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Leveraging Entwine LiDAR Datasets Within Civil 3D & ReCap Pro

Justin Ehart
Engineering BIM Manager | Ware Malcomb

andthisjustin

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TLDR: Exploit Online LiDAR Data For C3D Use

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Who is this guy on the stage?

Why is he teaching us this session?

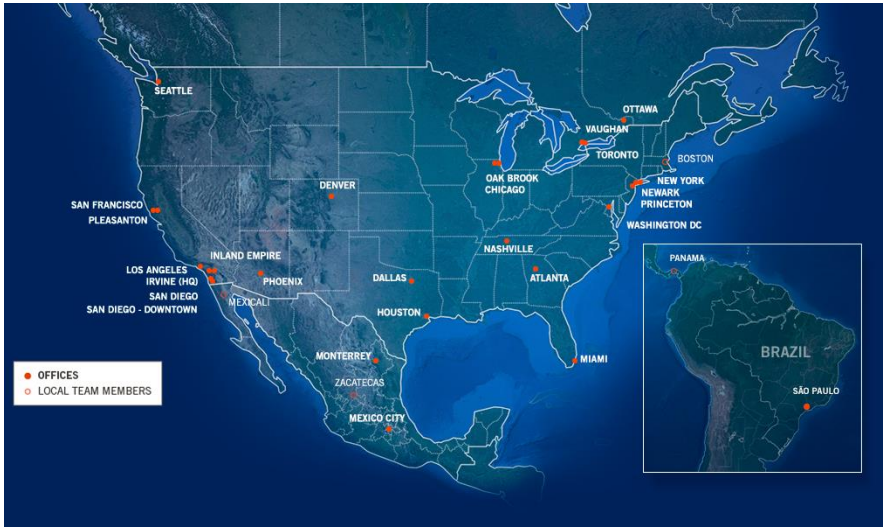
Justin Ehart

WARE MALCOMB

- Engineering BIM Manager
- 28 years in Architecture, Civil Engineering & Surveying
- Previously spoke at AU & BiLT Europe in 2019 on "*Drone 2 Design",* and most recently BiLTNA 2022 *"Dynamo for Civil 3D"*
- Absolutely love coding
  - Python, IFC.js, .NET, PowerShell, Dynamo, LiSP
  - Engineering (& now Revit) Chatbot in Microsoft Teams QnA Maker
  - Civil 3D TensorFlow AI integration
- Currently focusing on Geospatial & Data Science applications
- Avid comic book collector & sneakerhead

WARE MALCOMB

- 2022: 50th Anniversary of the firm
  - Full-service Architecture, Interiors, Civil Engineering, Branding, Sustainability, Building Measurement Services, Land Surveying and Workplace Strategy & Change Management firm.
- 28 offices across North & South America
- We pride ourselves on not being like everyone else.
- WM Future Lab (R&D team)



OUR LEGACY INSPIRES THE FUTURE

DESIGN • PEOPLE • COMMUNITY • INNOVATION

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What can I expect from this session?

CES502661 – Leveraging Entwine LiDAR Datasets Within Civil 3D & Recap Pro

Course Overview:

In this session, we'll explore Entwine Point Tiles (over 43 Trillion individual points), and how to consume them quickly inside of Civil 3D software as a surface (via point cloud). As large point cloud data sets become ubiquitous in the architecture, engineering, and construction (AEC) community, open-source libraries and software dedicated to manipulating these data sets are valuable tools for civil engineers and those in the geospatial community. Entwine is a free online cloud repository that anyone can access, and with this technical instruction, you can go from zero (knowledge) to office hero in minutes!

- Learn how to quickly find LiDAR data for your area of work or even business development.
- Learn how to clean and generate a consumable point cloud within Civil 3d in minutes.
- Learn how to create better informed proposals before a contract is created.
- Gain a more refined understanding of grading constraints early in your project lifecycle.

How we will accomplish this…

Geolocate → Gather → Clean → Convert → Create

Civil 3D

Create a new drawing in **Civil 3D**, and geolocate it. Trim map and save.

3DEP

Browse to the National Map, define an Area Of Interest (AOI) and download *.laz files.

Cloud Compare

Use open source software **Cloud Compare** to filter, subsample and merge our tiles based on classification #2.

ReCap Pro

Create **ReCap Pro** project with *.las and convert to *.rcp file.

Back to Civil 3D

Import *.rcp file and create surface from point cloud.

Great, but what is entwine?

entwine.io

- Data organization library for massive point clouds
- Designed to handle datasets of trillions of points
- Completely lossless even with terabyte scale datasets
  - No point loss
  - No meta data loss
  - No precision loss
- Even better yet, amazon pays to convert files to EPT and to store the data

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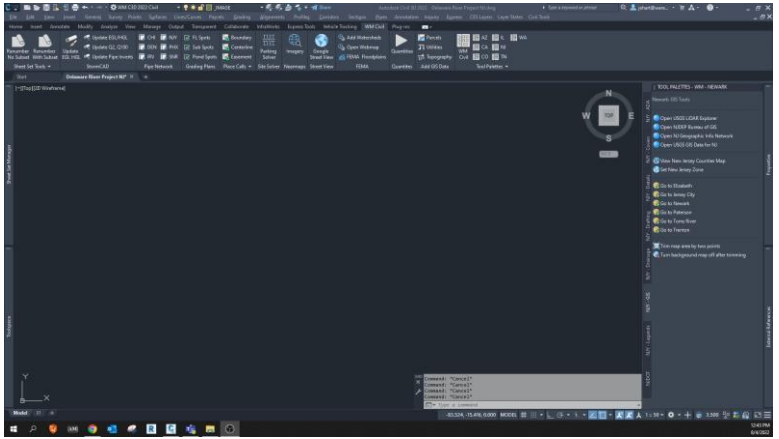
Step 01: Geolocation

Geolocate a location within Civil 3D

Step 01: Geolocate a new drawing template

- Use the command **EDITDRAWINGSETTINGS** or
- Browse to **Toolspace** > **Settings** > Right click **Drawing Name** > **Edit Drawing Settings**..
- Set to the correct coordinate system (*I am using NAD83 Feet in USA, UTM elsewhere*)
- If you have a boundary, **Mapimport** it now also
  - I use parcel shapefiles from www.regrid.com



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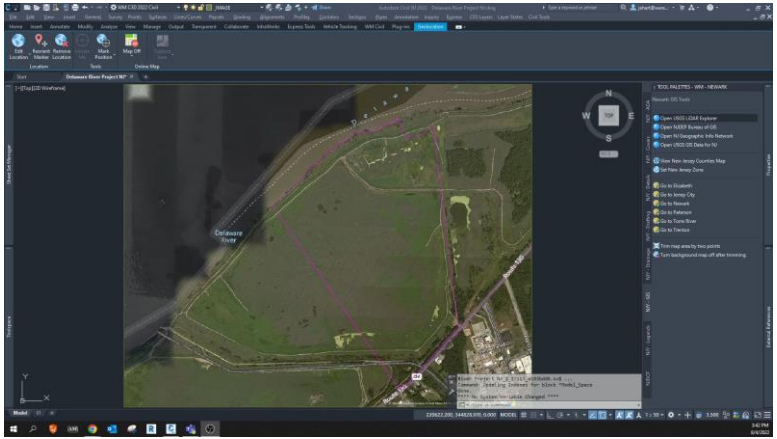
Step 02: Gather LiDAR Data

https://apps.nationalmap.gov/lidar-explorer/#/

Step 02: Gather most recent data from Entwine

- Browse to https://apps.nationalmap.gov/lidar-explorer/#/
- Define AOI (Area Of Interest)
- Download *.laz files



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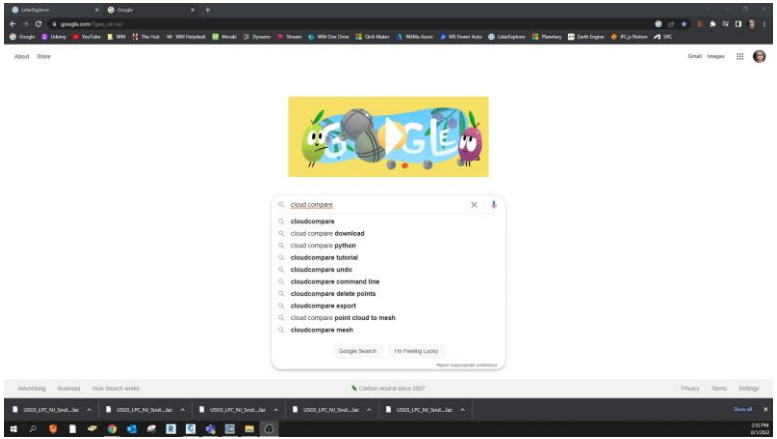
Step 03: Clean data

https://www.danielgm.net/cc/

Step 03: Clean data with Cloud Compare

- Browse to https://www.danielgm.net/cc/ go to downloads page, install your version
- Once installed, open and browse to .laz files
- Edit > Scalar Fields > Filter By Value (2 for ground shots)
- Edit > Subsample > Min Distance = 2.5
- Edit > Merge
- Save as .las file format



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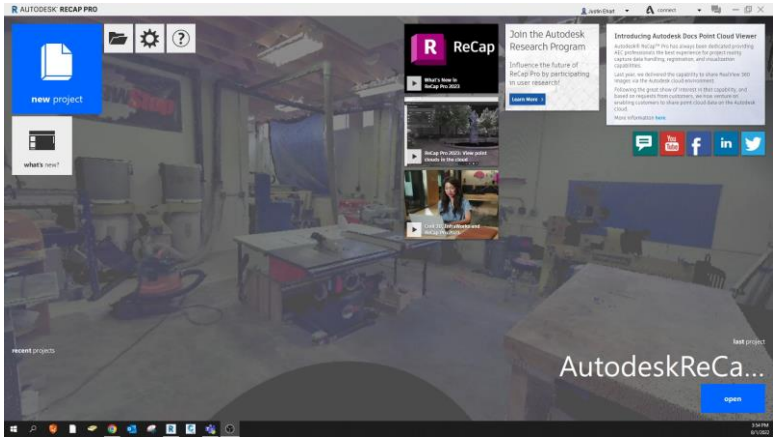
Step 04: Convert data

Convert .las to .rcp file format

Step 04: Convert data from .las to .rcp file format

- Create a new project in ReCap Pro
- Clean up area outside of your area of interest
- Save > Optimize
- I will also export a new .rcp file



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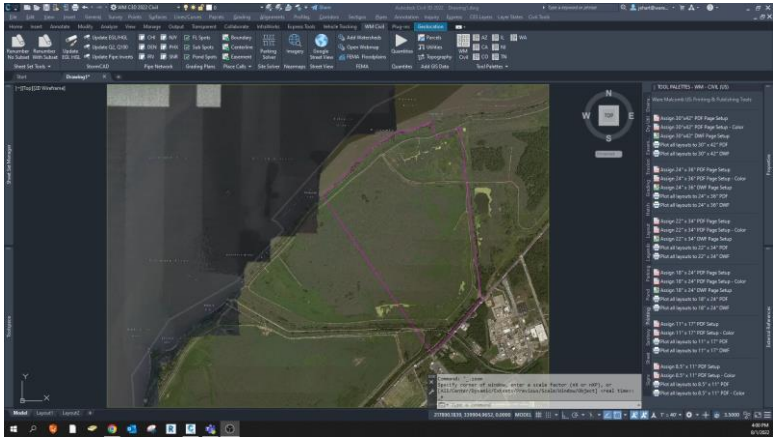
Step 05: Create Surface

Round-robin back into Civil 3D

Step 05: Create Surface in Civil 3D

- **Insert** tab on Ribbon > **Attach Point Cloud**
- **Home** tab on Ribbon Save > **Surfaces** ▼ > **Create Surface from Point Cloud**
- Create Snapshot of generated surface
- Detach/Delete Point Cloud



And There You Have It, Just That Simple…


Questions?!?