

Understanding Drone Data Classes

A Complete Guide to Comparing 3D Tower Data

Engineering-Grade

VISUAL INTELLIGENCE MACS-3D SENSOR

Inspection-Grade

DJI PHANTOM 4 PRO V2 SENSOR

VS

Engineering Class

VI MACS-3D

Engineering-grade accuracy is the data fidelity and structural coverage needed for applications that require millimeter class measurements, such as engineering analysis and structural design. Engineering class digital models have accuracy that provides 1/16th inch (or 1.6 mm) RMS error or better across 99% of a tower structure.

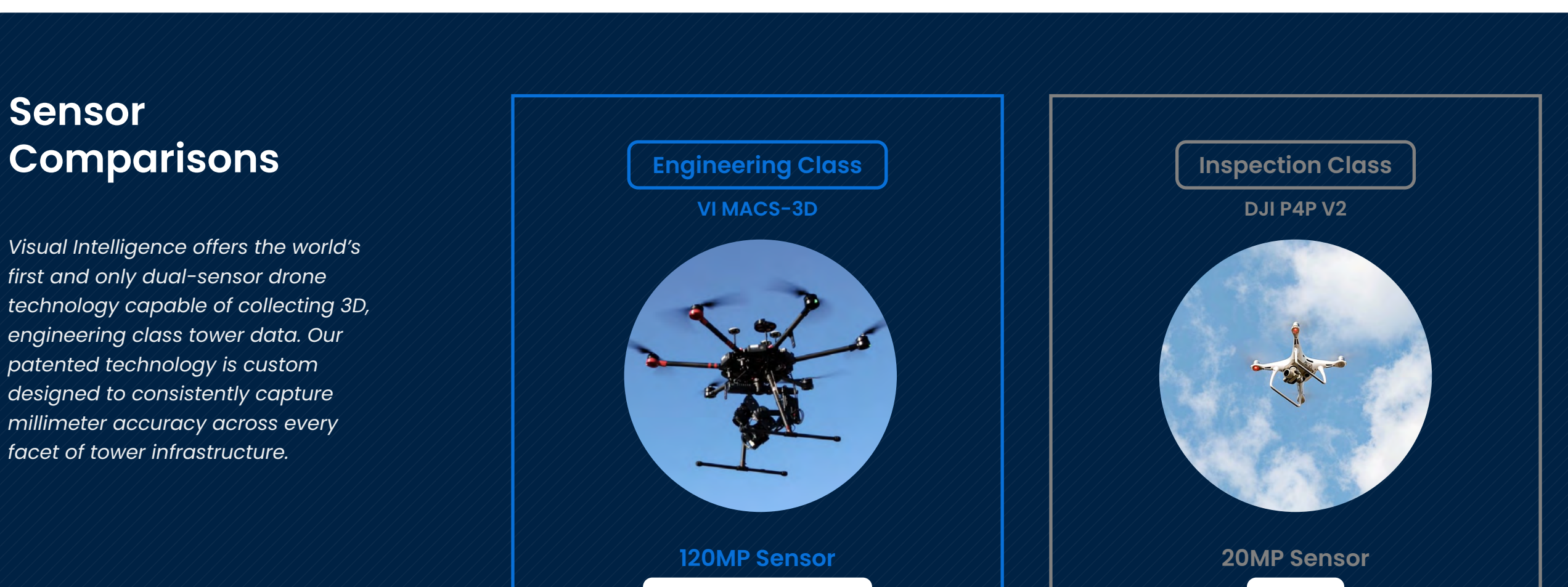
Inspection Class

DJI P4P V2

Inspection-grade accuracy is the data fidelity and structural coverage needed for applications that require centimeter class measurements, such as major appearance types or mount heights. Inspection class digital models have accuracy that provides 1 cm RMS across 80% of a tower structure.

Data Classifications

MEASURABILITY & DATA VALUE



Sensor Comparisons

Visual Intelligence offers the world's first and only dual-sensor drone technology capable of collecting 3D, engineering class tower data. Our patented technology is custom designed to consistently capture millimeter accuracy across every facet of tower infrastructure.

CAMERA

LENS

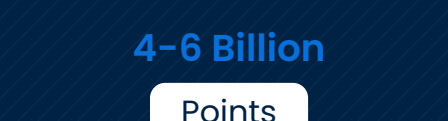
RESOLUTION

COVERAGE

POINTS CAPTURED

Engineering Class

VI MACS-3D



120MP Sensor
Dual 60MP Sensors

35, 55, 85, 135mm
Adjustable Lenses

1.0-17mm
at 12 Meters

99%
Coverage

4-5 Billion
Points

Inspection Class

DJI P4P V2



20MP Sensor
Single

8.8mm
Fixed Lens

4.0-12.0mm
at 5 Meters

80%
Coverage

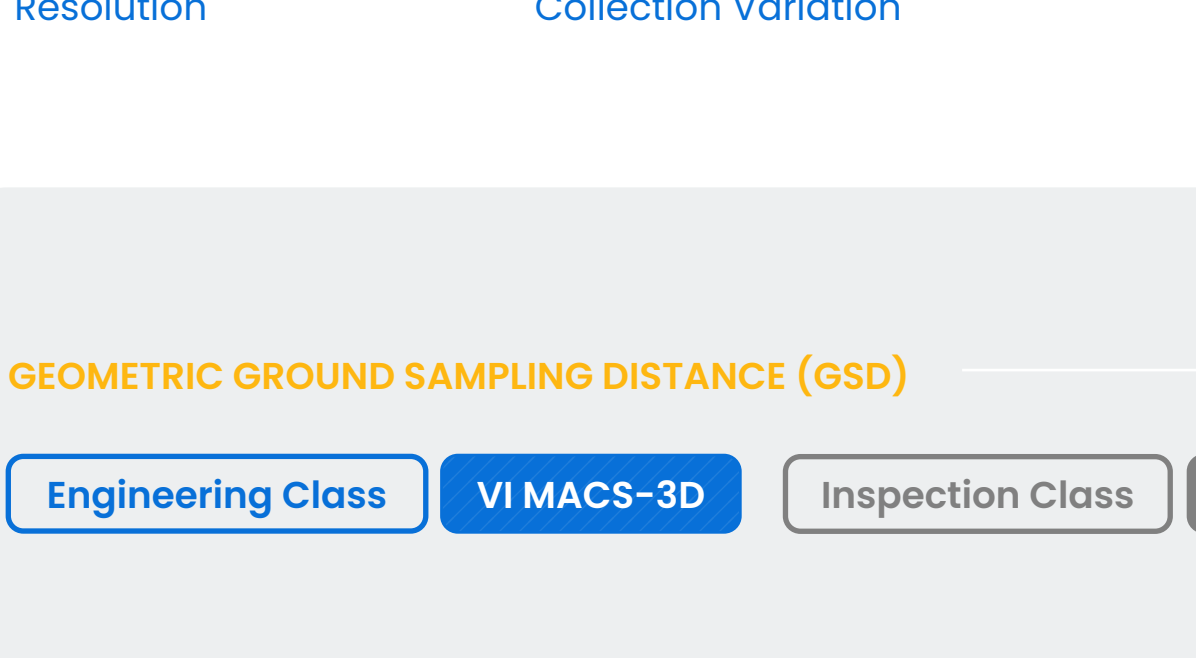
100 Million
Points

Accuracy

RESOLUTION

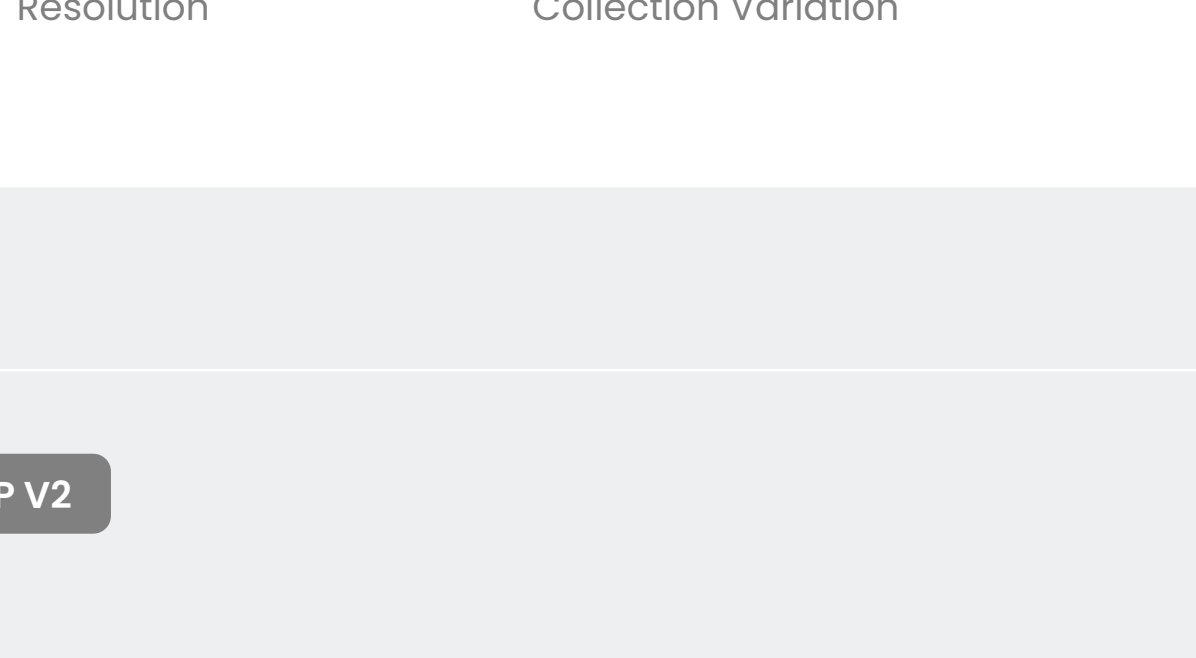
Engineering Class

VI MACS-3D AT 12 METERS (40 FEET)



Inspection Class

DJI P4P V2 AT 5 METERS (18 FEET)



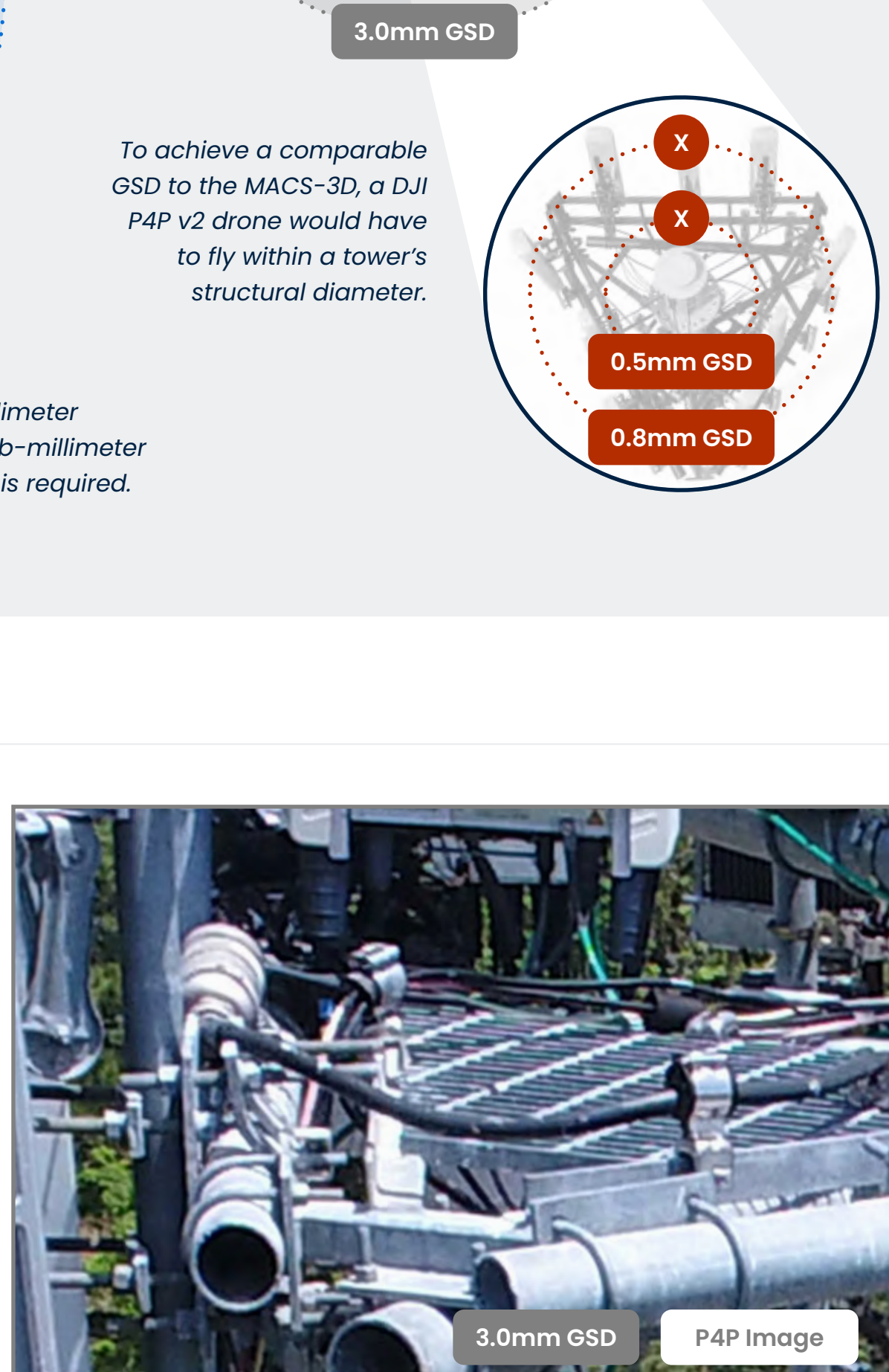
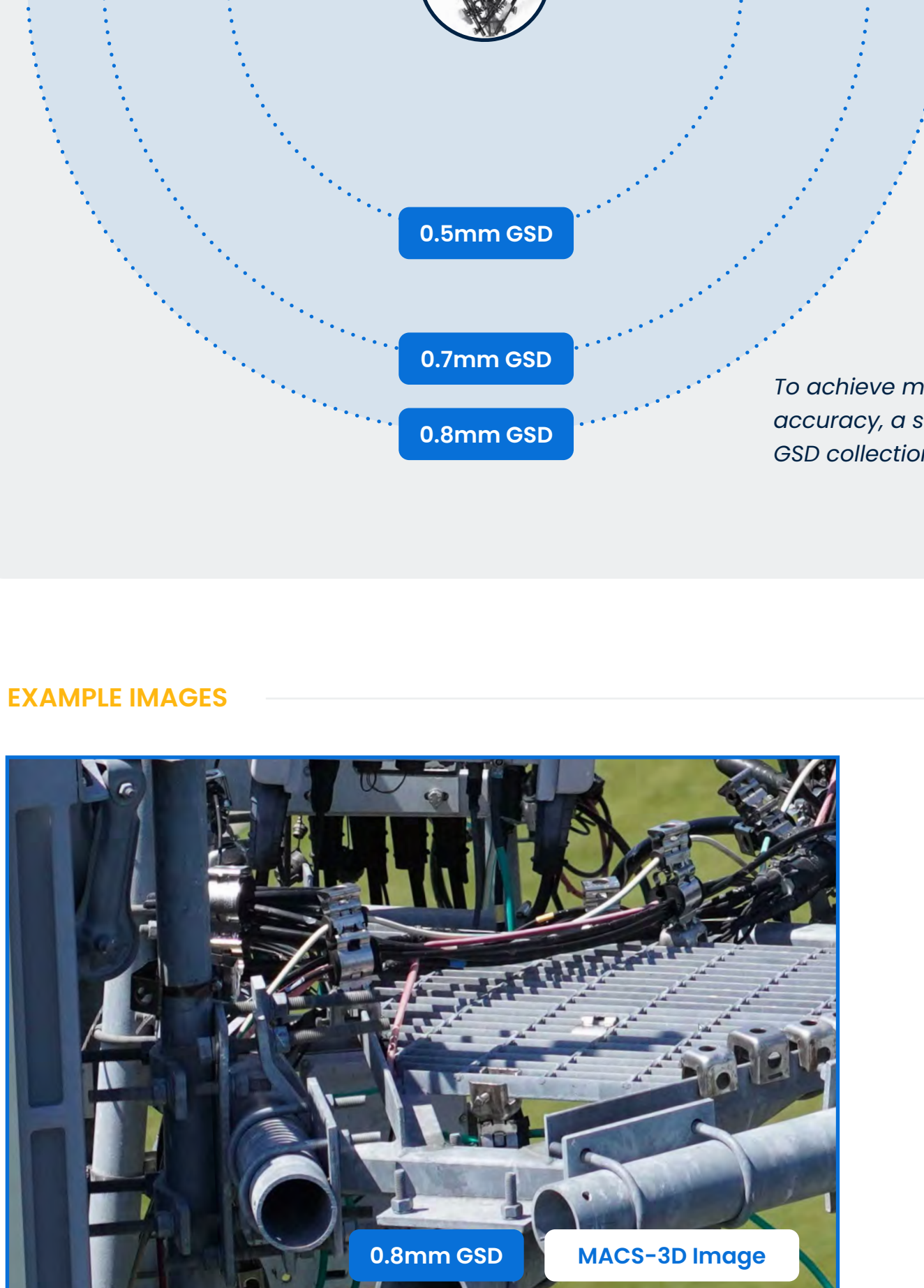
GEOMETRIC GROUND SAMPLING DISTANCE (GSD)

Engineering Class

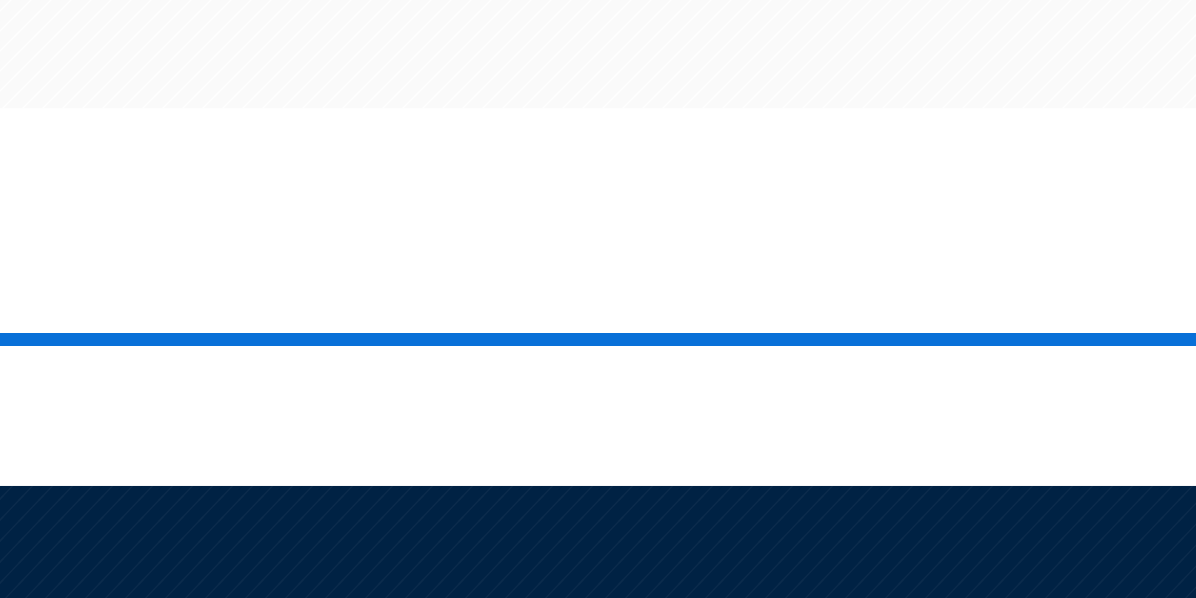
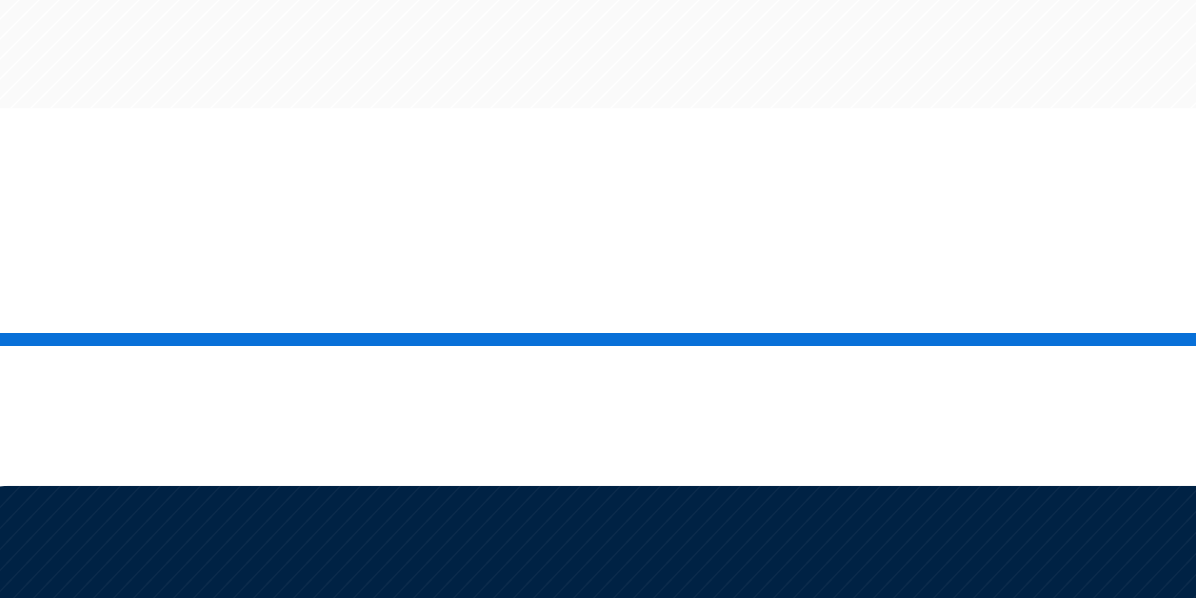
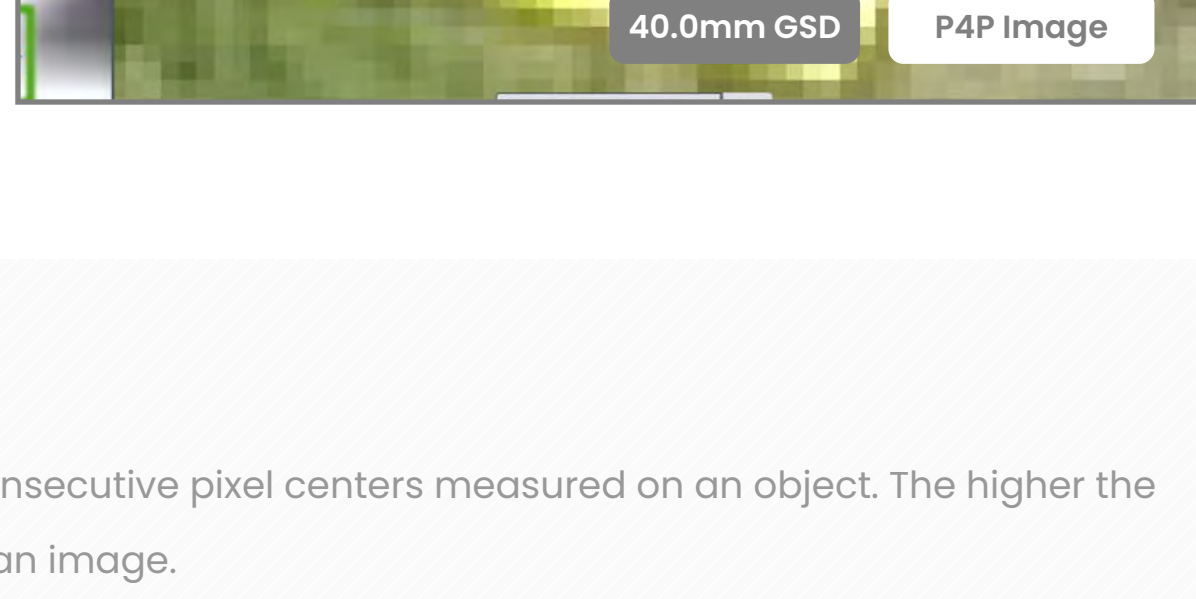
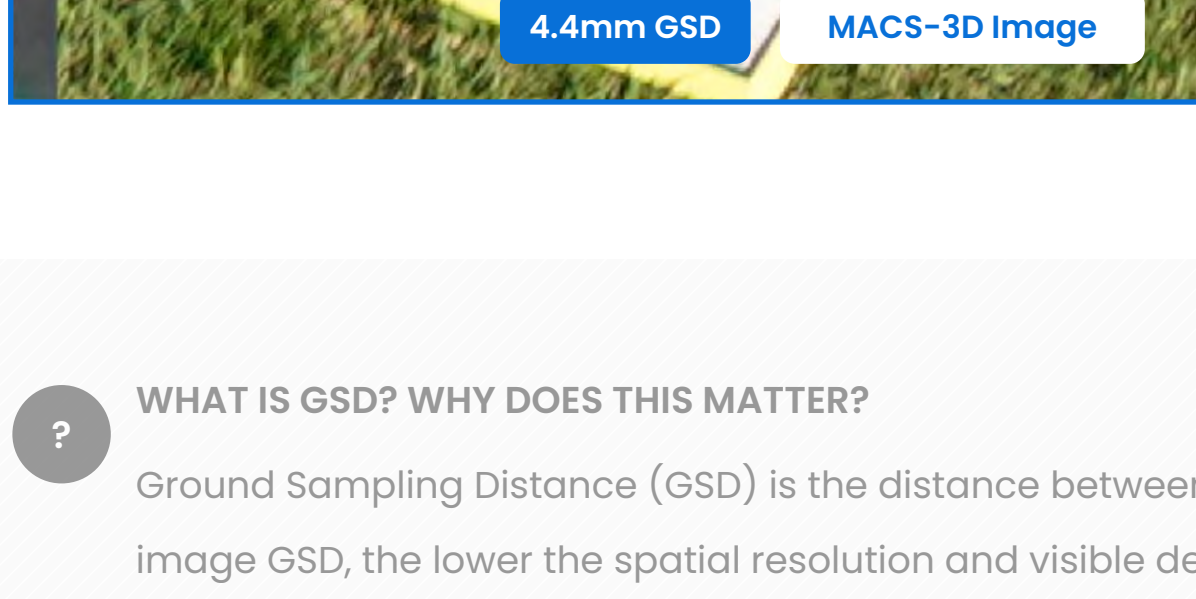
VI MACS-3D

Inspection Class

DJI P4P V2



EXAMPLE IMAGES



WHAT IS GSD? WHY DOES THIS MATTER?

Ground Sampling Distance (GSD) is the distance between two consecutive pixel centers measured on an object. The higher the image GSD, the lower the spatial resolution and visible details of an image.

Pixels on Target

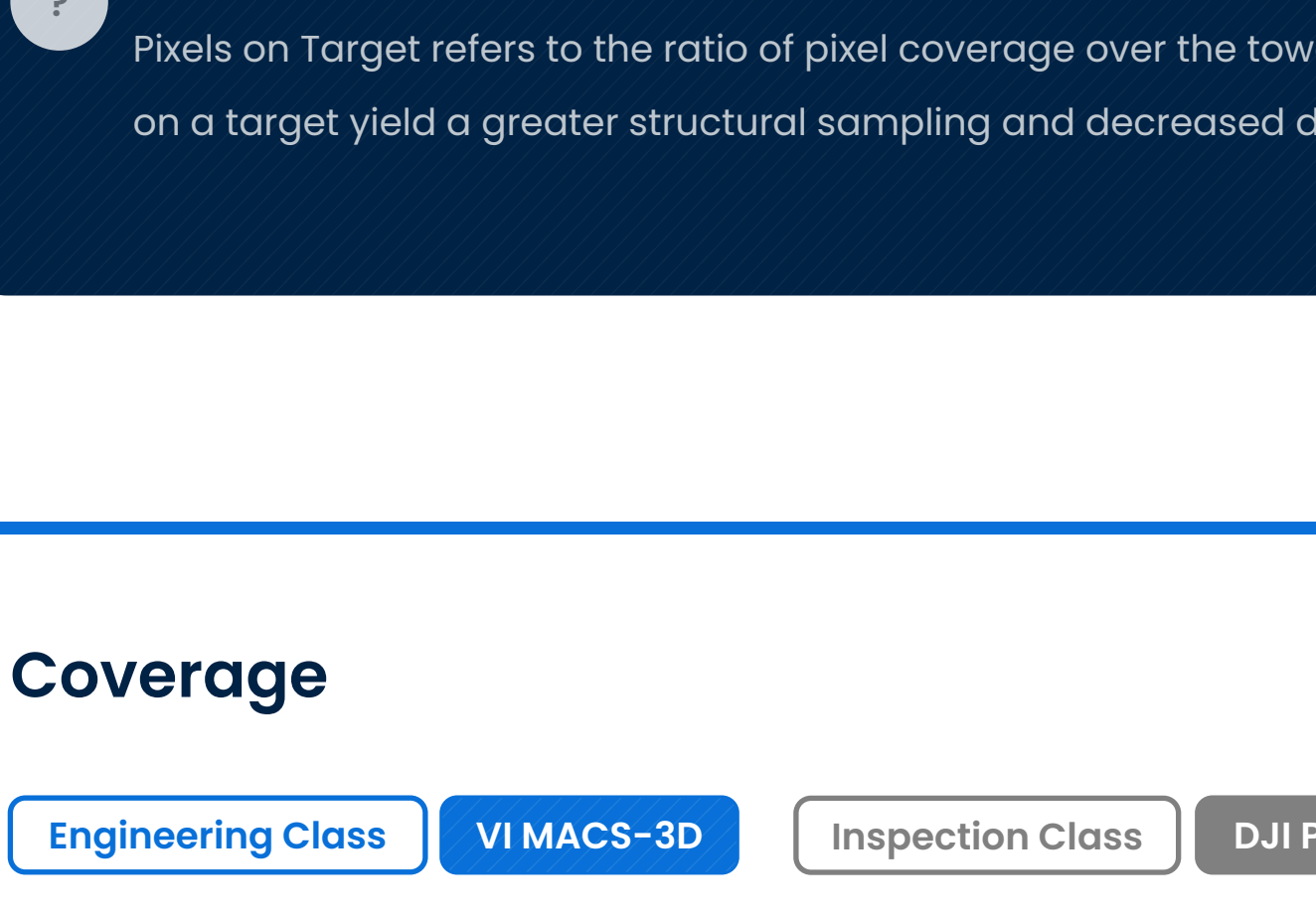
Engineering Class

VI MACS-3D

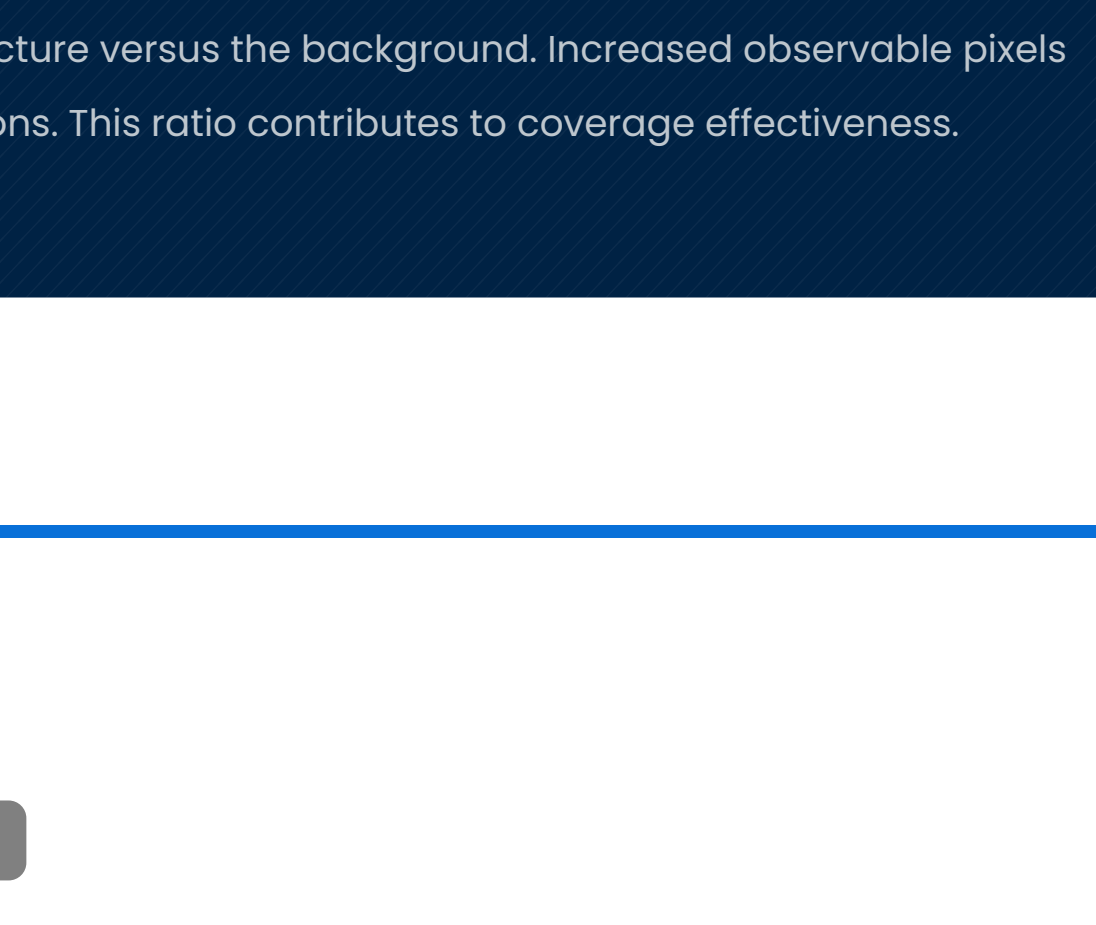
Inspection Class

DJI P4P V2

FIELD OF VIEW



PIXELS ON TARGET



WHAT IS PIXELS ON TARGET?

Pixels on Target refers to the ratio of pixel coverage over the tower structure versus the background. Increased observable pixels on a target yield a greater structural sampling and decreased distortions. This ratio contributes to coverage effectiveness.

Coverage

Engineering Class

VI MACS-3D

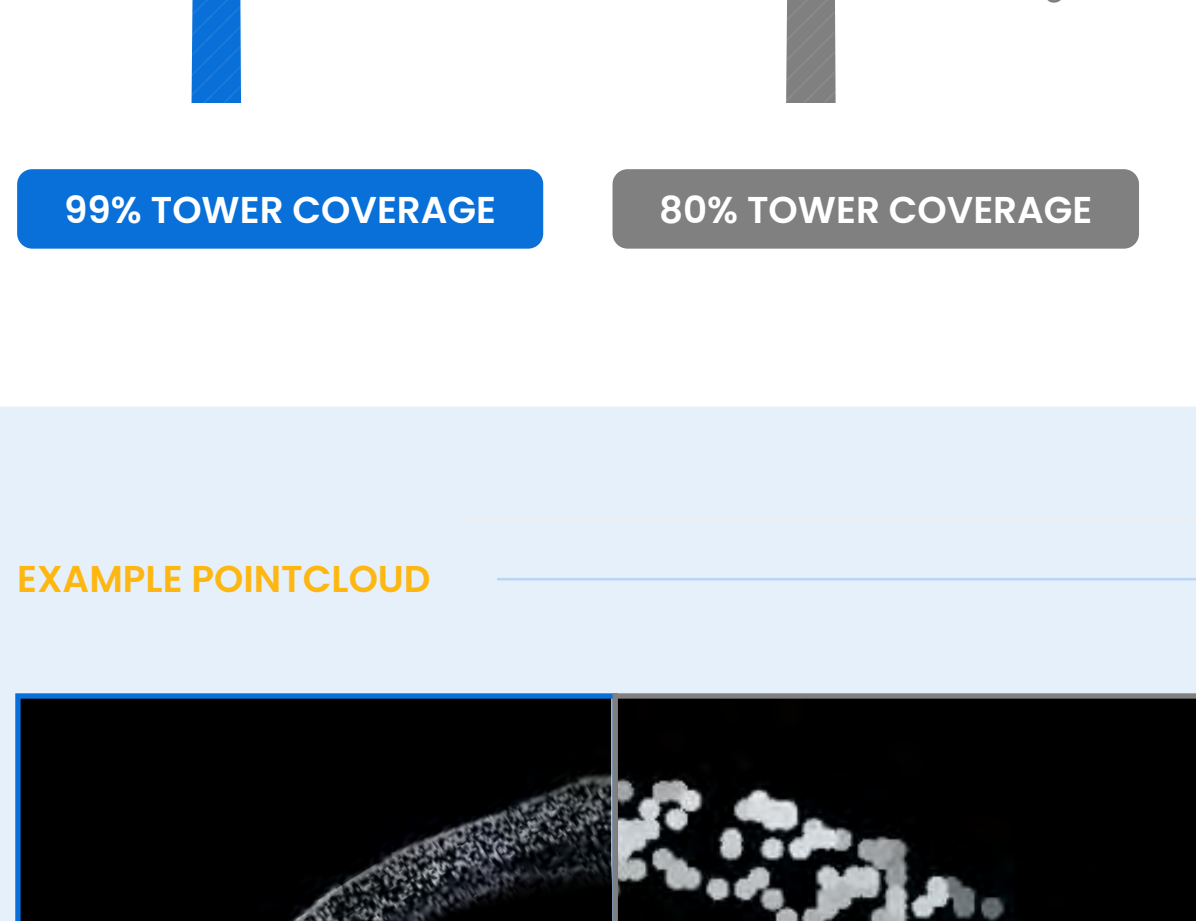
Inspection Class

DJI P4P V2

POINTCLOUD DENSITY

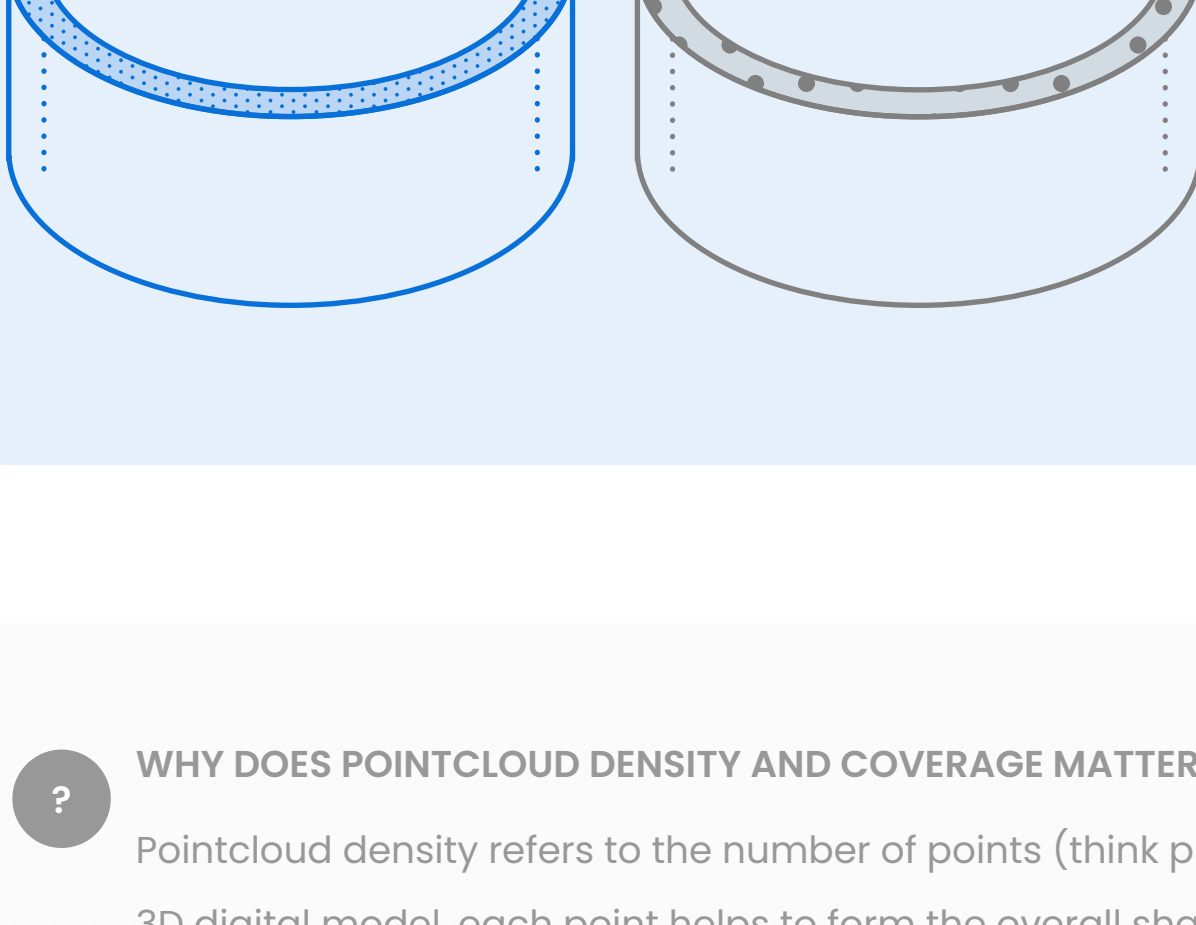


SURFACE COVERAGE

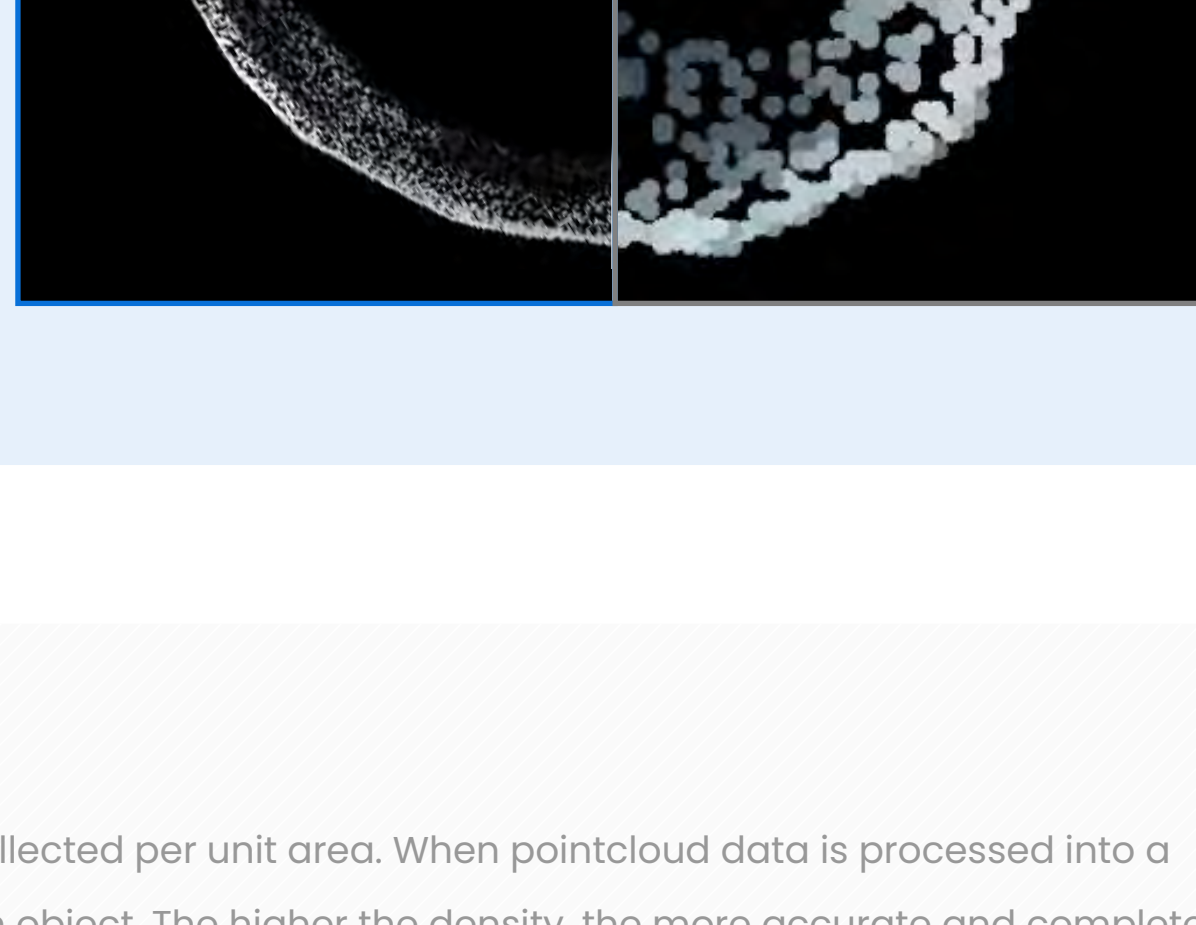


Typically, there is insufficient data overlap and coverage under platforms and in complex structural areas (such as cabling or equipment clusters) that create poor 3D renderings.

MEASURABILITY



EXAMPLE POINTCLOUD



3D Modeling

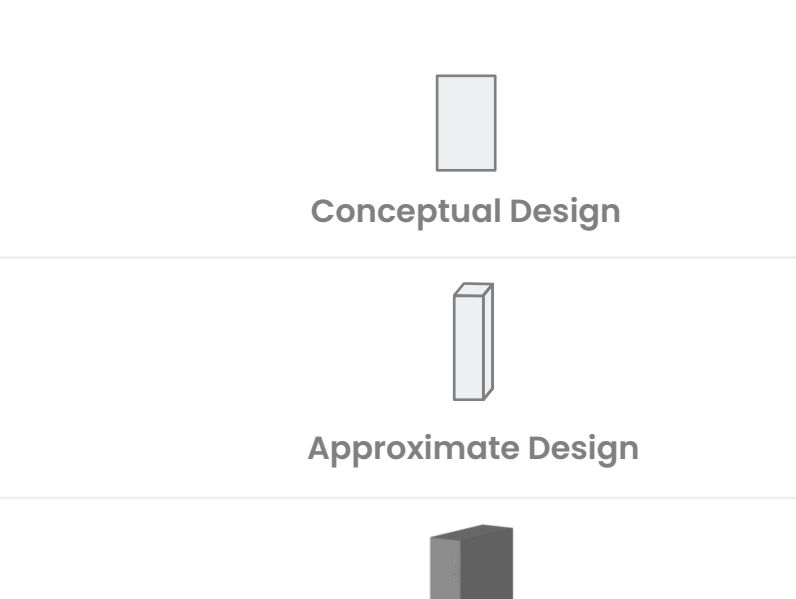
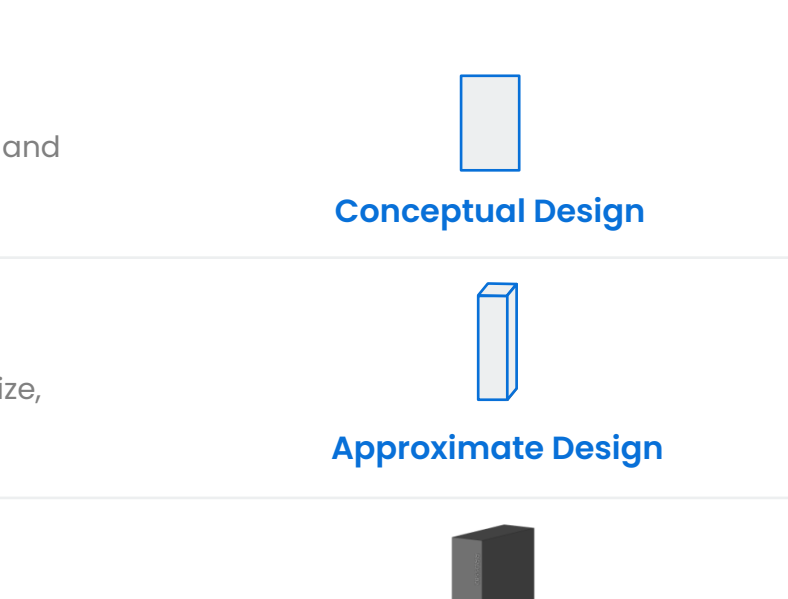
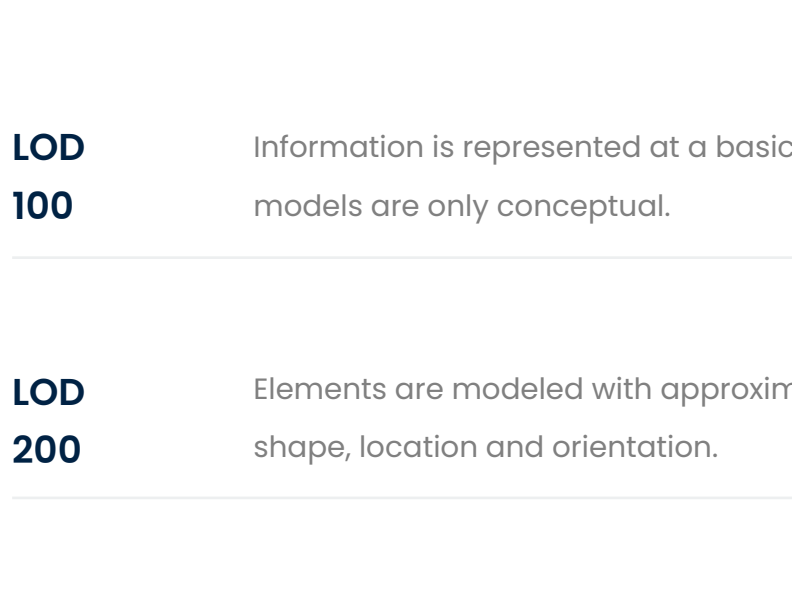
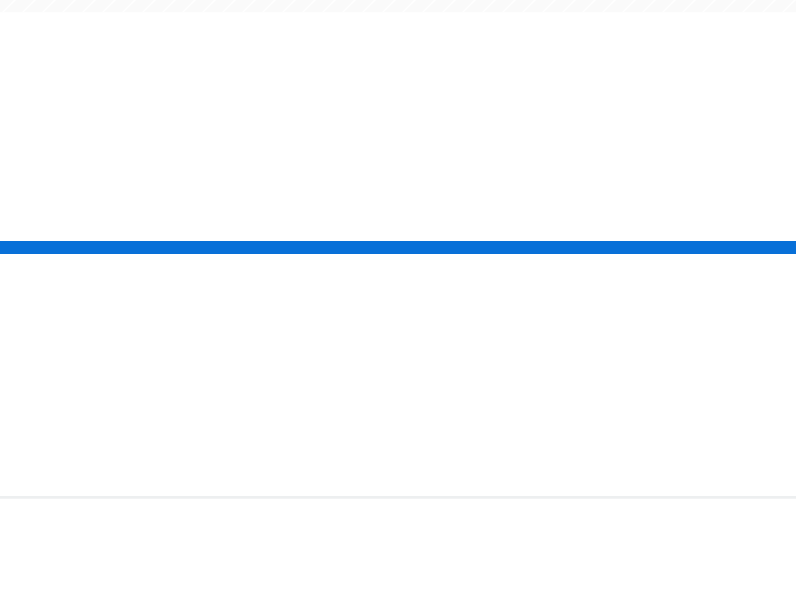
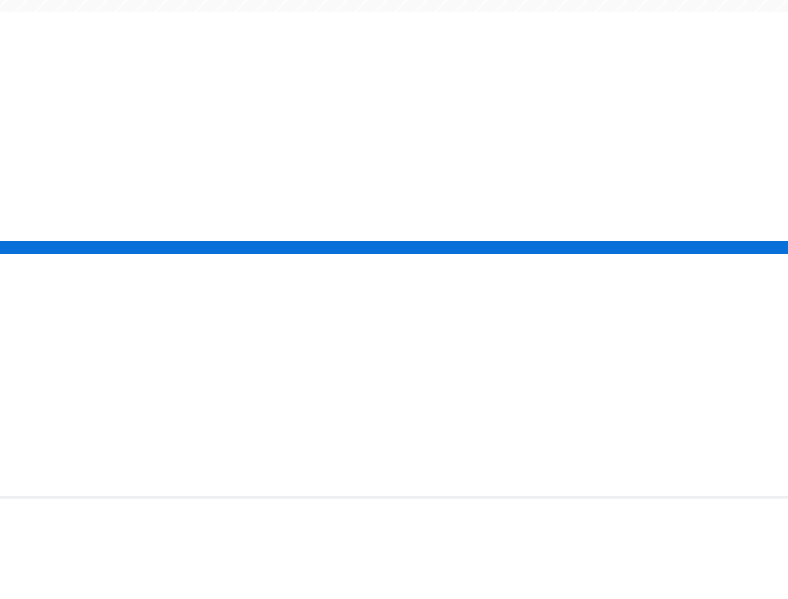
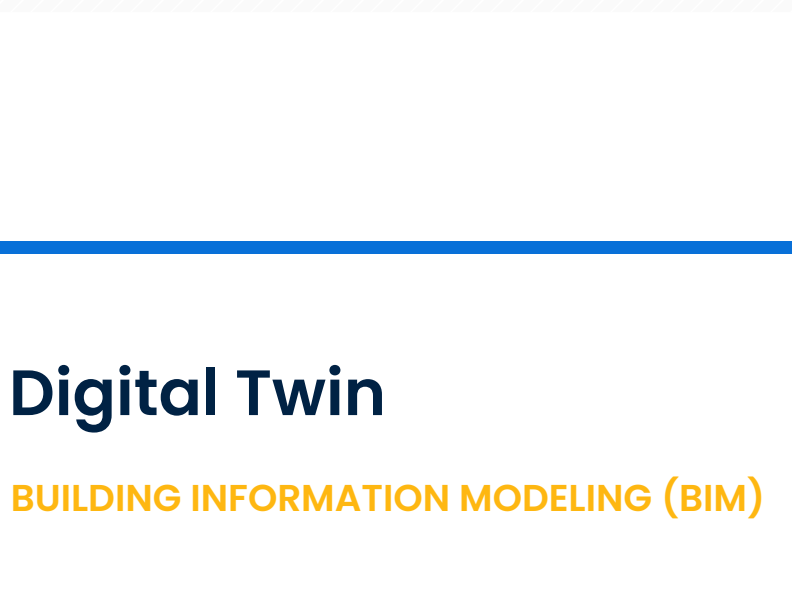
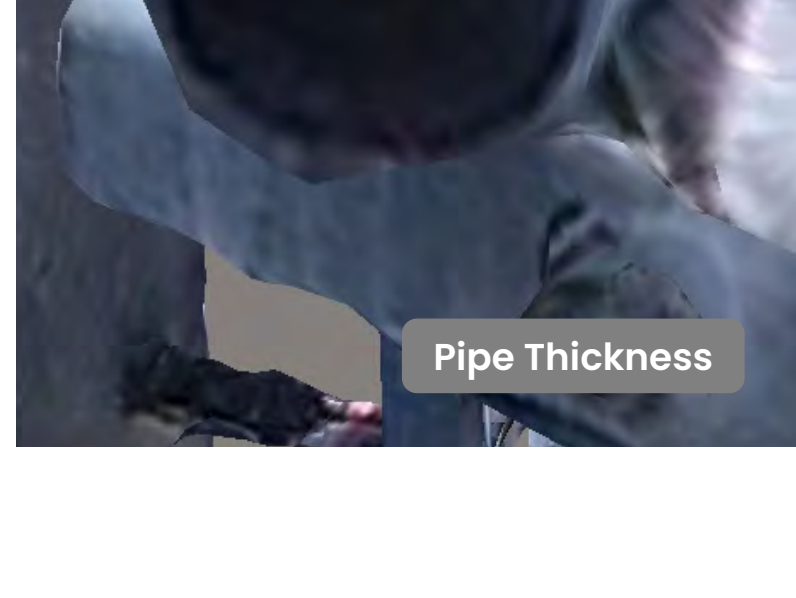
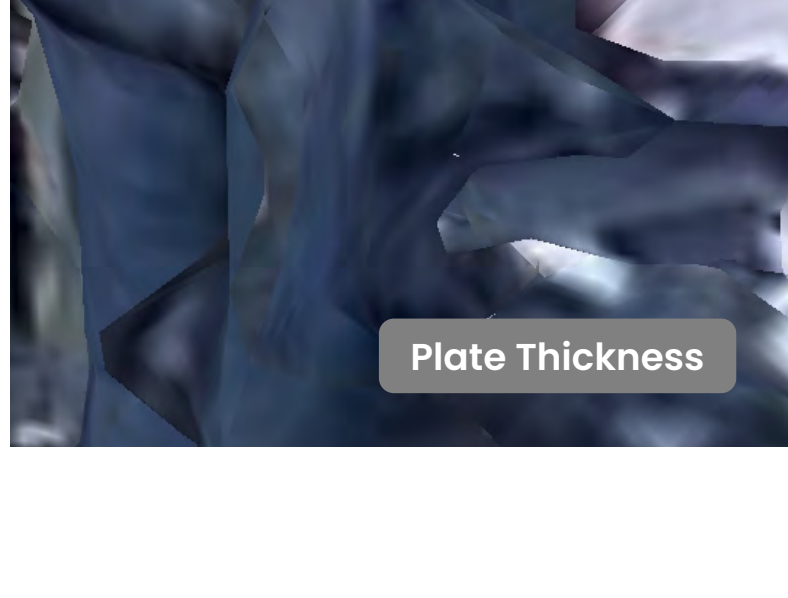
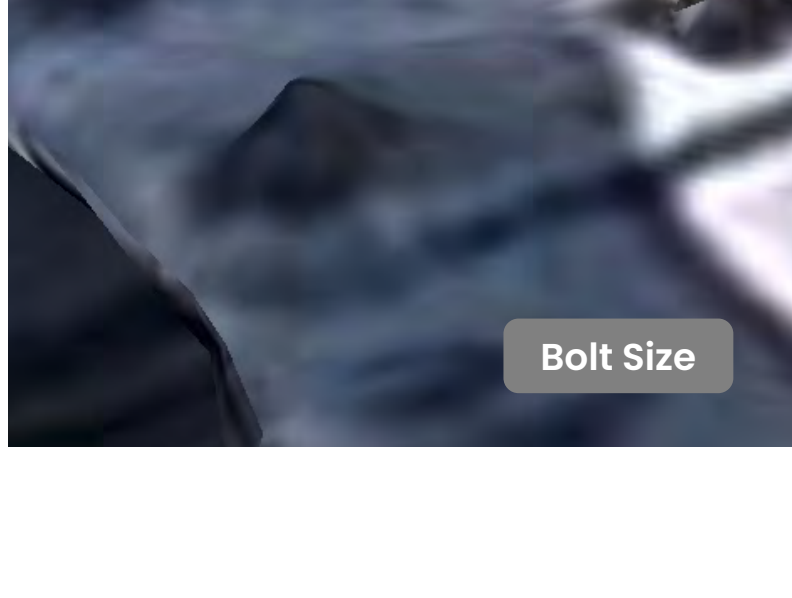
Engineering Class

VI MACS-3D

Inspection Class

DJI P4P V2

CRITICAL MEASUREMENTS



Digital Twin

BUILDING INFORMATION MODELING (BIM)

	Engineering Class VI MACS-3D	Inspection Class DJI P4P V2
LOD 100	Information is represented at a basic level and models are only conceptual. Conceptual Design	Information is represented at a basic level and models are only conceptual. Conceptual Design
LOD 200	Elements are modeled with approximate size, shape, location and orientation. Approximate Design	Elements are modeled with approximate size, shape, location and orientation. Approximate Design
LOD 300	Models are accurately defined with specific assemblies, precise size, location and orientation. Detailed Design	Models are accurately defined with specific assemblies, precise size, location and orientation. Detailed Design
LOD 400	Models provide engineering precision with specific size, shape, location and orientation. Fabrication & Assembly	Models provide engineering precision with specific size, shape, location and orientation. Fabrication & Assembly
LOD 500	Model elements meet LOD 400 specifications and are field-verified and updated as built. As-Built	Model elements meet LOD 400 specifications and are field-verified and updated as built. As-Built

HOW DOES A 3D MODEL FIDELITY RELATE TO BIM?

Because legacy tower data is typically poor, BIM requires an accurate and up-to-date digital footprint of the site. 3D models serve as a foundation for BIM, however BIM is constrained by its input. Where accuracy and coverage is poor, level of detail is low.

EXAMPLE CAPABILITIES

	Engineering Class VI MACS-3D	Inspection Class DJI P4P V2
SITE MAPPING	✓	✓
AI / ML MAJOR EQUIPMENT DETECTION	✓	✓
MOUNT MAPPING	✓	✗
TOWER MAPPING	✓	✗
TIA REPORTS	✓	✗
MOUNT ANALYSIS	✓	✗
TOWER ANALYSIS	✓	✗
AUTOMATED CHANGE DETECTION	✓	✗
AI / ML MAJOR FEATURE IDENTIFICATION	✓	✗

HOW DOES ACCURACY AND COVERAGE ENABLE MORE CAPABILITIES?

As data quality increases, so too does its applications. Higher fidelity and increased coverage provide a better representation of a tower structure. When millimeter accuracy is achieved, artificial intelligence can automate engineering reports and analysis.

Millimeter accuracy is changing how tower companies operate.

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Visual Intelligence is the first and only drone sensor and software automation platform that digitizes tower infrastructure with millimeter accuracy to reliably deliver 3D, engineering-grade asset intelligence.

visual intelligence

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