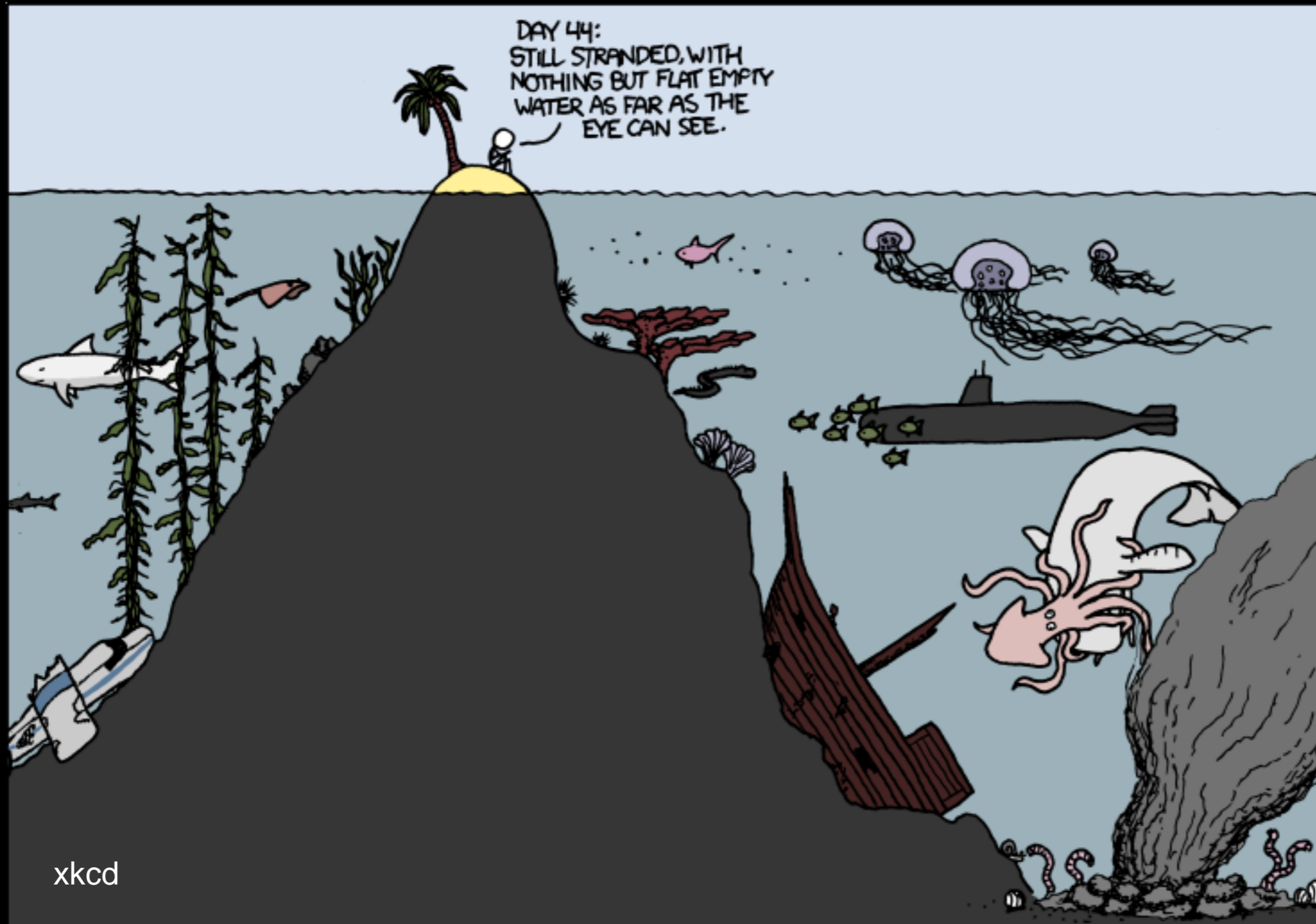


Situating Knowledge On The Landscape

Expert and Citizen Science, Games, and Community

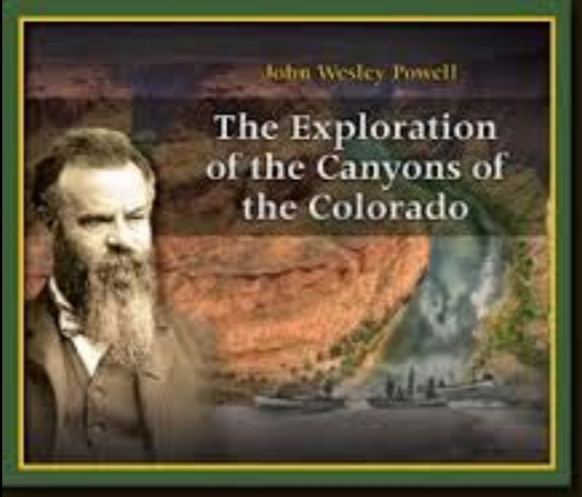


Rob Harrap, Shaun O'Connor, Matthew Ondercin, Jean Hutchinson (Queens)
Sylvie Daniel (Universite Laval)

Expert science



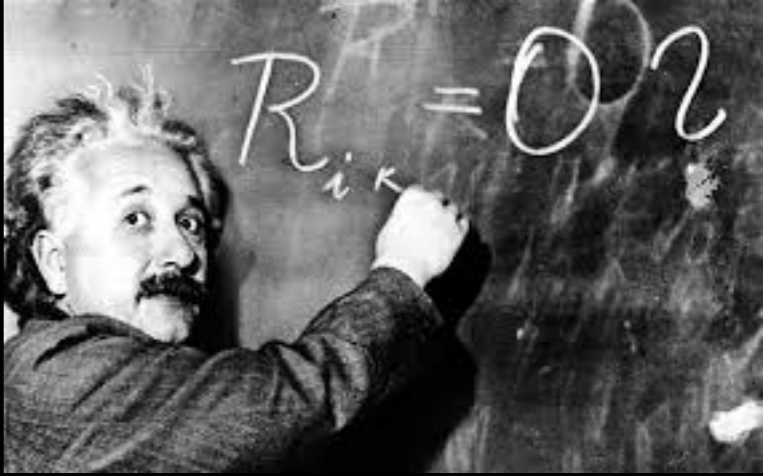
wikipedia



usgs



u. toronto



the guardian

Citizen science and public participation in expert science



audobon.org
association of zoo aquariums



Engagement

High

Low

games?

?

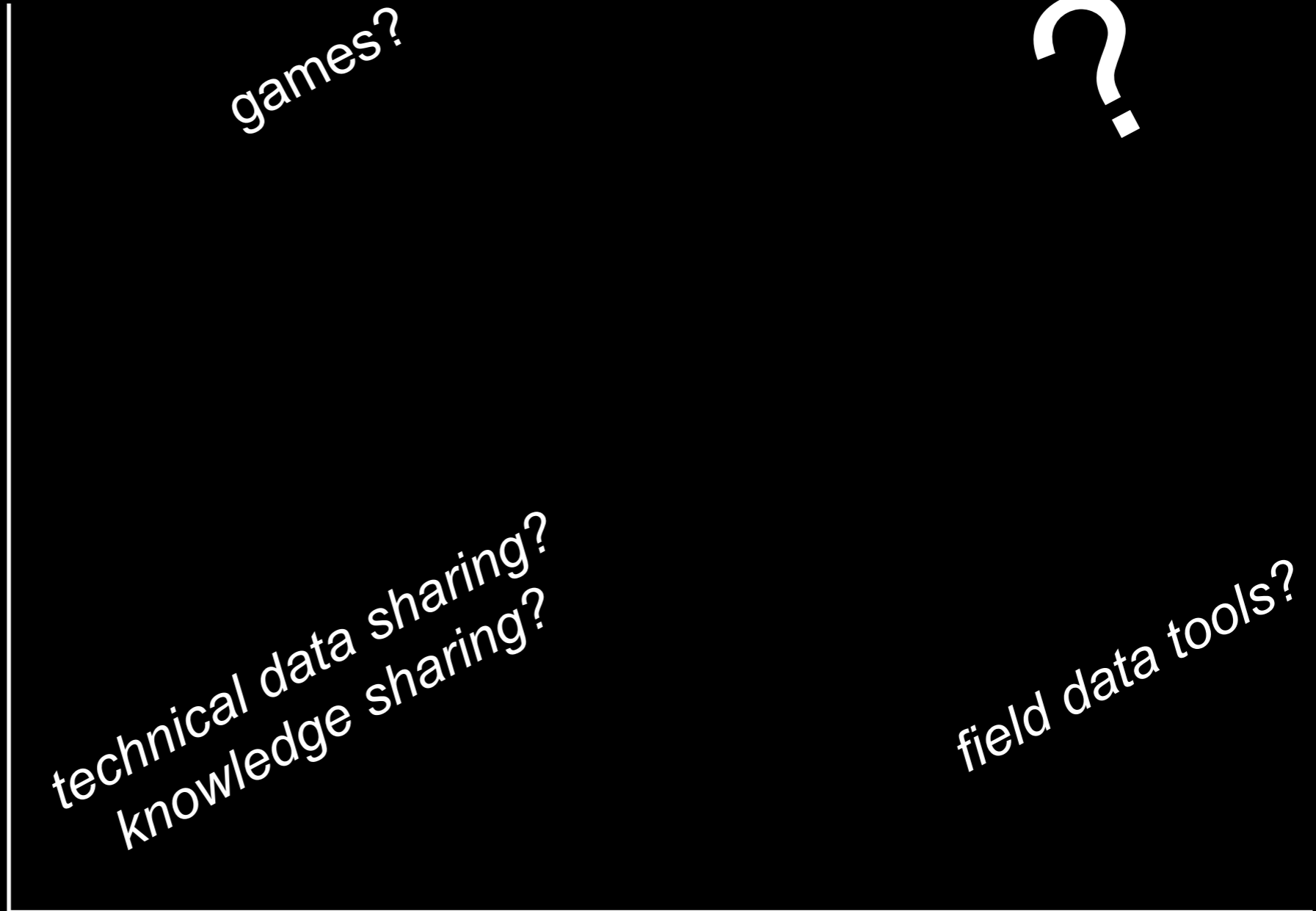
technical data sharing?
knowledge sharing?

field data tools?

Mostly Existing

Data

Mostly New



Engagement

High

Low

Mostly Existing

Data

Mostly New

te hreexaminer.com



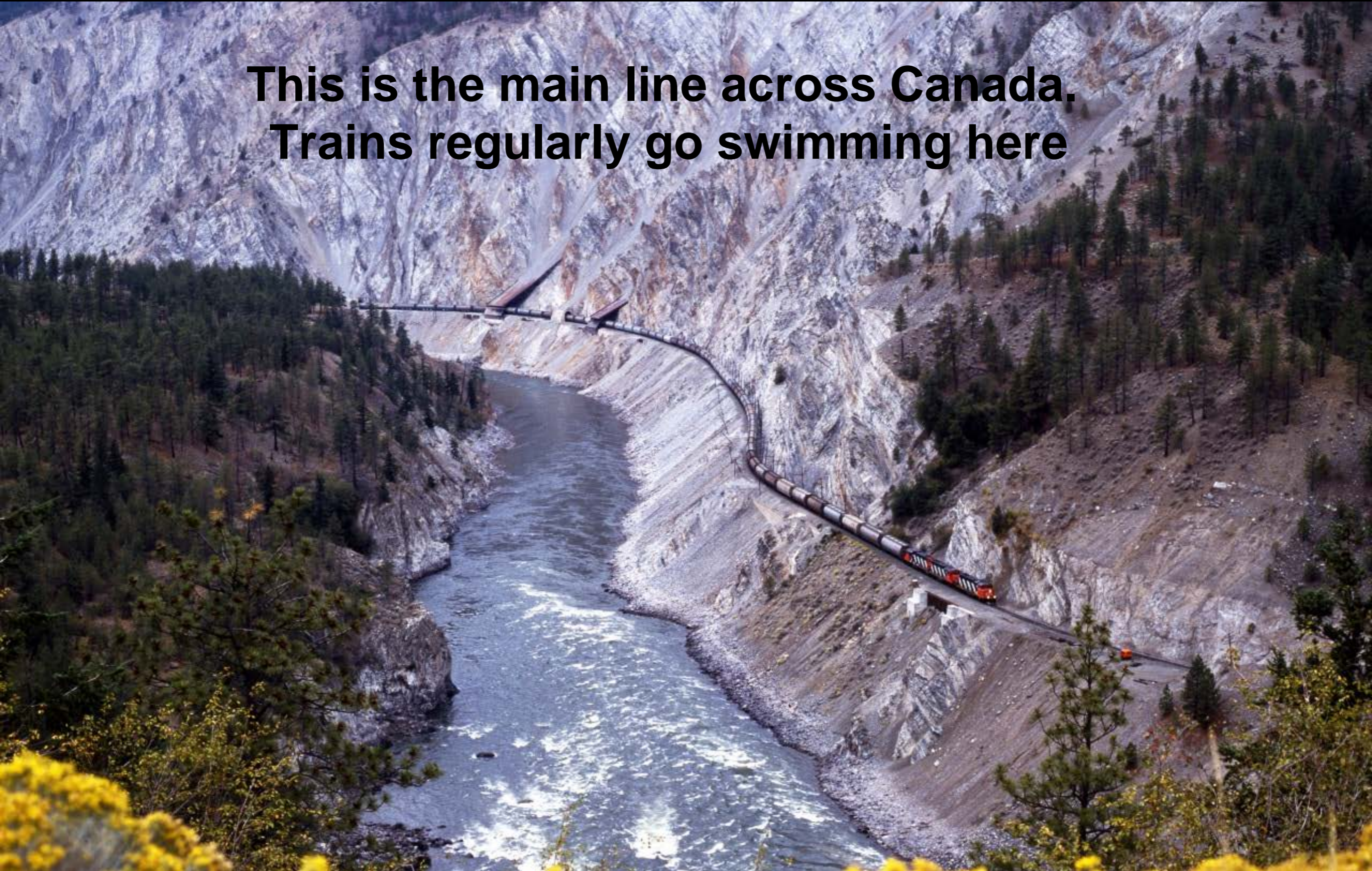
Tools?

Queen's Geotechnical Engineering Group



Queen's Geotechnical Engineering Group

**This is the main line across Canada.
Trains regularly go swimming here**



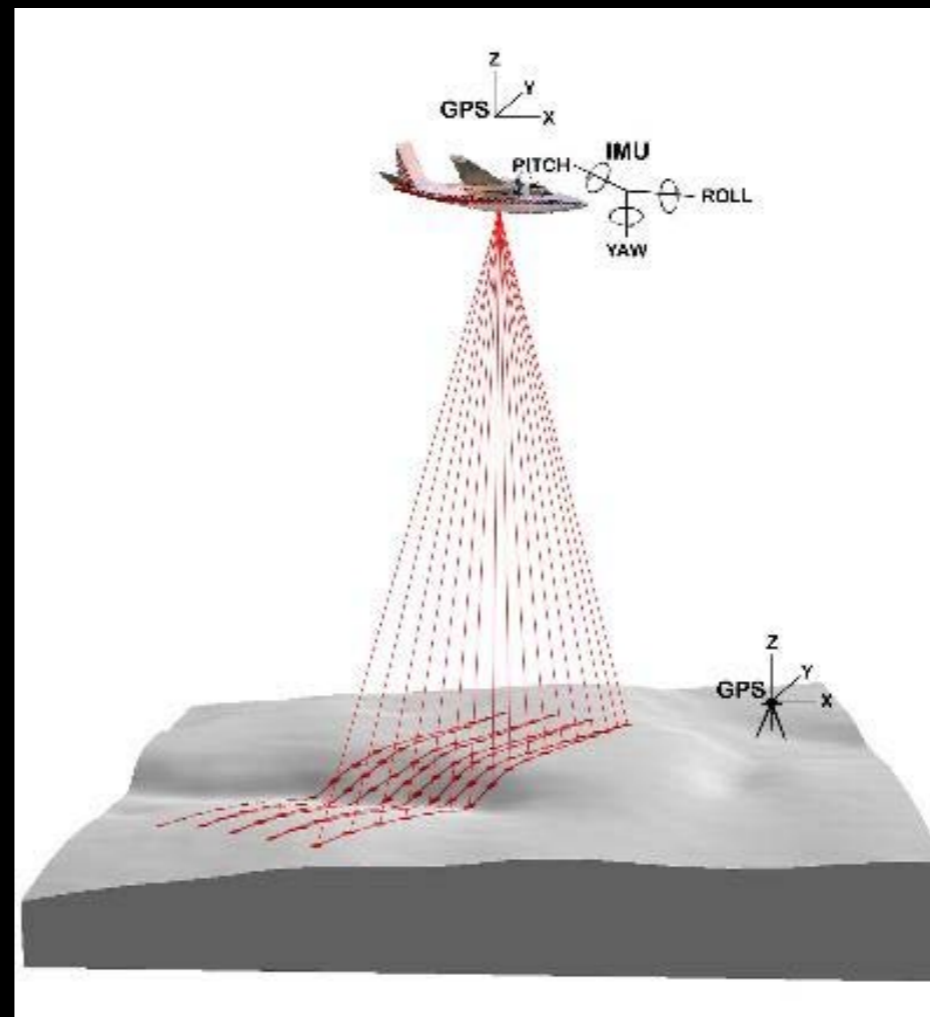


Study properties of the rock slopes and faces without

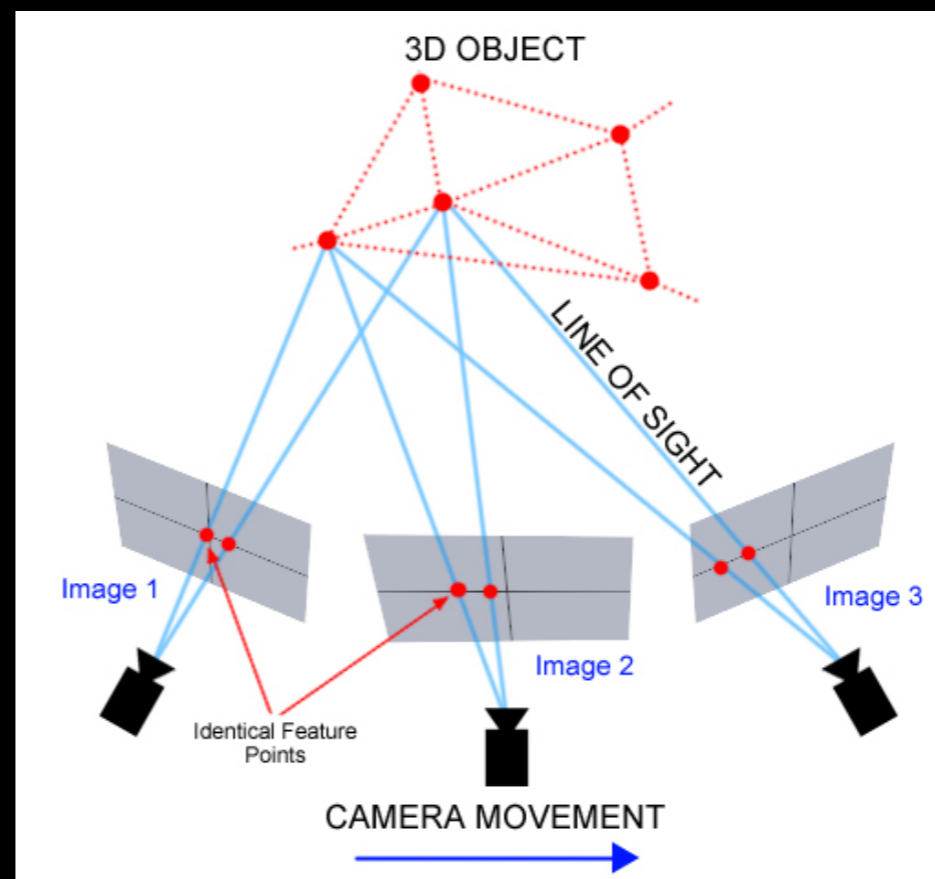
1. putting anyone at risk
2. hugely biasing data towards easy access area
3. shutting down operations for long periods



Lidar



Photogrammetry



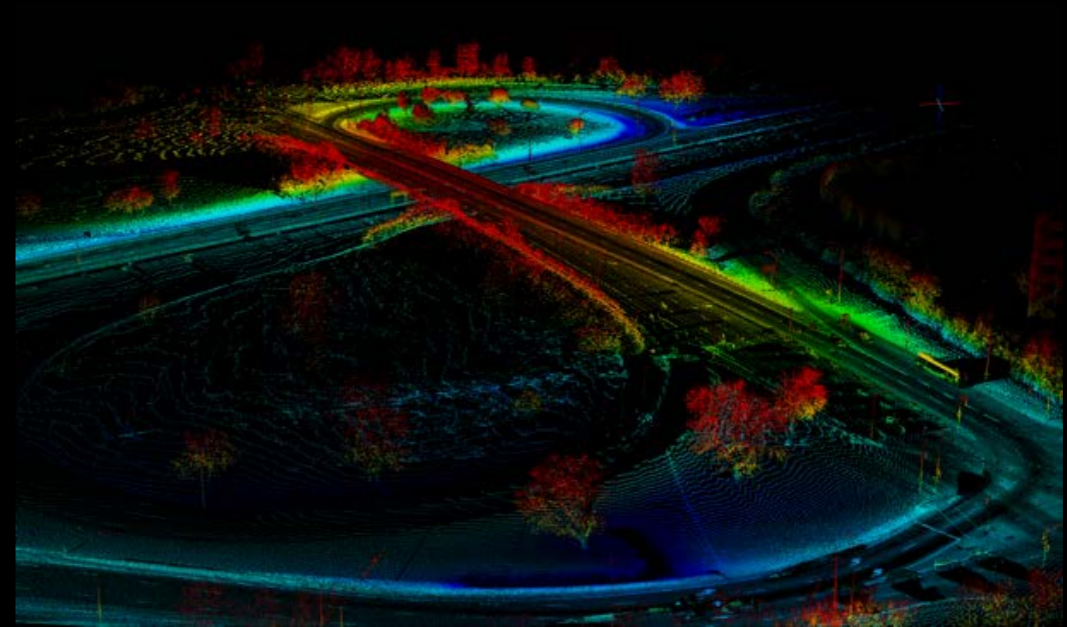


Airborne - fast, but view angle not great for geology

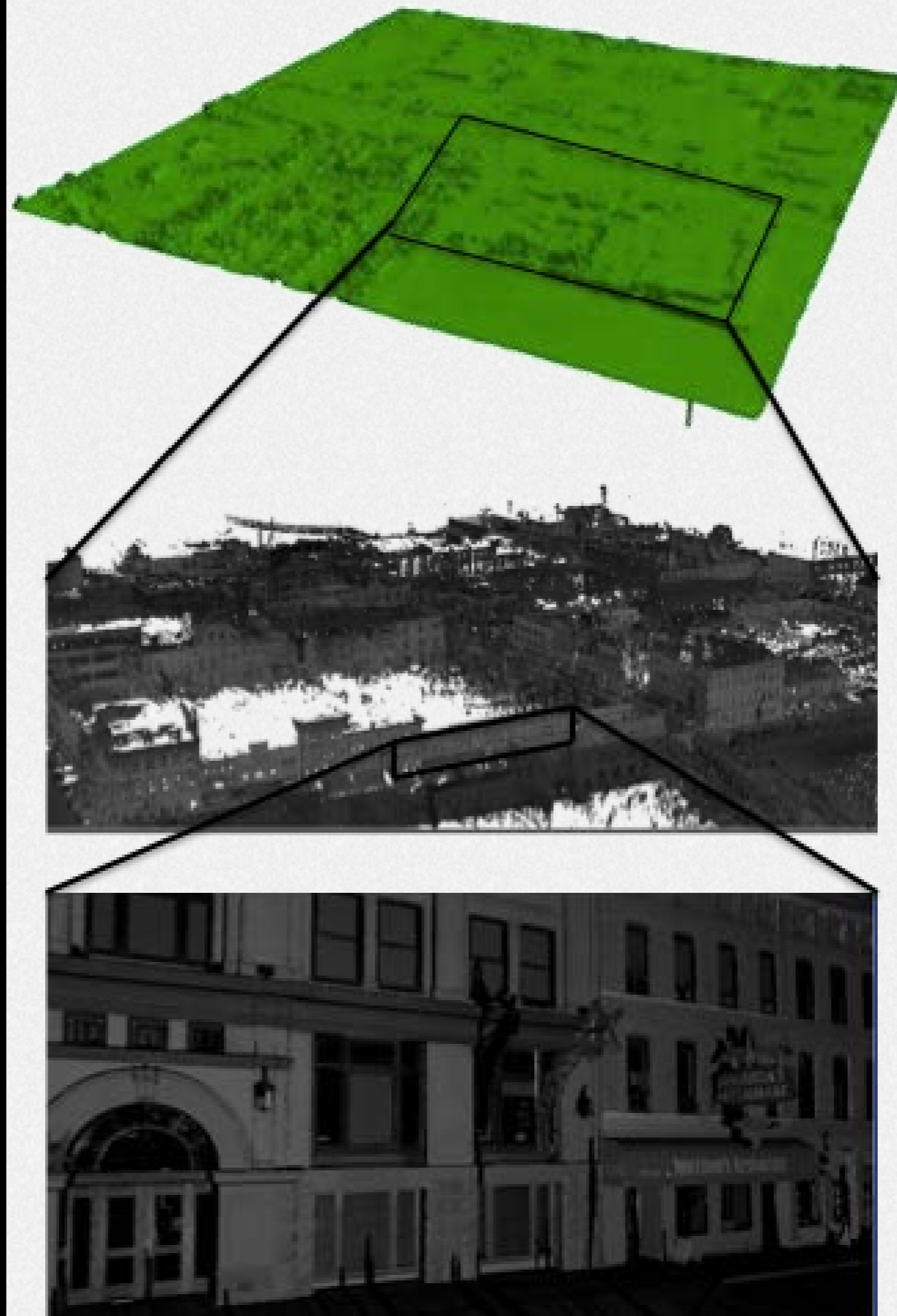
Static terrestrial - good view angle, but... slow

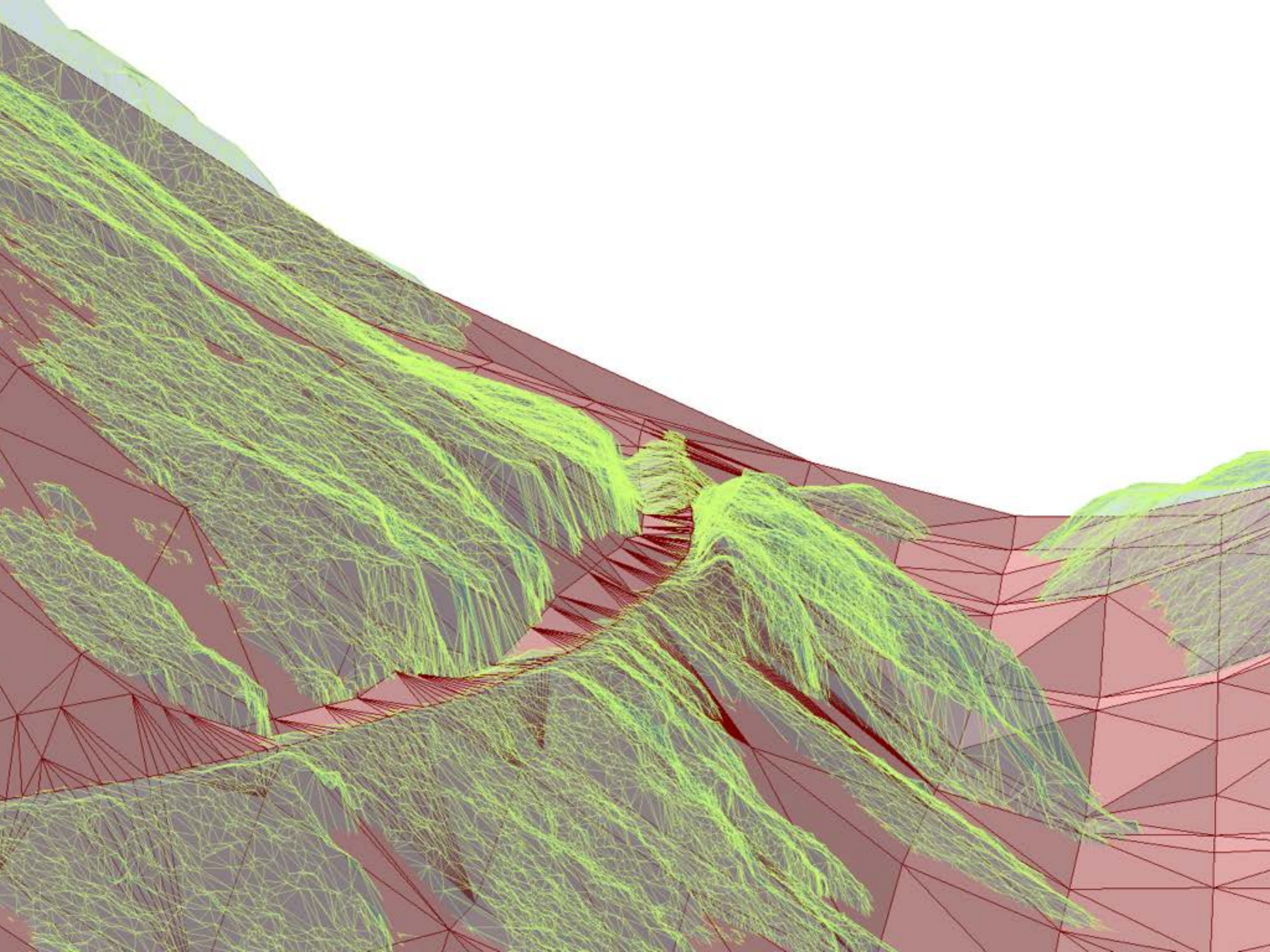


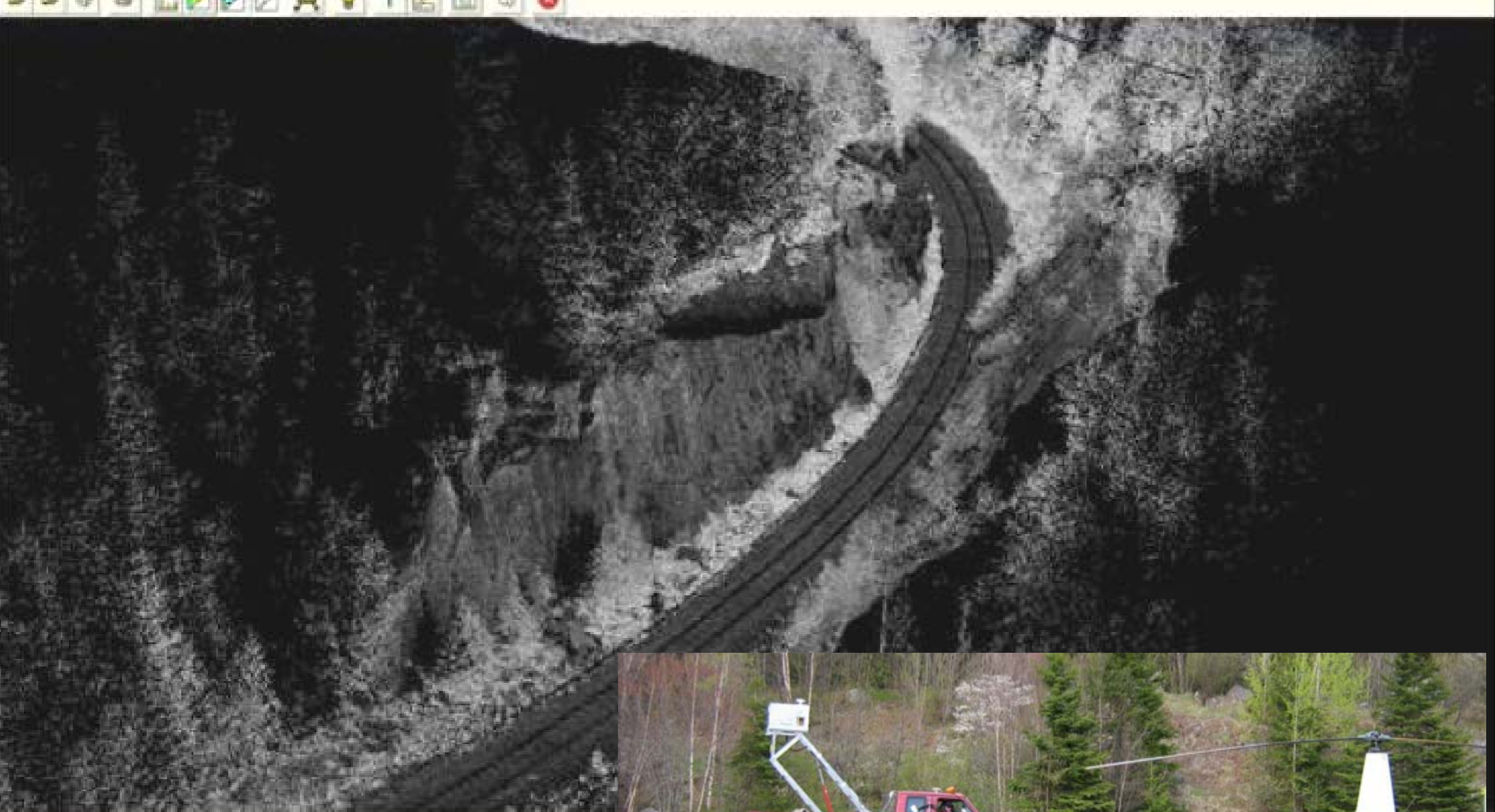
Mobile Terrestrial Lidar = more data collection, sooner



Work with Terrapoint Titan - first mobile system, first research users

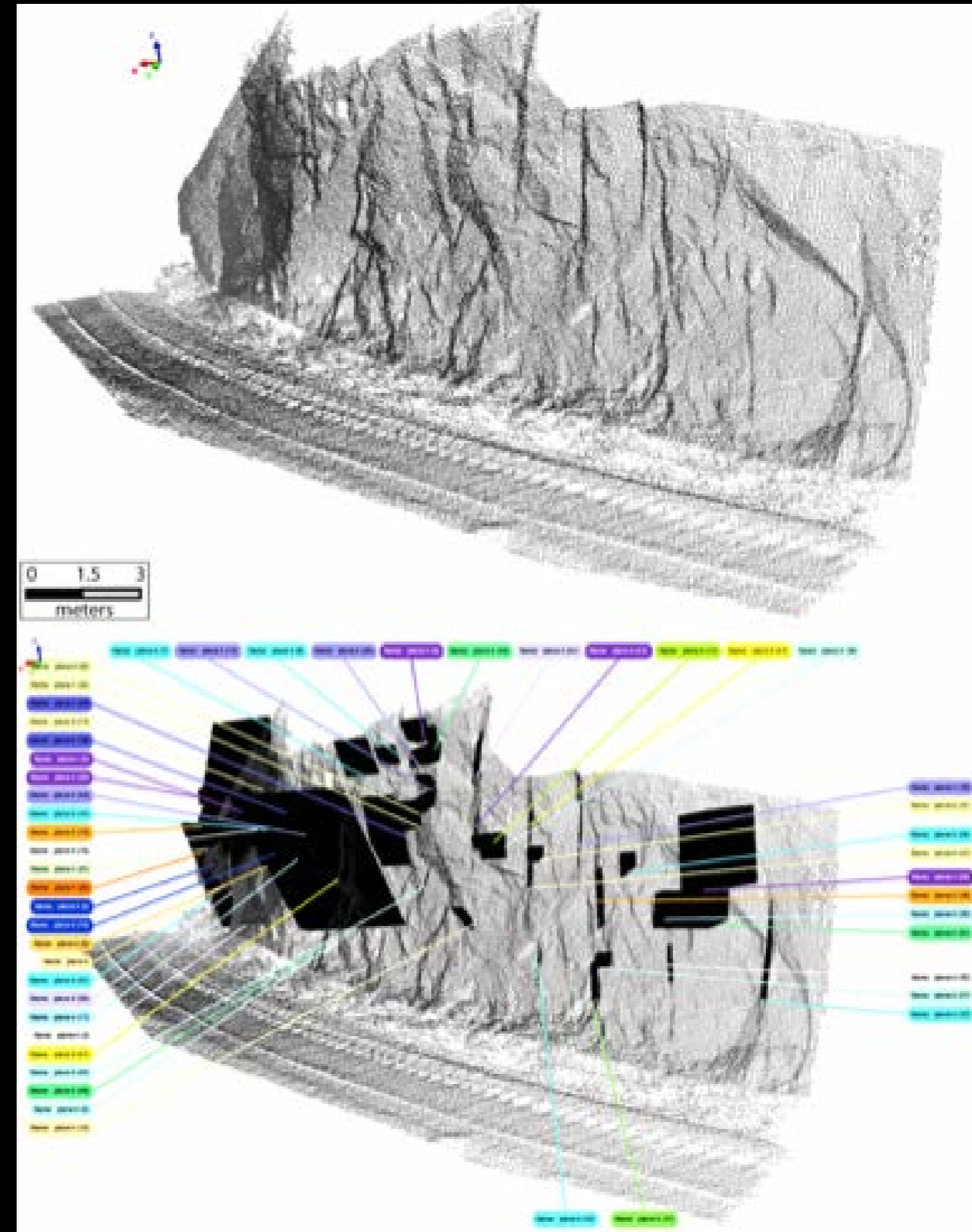
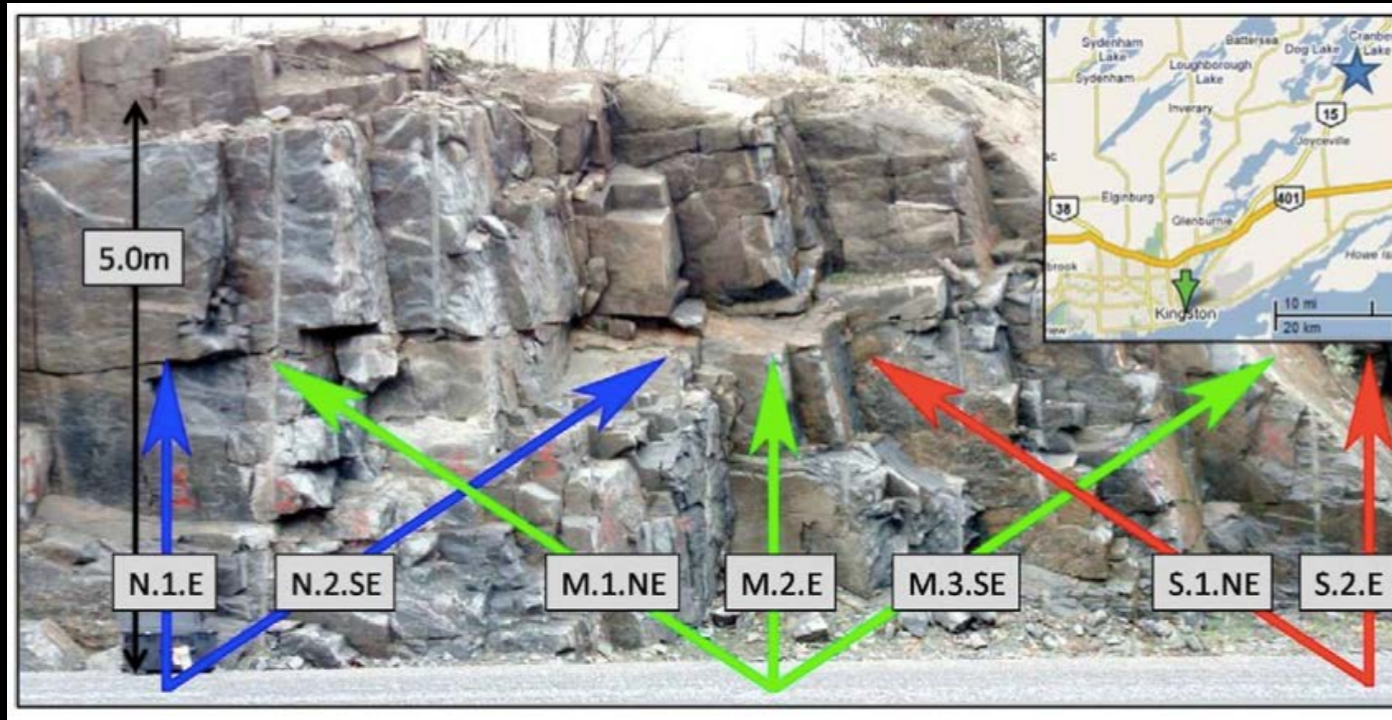




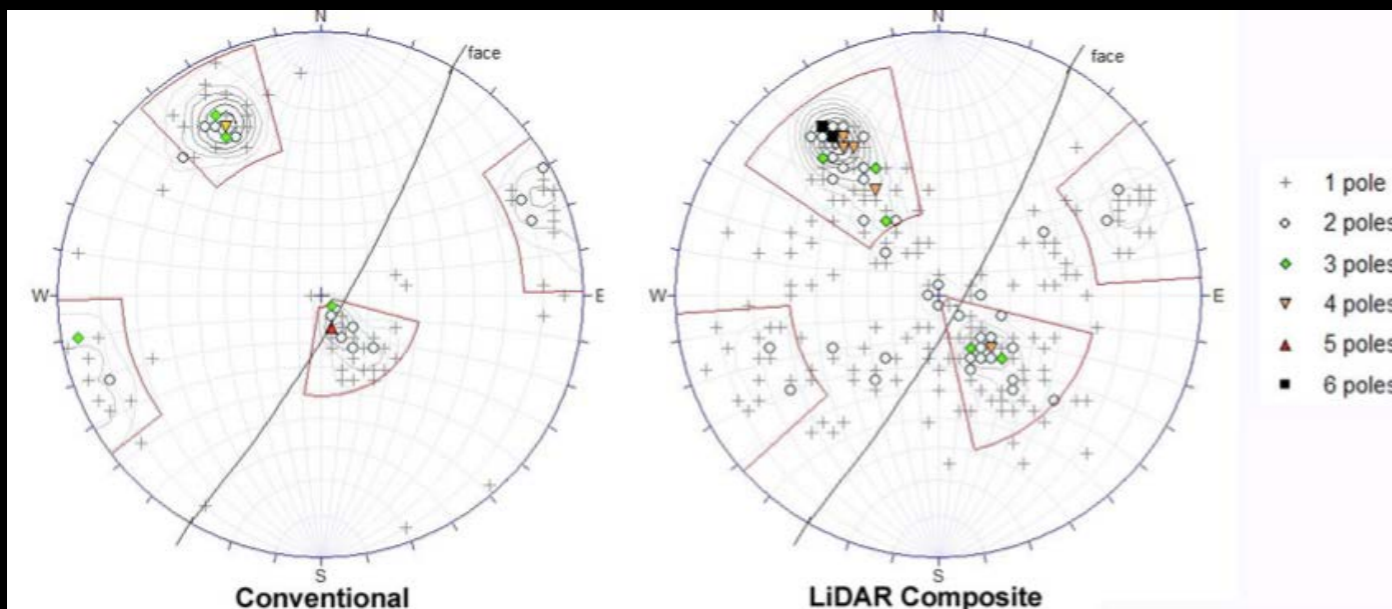


Empty part Camera 10:47:52, 10:47:52, 10:47:52 map_to_Planet_4.jpg





Matt Lato, Queen's PhD
 Structural Discontinuity Mapping with
 Mobile and Static Lidar



FIELD DATA COLLECTION SYSTEMS FOR RAILWAY GROUND HAZARD RESEARCH

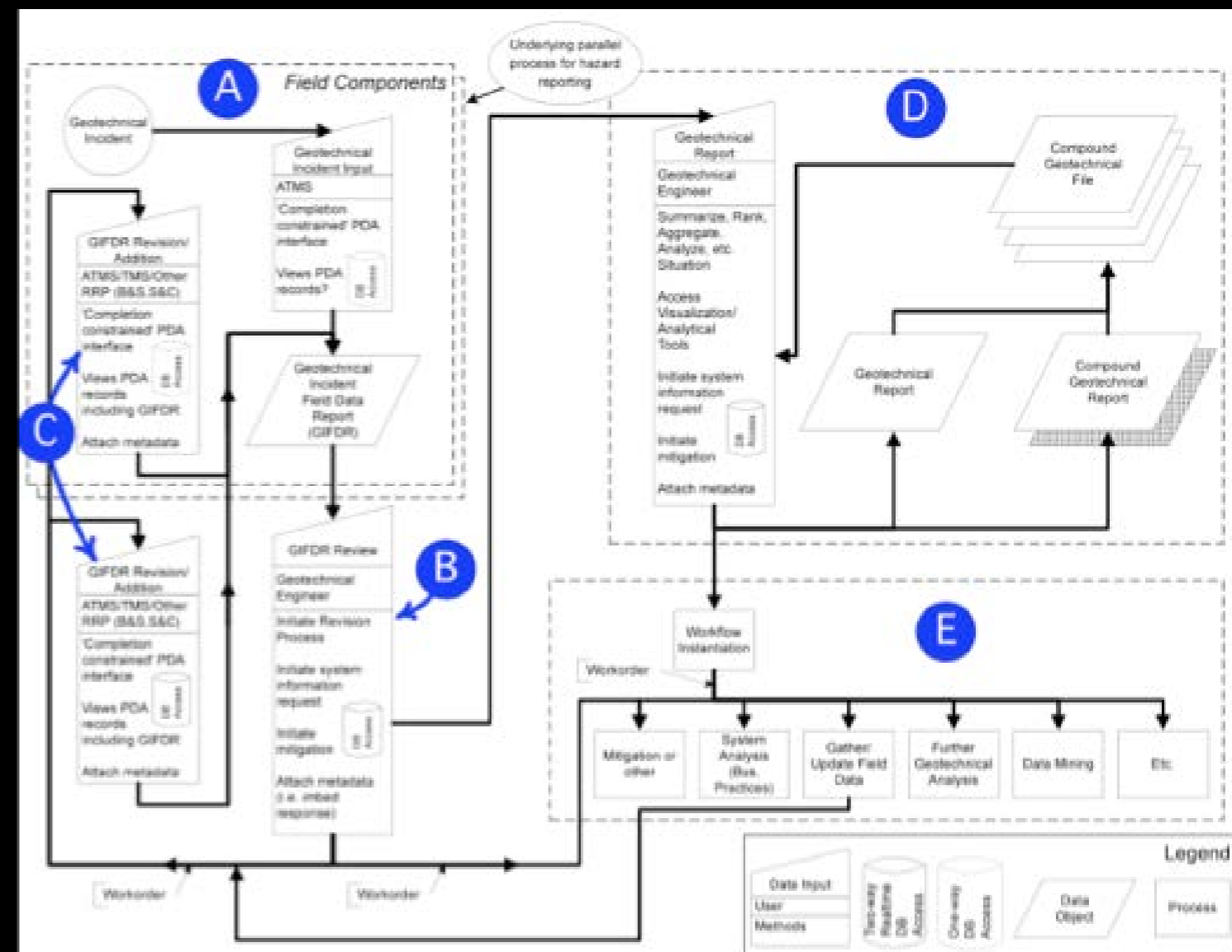
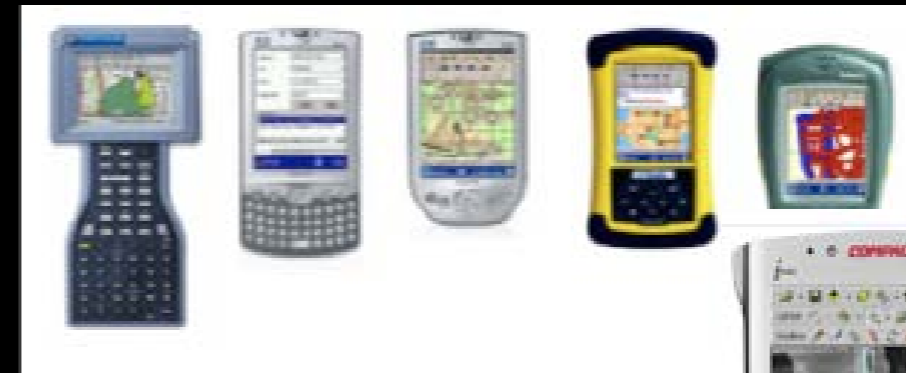


RGHRP TECHNICAL REPORT

Rob Harrap
Craig Sheriff
Queen's University GIS
Laboratory

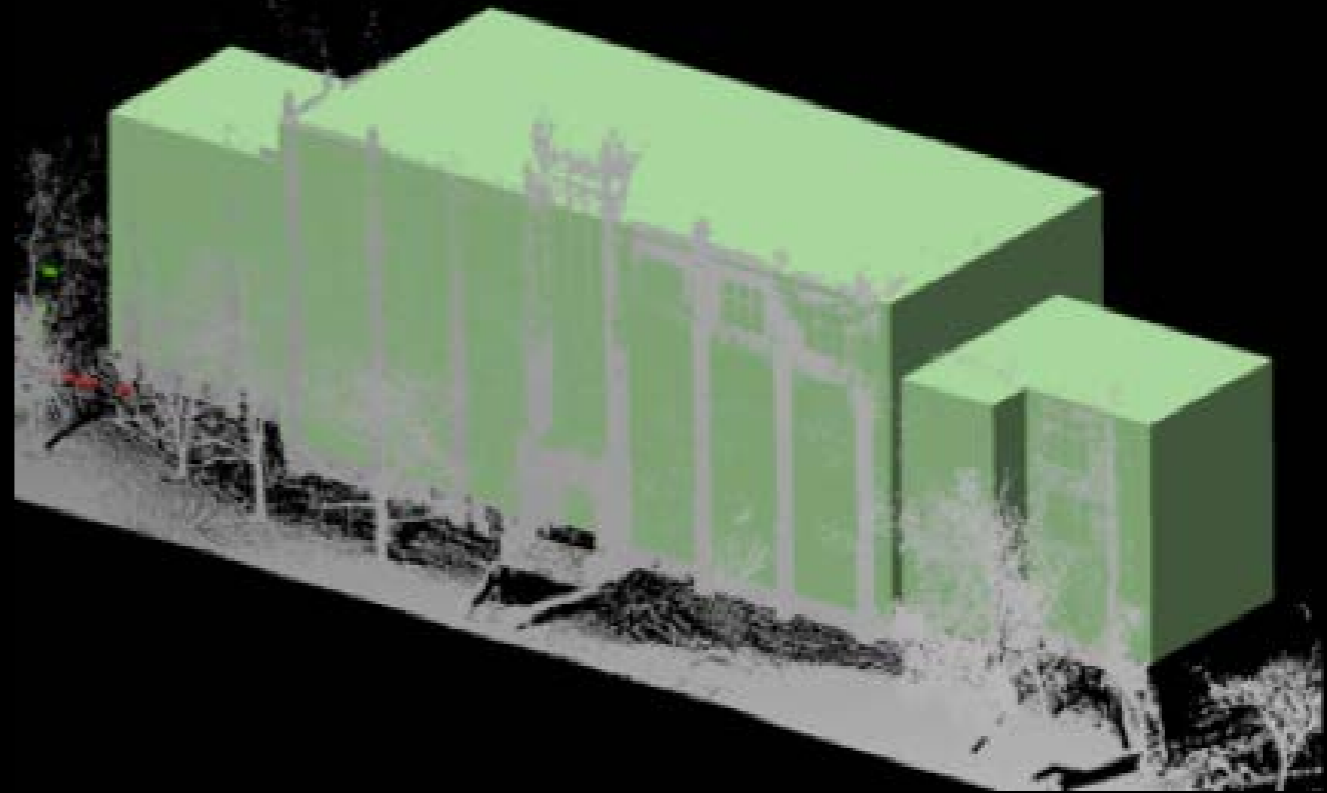
October 2004

Field Data Collection Systems - RGHRP Technical Report

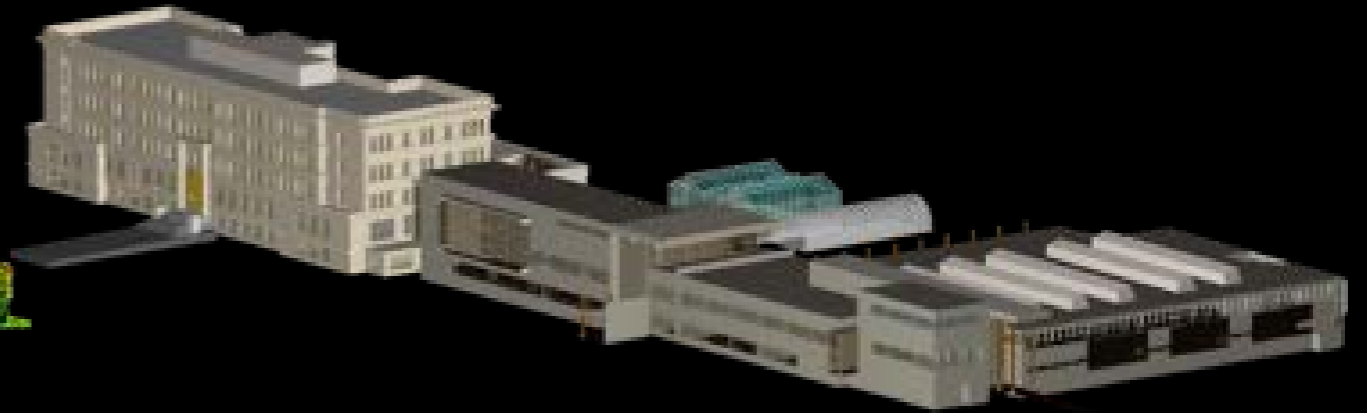
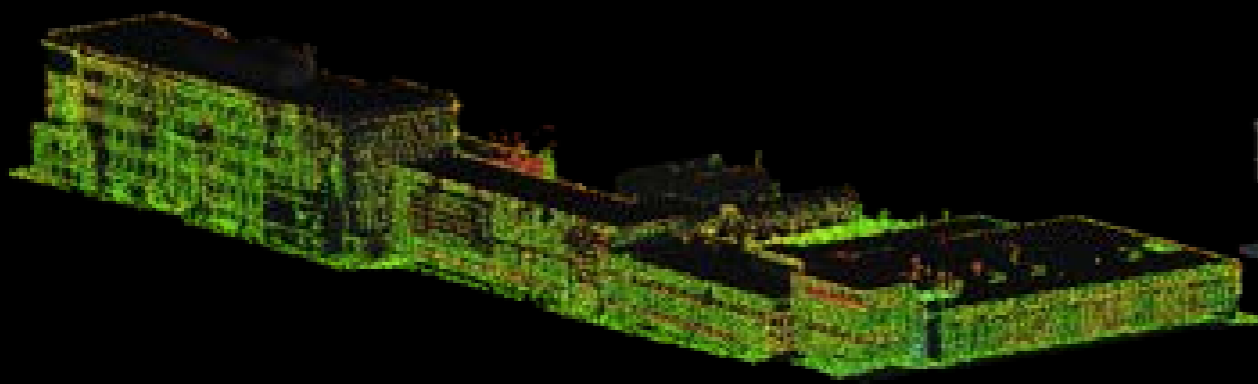


Urban data with mobile, too!





Sketchup makes model building easy
Sketchup with mobile lidar data is both accurate and easy



Once you have a model, ... why not use it!

Solar - PV - energy retrofits - greening the city - ...

and

Video games set in real urban spaces

Modelling solar PV potential from lidar



High : 4.36
Low : 0

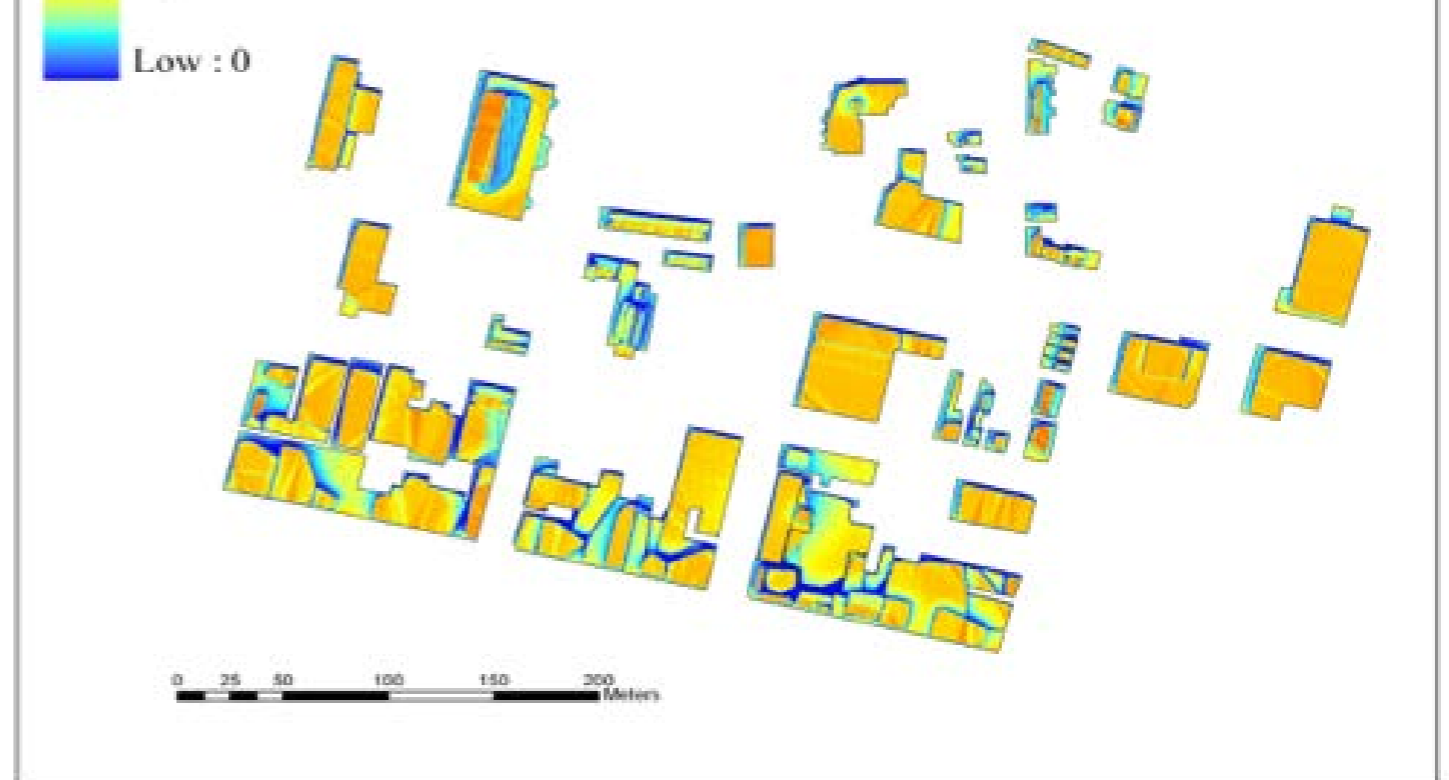
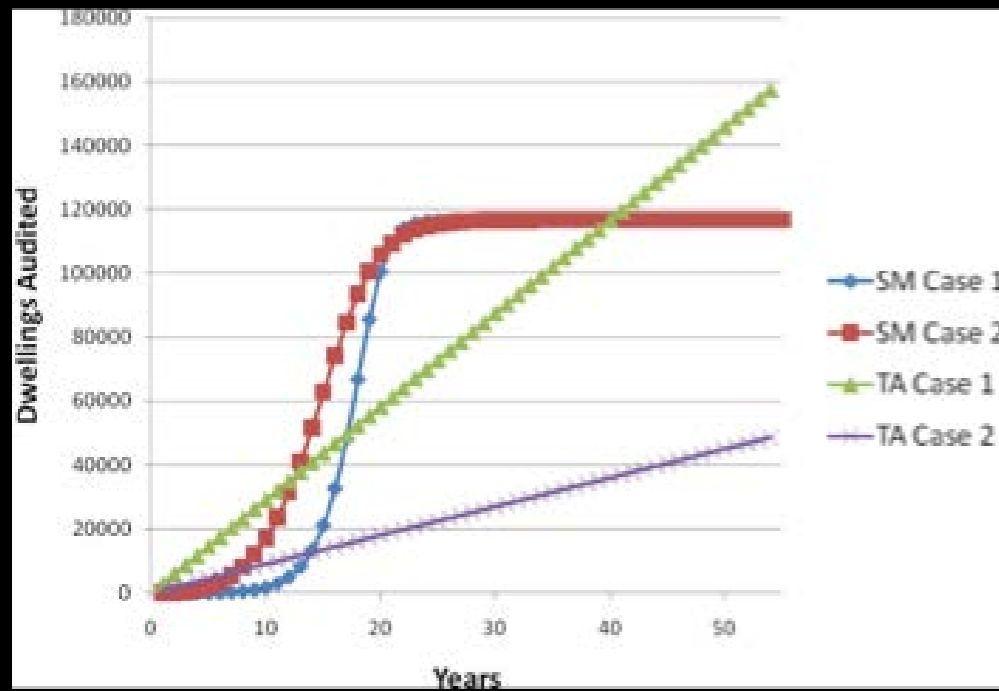


Fig.5.6: Annual daily irradiation on roof top for a simulation at 0.55m resolution



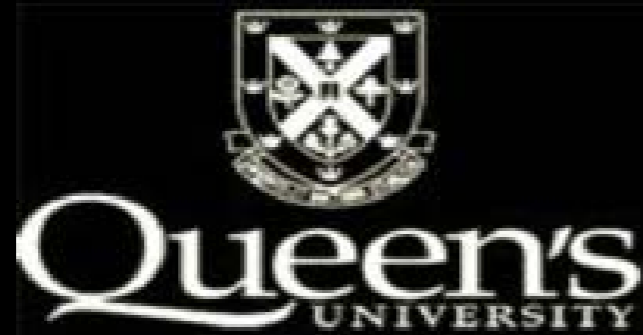
Or, without the lidar, put people on-site with mobile tools and have them do quick, template-directed retrofit models

Games set in real spaces



Serious Games





Tab - switch units
Right-click - Move
Left-click - Attack
F - Fix/Sprint
V - Restore View

Warcraft 3 engine hack
Written by a high school
student and a 1st year.
Energy, geology,
game design
profs offered advice

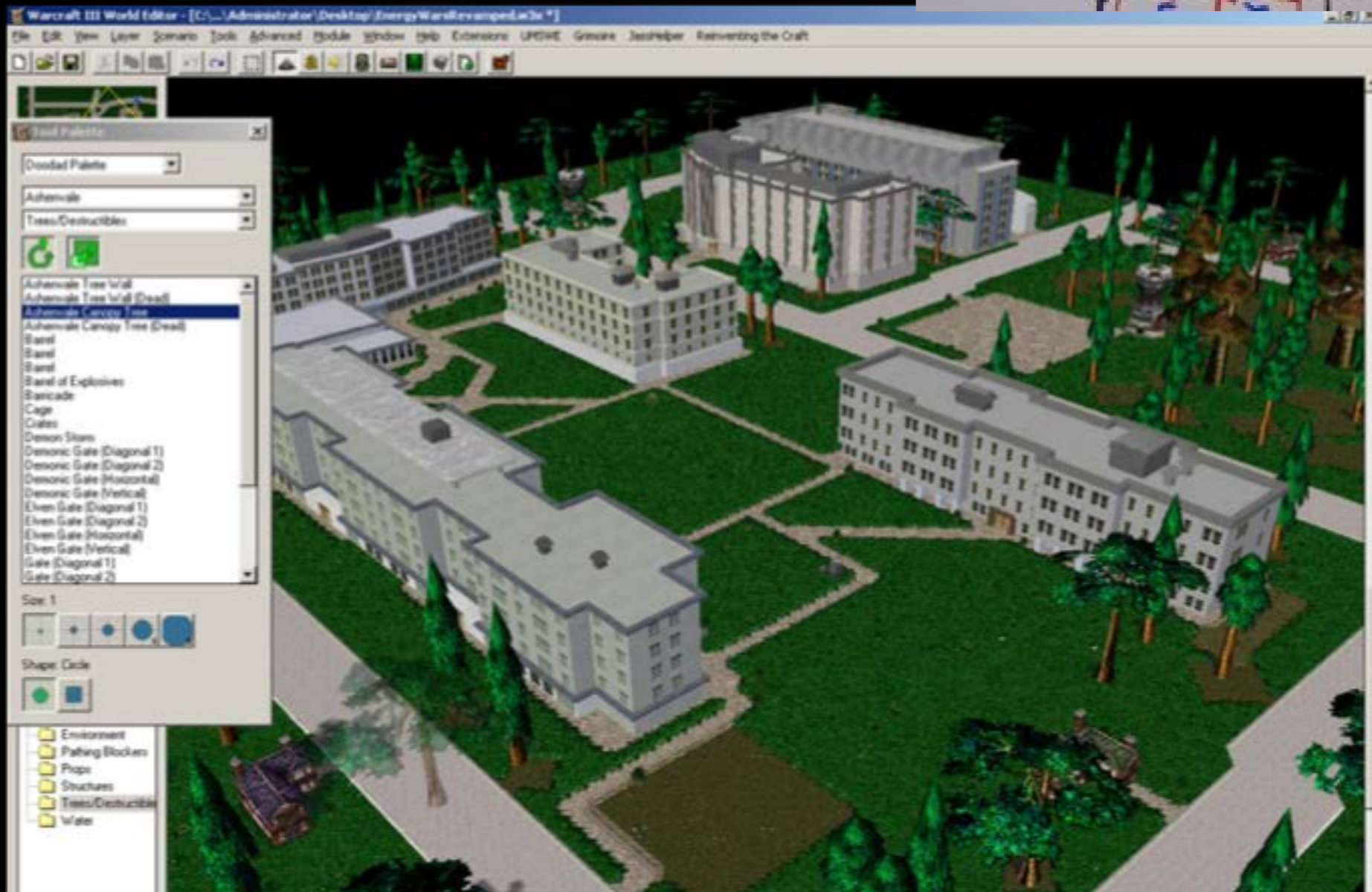


PRESS ANY KEY TO CONTINUE

Energy Wars - Rise of the Chimera

educational goals - learn intuitive sense of cost-benefit of energy retrofits

Runner up in world serious games contest





-55

-56

Currently Viewing... Morris Hall

Morris Hall was built as part of the great residence-building boom in the late 1950s and early 1960s. It is named after Honorable William Morris, a founder of Queen's, first chair of Queen's Board of Trustees and a member of legislative council of Upper Canada.

- Lights On: 116
- Computers On: 116
- Heating: 0
- Lighting: 0
- Solar: 0
- Water: 0
- Resp.(Lights): 0
- Resp.(Computers): 0
- Upgrading...

You earned \$136!

Install Hot Water Heaters (A)

160

Solar water heaters are a cost-effective way to generate hot water for your building. They can be used in any climate, and the fuel they use—sunshine—is free.



900 / 900

Morris Hall

Armor: 5



SERIOUS GAMES
SHOWCASE & CHALLENGE

NAVY USMC AIR FORCE ARMY INDUSTRY

ENTER YOUR GAME BASED TRAINING AND EDUCATION APPLICATION IN FRONT OF TOP GAMING, SOFTWARE AND SYSTEM INTEGRATOR COMPANIES

ENTER YOUR GAME BY SEPTEMBER 15

4 DISTINCT CATEGORIES: STUDENT, INDIVIDUAL / SMALL BUSINESS, LARGE BUSINESS, GOVERNMENT

UP TO 12 AWARDEES AT I/TSEC '09

www.itsec.org

INTER-SERVICE/INDUSTRY TRAINING, SIMULATION & EDUCATION CONFERENCE

Visit: www.sgschallenge.com for detailed information

Questions: sgschallenge@gmail.com

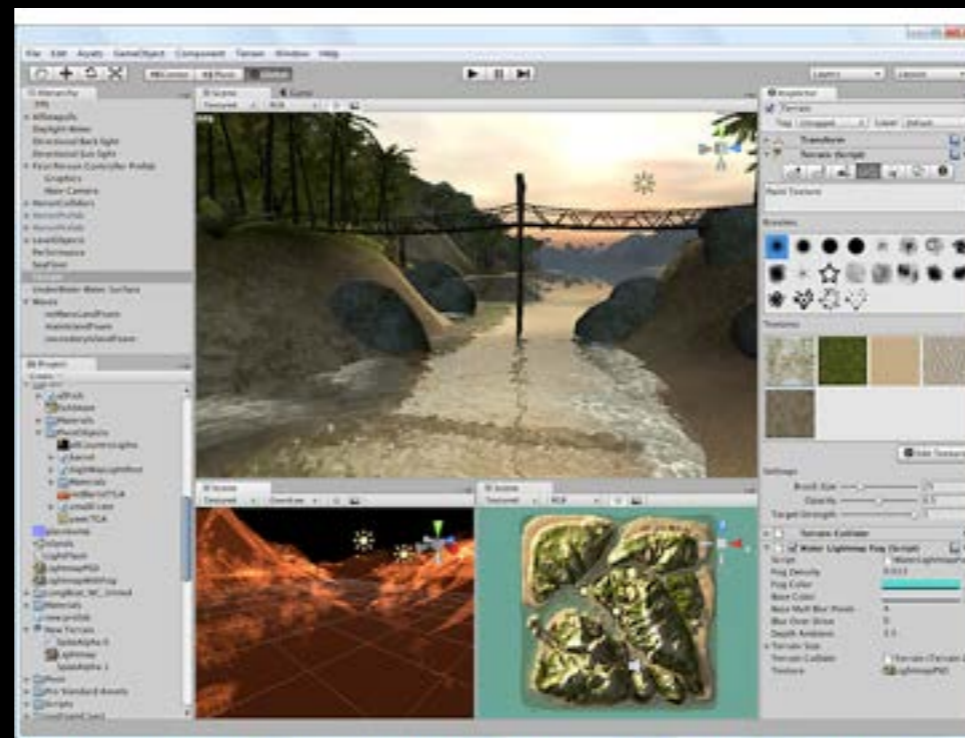
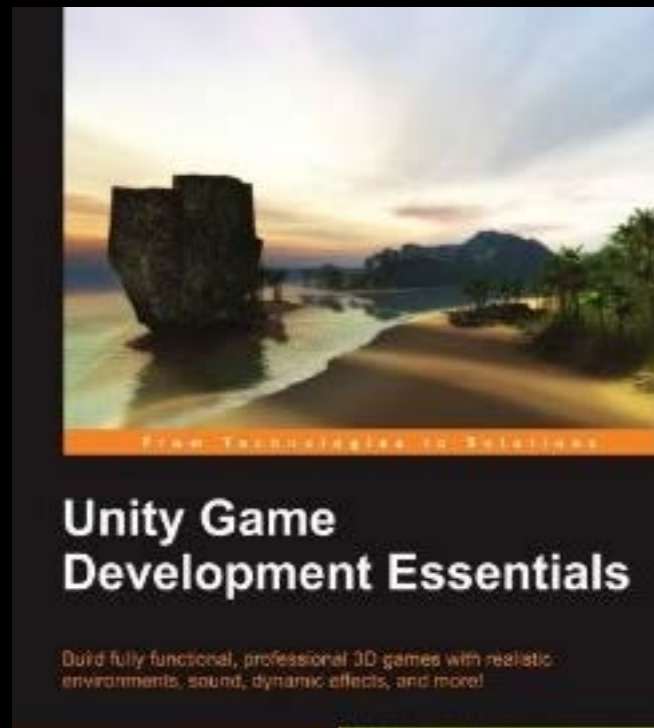
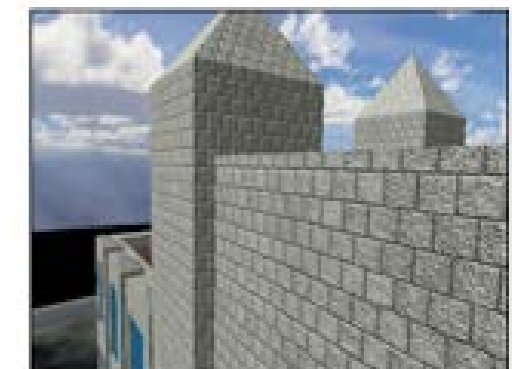
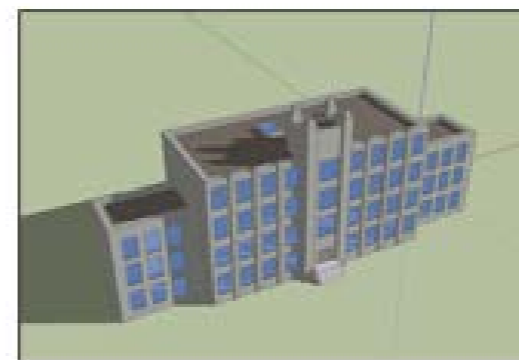
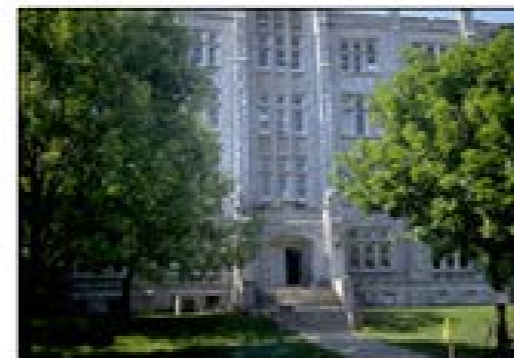
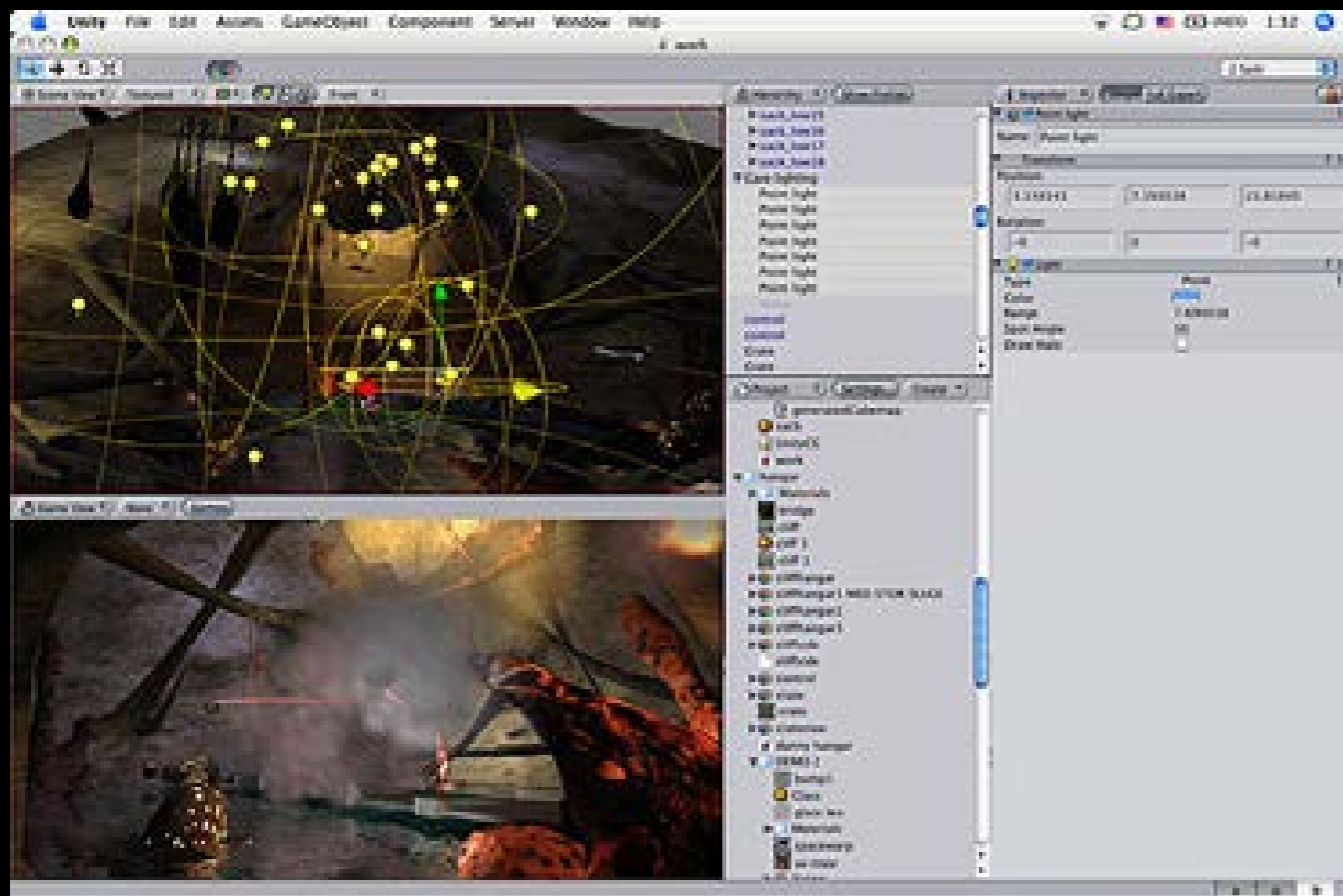
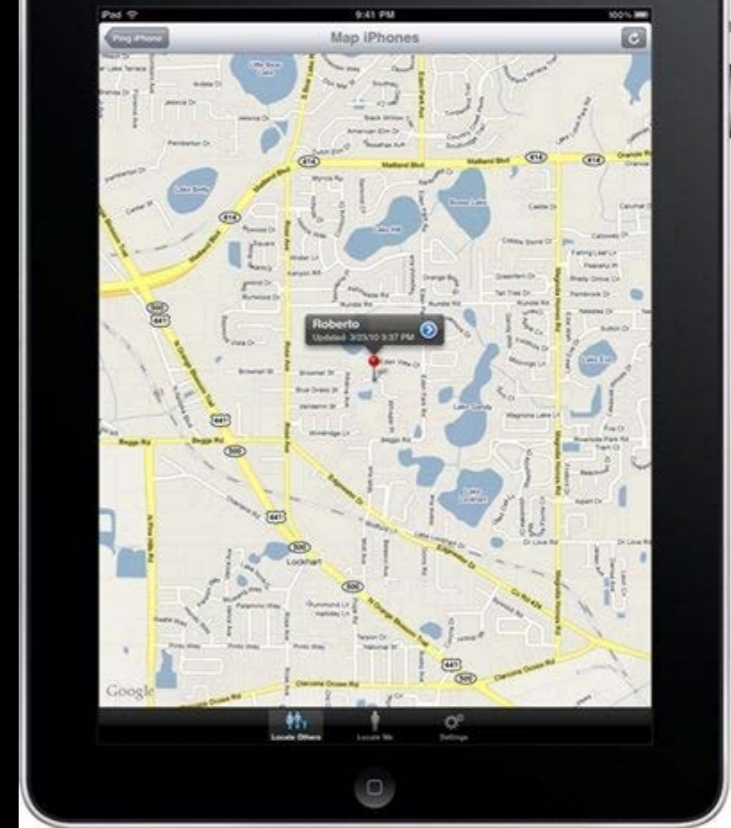


Figure 1: An in-editor screenshot of a demo scene with assets, scripts, graphics shaders, and more



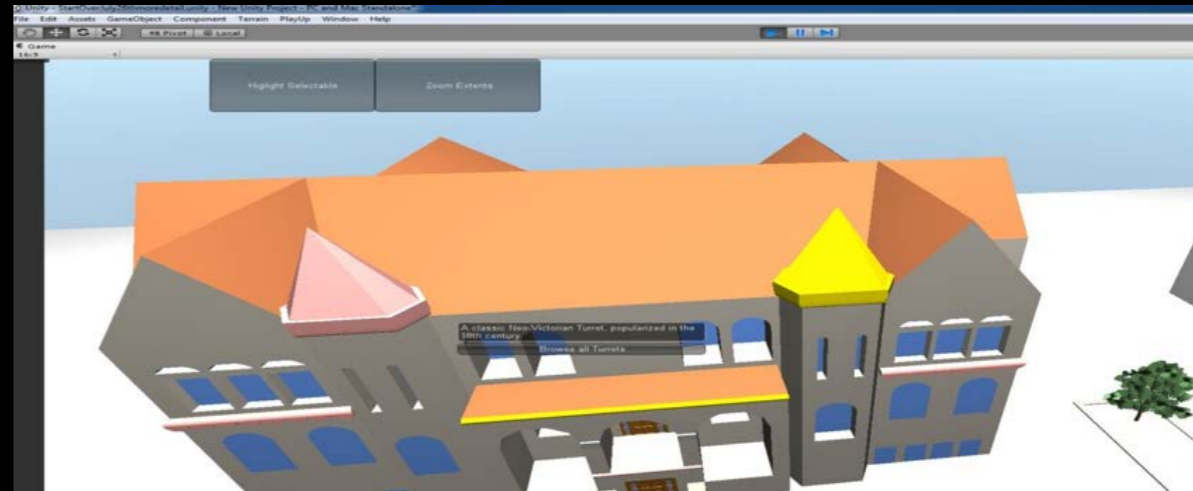


Situated Interaction

Real world



Game World of same area



www.shutterstock.com

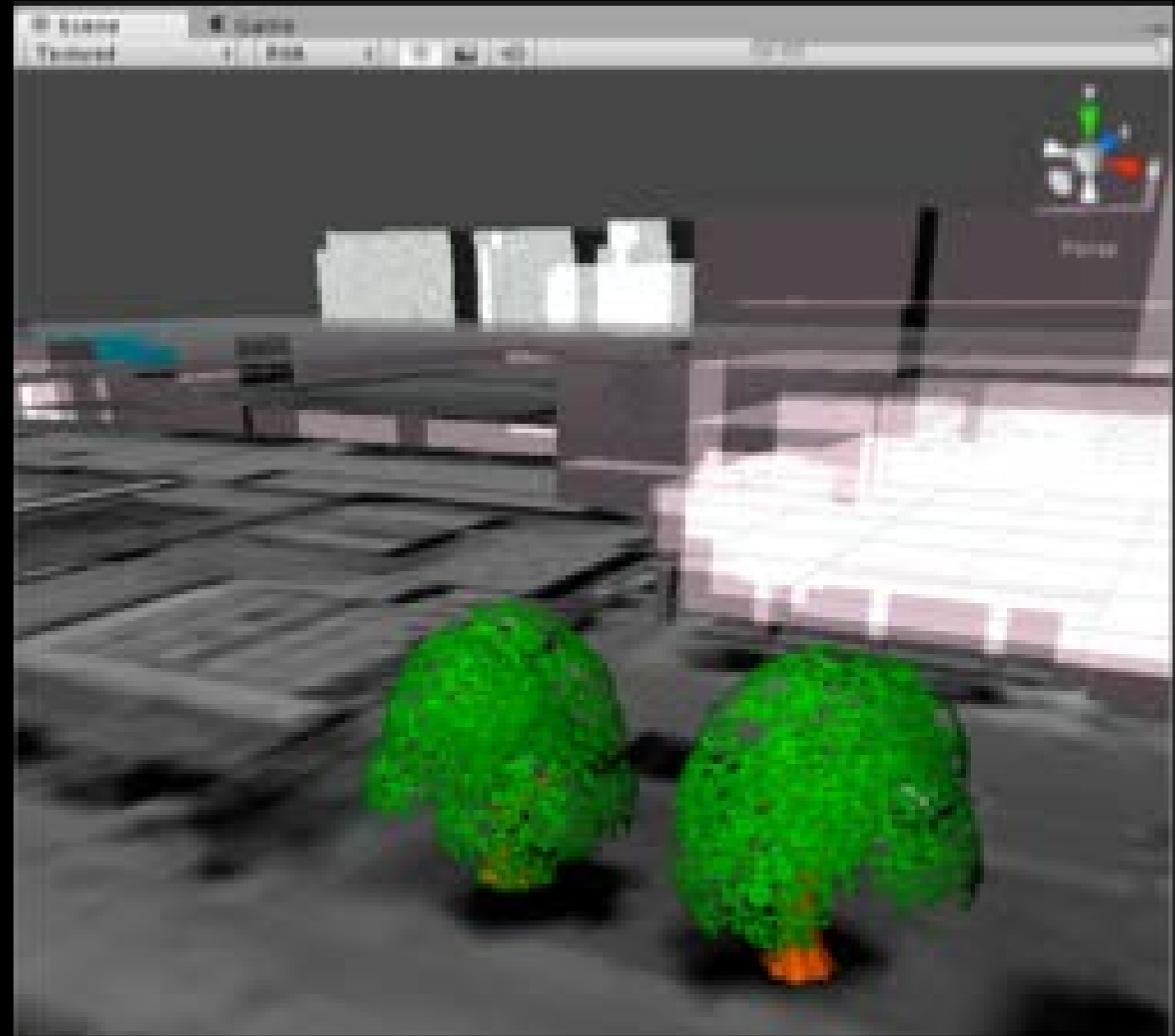


As you walk in the real world
Your ipad synchronizes your
position on a map

or

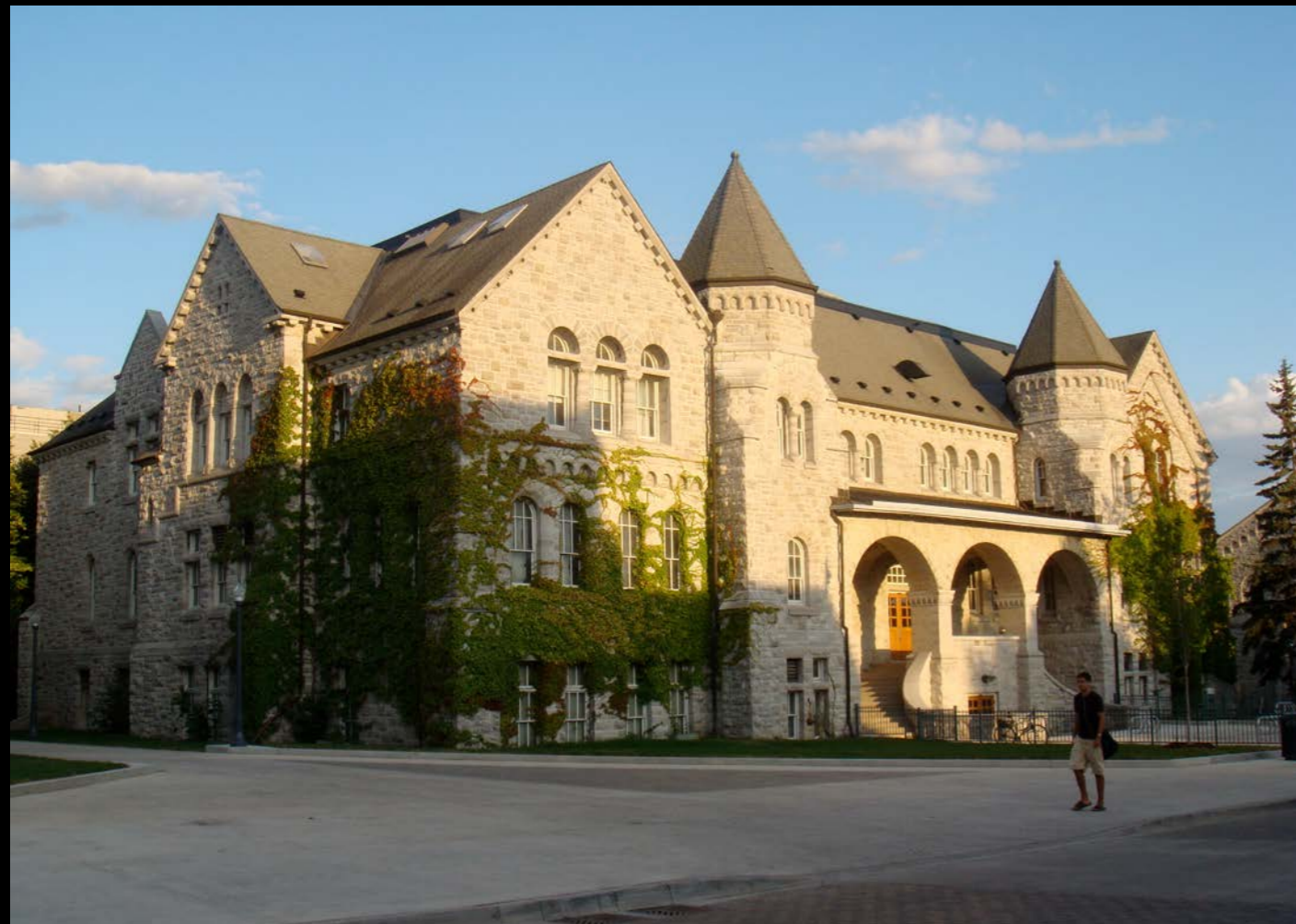
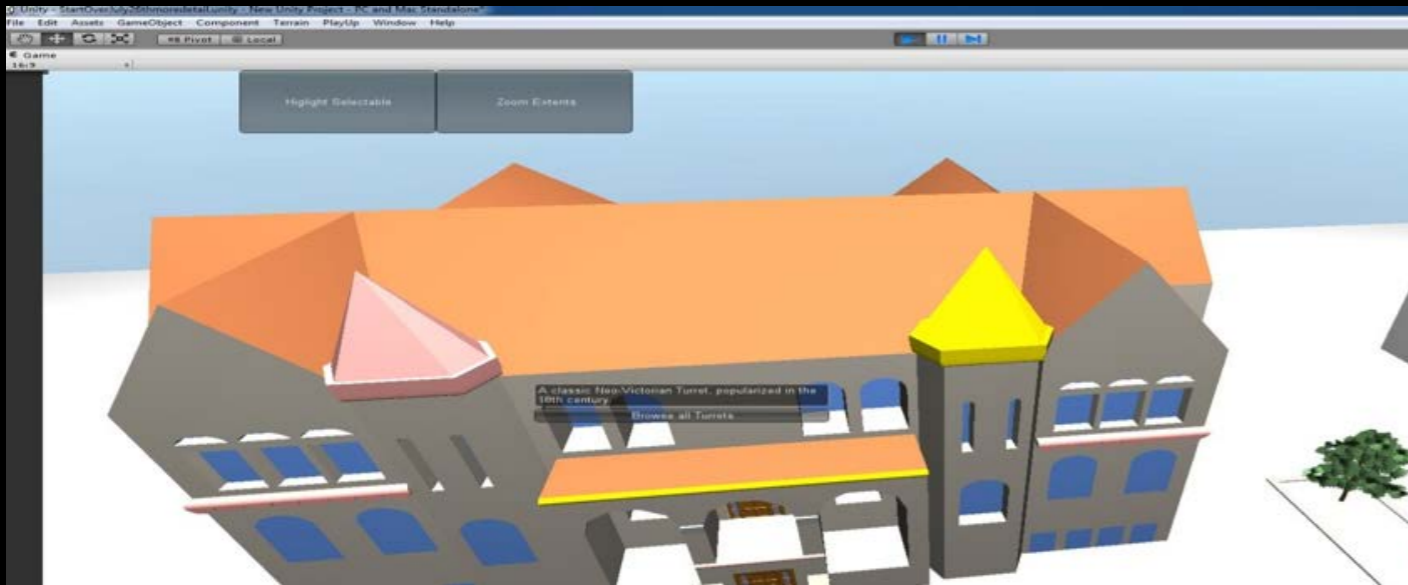
As you walk in the real world
Your ipad shows a synchronized
and oriented view into a game
world

viewing a local environment and making the ground invisible so



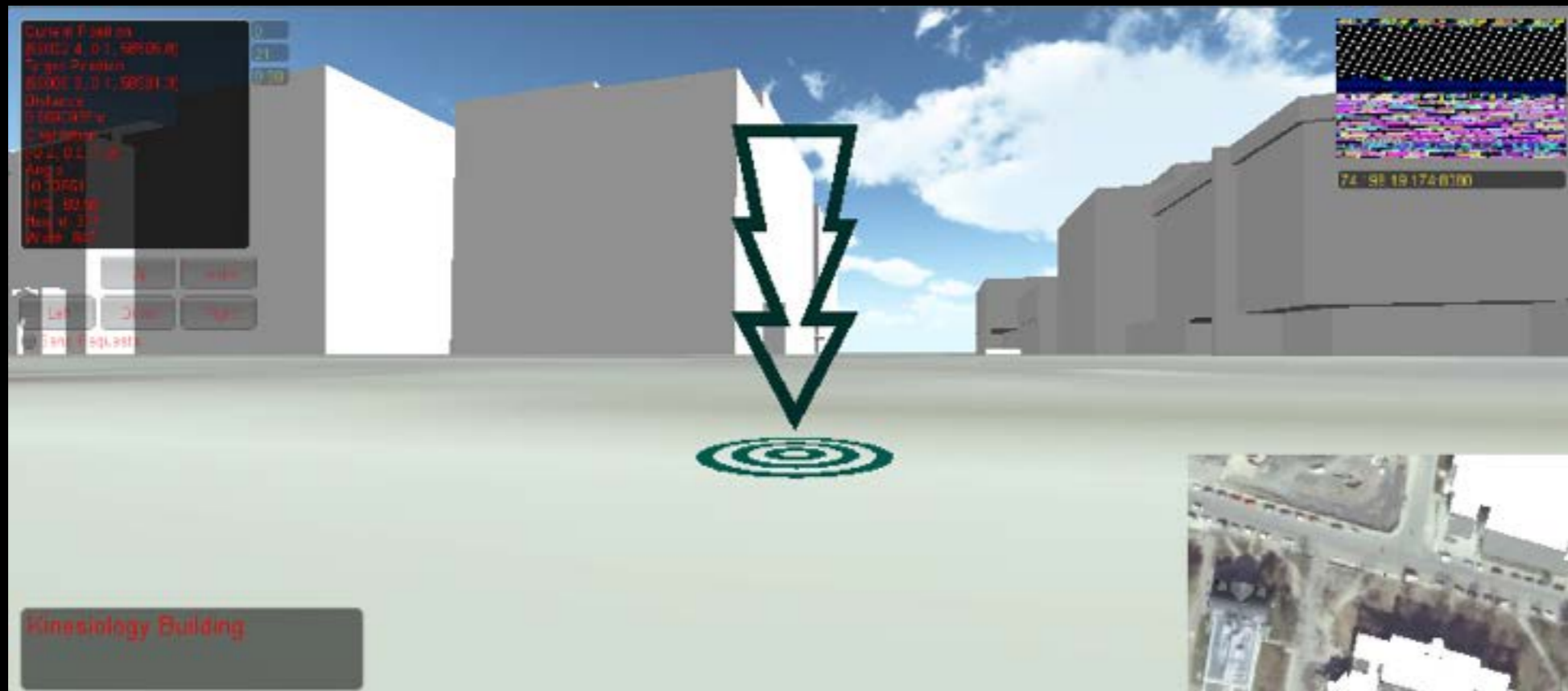
Queen's and Laval campus Unity worlds with buried infrastructure model and transparency for all buildings

Synchronized worlds also allow live building 'edits'
(visualizing alternative energy-saving modifications)





Sending a robot out to collect data and paste it into a game world
(reversing the situatedness)

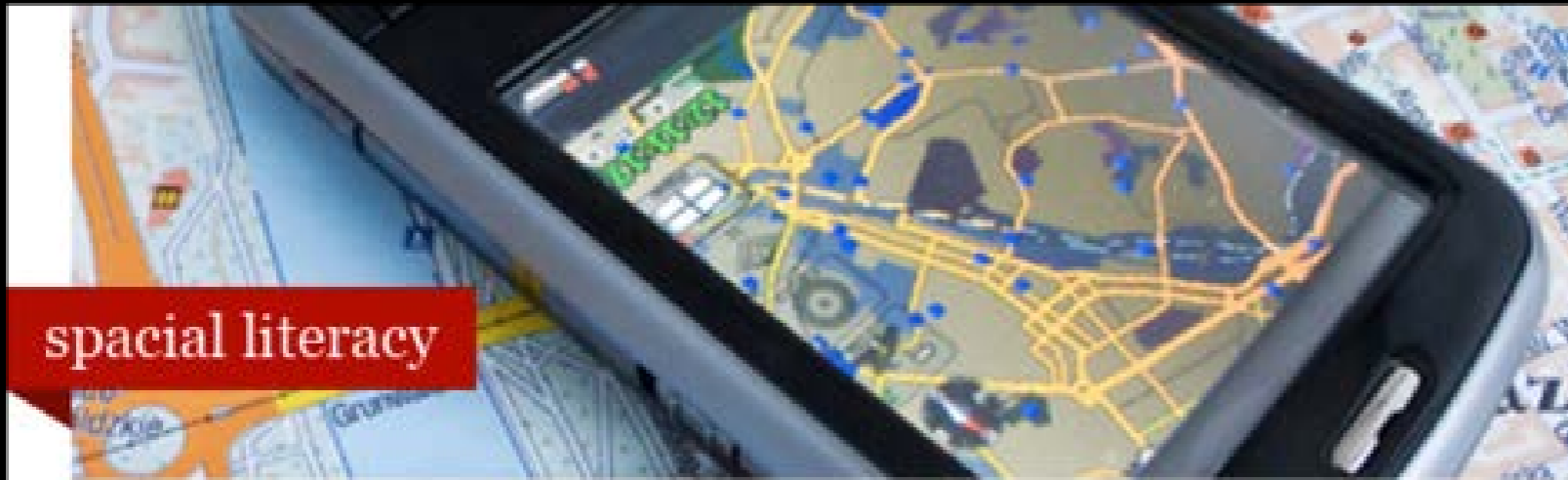


all work by Keith Huang, intern from University of Waterloo Robotics Programme (1st year)

Revisiting the Game idea

what about a multiplayer game
what about AR integration
what about players in the field and at base

GeoEduc3d Project
Geoide NCE
NSERC
Sylvie Daniel, leader



Source: <http://www.nedlandsdegrees.com/certificate-spatial-literacy.aspx>



Smart Cities
and Communities

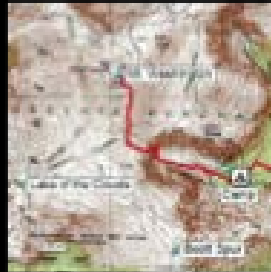
Source: <http://tu-smartcities.eu/>



+



=

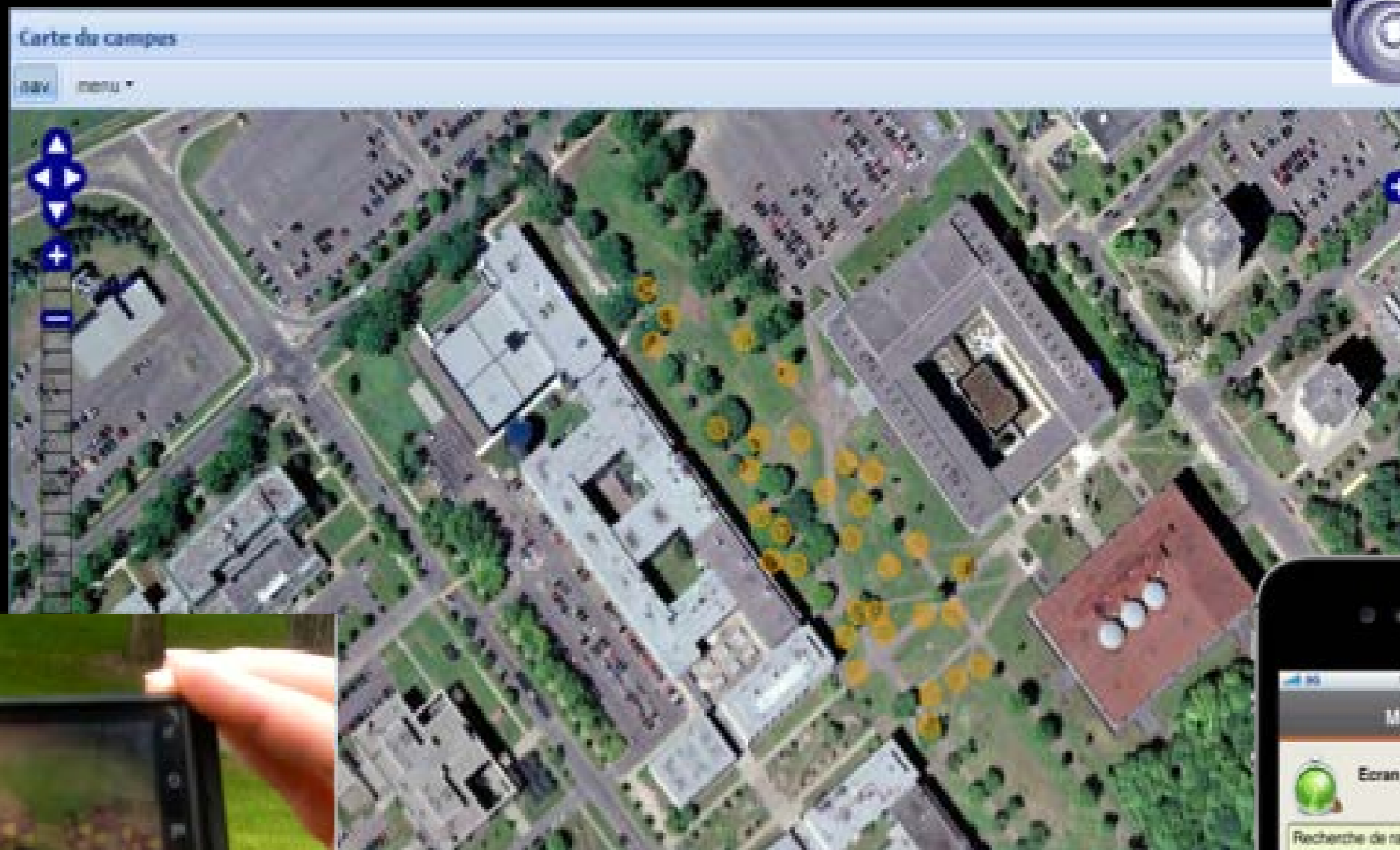


awareness of science around us

GeoEduc3d Game - set on Universite Laval Campus



Source: <http://www.gameinformer.com>



team-based
spatial
investigation
with mobile
phones



augmented reality mini-games

Nuclear disaster scenario



Augmented reality - a highly situated approach



Augmented Round Table for Architecture and Urban Planning : www.vr.ucl.ac.uk/projects/arthur/arthur2.jpg



Photo: David Stuart; Retouching: Smalldog Imageworks



AR, Mobile - graphics quite limited

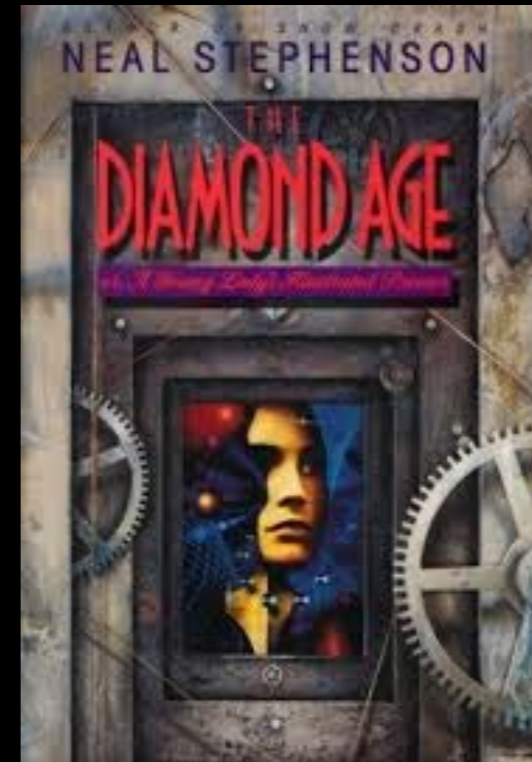
Desktop - current games are
photorealistic for static scenes

Next generation (this year) iPad
games are close...



Situated Interactions in Space and Time

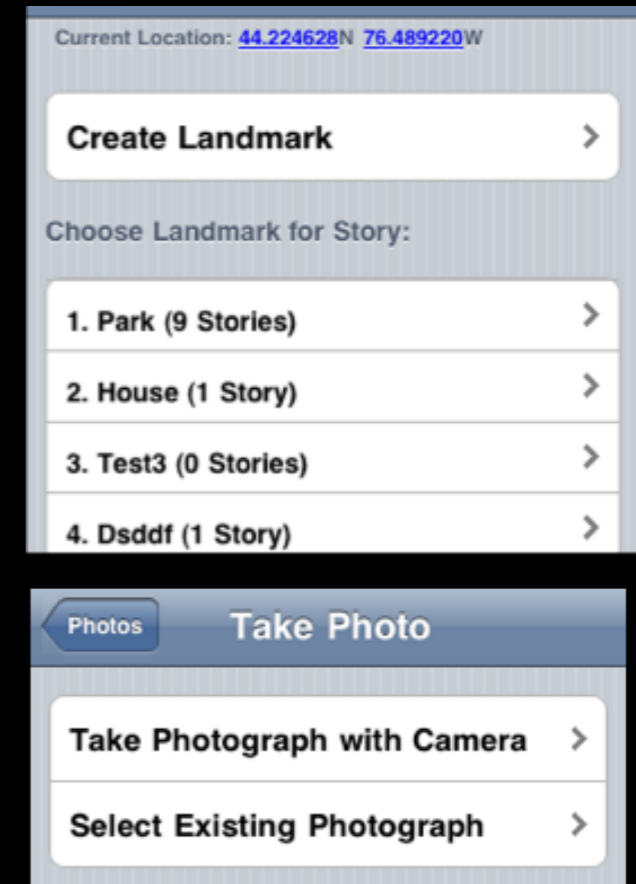
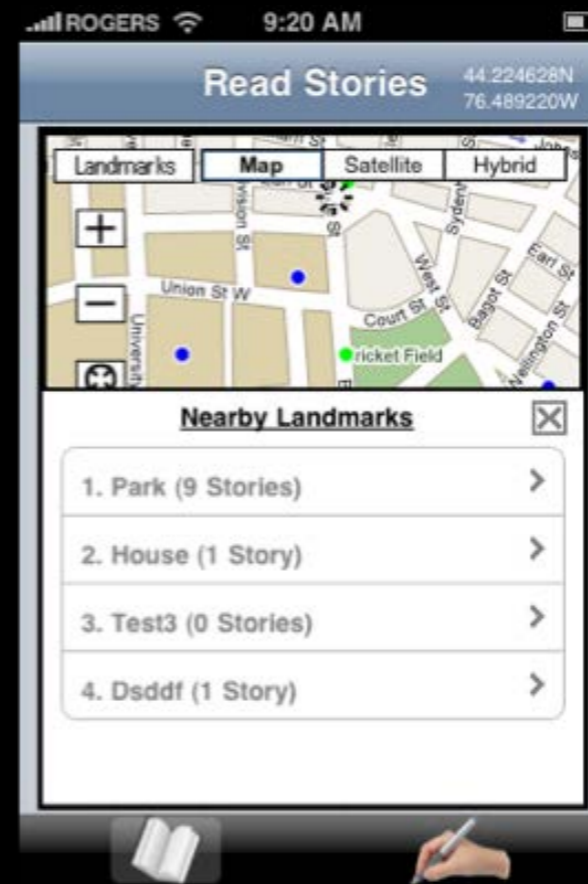
Can we place user-generated stories on the landscape?



Can we use a mobile device as a local window into some other geography - situatedness?

Situated Authoring

Place-based messages and information access



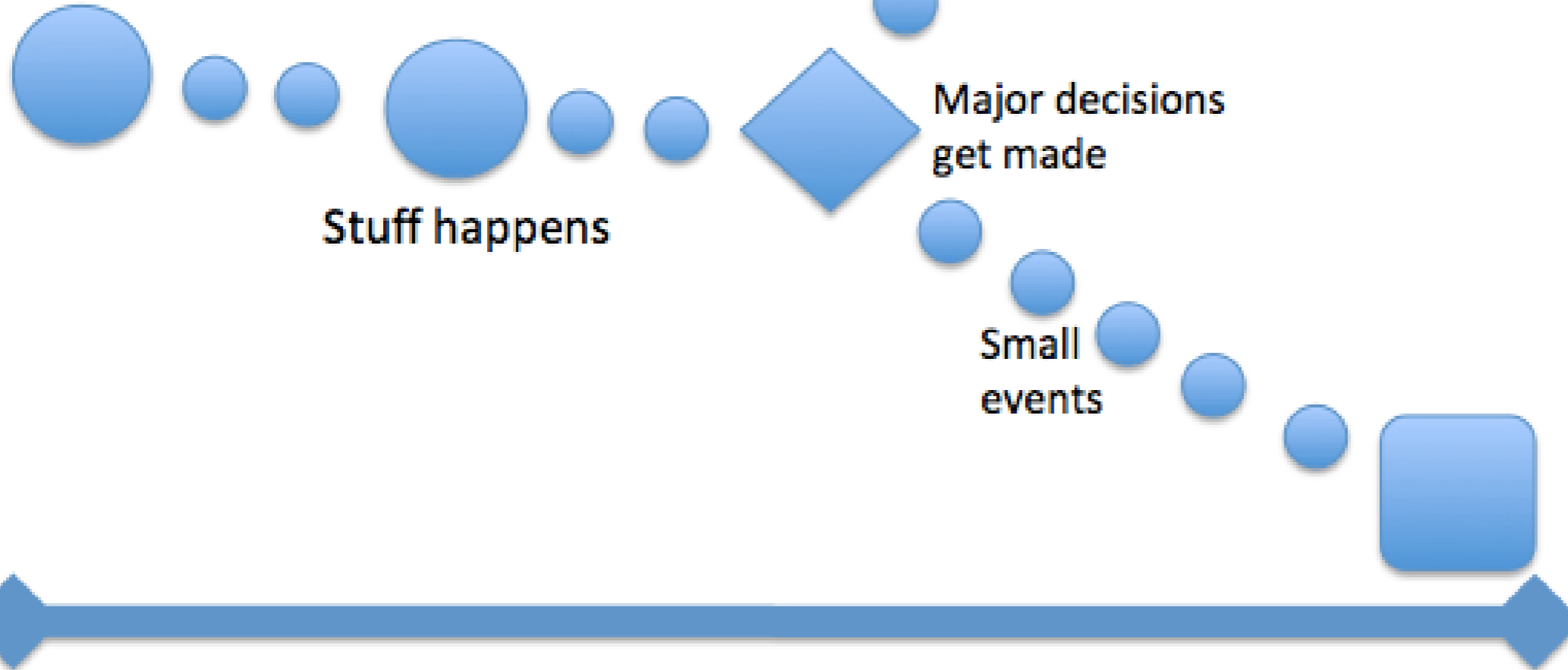
Text
(differing perspectives)

Pictures

(Movies)
(Active agents)
(emails)
(chains of locations - tours)
(simple games)

Story Arcs

The story begins...

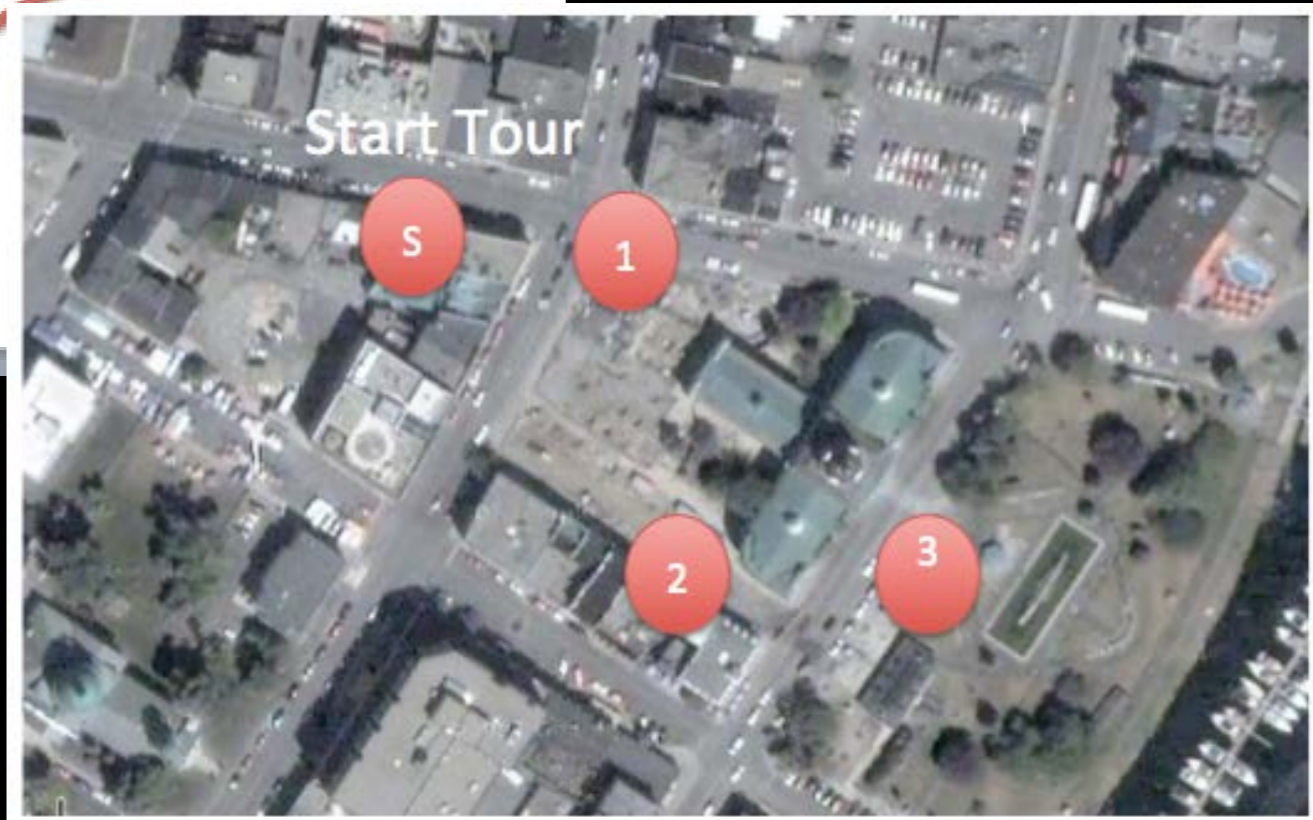
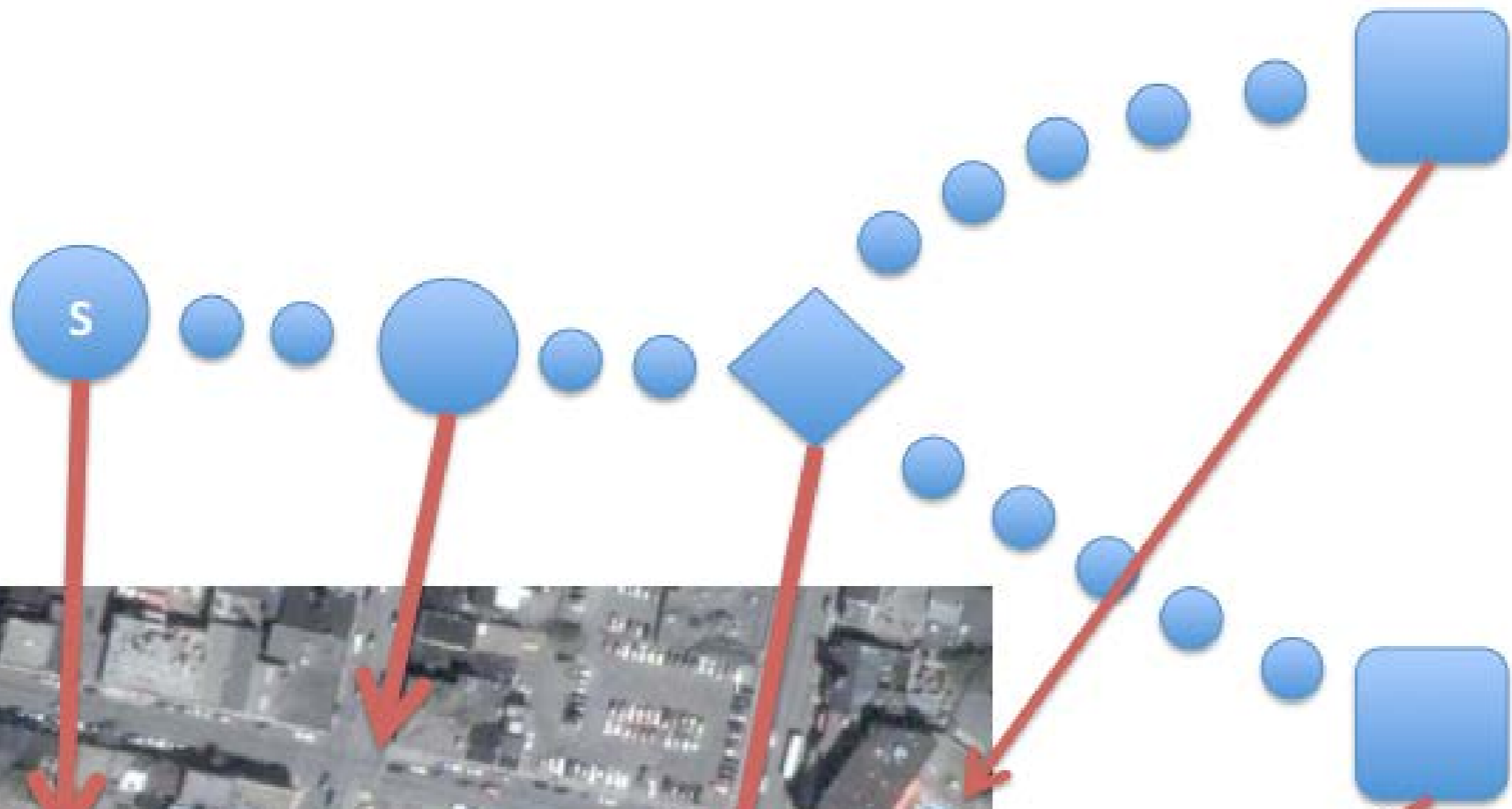


Is this a story or a fragment of a story?

Does it take place at a specific place or a series of places?

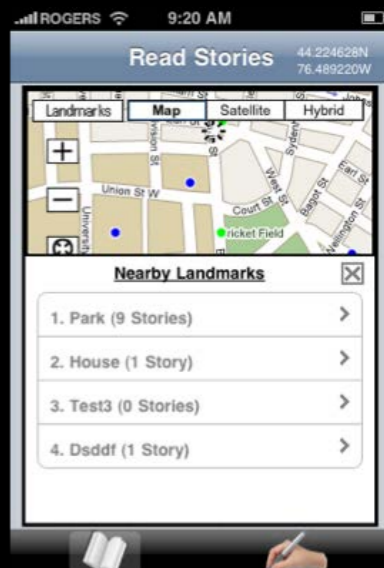


Fragment of a story (object)

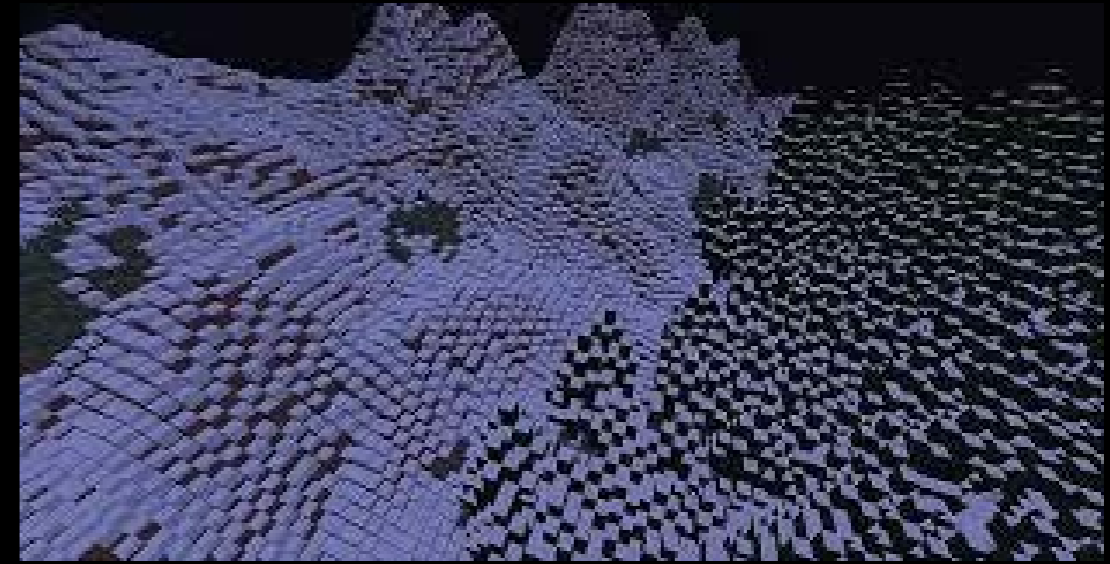


Thinking about geoscience in this context

1. embed knowledge about geology in the landscape
2. embed secondary notes (e.g. this building is built on...)
3. embed use notes (your energy comes from)
4. allow community authoring of these?
5. allow authoring of geoscience 'lite' observations? Perspectives?

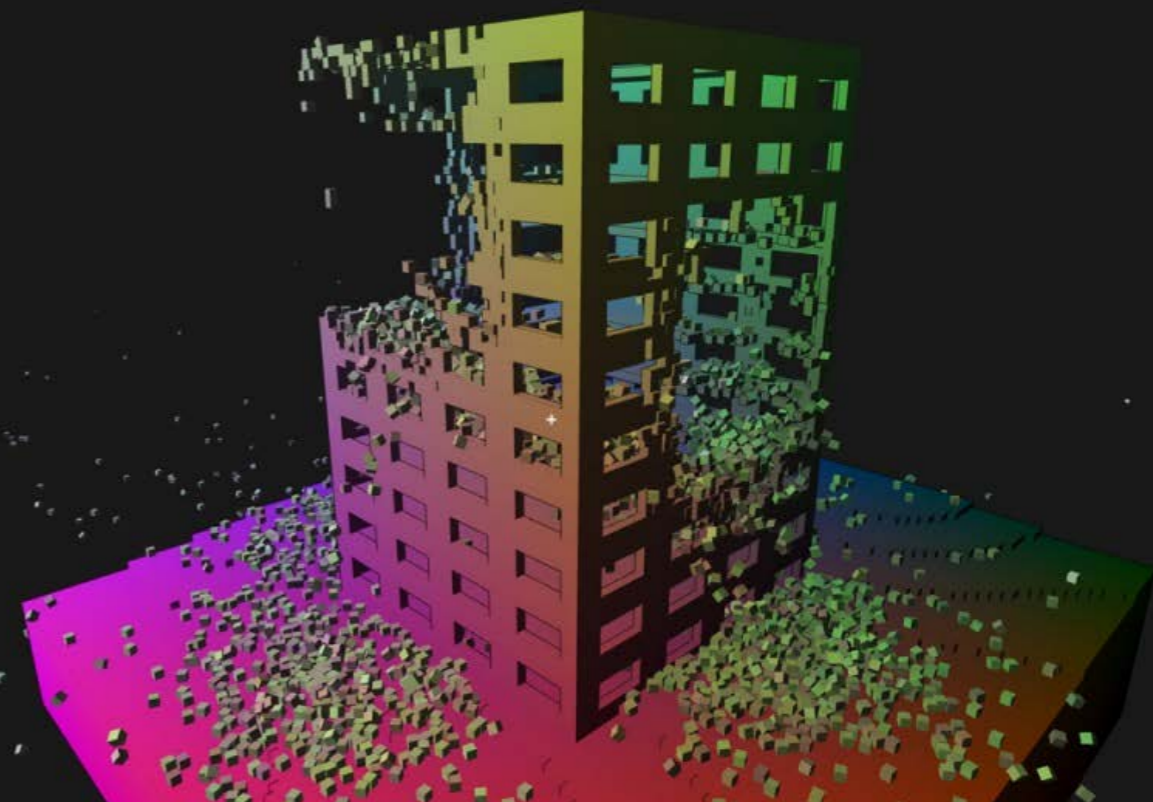


Those Game Engines are Surprisingly Useful!



realistic terrain
physics
destructible terrain

The most realistic damage
model **ever**







Typical photo using Gigapan mount:



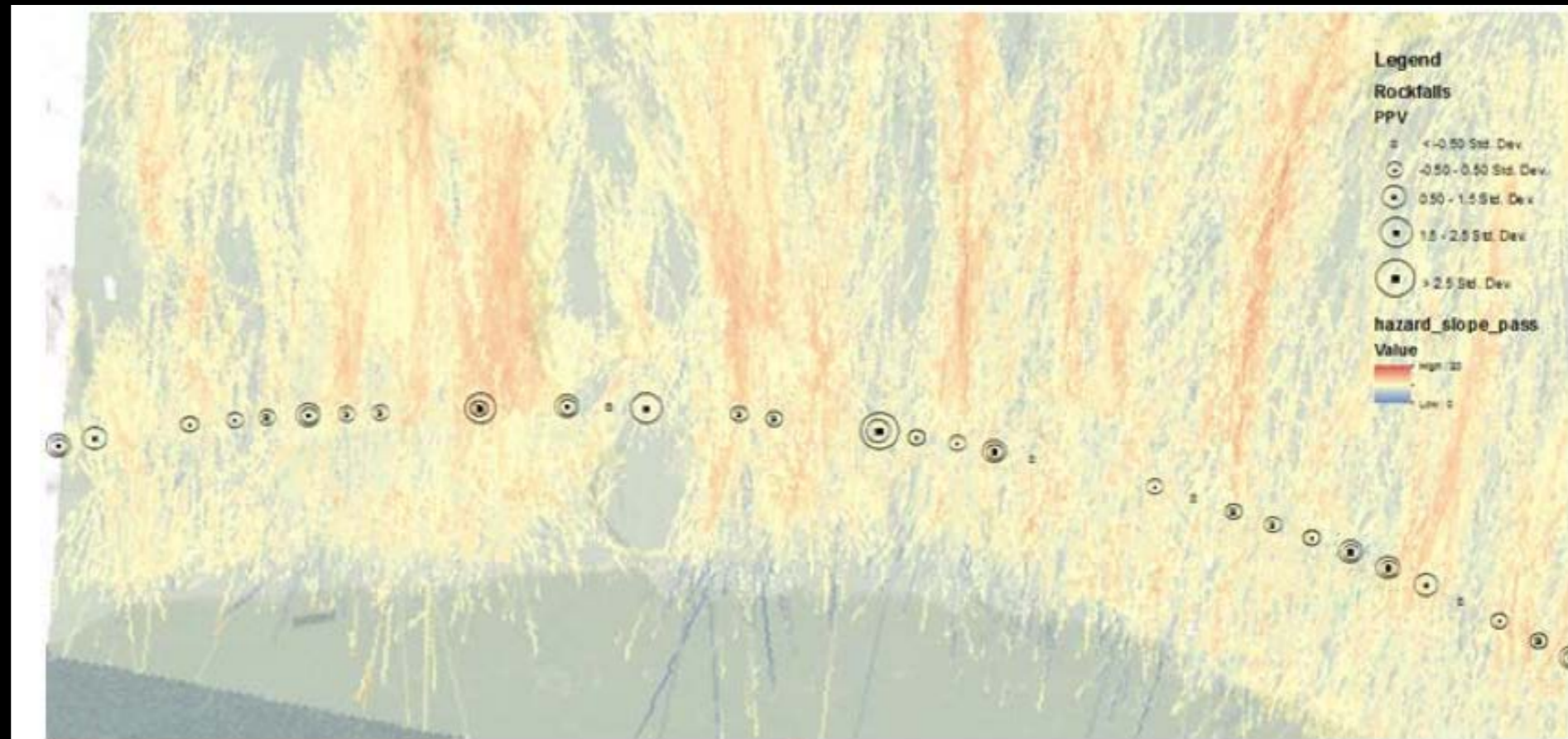
Assembled gigapixel photograph (pan/zoom):



Grainsize analysis across photos:



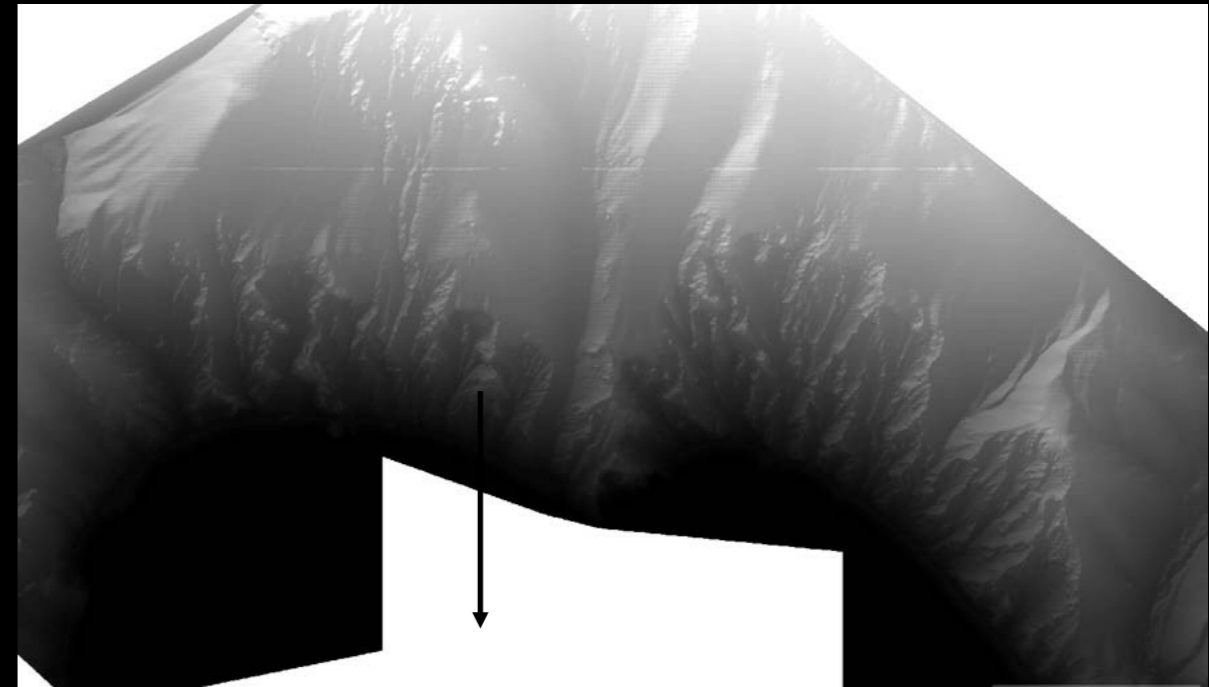
Photogrammetry possible in some cases:



Aerial LiDAR
Data (.las)



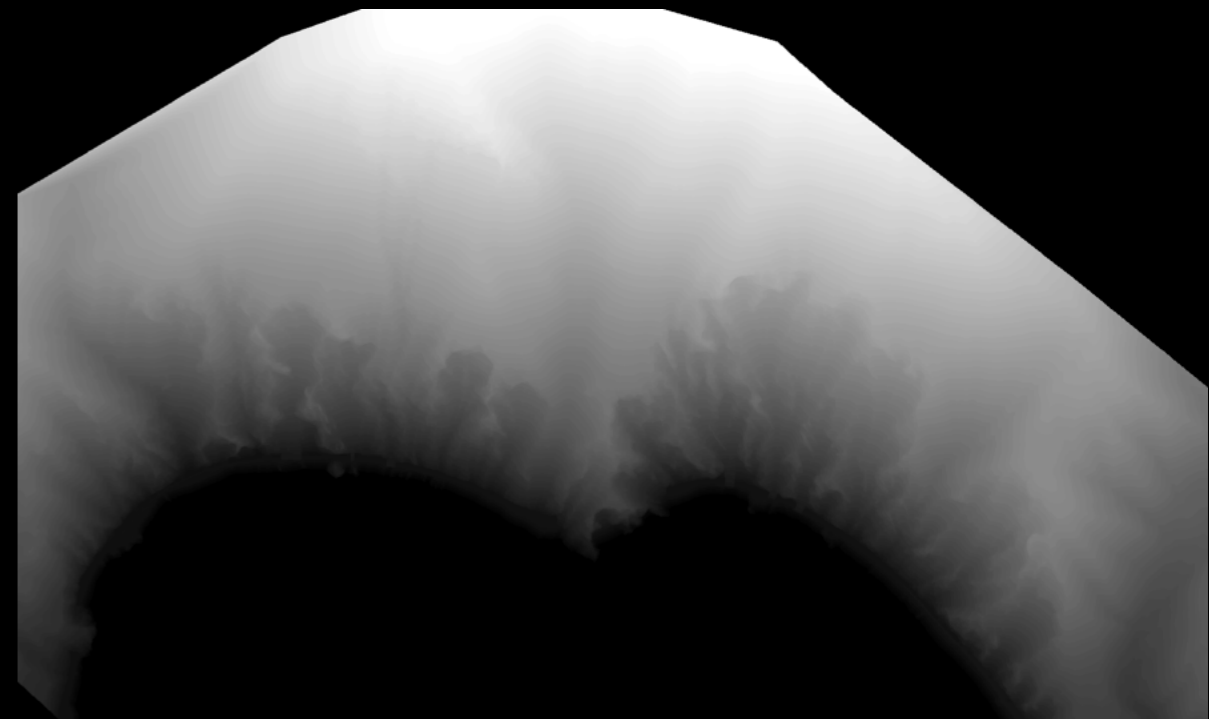
Detailed Raster 0.2 m - 1 m resolution

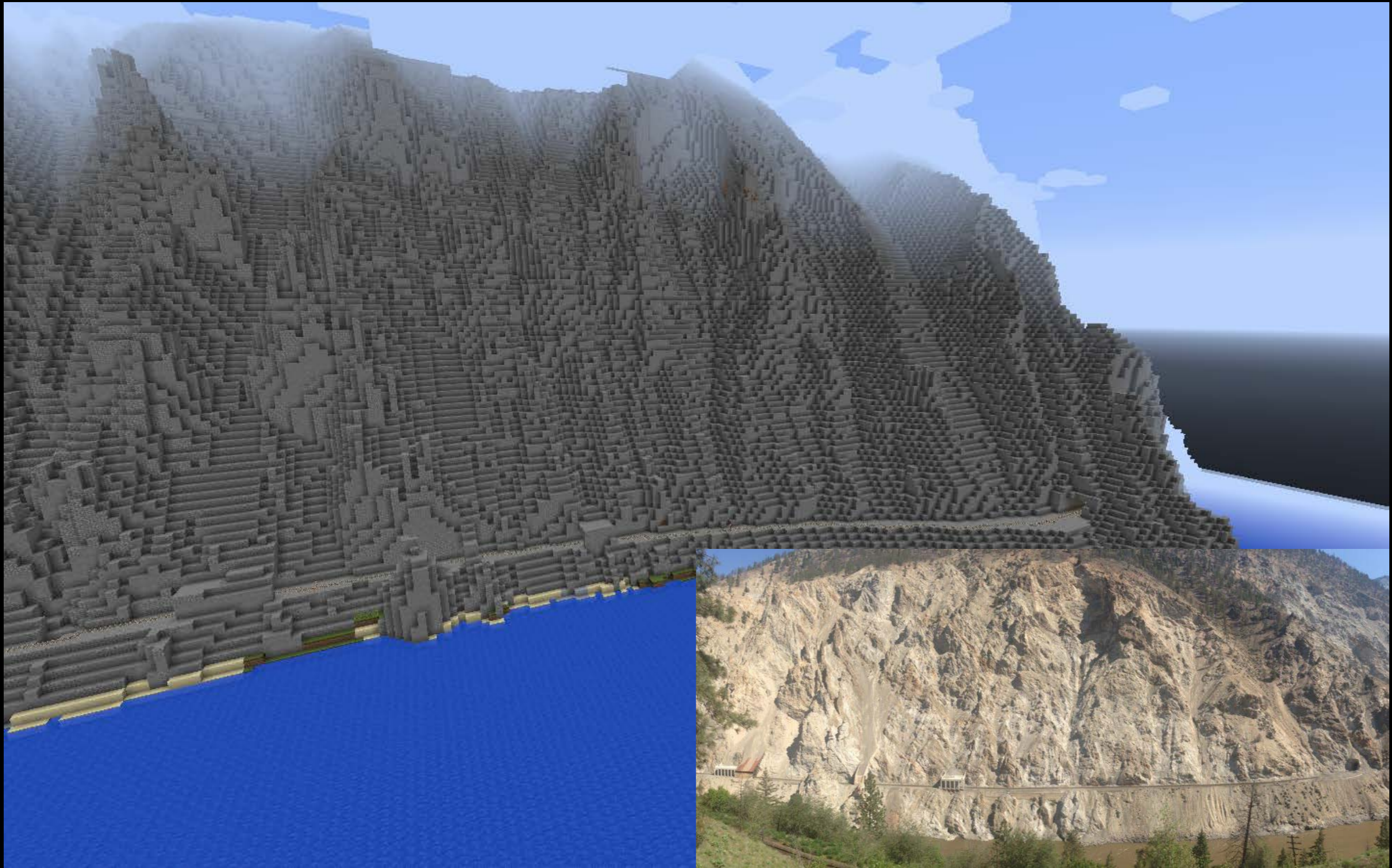


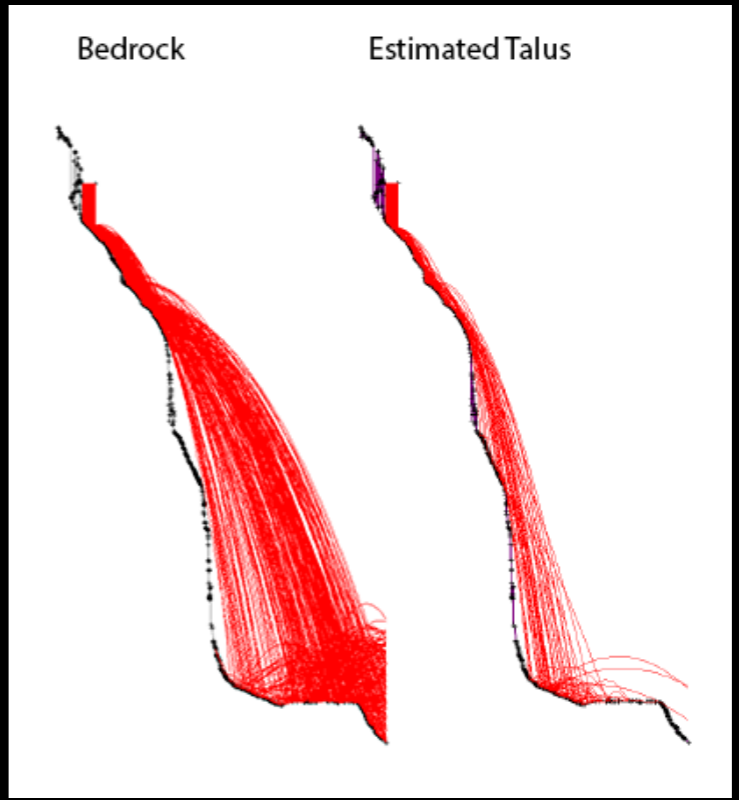
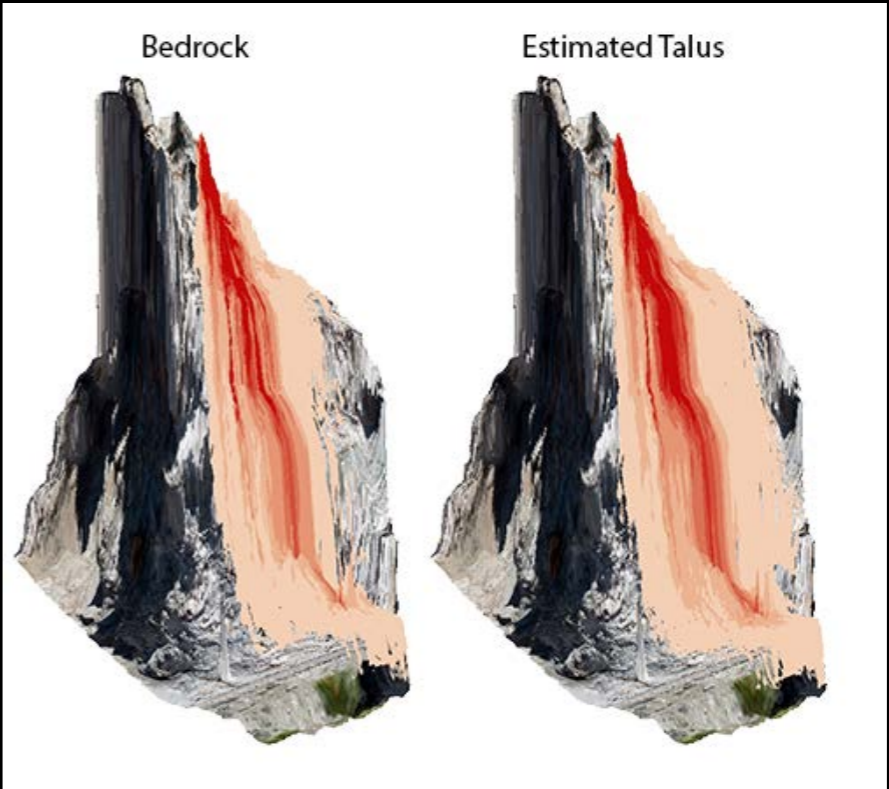
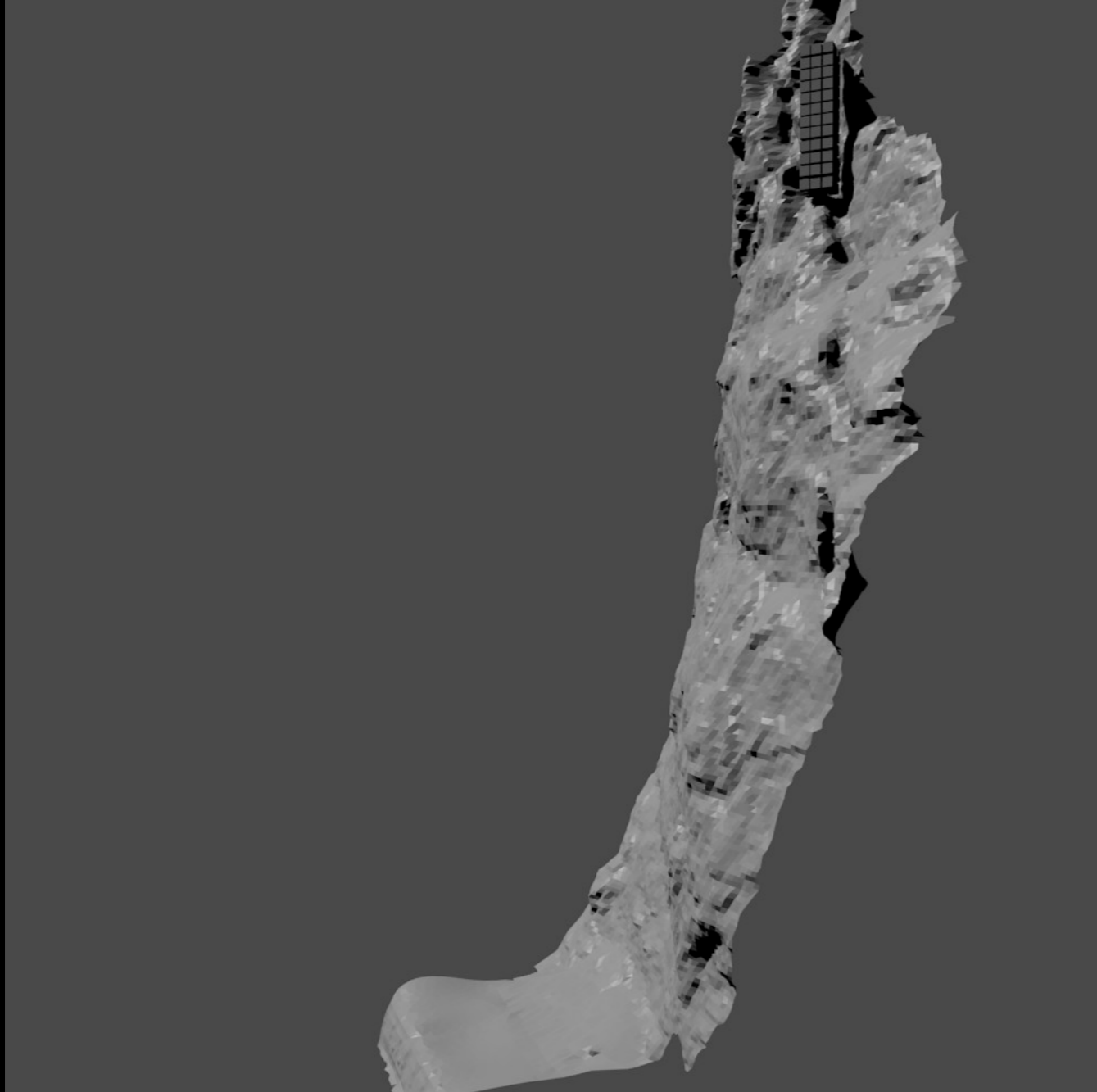
MineCraft heights



Scaled Raster 0 to 256 heights

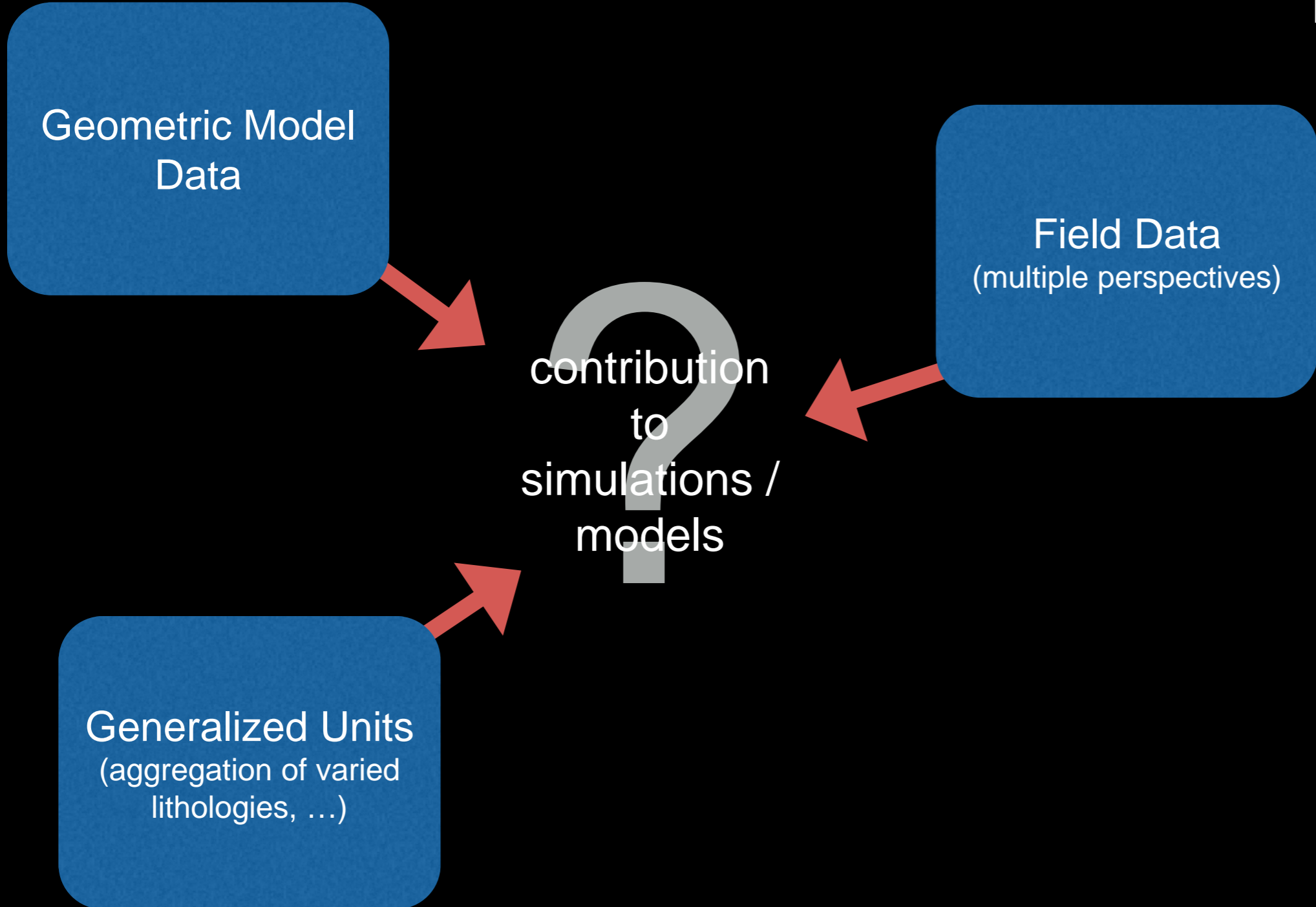






an aside - something else we worry about

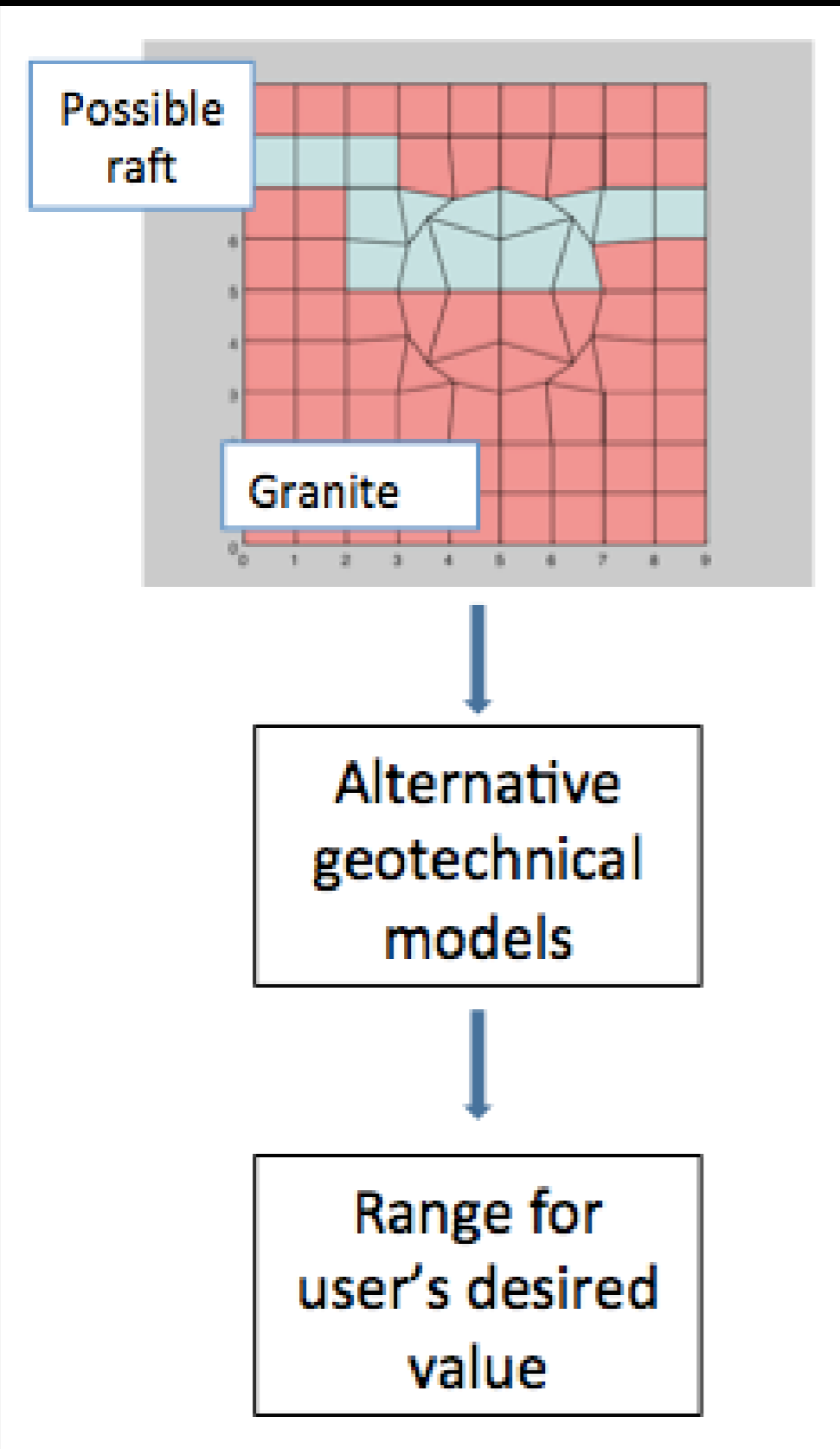
semantic accuracy in geological data
model-based understanding
representation
vagueness



FLAC Geotechnical Models

Model iterations

Impact of choices in geological model
Impact of unit aggregation choices
Impact of geometric and generalization decisions



i.e. does it really make a difference that we examine these?



I HAD A DREAM
THAT I MET A GIRL
IN A DYING WORLD.



IT WAS ALL COMING APART.
HAIRLINE CRACKS IN REALITY
WIDENED TO YAWNING CHASMS.
EVERYTHING WAS GOING DARK
AND LIGHT ALL AT ONCE, AND
THERE WAS A SOUND LIKE
BREAKING WAVES RISING INTO
A PIERCING SCREAM AT THE
EDGE OF HEARING. I KNEW WE
DIDN'T HAVE LONG TOGETHER.

SHE GRABBED ME AND SPOKE
A STREAM OF NUMBERS
INTO MY EAR.
THEN IT ALL
WENT AWAY.



I WOKE UP. THE MEMORY OF
THE APOCALYPSE FADED TO
MERE FANCY, BUT THE NUMBERS
BURNED BRIGHT IN MY MIND.
I WROTE THEM DOWN RIGHT AWAY.

42.39561 -71.13051
2007 09 23 14 38 00

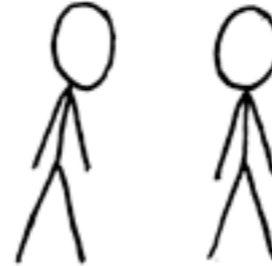
THEY WERE COORDINATES.
A PLACE AND A TIME,
NEITHER ONE TOO FAR AWAY.

WHAT ELSE COULD I DO?
WHEN THE DAY CAME, I WENT
TO THE SPOT AND WAITED.



... AND?

IT TURNS
OUT WANTING
SOMETHING
DOESN'T MAKE
IT REAL.



I HAD A DREAM
THAT I MET A GIRL
IN A DYING WORLD.



IT WAS ALL COMING APART.
HAIRLINE CRACKS IN REALITY
WIDENED TO YAWNING CHASMS.
EVERYTHING WAS GOING DARK
AND LIGHT ALL AT ONCE, AND
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2007 09 23 14 38 00

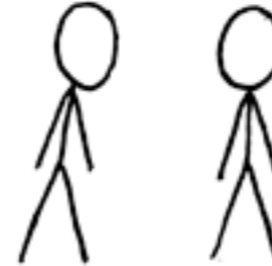
THEY WERE COORDINATES.
A PLACE AND A TIME,
NEITHER ONE TOO FAR AWAY.

WHAT ELSE COULD I DO?
WHEN THE DAY CAME, I WENT
TO THE SPOT AND WAITED.



... AND?

IT TURNS
OUT WANTING
SOMETHING
DOESN'T MAKE
IT REAL.



xkcd

oh look, coordinates and a time!



xkcd blog

