instruments on infrastructure, people as sensors, social media

2. Three Dimensional (3D) GIS and Time GIS	How can we say "where" in richer ways? Ditto for "when"?

- Which GIS products currently provide 3D and/or time capabilities? Are they "full" 3D or really just 2.5D?
- How do you link/load time-series data (x,y,z,t) into your geospatial databases?

Food for thought: Many of the current three-dimensional capabilities we use come from CAD products. Time products?

3. GIS Building Blocks	What is on your "must have" shopping list? (We bet some of them are free)

- What building blocks to you use today? Products, databases, languages, ...
- Interesting / emerging tools that are almost there?

Food for thought: What are the key software elements you need to do your work? ... not just the main GIS SW.

4. Advanced Visualization	There are lots of new scientific data viz and big-data tools out there.

- Is advanced visualization a big deal for GIS practitioners?
- What are some leading tools for this? Is it more than just good cartography?

Food for thought: There are some pretty cool data-visualization, big-data, and scientific data visualization tools out there…which ones have you seen or been amazed by?

5. GIS for the Masses	Geospatial is now being brought to the public at large. Is this a good thing?

- Unleashing geospatial to the public at large: scary or powerful?
- What are good examples of public GIS? social media GIS? Others?

Food for Thought: Should we be concerned about those with little or no training on map projections, precision and accuracy? or about the spatial analyses conducted using these new tools?

6. GIS and Current Events	How relevant has GIS been to Canadians?

- Has GIS become an important tool in Canadian society?
- How and why?

Food for thought: Canada has experienced a number of major technological and natural disasters in the last few years. Did GIS professionals play an important role in these events? Could we in future?

7. GIS Markets	What is the Next Big Big Thing?

- Which markets are now fully mature? Which markets are just starting?
- Where do you see GIS in the next 5 years?

Food for Thought: Apple Computer, Inc. just had its 30 year anniversary. The GIS industry has changed significantly in the same period. What does the future hold for GIS?

Appendix B Additional Ideas from Martin Feuchtwanger

Additional ideas from Martin shown in the next two pages.

MC: Bill Johnstone February 12, 2014

The geospatial revolution, where are we and what is to come?

Topics of Discussion

1. 3D GIS

- Is this a reality or wishful thinking? Why?
- Are the tools still 2.5D?
- Are 3D GIS fully capable today?

2. GIS & Sensor Webs

- What sensor webs do you use?
- Satellite, airborne-manned (LiDAR, etc), airborne-unmanned
- Terrestrial (static-LiDAR), vehicles as sensors, people as sensors
- road sensors, instruments on pieces of infrastructure
- social media
- What tools?
- How do you link these time-series data (x,y,z,t) to your geospatial databases?

3. GIS & Databases/Programming Languages

A. Databases

- Which do you use today?
- Which do you see yourself using in the near future?

B. Programming Languages

- Which do you use today?
- Which do you see yourself using in the near future?

4. GIS & Visualization

- Is this a big deal? Why?
- What are some leading tools for this?
- There are some pretty cool data-visualization/big-data/scientific data visualization tools out there…which ones have you seen or been amazed by?

5. GIS & Current Events (e.g. oil pipelines, planning & taxation, Translink referendum)

- Has GIS become an important tool in Canadian society? How and why?
- There have been lots of technological and natural disasters in Canada over the last year, so have GIS professionals played a role in these?

6. GIS Markets

- Mature or still innovating? Which markets?
- Where do you see GIS in the next 5 years?
- ~~Apple just had its 30 year anniversary, how much has GIS changed in the same period?~~

7. GIS and the Masses

- Unleashing geospatial to the public at large: scary or powerful?
- What is the role of the GIS professional amongst the masses?
- Should we be concerned about those with little or no training on map projections, precision and accuracy, or spatial analysis conducting analyses with their newly discovered tool?

8. Need for coding & scripting

- Is there an oversupply or undersupply of programmers in GIS?
- Is there an oversupply or undersupply of script writers in GIS?
- Which GIS tools still need to be built?

9. GIS & BIM

- How close is GIS to “building modelling”?
- Should there be any convergence?

10. GIS & land surveying

- Are land surveyors left out of the GIS game?
- What impact is the Integrated Cadastral Information Society having
  - on GIS?
  - on the Land Titles Office?

11. GIS & civil engineering

- How close is GIS to major construction planning and design?
- Should there be any convergence?

12. GIS & Transfer / Markup Languages

- Which do you use today?
- Which do you see yourself using in the near future?

13. GIS & Apple

- Is Apple trying to patent 40-year-old GIS methods? See http://patents.stackexchange.com/questions/5658/interactive-map-is-apple-trying-to-patent-40-year-old-gis-methods-patent-ap
- What GIS tools are available for the Mac?
- What ones should be made available?

Topics 8-13 added by Martin Feuchtwanger