

Drone Facade Inspection Flight Mission Plan

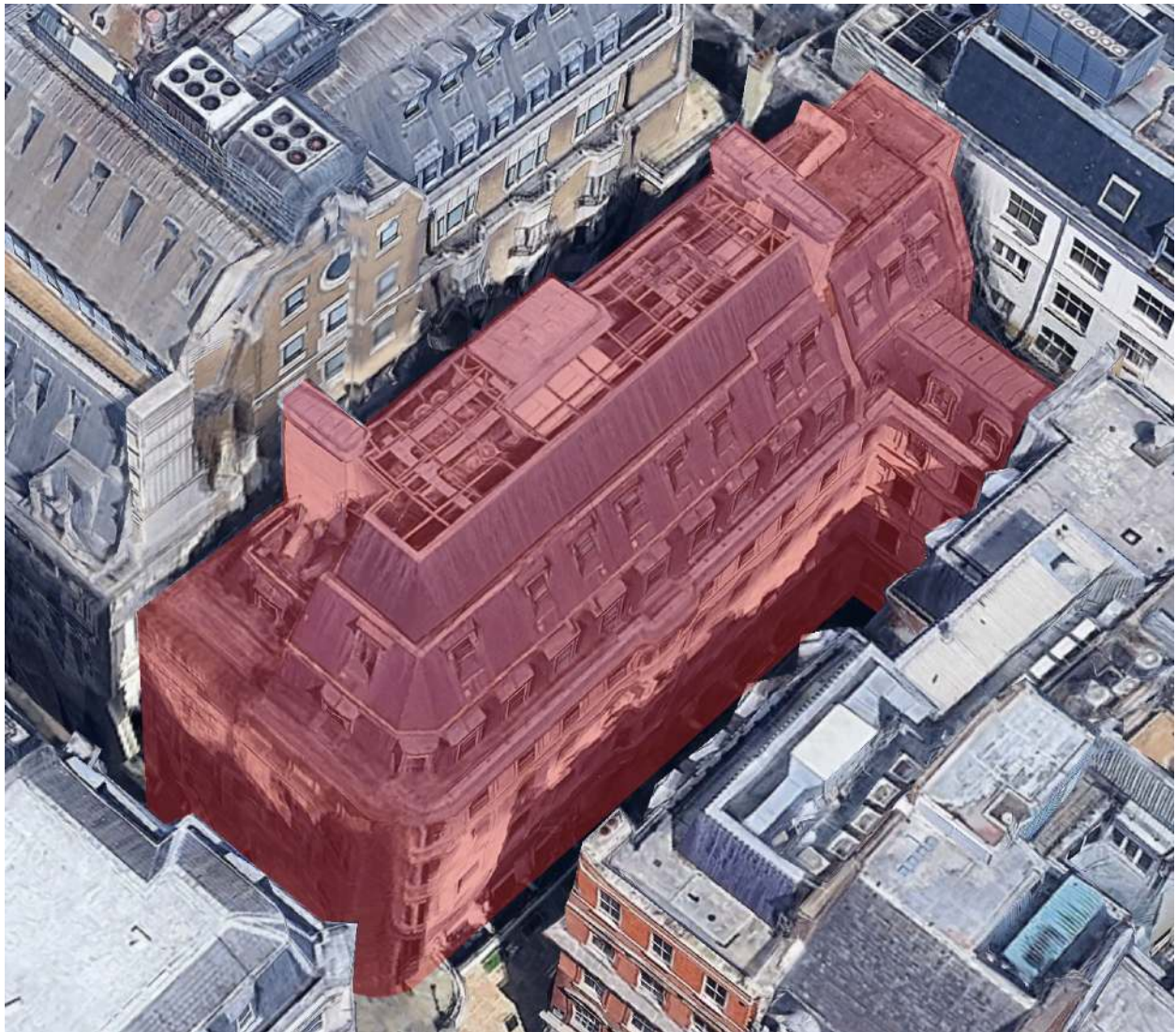
Building: 15 Austin Friars

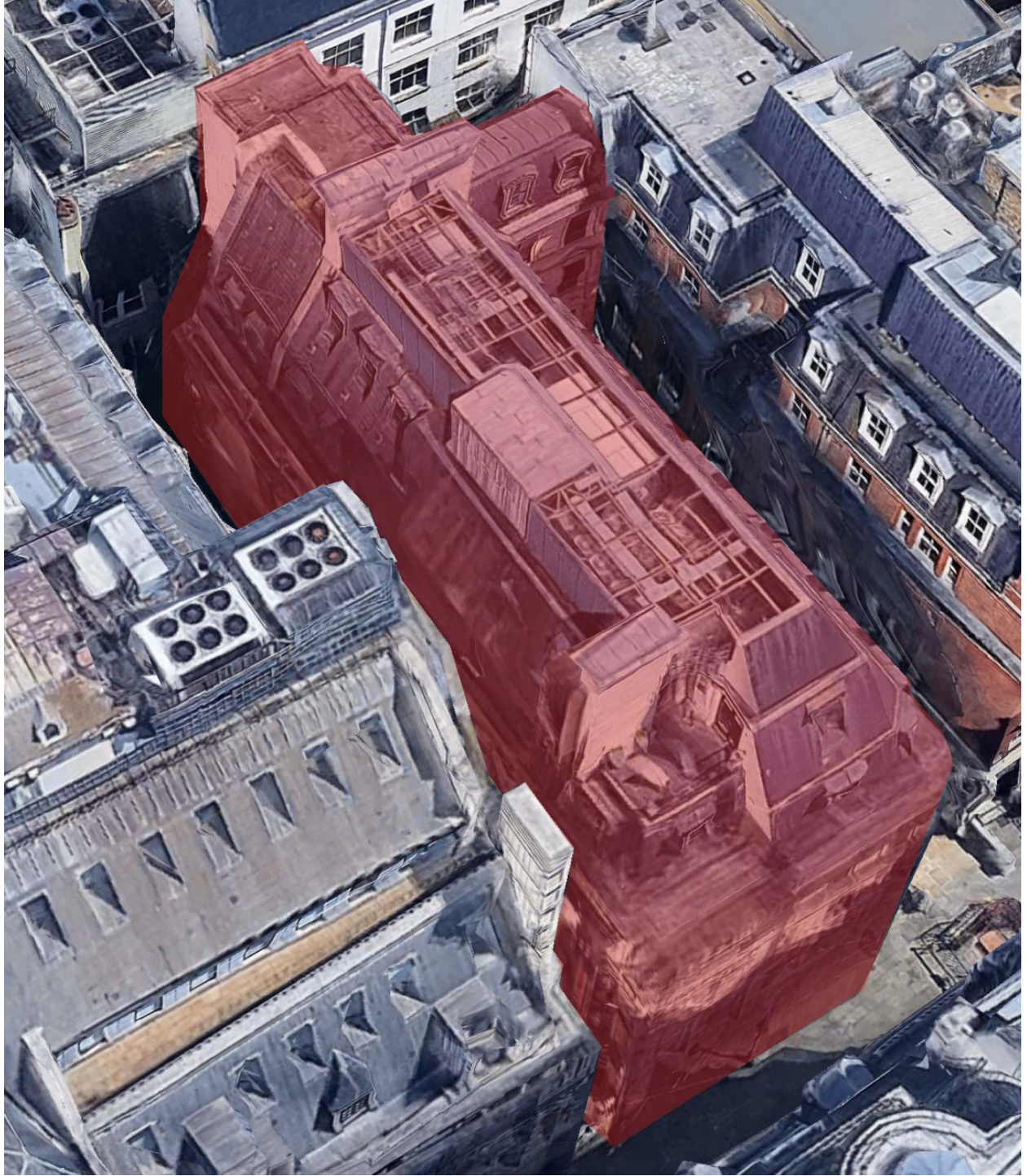
Address: 15 Austin Friars, London EC2N 2HE, UK

Google Maps Link: [📍 15 Austin Friars](#)

Objective:

- **Assess Condition and Structural Integrity:** Capture high-resolution and thermal images for a thorough evaluation of the facade's current state and structural health.
- **Determine Maintenance Needs:** Use the captured data to identify necessary repairs and maintenance.
- **Generate a Detailed 3D Model:** Utilize the high-resolution imagery to create a precise three-dimensional model of the structure.





1. Equipment

- **Drone:** DJI Mavic 3T with RTK module and GNSS Mobile Base Station
- **Accessories:** Spare batteries, chargers, memory cards, thermal imaging attachment
- **Image Specs:** 8000 × 6000 px (visual)

2. Pre-Flight Checklist

- **System and Location Setup:**
 - Set the home point and confirm GPS / RTK functionality.
 - Verify the correct Project ID is displayed in the Pilot Viewer.
- **Equipment Readiness:**
 - Confirm battery levels, ensuring spare batteries and chargers are available.
 - Check for formatted SD cards and the thermal imaging attachment.
- **Environmental Checks:**
 - Assess current weather and light conditions.
- **Safety Protocols:**
 - Ensure all necessary safety equipment is on hand.

3. Capture Rules

Note: Set timer to 2 seconds for automatic photo capture

Area	Distance	Overlap	Notes
Facade	3 m (2 m for tight/recessed areas)	90% ▾	Adjust for obstacles, recessed areas and corners
Roof	3 m from surface	90% ▾	Adjust altitude & gimbal for slopes
Orbit	20 – 30 m from building	90% ▾	Avoid flying over streets, partial orbits allowed
Handheld	3 m	90% ▾	For lower facades or obstructed areas

The codes for highlights in the sample images represent specific meanings or instructions. Each code corresponds to a particular area, and the highlights are used to emphasize important details.

- **BLUE**: This refers to the roof inspection images the pilot should capture. Set the drone's gimbal to an 85-degree angle if possible, ensuring clear coverage, proper overlap, distance, and movement. Since each roof is different, refer to the video of the flight plan for guidance to ensure the images are accurate.
- **RED**: is for the facade inspection images, keep a distance of 3 meters to ensure proper overlap. Move vertically along the walls and make sure to capture the corners for full coverage. You can also refer to the video in the flight mission plan for guidance.
- **Yellow**: Yellow line indicates the path for the image inspection. In most cases, the flight should be vertical along the building walls and roof, with no horizontal flights unless there are special circumstances. This approach ensures maximum image overlap

On the links below are some examples how inspection images should be captured:

[Facade images](#)

[Inspection images - angles \(roof etc\)](#)

[Corners etc](#)

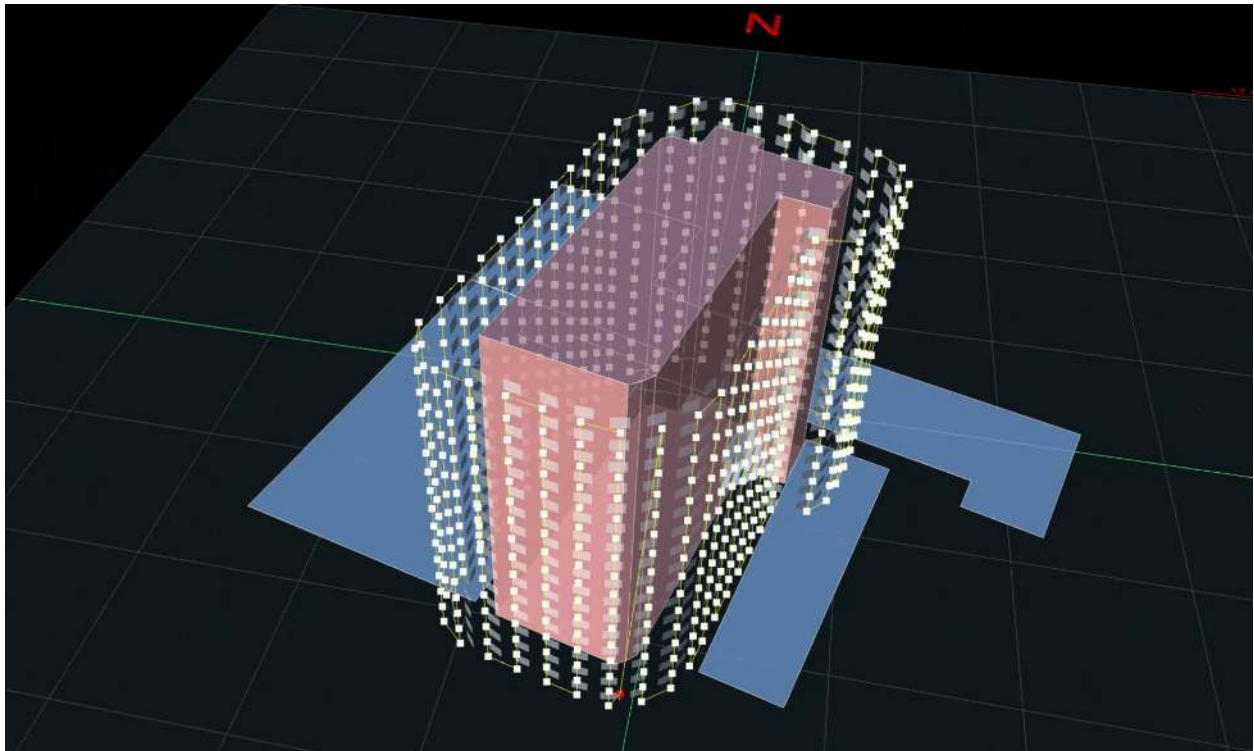
Note: In some areas, there may be trees or obstacles blocking the drone's path. To capture the details behind these obstacles, try taking the images from different angles, such as sideways or top-down. If necessary, a handheld camera can be used, depending on the circumstances.

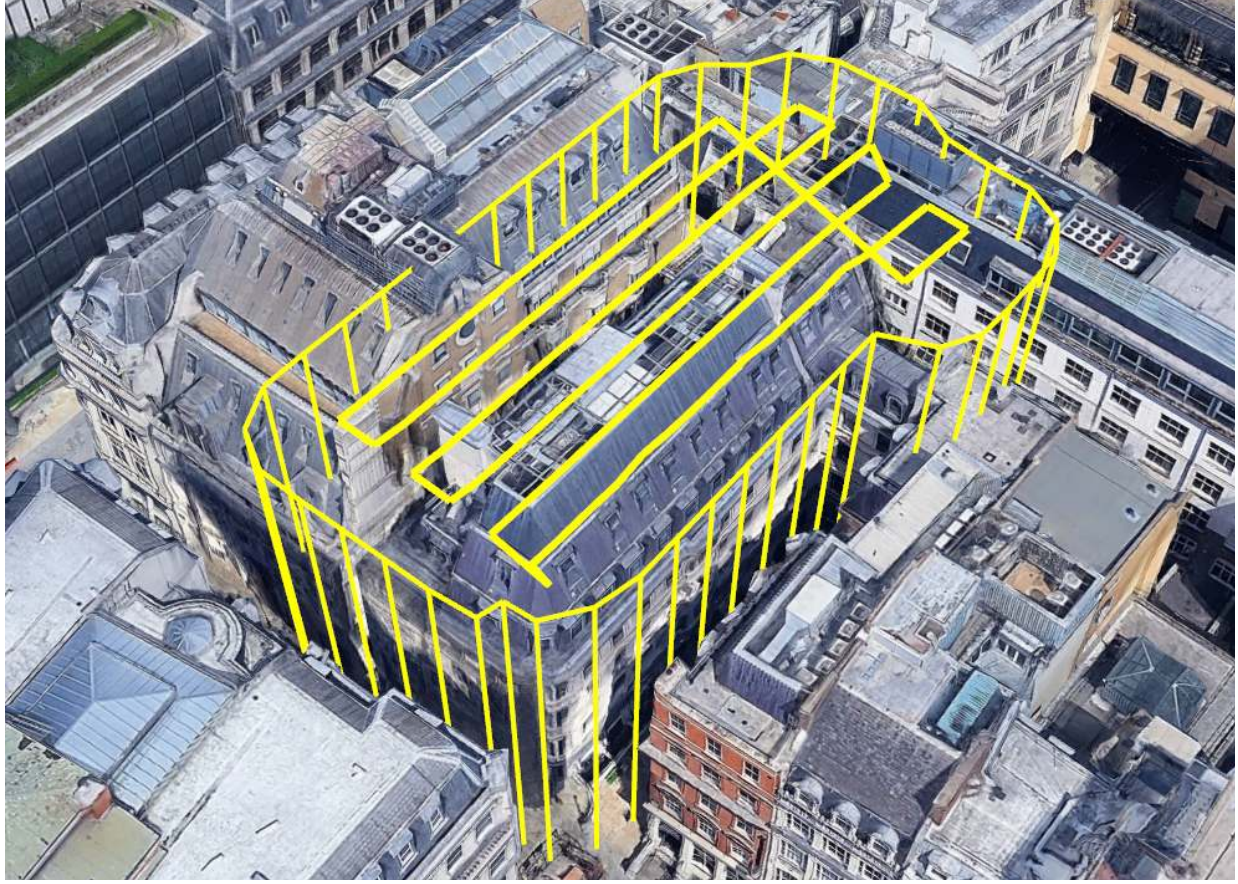
Follow the visual reference below as the recommended flight method for this operation. Please note that the provided reference serves only as a visual model. Actual site conditions, structural clearances, and surrounding obstacles may vary. All flight paths should be adjusted on-site based on real-time assessments, GPS performance, and environmental factors such as wind and lighting.

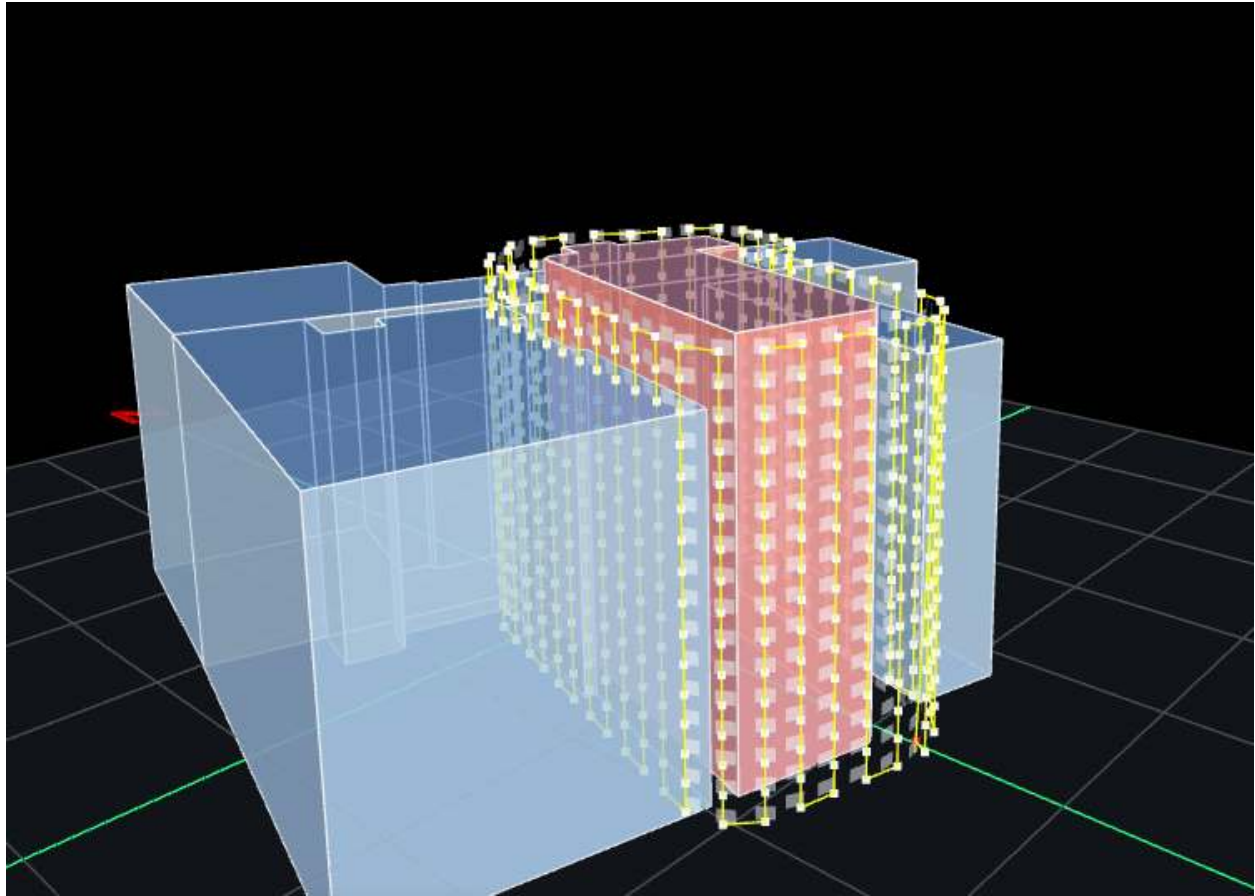
- Use the additional reference images provided to understand the real-world context, scale, and geometry of the structure before flight execution.

Facade Inspection Flight Path:

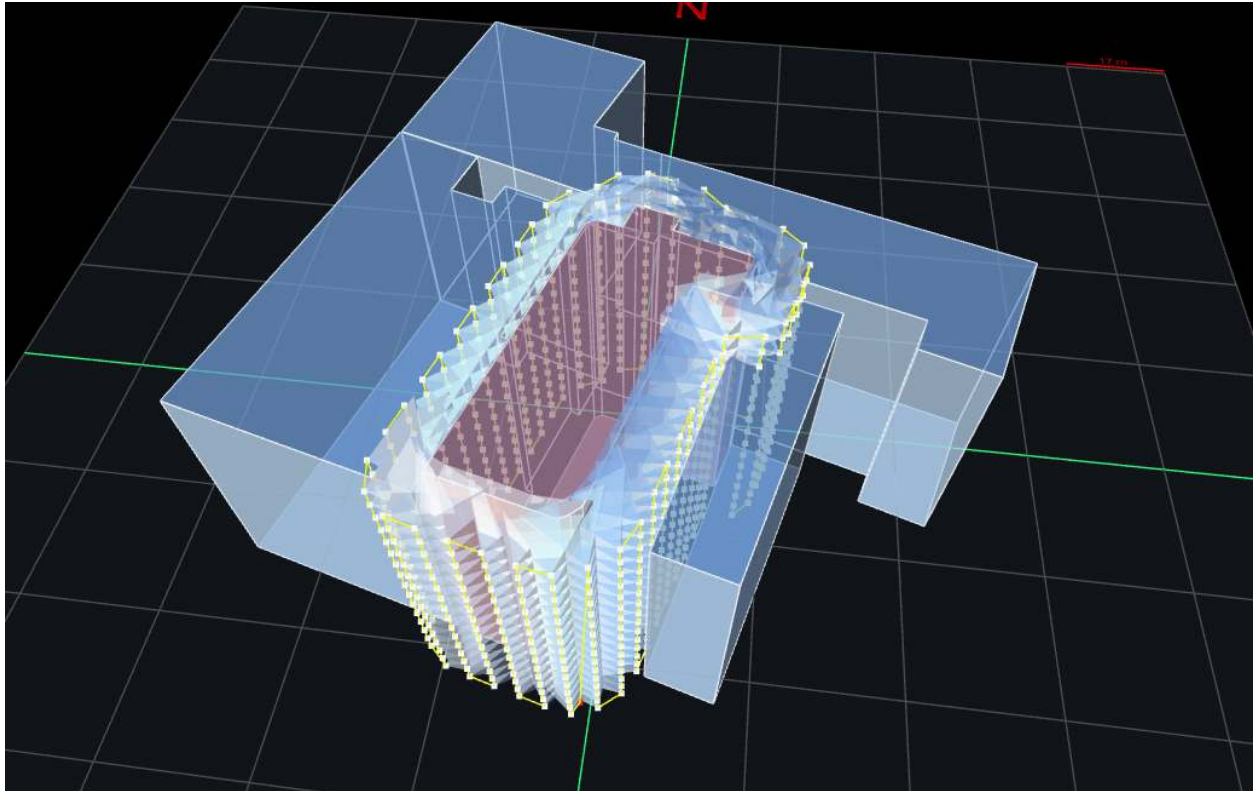
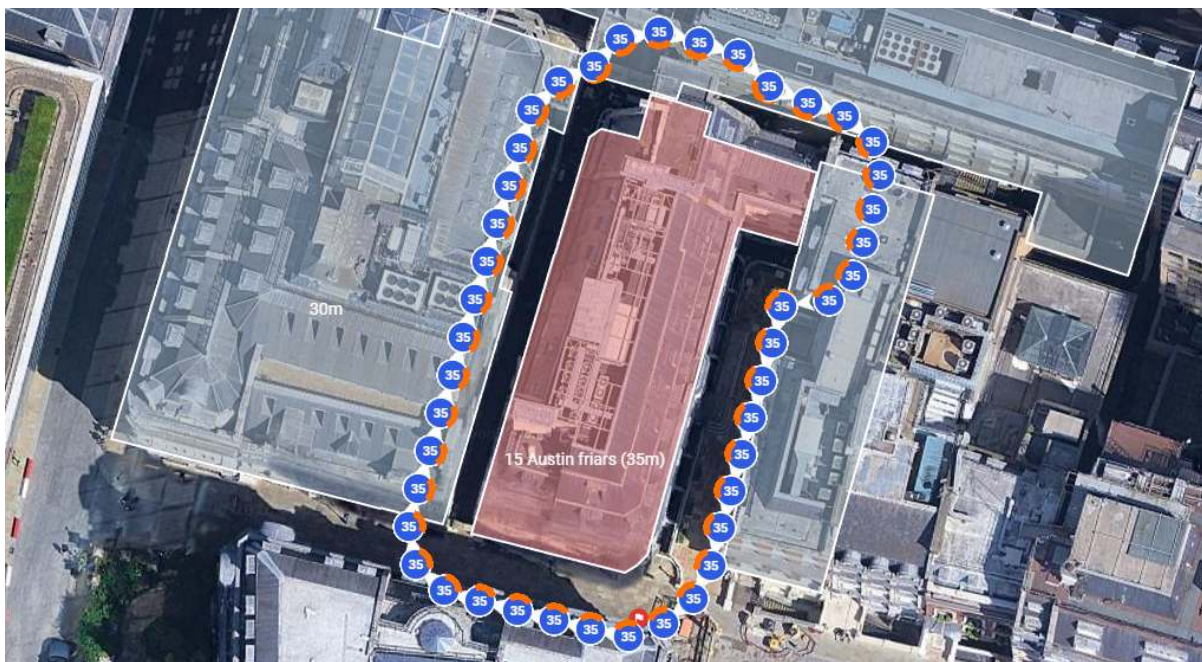
Conduct a vertical flight pattern along each facade, maintaining approximately 90% image overlap and a consistent distance of 3 meters from the building surface.





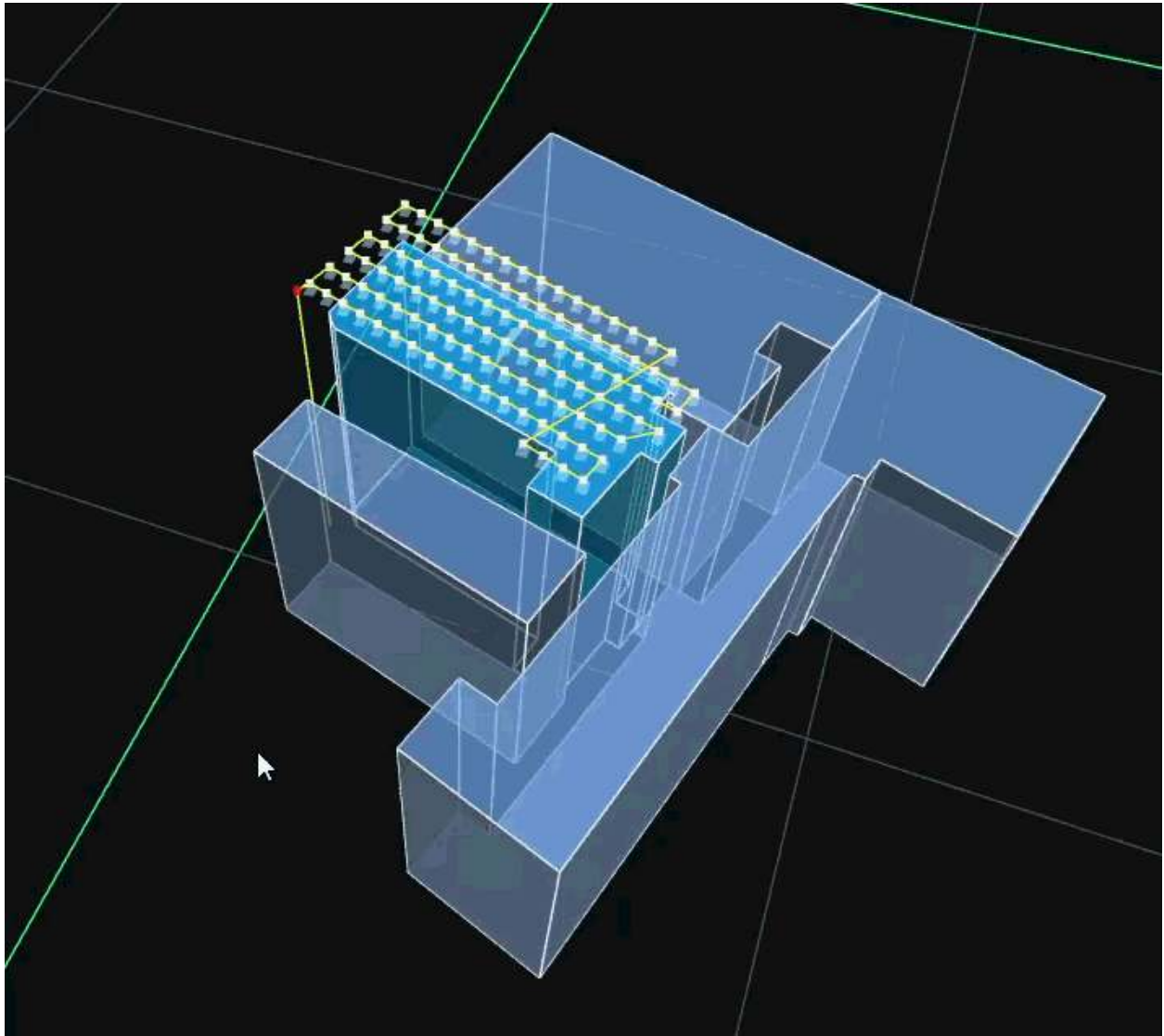


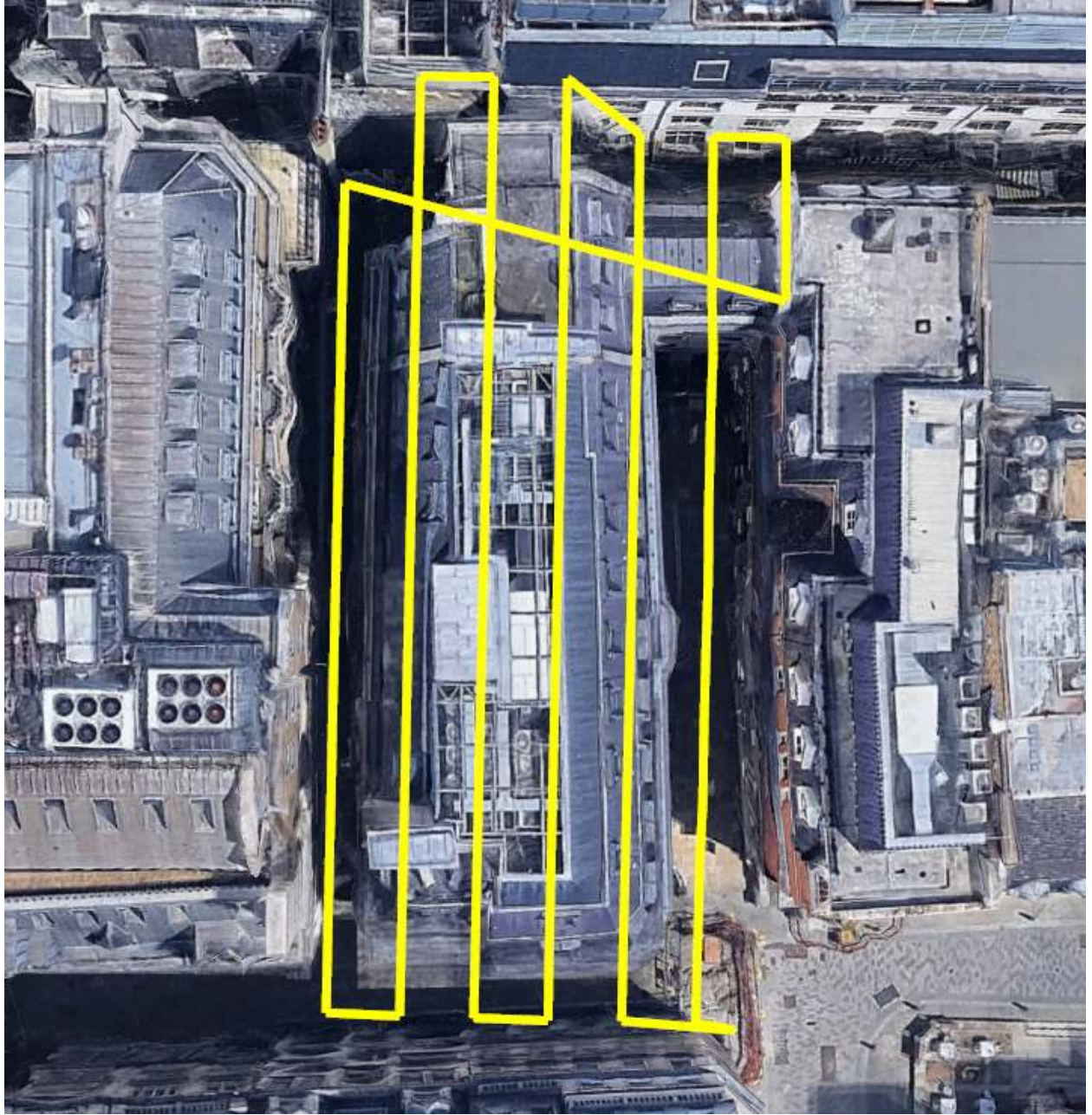
The gray cones indicate the camera waypoints and viewing angles directed toward the inspection wall. Ensure that all sides and areas are captured as shown in the waypoints to achieve proper coverage.

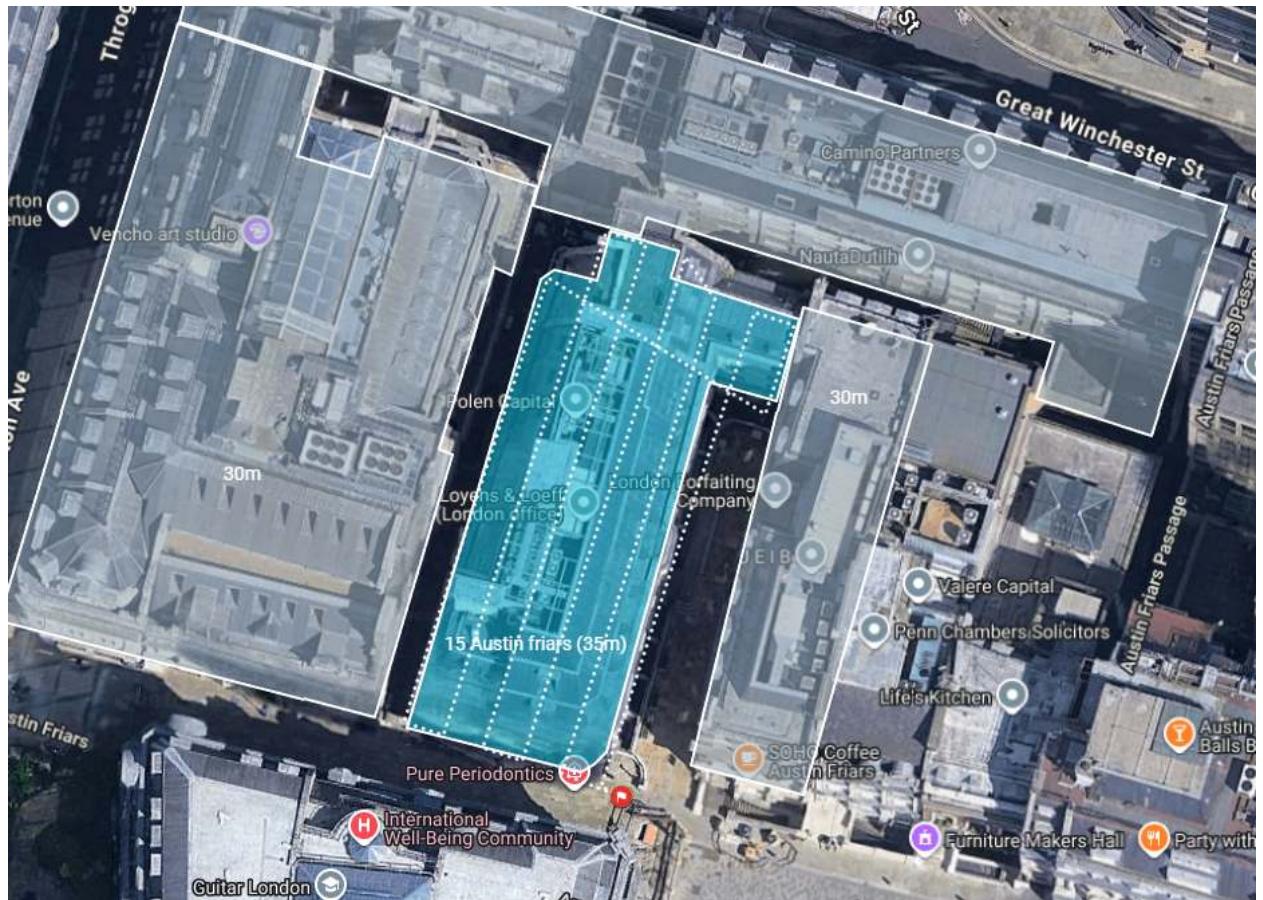


Roof Flight Path:

Conduct a horizontal flight pattern over the roof area, maintaining approximately 90% image overlap and a consistent distance of about 3 meters above the roof surface. Adjust altitude and gimbal angle as needed to capture varying elevations and roof features clearly.







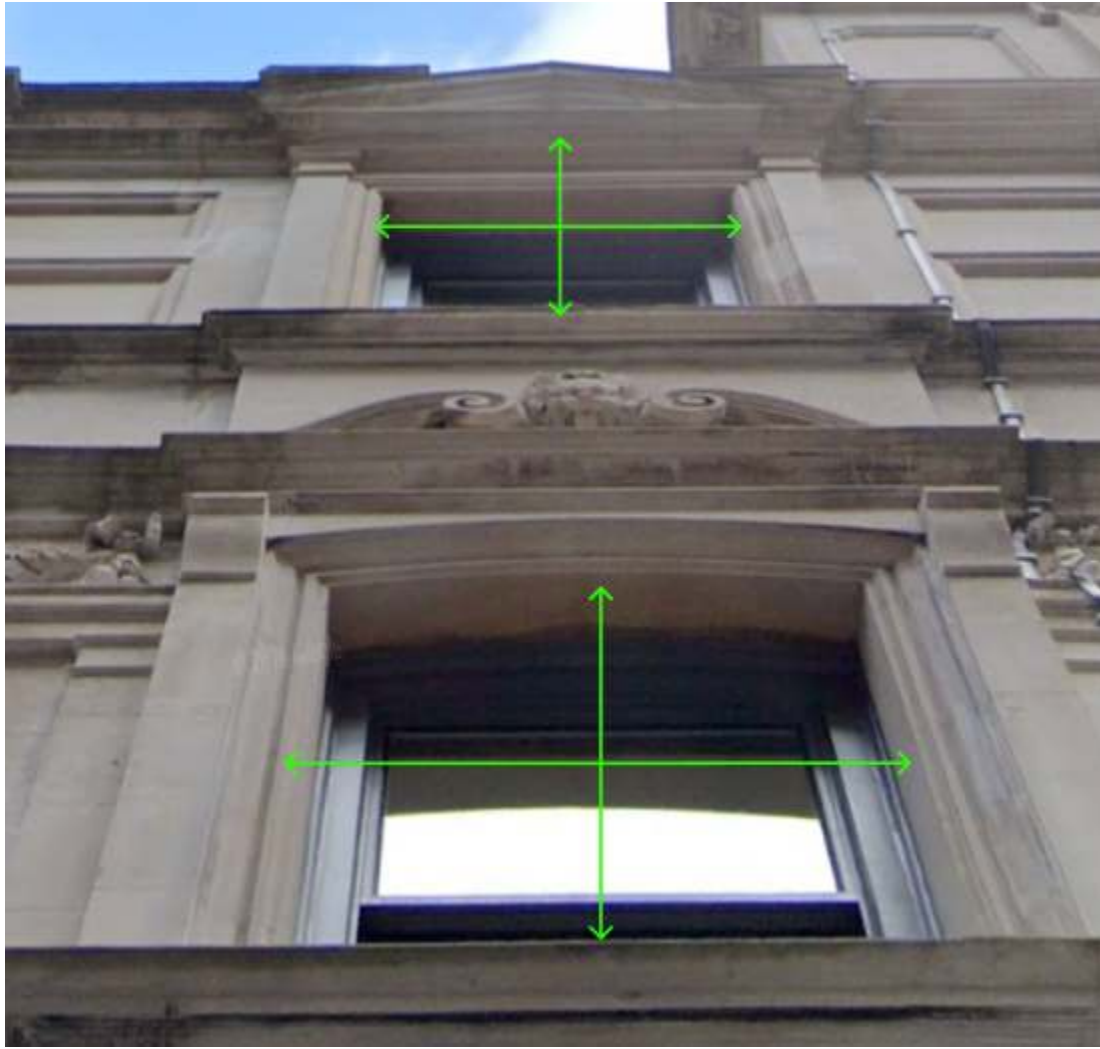
Areas Requiring Special Attention:

Please use the following images as a guide for capturing the areas that require special attention to detail. Use your best judgment when planning shots, and since there are only limited reference images available online, make sure to apply the same approach to any undocumented areas included in the inspection scope. The same capture method should be followed for all similar sections to ensure 100% detailed coverage of the building.

*Capture all **corner details**, as well as the **top and underside areas** marked with arrows, using **angled shots** in addition to the standard straight-on inspection passes. Ensure that all captures in these areas **maintain the required distance and image overlap** to preserve consistency and coverage quality. Follow this same method for all similar structures within the inspection scope.*



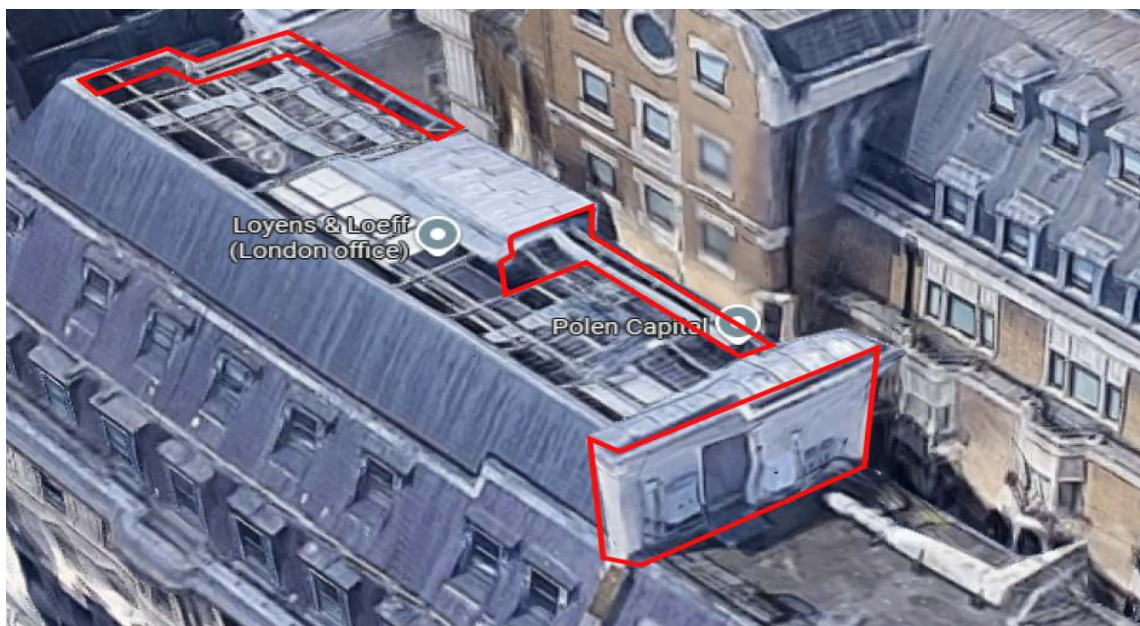
Since the windows have a recessed feature, capture the sides by adjusting the drone's yaw and angle. Make sure to add these details after the standard straight-on capture.



Capture the side details of the dormer windows by adjusting the drone's yaw angle and flying in both directions to capture both sides

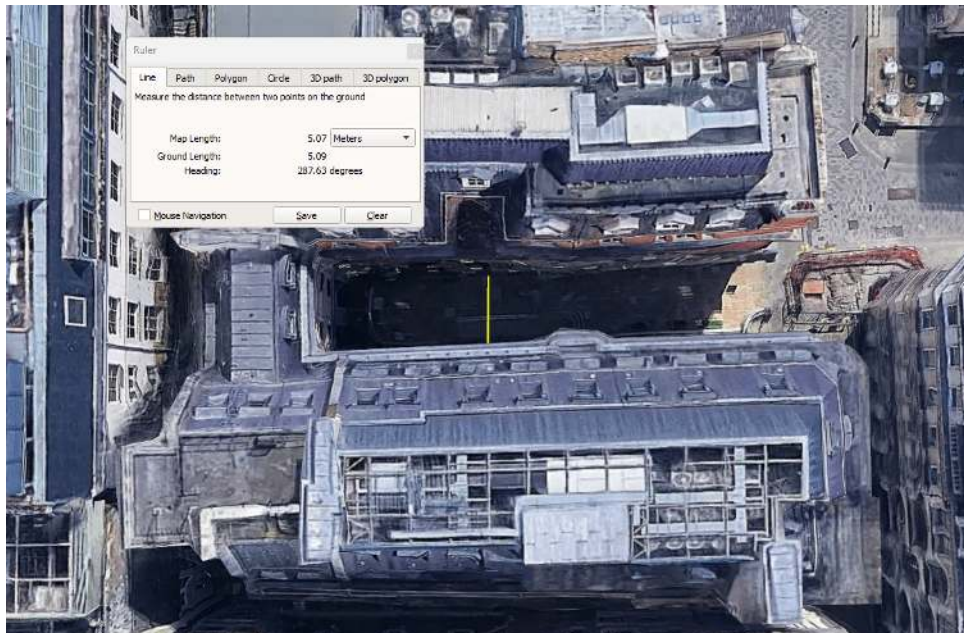
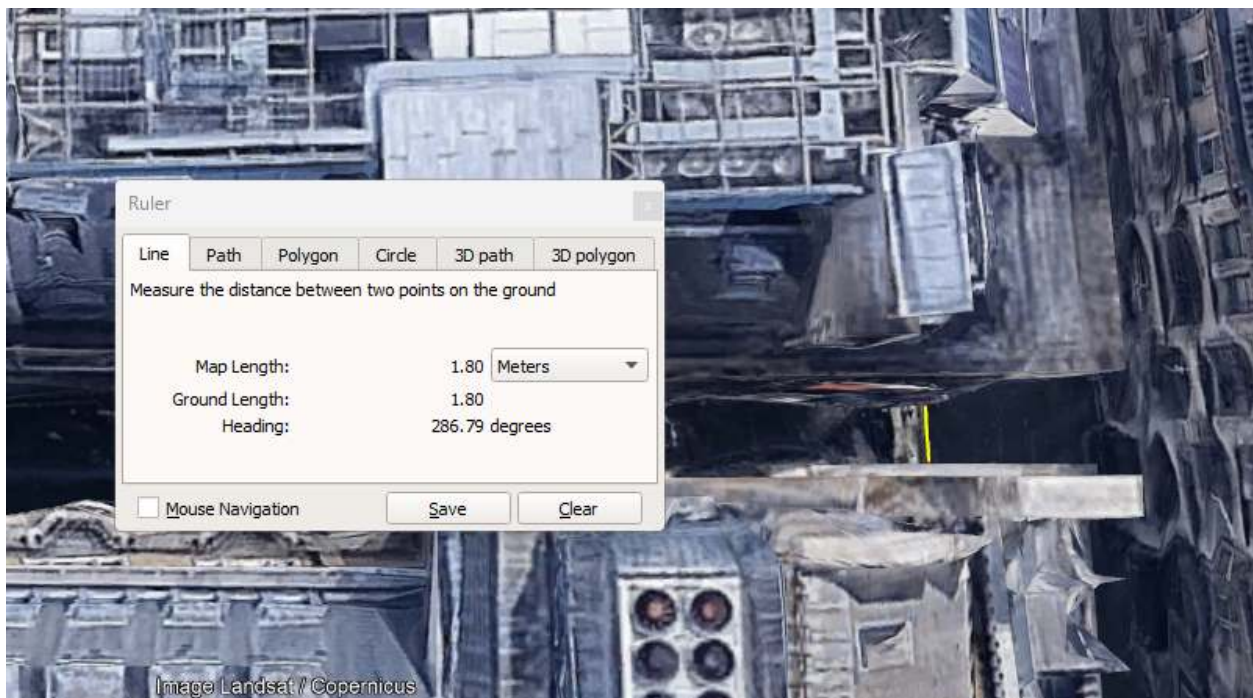


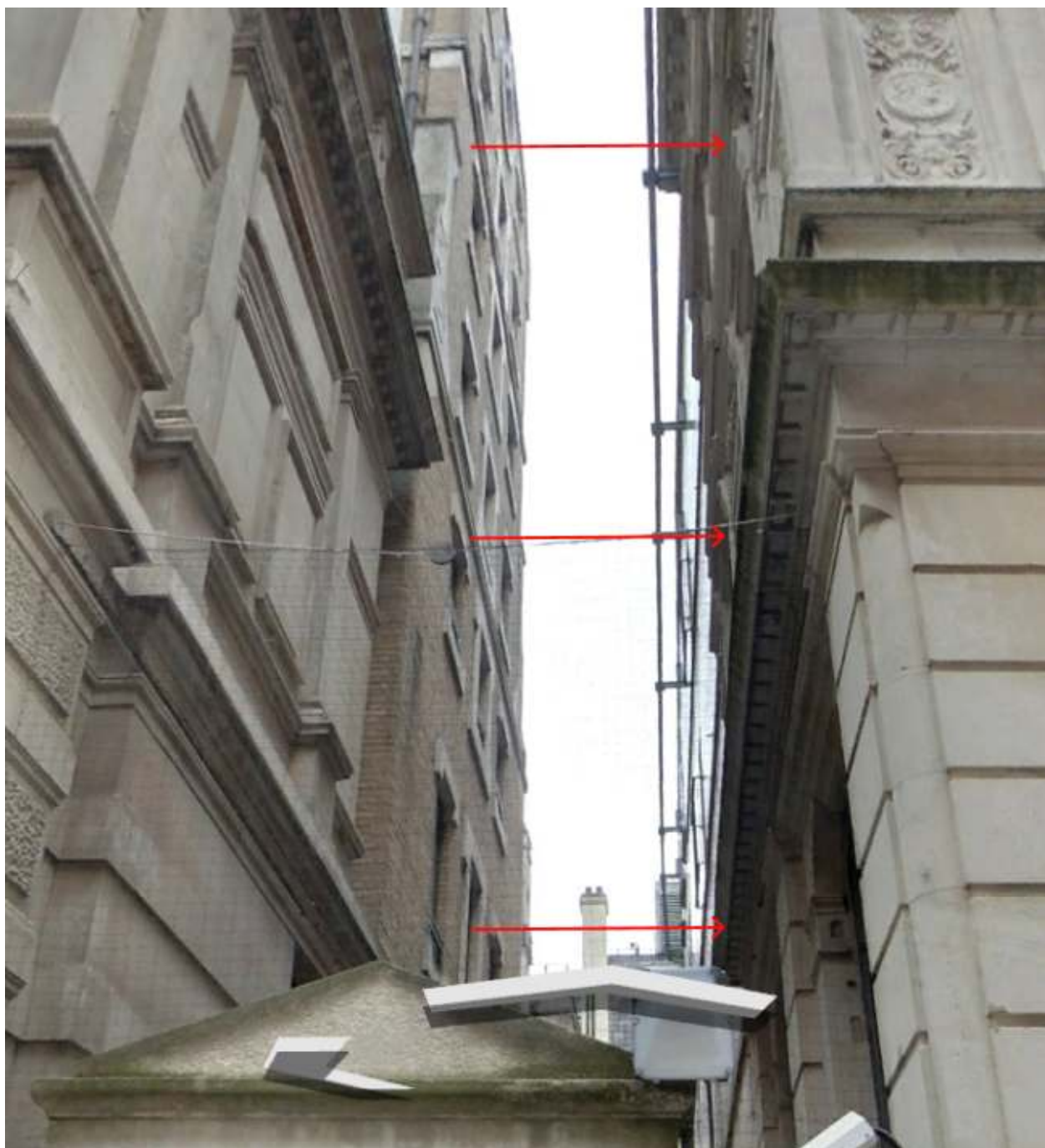
Be aware of other rooftop structures, including the access building and the inner side of the parapet walls. Capture the walls of these areas and adjust the drone's elevation when capturing the roof to maintain a 3-meter distance from the surface.



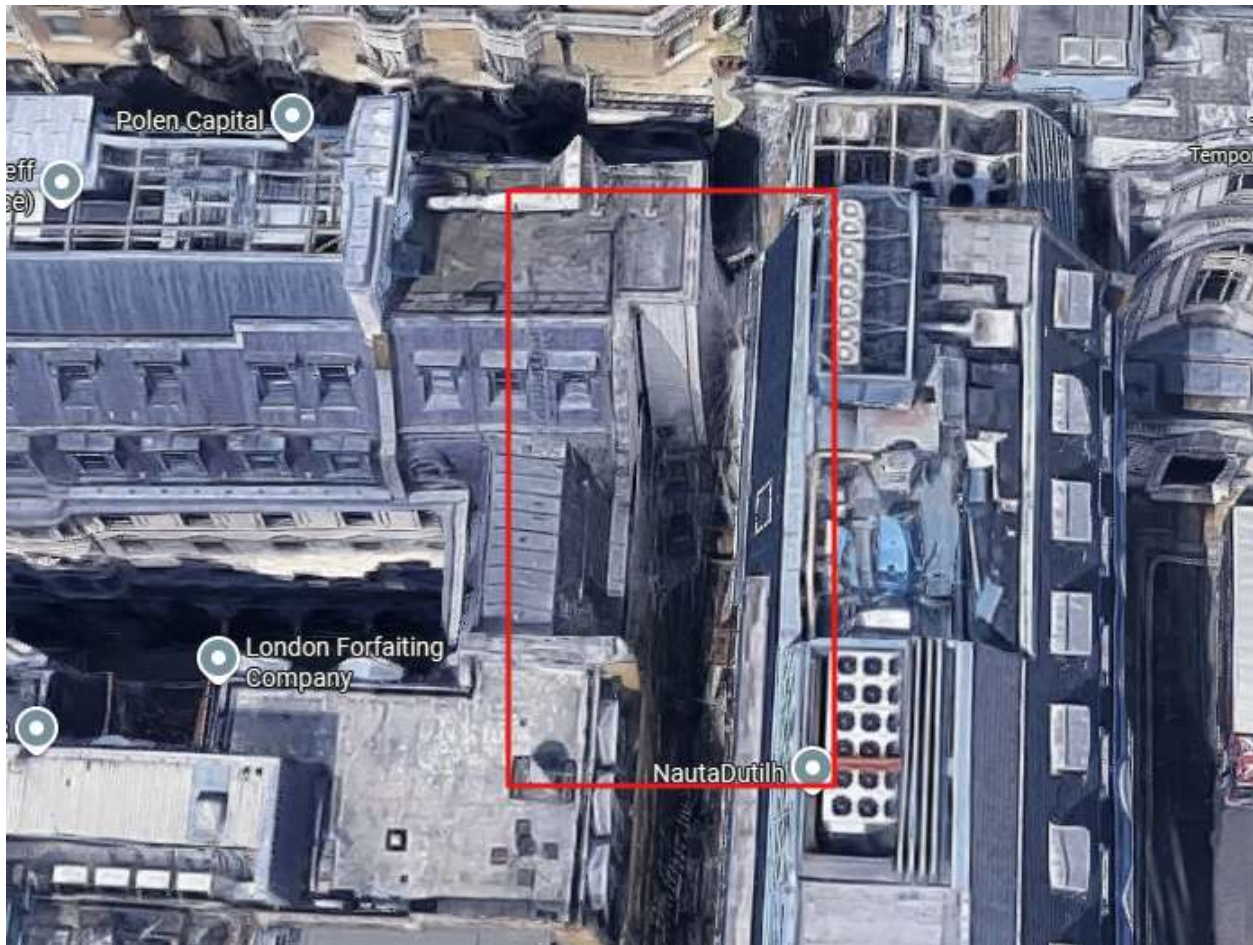
The sides of the building are close to the adjacent structures, leaving limited space for drone maneuvering. To capture this area effectively, adjust the drone's distance to 1–3 meters from the facade.

Ensure the RTK system maintains a strong connection, as this is a tight space. Always follow safety precautions when operating in constrained areas.





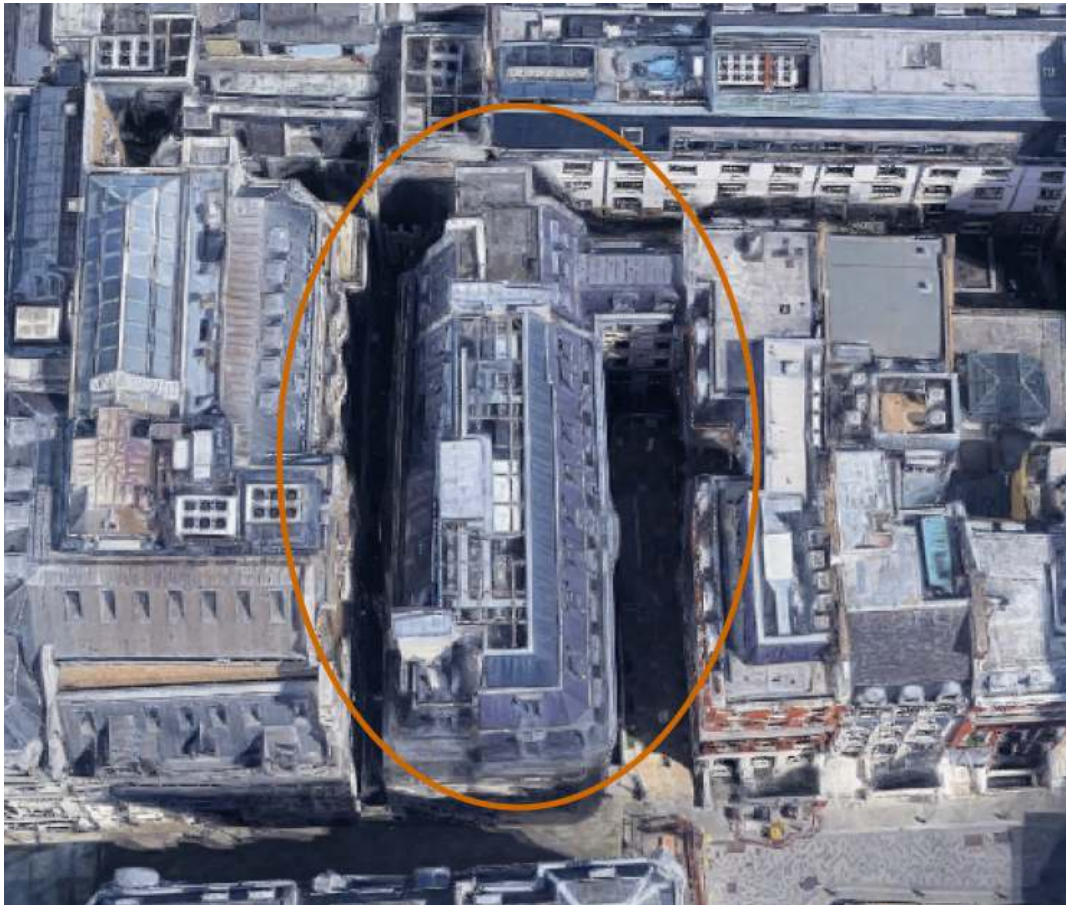
For areas with limited space where safe drone flight is not possible, use the drone in handheld mode. Walk along the sides and capture images straight-on, then tilt upward, and from above, take oblique shots. Ensure proper overlap and triangulation to fully cover the area.



Orbital Flights for 3D Modeling

Flight Parameters

- **Starting Altitude:** The first orbital flight should begin at 5 meters above ground level (AGL).
- **Altitude Progression:** Increase the altitude by 5 meters for each subsequent orbit, until the drone reaches a maximum of 10 meters above the roof level.
- **Safety and Proximity:** Maintain a safe distance of 20–30 meters from the building. To ensure compliance and safety, explicitly avoid flying over any streets.
- **Image Overlap:** A 90% photo overlap is mandatory to ensure the highest accuracy for the 3D model generation.
- **Gimbal Setting:** Set the gimbal angle to 45° (forward-facing) and keep this setting consistent throughout the entire flight.



Since the building is very close to adjacent structures, we will perform a partial orbit capture at lower levels. Full orbit capture will only be possible at higher areas. Please follow the image capture method as illustrated below. Cross Grid Scanning for High-Definition 3D Modeling

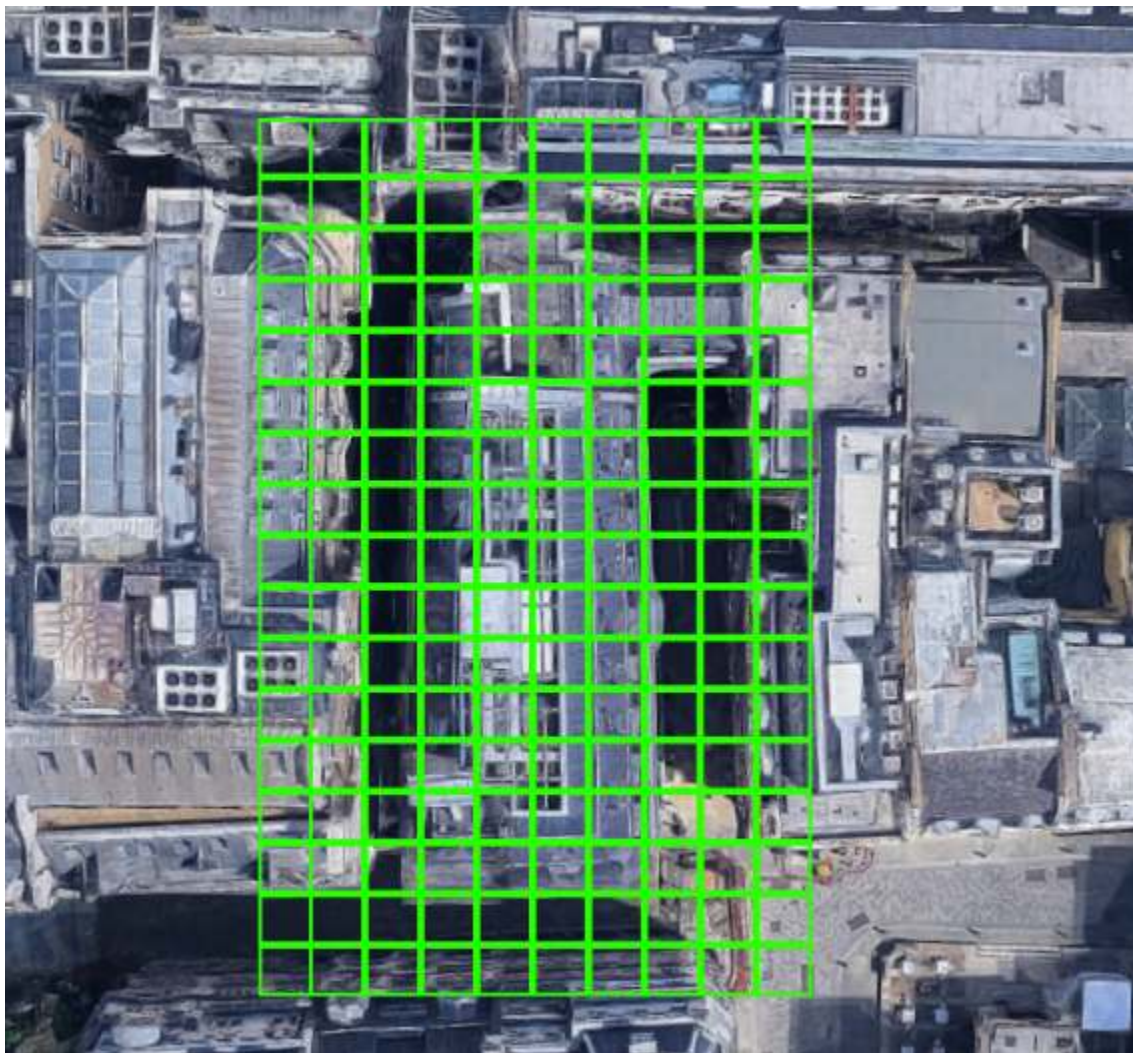


For the lower-level photogrammetry capture, start with a stack capture from the side, with the camera pointed directly at the building façade. Then perform top oblique captures, also pointed toward the sides of the building. This will help ensure proper coverage and triangulation of the lower areas.



To enhance the 3D model with greater detail and multi-angle depth information, perform a cross-grid scan after completing the inspection and orbital imagery

- **Purpose:** This step improves photogrammetry by capturing additional angles, resulting in significantly higher detail in the 3D model.
- **Starting Altitude:** Begin the scan 15–20 meters above the tallest point of the structure and maintain this altitude throughout the process.
- **Gimbal Angle:** Set the gimbal to a 45° forward-facing angle to maximize coverage and depth detail.
- **Cross Grid Pattern:** Use a cross-grid flight path, as shown in the reference image, to cover as much of the structure as possible.
- **Flight Path Spacing:**
 - Ensure slight overlap between paths for consistency.
 - Choose the spacing density based on available time—denser grids yield better detail but require more time.



Common Mistakes & How to Avoid Them

- Here is a reorganized and rephrased list of common Field Mission Protocol (FMP) issues and their solutions:

Issue	Solution / Best Practice
Incorrect Resolution	<p>Verify 8K resolution, 4:3 aspect ratio & JPG/JPEG as image format.</p> <p>Ensure C1 and C2 are <i>not</i> set to anything that toggles camera modes or photo resolution.</p> <p>Unbind "Switch Camera" from C1/C2 in RC settings.</p>
Incorrect Gimbal Angle	<p>Verify the gimbal angle is correctly aimed toward the structure and check for potential gimbal lock.</p> <p>Avoid 90° gimbal tilt to prevent gimbal lock</p>
Incorrect Flight Distance Adjustment	<p>Accurately measure the distance to the nearest wall, <u>taking into account any recessed or set-back building sections.</u></p>
Incorrect RTK Settings	<p>Install the Base Station in an open area, free of obstacles, to ensure a strong signal. Install the RTK module on the drone, power on, and confirm a successful connection with the Base Station.</p> <p>Verify RTK status, which should display as "connected" and ensure RTK connectivity at all times.</p>
Missed Corners / Details	<p>Ensure comprehensive capture of the structure, including all corners, rooftop features, and recessed areas.</p>
Insufficient Image Overlap	<p>Maintain a 90% overlap and a consistent distance from the structure, unless the mission requires variation.</p>
Inconsistent Flight Path	<p>Follow the structured flight mission plan and maintain 10-16 feet from the facade to not</p>

	deviate and result in uneven coverage.
Incorrect Thermal Settings	<p>Verify and ensure IR Camera: Rainbow 2 color palette. Do not change.</p> <p>Ensure C1 and C2 are not set to anything that toggles camera modes or photo resolution.</p> <p>Unbind "Switch Camera" from C1/C2 in RC settings.</p>
Obstacles Not Accounted For	Use angled shots to capture areas behind trees, signs, or poles. Use handheld capture for 100% coverage if necessary.