



Drone Altitude LLC

# Thermal Building Inspection Report.

## Property Information.

Property Address	Our Lady Star Of The Sea Church 204 Espanong Rd, Lake Hopatcong, NJ 07849
Client Name	Michael Kahwaty
Inspection Date	05/16/25
Inspection Conducted By	Paul Komosinski - Thermographer License #100892 - FAA Certified Drone Pilot License #4240003
Thermal Camera Model	DJI Mavic 3 Enterprise-Thermal
Weather Conditions	Slightly overcast, Fair, Wind 10 Mph.

## 1. Executive Summary

- Summary of Key Findings:
  - Roof: Front Church Entrance Overhang
  - Facades: NA
  - Solar Panels: TBD

## 2. Purpose of the Thermal Inspection:

The purpose of a thermal inspection is to assess and monitor the thermal performance of a building or structure by detecting temperature variations that could indicate issues such as energy inefficiencies, heat loss, moisture damage, or equipment malfunctions. Thermal inspections are often done using infrared thermography, which allows the inspector to see temperature differences on surfaces, revealing hidden problems that may not be visible to the naked eye.



## 1. Identifying Heat Loss and Energy Inefficiencies - NA

- **Purpose:** Detect areas where heat is escaping or unwanted heat is entering, often due to poor insulation, gaps, or air leaks.
- **Outcome:** Helps improve energy efficiency, reduce heating and cooling costs, and ensure better climate control within the building.

## 2. Detecting Moisture and Water Leaks

- **Purpose:** Moisture can lead to mold, rot, and structural damage. Thermal inspections can reveal areas of moisture infiltration, even behind walls or under roofs.
- **Outcome:** Early identification of leaks and moisture problems, preventing costly repairs and maintaining building integrity.

## 3. Evaluating Roof and Façade Insulation - NA

- **Purpose:** Assess the effectiveness of insulation in the roof, walls, and façade.
- **Outcome:** Identifies areas that may need additional insulation to improve thermal performance and prevent energy loss.

## 4. Evaluating Solar Panel Performance - NA

- **Purpose:** Inspect solar panels for malfunctioning or underperformance, such as hotspots caused by damaged or dirty panels.
- **Outcome:** Ensures that solar panels are operating efficiently and helps identify faulty panels that need maintenance or replacement.

## 5. Preventing Structural Damage

- **Purpose:** By detecting hidden issues like air leaks or moisture, thermal inspections help avoid long-term damage to the building's structure.
- **Outcome:** Protects the building's lifespan and reduces the risk of costly repairs.

## 6. Providing a Baseline for Future Inspections

- **Purpose:** Establish a thermal baseline of the building's conditions at a specific point in time.
- **Outcome:** Enables comparison with future thermal inspections to track changes or worsening conditions, aiding in proactive maintenance.
- **Areas Inspected:**
  - Roof



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- Facades
- Solar Panels

### 3. Methodology

Aerial scan using a drone has been performed to identify any anomalies. A SBS ( Side By Side ) scan method used where a Thermal Image and Visible Image are next to each other for real time comparison. When some type of anomaly is detected, a closer look is in effect and images with temperatures are taken for in-post analysis.

- **Equipment Used:**
  - Thermal Camera Model : DJI Mavic 3 Enterprise-Thermal
  - Calibration : Done by Manufacture

### 4. Inspection Technique

- **Pre-inspection Setup:** Prior to beginning the inspection, the thermal camera is set up to ensure proper calibration and focus. The camera's parameters, such as temperature range, emissivity settings, and measurement modes, are adjusted according to the surface and conditions being inspected.
- **Thermal Image Capture:** During the inspection, the DJI Mavic 3 Enterprise-Thermal drone is flown over the roof section in question. The thermal camera captures real-time infrared images and videos, detecting heat patterns, anomalies, or temperature variations that indicate potential issues, such as heat loss, water penetrations, or insulation deficiencies.
- **Flight Path Planning:** A flight path is planned to cover all critical areas that require inspection, ensuring a comprehensive scan. The drone is controlled to capture both broad and detailed thermal images at various angles to maximize coverage.
- **Data Collection:** While flying, the thermal camera records temperature data continuously. The collected thermal images are saved for further analysis, with any significant temperature variations marked for in-depth review.
- **Post-Inspection Analysis:** After the inspection, the captured thermal images or videos are analyzed by a trained technician or engineer. The data is reviewed for signs of anomalies such as hot spots, thermal leaks, or other potential issues.
- **Reporting:** After analysis, a report is generated detailing any detected issues, along with temperature measurements, the location of the anomalies, and recommendations for maintenance or corrective actions.

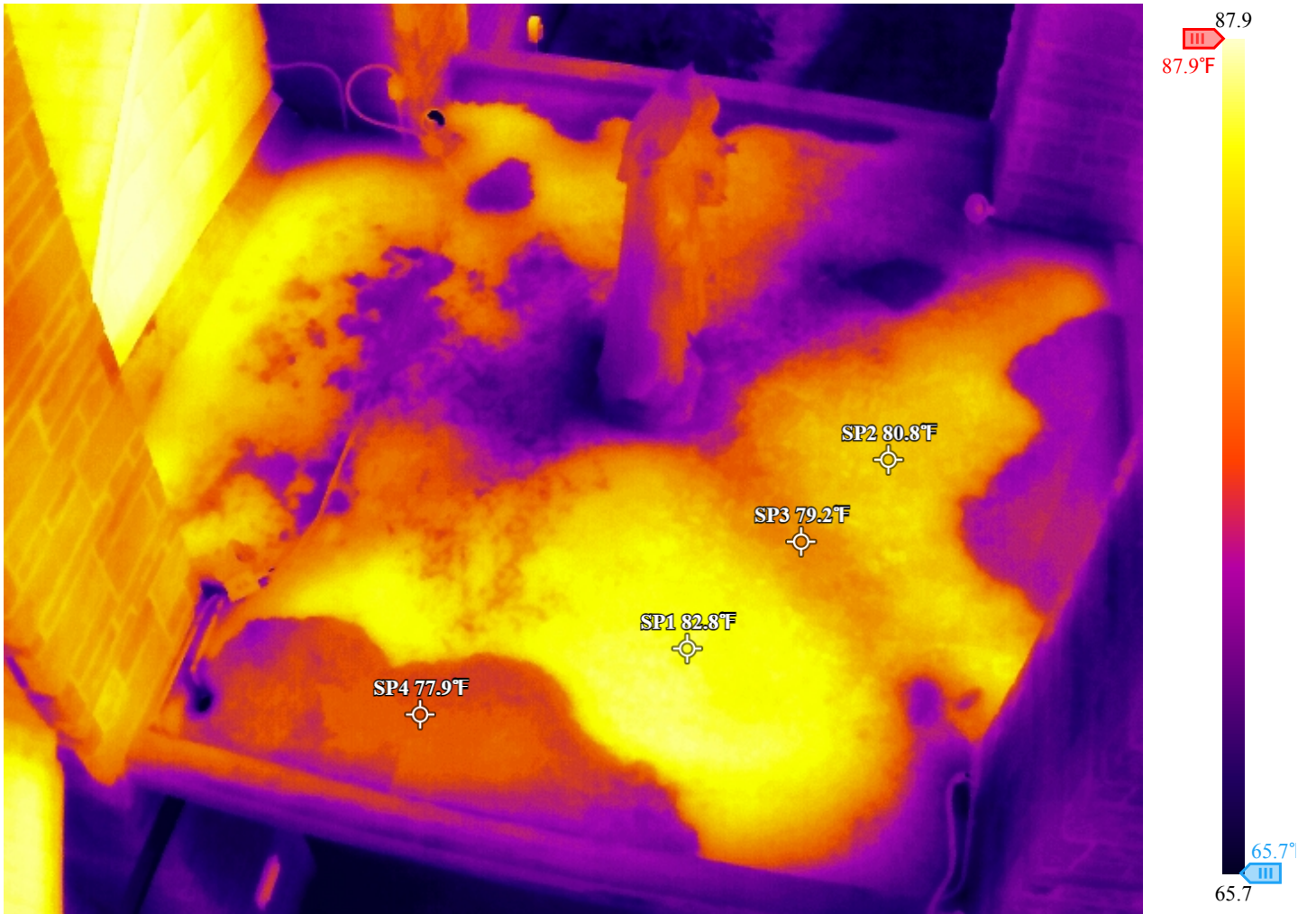
## 5. Data Analysis Report of Thermograph

The main building's roof is in pretty good condition. One anomaly has been found on the east side of the roof on the right skylight/vent.

### 5.1 Main Entrance Roof - Side 1

- **Description of Findings:**  
IMG 1 - Standard RGB image - shows standing water accumulations.
- **Potential Issues Identified:**  
There is a possibility of moisture accumulation next to and around the AC unit as the temperatures in the marked areas are higher than areas away from the unit.
- **RGB & Thermal Images: Side 1 Overhang IMG 1**





DJI\_20250516181359\_0001\_T.JPG

2025/05/16 18:13:59

### Measurements

SP1	VALUE	82.8°F
SP2	VALUE	80.8°F
SP3	VALUE	79.2°F
SP4	VALUE	77.9°F

### Parameters

Distance	5 m
Humidity	50%
Emissivity	0.94
Reflected Temp	70.0°F

## Image Info

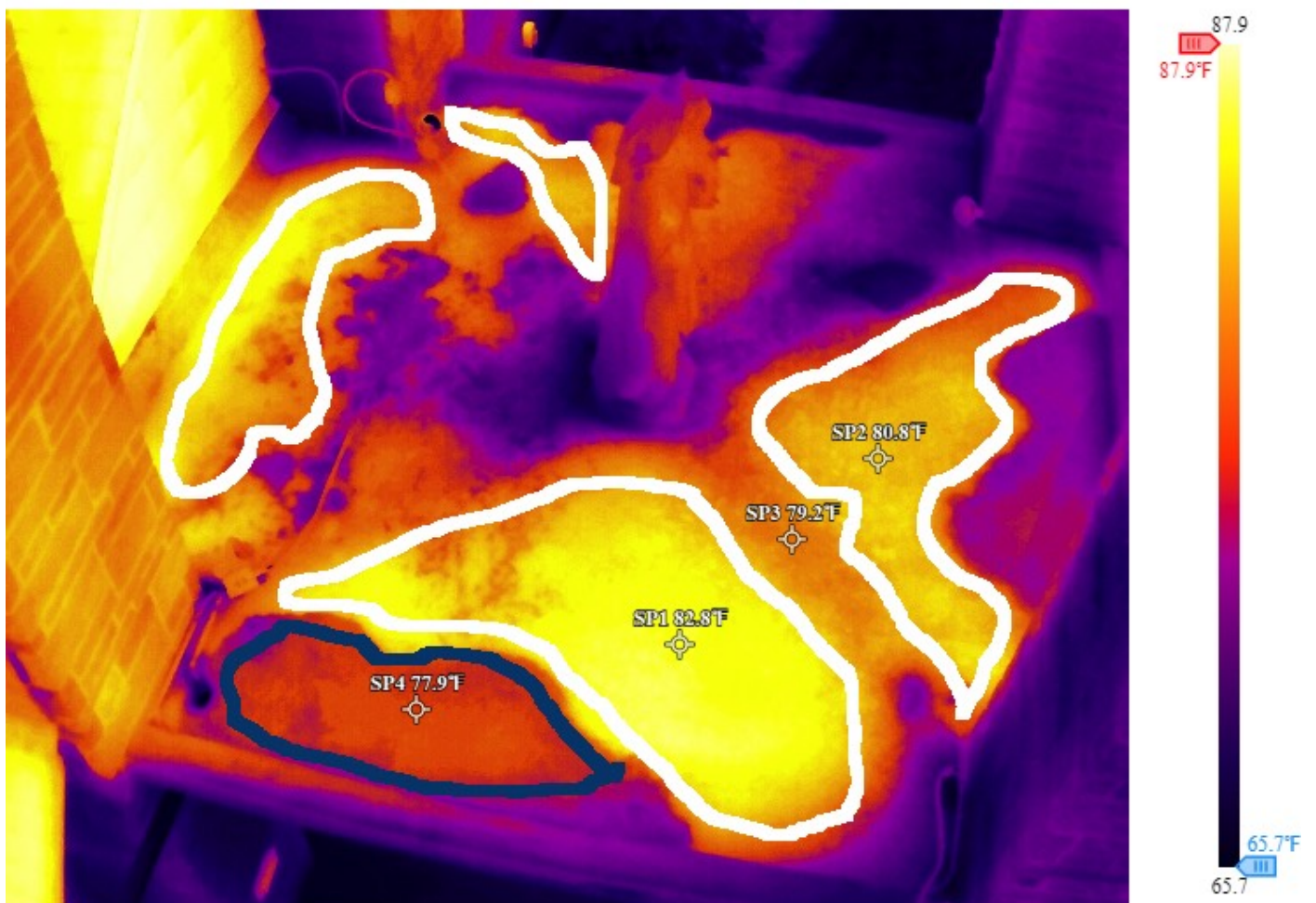
Model	M3T
Serial Number	1581F5FJC248E00D2NH5
Focal Length	9.1 mm
F-Number	f/1.0
Width	640
Height	512
Created	2025/05/16 18:13:59
Modified	2025/05/18 12:41:08
Coordinates	40.952007, 74.615734

## Annotations

KEY	VALUE
SP1	Possible Moisture
SP2	Possible Moisture
SP3	Cross Beam
SP4	Surface Water

## Remarks

Image shows areas when water might have penetrated under the paint or in to concrete. See areas in SP1 & SP2.

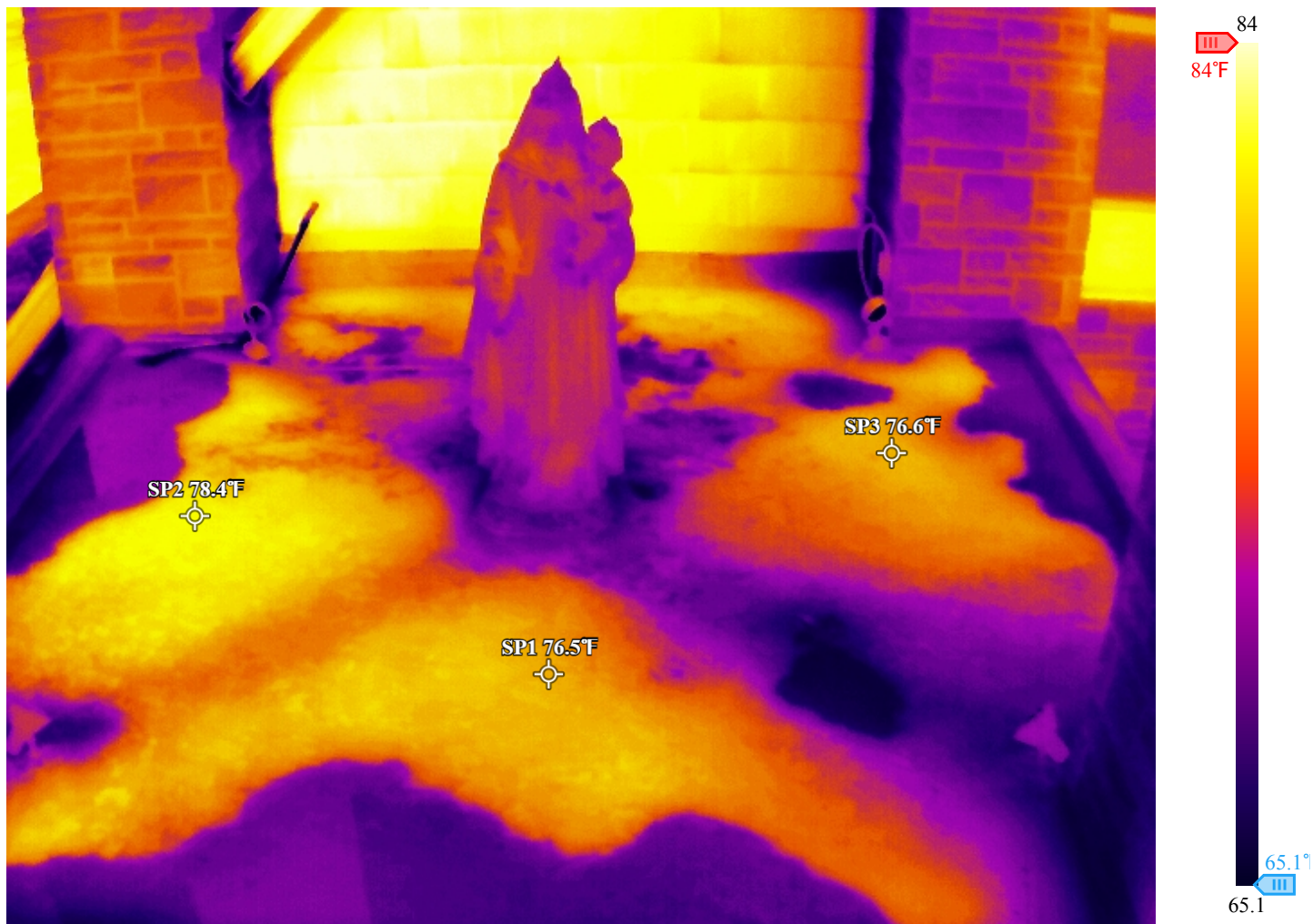


- **Description of Findings:**  
IMG 3 - The front of the roof, middle section shows a dry area with some standing water on sides.
- **Potential Issues Identified:**  
The thermal image displays areas where moisture might have penetrated underneath the paint and into the concrete.
- **RGB & Thermal Images : Front Overhang Roof IMG 3**





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DJI\_20250516181634\_0003\_T.JPG

2025/05/16 18:16:34

Measurements

SP1	VALUE	76.5°F
SP2	VALUE	78.4°F
SP3	VALUE	76.6°F

Parameters

Distance	5 m
Humidity	50%
Emissivity	0.94
Reflected Temp	77.0°F

Image Info

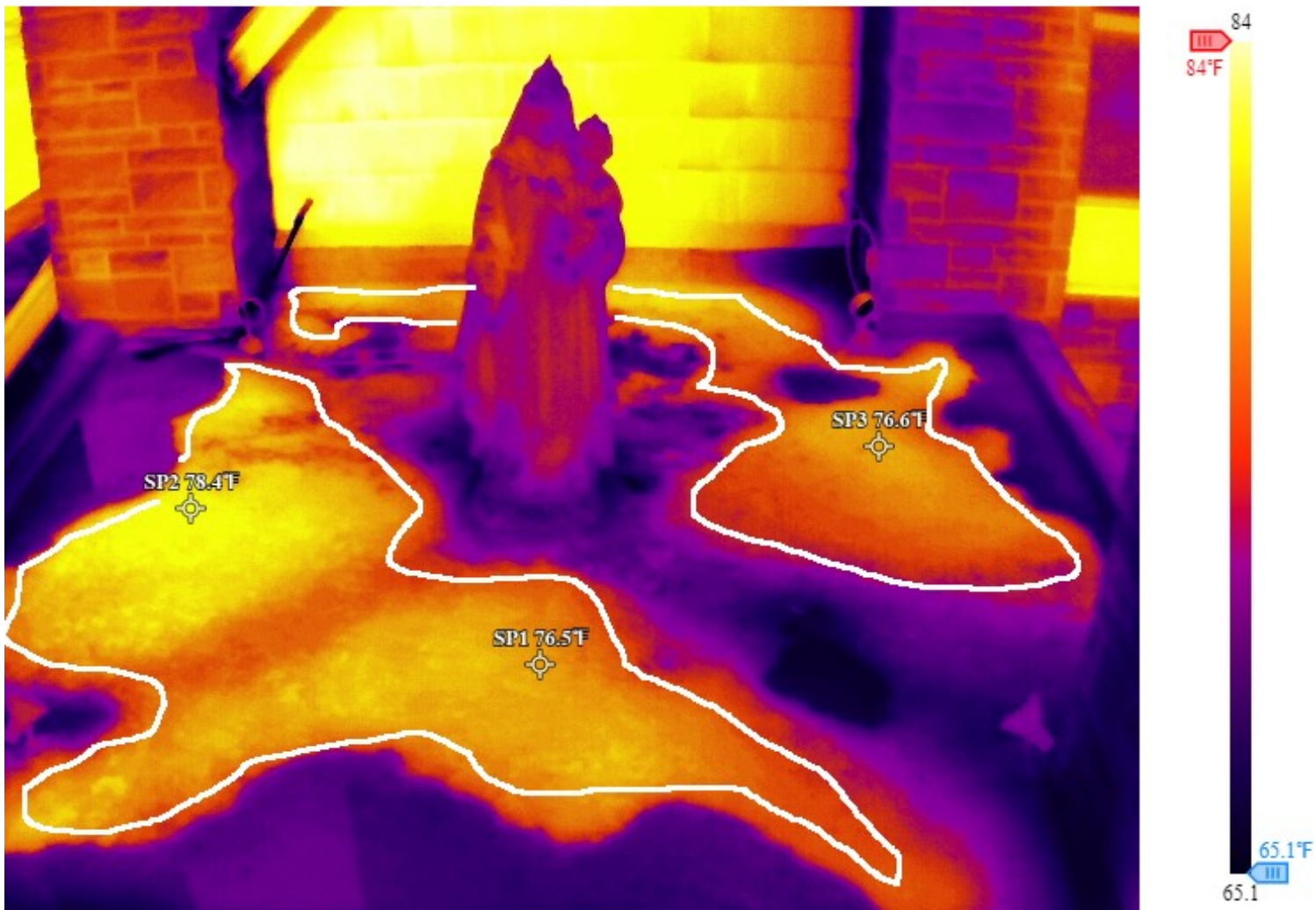
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F-Number	f/1.0
Width	640
Height	512
Created	2025/05/16 18:16:34
Modified	2025/05/18 12:59:38
Coordinates	40.951979, 74.615792

**Annotations**

KEY	VALUE
SP1	Possible Moisture
SP2	Possible Moisture
SP3	Possible Moisture

**Remarks**

Target areas marked for possible moisture penetration. Can be under surface paint or deeper and should be investigated.





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- **Description of Findings:**  
IMG 5 - Another angle yet at higher altitude to show connecting beams between the pillars.
- **Potential Issues Identified:**  
Beam material is unknown, yet moisture is clearly surrounding the 4 quadrants and can cause deterioration of some type, hence potential hazard.  
**TO BE DETERMINED BY ENGINEERS.**
- **RGB & Thermal Images : Front Overhang Roof IMG 5**





DJI\_20250516181749\_0005\_T.JPG

2025/05/16 18:17:49

Measurements

SP1	VALUE	74.1°F
SP2	VALUE	72.7°F
SP3	VALUE	69.8°F
SP4	VALUE	69.4°F

Parameters

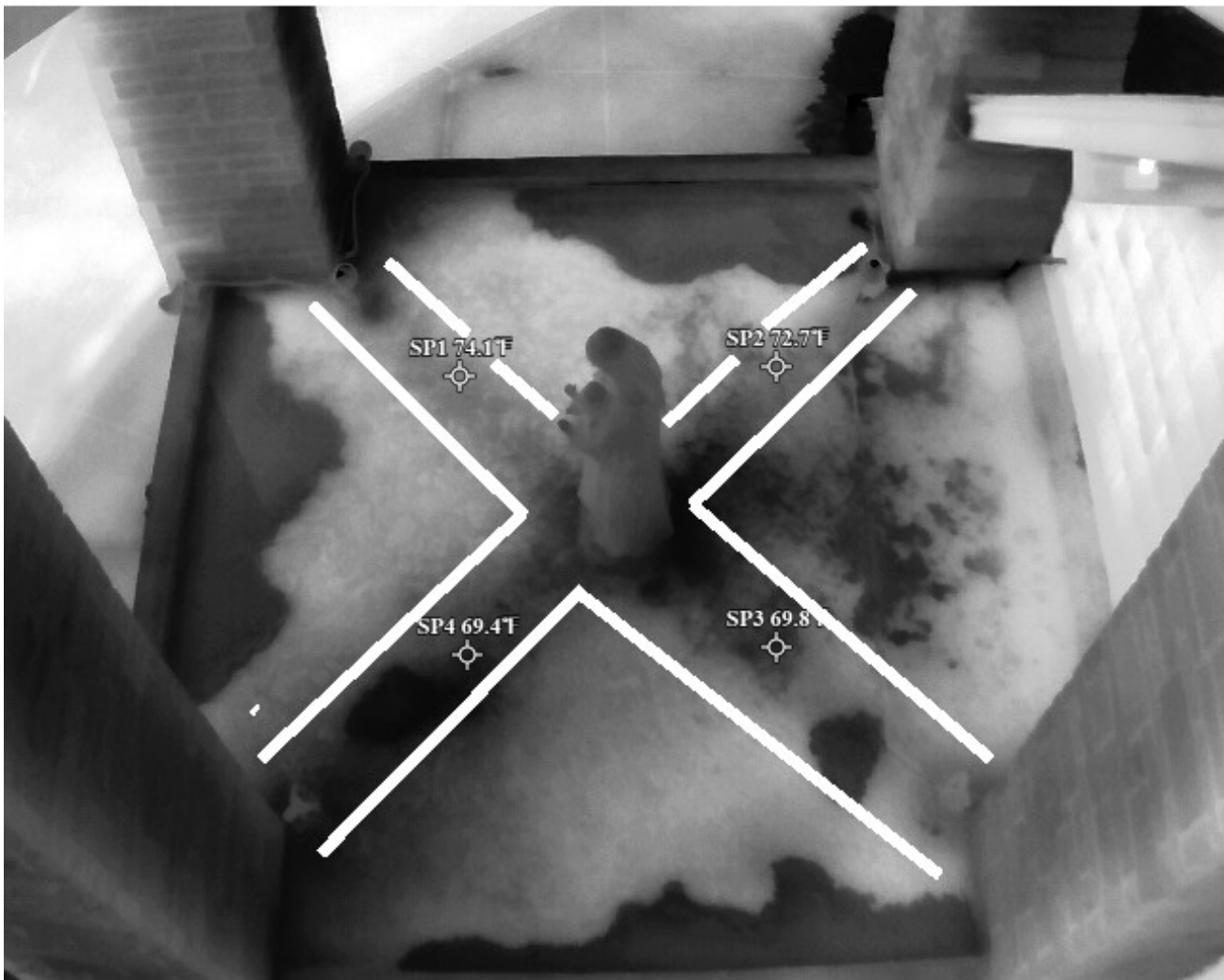
Distance	5 m
Humidity	50%
Emissivity	0.94
Reflected Temp	77.0°F

## Image Info

Model	M3T
Serial Number	1581F5FJC248E00D2NH5
Focal Length	9.1 mm
F-Number	f/1.0
Width	640
Height	512
Created	2025/05/16 18:17:49
Modified	2025/05/18 13:06:05
Coordinates	40.951937, 74.615763

## Annotations

KEY	VALUE
SP1-SP4	Cross Beams





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### 5.3 Solar Panels - NA

- **Description of Findings:**  
[Provide details about solar panel performance, temperature variations, and any defects found.]
- **Potential Issues Identified:**  
[For example, overheating, defective panels, or poor alignment.]
- **Thermal Images:**  
[Insert thermal images showing panel conditions.]

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## 6. Discussion - NA

Provide an analysis of the findings, explaining what the thermal anomalies indicate, the severity of the issues, and the potential impact on the building or system. Discuss any further action that may be required.

- **Roof Issues:**  
[Discuss the impact of the findings on the roof's energy efficiency or structural integrity.]
- **Facade Issues:**  
[Discuss how facade issues may affect the building's insulation or comfort.]
- **Solar Panel Issues:**  
[Discuss how performance issues in solar panels could affect energy production.]

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## 7. Conclusion

The areas in thermal images that have been identified with marked temperature targets spots show that there is potential water penetration under the paint that clearly has deteriorated allowing for potential water penetration into the structure. Cross beams of unknown material connect the 4 brick pillars. They also might be affected by surrounding moisture and should be looked into by a structural engineer.

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## 8. Thermal Images (Appendix)

Include the thermal images captured during the inspection in this section, with corresponding labels and explanations for each image. You may want to group the images by area (roof, facades, solar panels).

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## Report Prepared By :

Paul Komosinski

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Cell - 973 980 2804



Signature : \_\_\_\_\_