THE EVOLUTION OF AERIAL IMAGERY & AI INSIGHTS

July 7, 2021

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Frank Teegelaar
Sr. Director of Sales - NYC
Nearmap

Frank is Senior Director of Sales – Commercial, at Nearmap. The mission of his team is to help customers gain access to Nearmap's geospatial data in support of business opportunities in their respective industries. The democratization of generally available high-quality imagery can transform the way you see the world and, in turn, transform the way you work.

Kevin Korth
Solutions Engineer
Nearmap

Kevin is a Government Solutions Engineer at Nearmap. His passion is focused around spatial technology and data driven solutions. Over the last 6-years he has worked assisting government entities with enterprise GIS web applications, GIS asset management implementations, and data driven strategies utilizing aerial imagery.

AGENDA

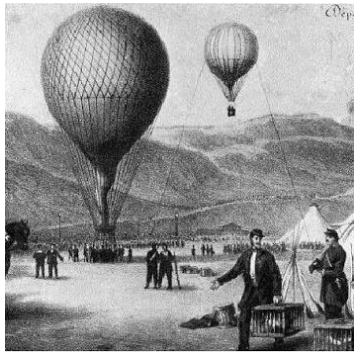
PART I: IMAGERY VEHICLES

- Aerial Imagery Evolution
- Technology & Limitations
- Nearmap History

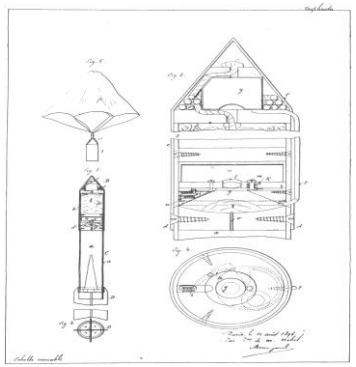
PART II: AERIAL IMAGERY ROAD AHEAD

- 3D
- AI

AERIAL IMAGE CAPTURE VEHICLE TIMELINE



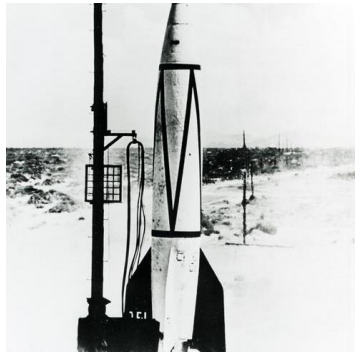
1858: Hot air balloon capture of a neighbourhood just outside of Paris, France at ~262 feet



1887: Rocket Camera designed by Swedish Chemist and Engineer, Alfred Nobel

1909: Carrier pigeons with camera's strapped to them in Germany

1909: Wilbur Wright's passenger took the first photos from a plane in Italy



1946: White Sands Missile Range launched V-2 Rocket captured the first photos from space

2021: where we are today..

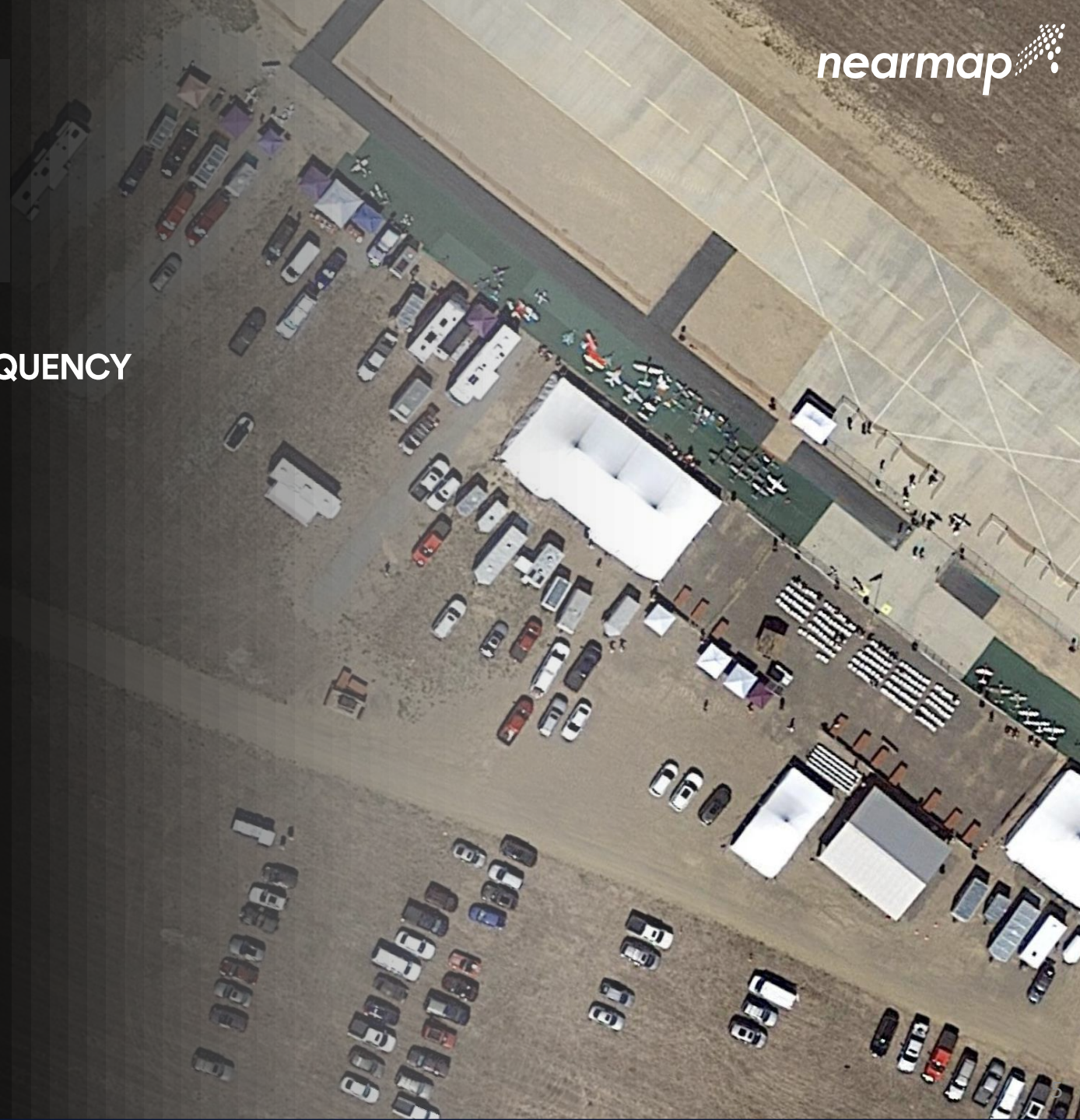
SATELLITES

RESOLUTION: 30CM-30M

ORBIT DETERMINES ACCESS TO LOCATIONS AND FREQUENCY OF COLLECTION

Polar orbit – Images 1x per day with a large footprint

- With the following limitations:
  - Clouds
  - Sun-angle
  - Competing access requests
  - Potential lack of demand



AIRCRAFT

RESOLUTION: 20CM – 5CM

FAA AND EQUIPMENT AVAILABILITY DETERMINES ACCESS AND FREQUENCY OF COLLECTION

- Provides resolution and scale but often less frequency
- Revisit dependent on environmental and policy factors
- Not ideal for timed collection
- Smaller footprint but that tech is evolving

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DRONES

RESOLUTION: <3CM

CAN GO EVERYWHERE BUT NOT SCALABLE.

- Resolution is impeccable
- Takes longer to fly and fly's low
- Expensive and not at the ready everywhere when you need it.
- Very small footprint.

OUR TECHNOLOGY

PATENTED CAMERA SYSTEMS

Patented, airplane-mounted camera systems allow us to cover wide land areas in a short amount of time, while capturing imagery at an extremely high resolution.

DESIGNED FOR THE CLOUD

Our photogrammetric processing pipeline enables accuracy, speed, and recency, so the imagery is in your hands and ready to use within a few weeks of capture via MapBrowser, APIs and into your favorite GIS and CAD software.

MORE THAN AERIAL IMAGERY

When combined with machine learning algorithms, our imagery delivers deep insights and automated location intelligence for a wide range of industries.

WE PROACTIVELY UPDATE SPATIAL DATA THAT BUSINESSES COUNT ON

1 **ALWAYS CURRENT:** WIDE-SCALE REALITY CAPTURE PROGRAM

Frequently updated aerial survey of large urban and regional areas, up to 3 times a year leaf on and off; accessible 24/7.

2 **CONSISTENT:** AUTOMATED PHOTOGRAMMETRY PIPELINE

Scalable processing pipeline means content can be delivered within days of capture; with consistent quality and resolution.

3 **NO FUSS:** ENABLE INSANELY SIMPLE ADOPTION

Instant access via MapBrowser, Esri ArcGIS Marketplace, or APIs. Our simple subscription model means no need to worry about annual procurement and storage.

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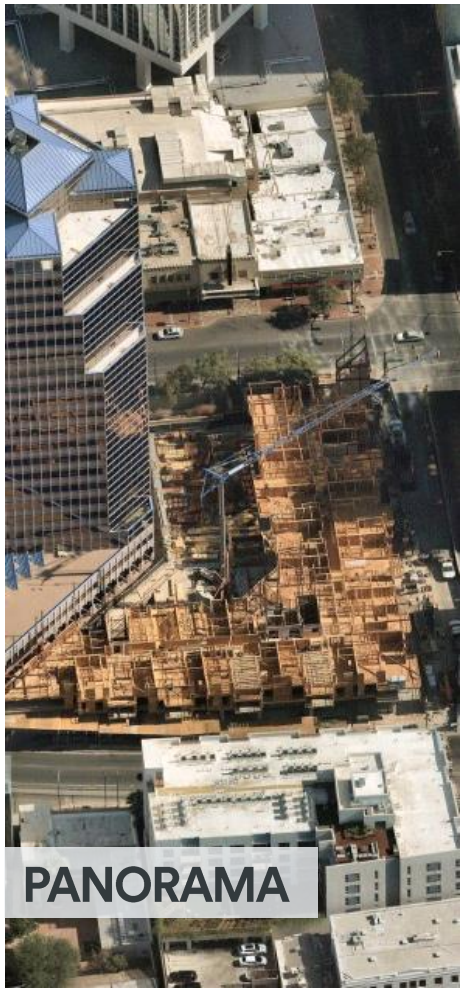
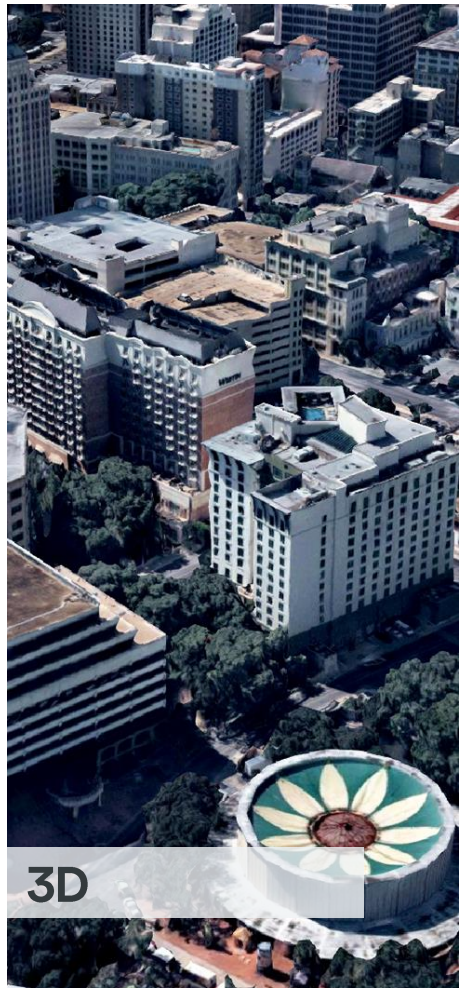
ROAD AHEAD FOR AERIAL IMAGERY & TECHNOLOGY

PRODUCTS OF AERIAL IMAGERY





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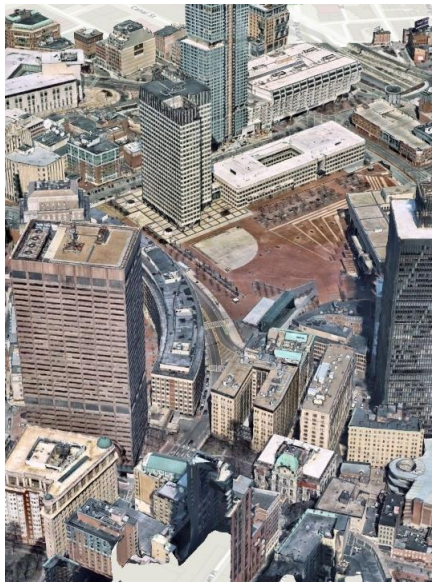
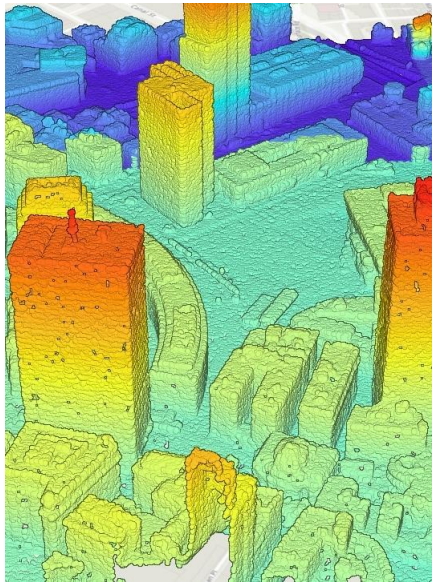
3D DATA FORMATS



TEXTURED MESH

Textured Mesh is a 3D triangulated wireframe model with high-resolution photo-realistic textures applied, available in multiple formats.

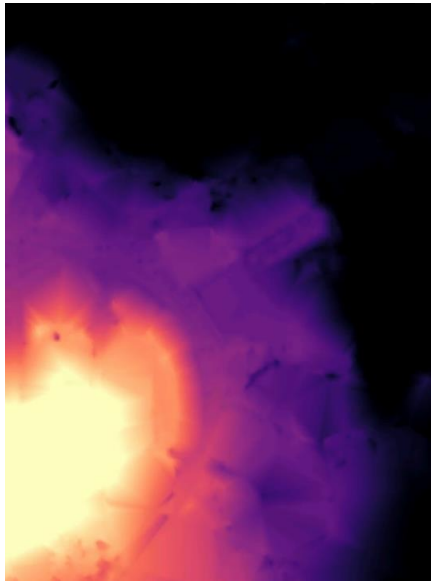


POINT CLOUD

The Nearmap Point Cloud is a vector file made up of points containing X, Y and Z and color values in the LAS format.

DIGITAL SURFACE MODEL

DSM is based on a raster file made up of pixels containing surface elevation values in the GeoTiff format, including heights of both natural and built objects above sea level.



DIGITAL TERRAIN MODEL

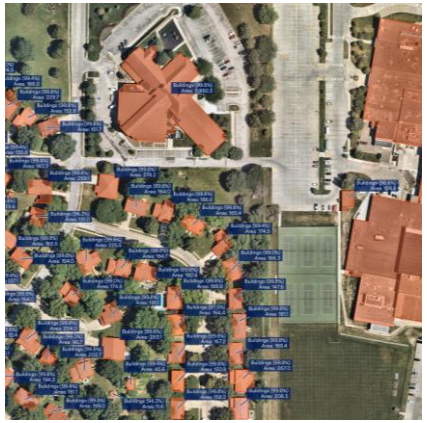
DEM is based on a raster file made up of pixels containing bare earth elevation values in GeoTiff format.

TRUE ORTHO

True Ortho is based on a raster file made up of pixels containing RGB color values in the GeoTiff format.

ARTIFICIAL INTELLIGENCE (AI)

BUILDING & LAND CHARACTERISTICS



BUILDING FOOTPRINTS

- Residential, commercial and industrial buildings
- Detects roof of a permanent structure
- House, unit, commercial buildings, garage, large garden, shed, carport

ROOF CHARACTERISTICS

- Roof material
  - Tile, metal, shingle, other
- Roof shape
  - Hip, Gable, Flat, Turret, Dutch Gable
- Tree Overhang
  - Protruding over the top of a building footprint

BUILDING CHARACTERISTICS

- Building Peak Height (ground to peak) using 3D AI.
- Storey Count (1, 2, 3+) using 3D AI.
- Must be purchased with Building Footprint AI Pack

SURFACES

- Lawn Grass
- Water Body
- Asphalt
- Concrete Slab
- Dirt/Sand/Gravel

VEGETATION

- Medium & High Vegetation – Tree Canopy (>2m)
- Low Vegetation (0.5m-2m)
- Very Low Vegetation (<0.5m)

AI FORMATS

AI RASTER

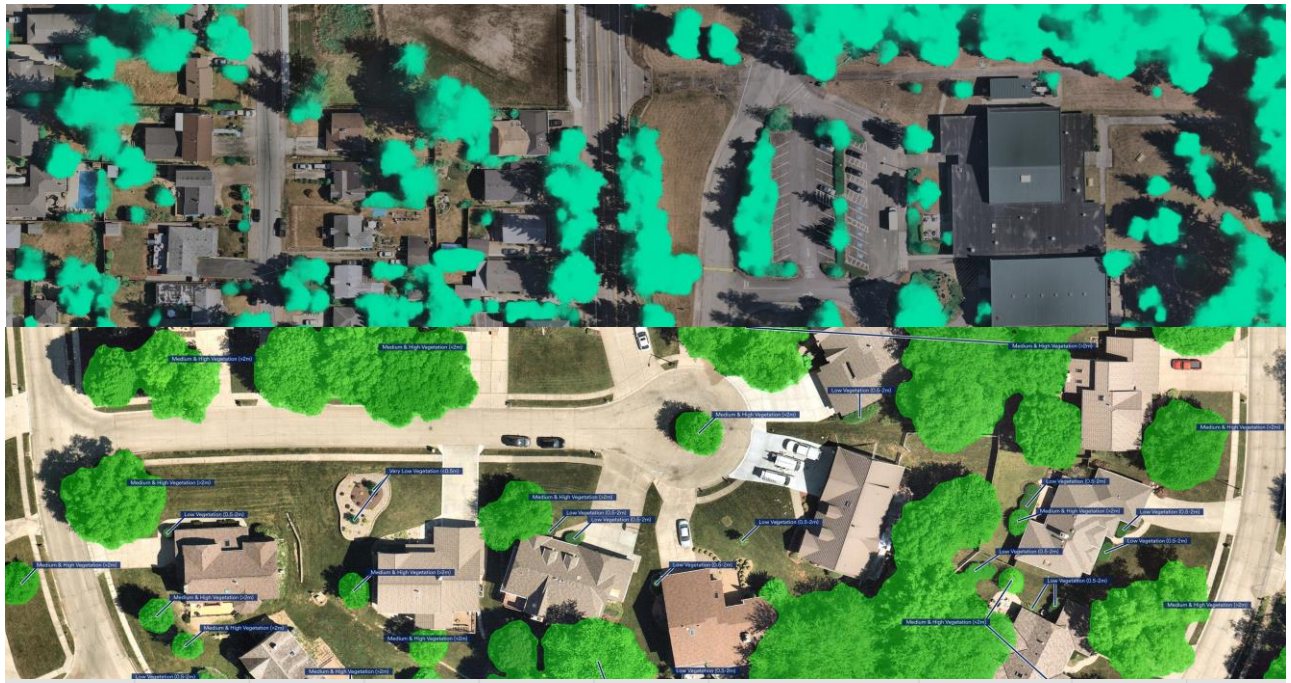
- Tiled GeoTIFF format

AI VECTOR

- Vectorization process
- Geospatial file formats (Geodatabase, Shapefile, Geopackage, GeoJSON)

AI OFFLINE PARCEL

- Vector results summarized with property and address information attached



B	C	D	E	F	G	H	I	J	K
survey_date	address	longitude	latitude	attribute	present	building_confidence_percent	area_estimate_sqm	dom_roof_material	dom_roof_material
12/09/2019	90 Pennant	151.0991	-33.7235	Roof	N	100	0		
12/09/2019	98 Pennant	151.0978	-33.7231	Roof	Y	99	317.4	Other	7
12/09/2019	98 Pennant	151.0978	-33.7236	Roof	Y	99	213.6	Metal Roof	8
12/09/2019	108 Pennar	151.0962	-33.7239	Roof	Y	99	292.2	Metal Roof	8
12/09/2019	18 Norman	151.0977	-33.7218	Roof	Y	99	264.7	Tile Roof	9
12/09/2019	7 Fraser Ro	151.0986	-33.7219	Roof	Y	99	199.2	Tile Roof	7
12/09/2019	23 Norman	151.0969	-33.7224	Roof	Y	99	324.6	Tile Roof	8
12/09/2019	28 Denmar	151.0958	-33.7221	Roof	Y	99	203.3	Tile Roof	8
12/09/2019	44 Denmar	151.0968	-33.7216	Roof	Y	99	139.6	Other	5

AGOL – AI AND 3D

WHY AI?

AUTOMATED FEATURE EXTRACTION

- Perform remote parcel assessments
- Easily identify objects and location attributes
- Accurately detect changes

SAVE TIME AND BUDGET

- Reduce the need to manually digitize datasets
- Shorten time spent collecting datasets

STREAMLINE GOV. INITIATIVES

- Plan for change and development
- Simplify asset, facility and risk management
- Verify permit compliance
- Correctly assess utility fees and parcel values

THANK YOU

JULY 7, 2021

MARCH 2021 | CASTAWAY BAY, OH U.S.

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YOUR SPEAKERS FOR TODAY

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