SOVAi

Intelligent Site Scanning

WZMH sparkbird

VERSION 1.0

CONTENTS

What is SOVAi?

1

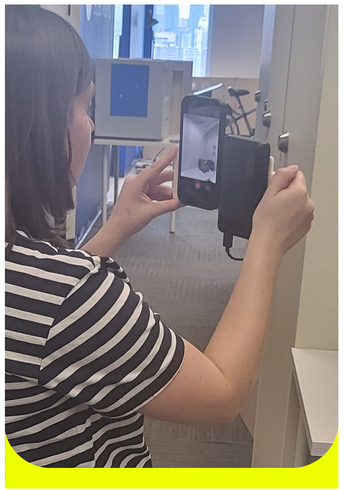
SOVAi represents a novel and advanced method for constructing and conducting site surveys that surpasses the conventional BIM modeling techniques. Its approach entails an exhaustive examination of the scanned area, including an evaluation of the environmental and building science aspects such as lighting levels (whether it's too much or too little), thermal graphic analysis to identify regions of significant heat loss, and a comprehensive study of the possibilities for utilizing photovoltaic panels to produce electricity.

SOVAi leverages straightforward hardware solutions like a smartphone, video camera, plug-in thermal camera, and light meter, which require only basic training to operate. There's no need for specialized equipment or the use of tripods. With just one person, site scanning can be completed within a few hours (depending on the site's size), and the ensuing BIM model and environmental reports can be produced within 2 to 3 days after the site visit.

How does SOVAi work?

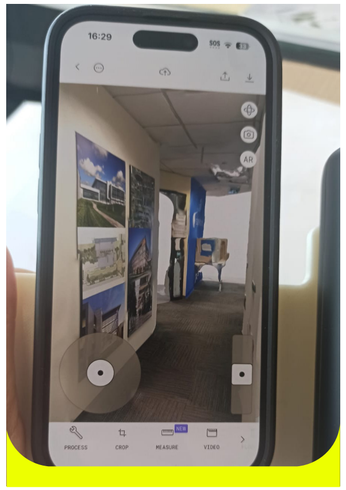
2

SCAN TO BIM PROCESS



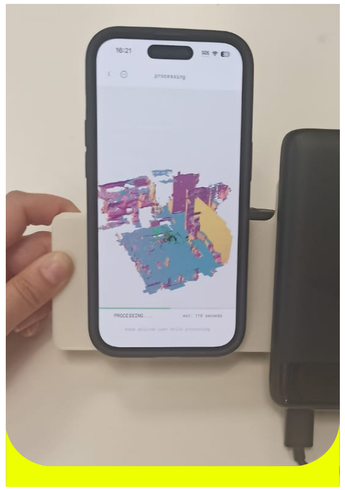
1

The first step of scanning a building or space entails employing a smartphone equipped with a Lidar camera and a separate wide-angle lens video camera. Both the phone and camera are attached to a specialized carrying case, which enables simultaneous capture of Lidar and video footage.



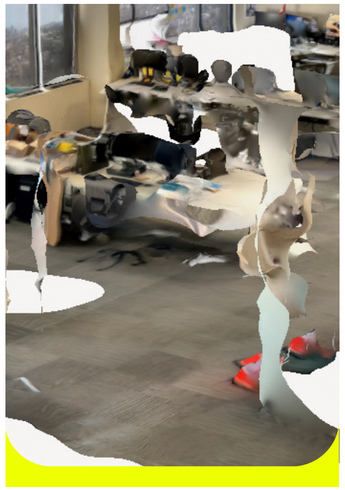
2

Video capture of space, with the image presented depicting the use of a smartphone with a wide-angle lens video camera.



3

Lidar technology is utilized to capture the space, with the image presented depicting a battery backup connected to the carrying case for scans that exceed 2 hours in duration.



4

Point cloud image of the scanned space.

5

Final BIM (Revit) model.

3

HARDWARE

The technology utilized for scanning and preparing the BIM model entails employing an iPhone 14 Pro, which serves as both the Lidar and video capturing device (though, in certain cases, a separate 4K camera that records at 30 frames per second - four times as many pixels as full HD recordings - is used in place of the iPhone for video capture). The process for constructing the BIM model entails a person walking around the space while holding the camera(s) in their hands, as opposed to using a tripod.

After the scanning process is completed (including both Lidar and video capture), the two files are uploaded into a software platform, which isolates the physical building components such as walls, doors, ceilings, and floors from loose items like furniture. The software platform also automatically incorporates a library of materials and components into the BIM model, thus generating a relatively precise depiction of the existing space, with a level of accuracy ranging from plus or minus 25mm to 50mm. Site scans can generate BIM models to the level of LOD 400.

3

ENVIRONMENTAL ANALYSIS

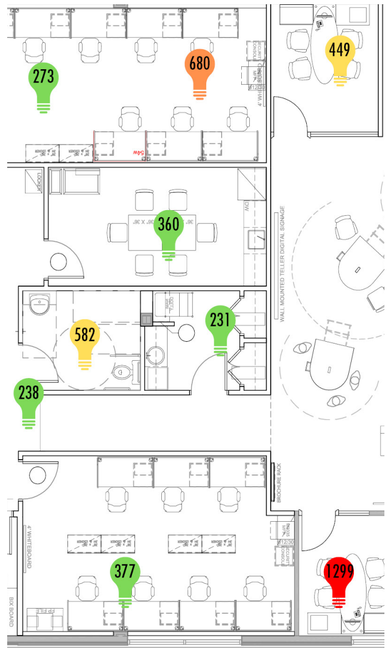
Light Levels

Light level readings can be obtained from a broad range of positions and situations. In office settings, readings are commonly collected from desk height. Natural daylight can affect light level readings; hence, it is crucial to document the time and day when the readings are taken. Light level readings offer valuable insights into whether specific areas receive adequate light or if certain rooms surpass the recommended light levels, which may suggest opportunities for conserving energy.

Strategic locations within a space are selected for light level readings, based on the space's type and size, including areas with and without access to natural daylight.

What did we observe?

Item	Observation
Light levels meet or exceed standards?	Exceed
Light levels deficient in these spaces?	Yes (Corridor)
Light levels exceed standards in these spaces?	Yes
Should a more detailed review be completed to determine potential energy savings for reducing light levels?	Yes



Minimum & Recommended LUX Requirements

Space	Minimum (LUX)	Recommended (LUX)
Office Areas	250	400
ATM Areas	250	400
Vault	200	300
Teller Area	350	500
Public Banking Area	250	350 - 450
Washrooms	200	300
Staff Coffee Room	200	300
Utility Rooms	200	300

LEGEND

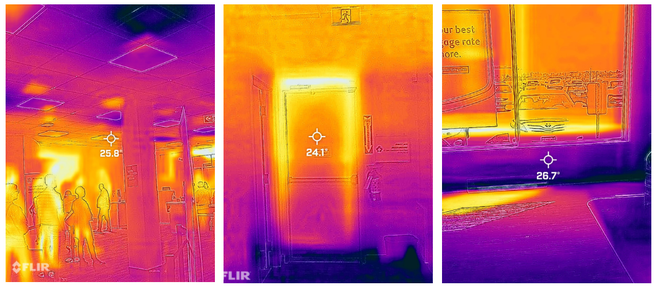
3

ENVIRONMENTAL ANALYSIS

Thermal Imaging

Thermal imaging is conducted at strategic locations, such as windows, exterior doors, ceiling tiles, and components that penetrate the building's exterior envelope (e.g., structural steel members for canopies, automatic teller machines, etc.).

Thermal imaging presents an opportunity to detect areas of substantial heat loss, such as faulty seals in window frames, thermal bridging in wall assemblies, ineffective weatherstripping, dislodged ceiling tiles, and so on.



Thermal imaging is accomplished by a basic camera that is attached to the smartphone.

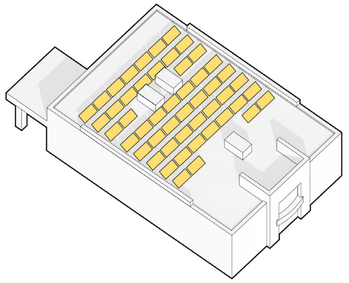
Item	Observation
Do the windows show signs of excessive heat loss?	No
Do the ceiling tiles show signs of excessive air leakage?	No
Do the exterior doors (non-public) doors show signs of excessive heat loss?	No

3

ENVIRONMENTAL ANALYSIS

Photovoltaic Study

Depending on the location, a rapid analysis of the potential for utilizing photovoltaic panels can be conducted. This high-level study factors in the building's geographic location, the roof's approximate available area, average daily sun peak hours, and the approximate electrical power consumption of the space (based on industry metrics). The analysis can be completed within a few hours and includes a brief summary of the estimated electrical energy produced by the photovoltaic system versus the electrical energy used by the building and/or space.



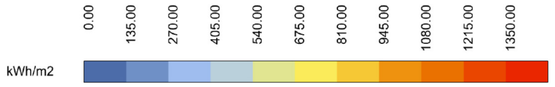
Item	Figure
Roof Area	4,200 sf
Total area of photovoltaic panels that represent approximately 75% of the roof area taking into account setbacks to parapets, maintenance walkways and clearances to roof top equipment	880 sf (50 panels)
Size of photovoltaic panel (panel installed horizontal)	39" x 65" (17.6 sf)
Angle of panel installation	30 degrees
Wattage of Photovoltaic Panel	300 watts
Average Daily Sun Peak Hours	3.5 hours
Total energy produced by photovoltaic panels in 1 year	19,150 kWh
Approximate electrical energy used by a typical retail bank branch in one year	13.81 kWh /sf
Approximate total energy used by the building in 1 year	58,000 kWh

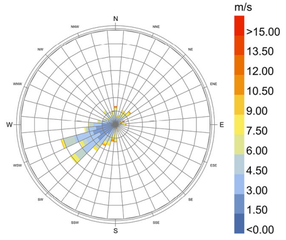
3.5 Hours
(Daily Peak Sun Hours)

300 Watts

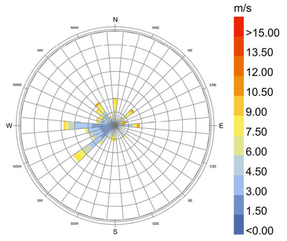
1,050 Watt-Hours
or
1.05 Kilowatt-Hours (kWh)

1.05 x 365 Days per year = **383 kWh** of energy per year per photovoltaic panel
383 x 50 panels = **19,150 kWh** of energy per year

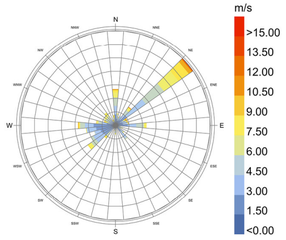




WIND ROSE - FALL
22 SEPTEMBER 0:00 - 20 DECEMBER 23:00
309 Hays Blvd. Oakville, ON L6H 6Z3



WIND ROSE - WINTER
21 DECEMBER 0:00 - 19 MARCH 23:00
309 Hays Blvd. Oakville, ON L6H 6Z3



WIND ROSE - SPRING
20 MARCH 0:00 - 20 JUNE 23:00
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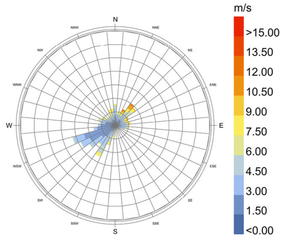
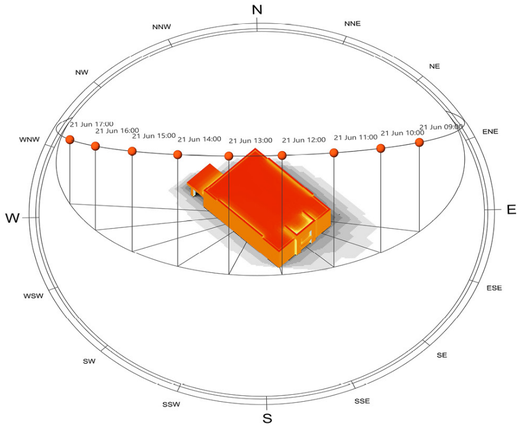
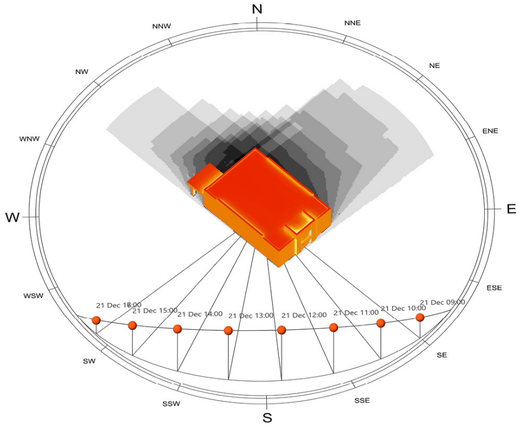


WIND ROSE - SUMMER
21 JUNE 0:00 - 21 SEPTEMBER 23:00
309 Hays Blvd. Oakville, ON L6H 6Z3



Summer Solstice 9:00 AM - 5:00 PM (June 21)



Winter Solstice 9:00 AM - 5:00 PM (December 21)

Future Features

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RECYCLING ANALYSIS

By utilizing scanning and video technology, it is possible to identify items that may be suitable for recycling or can be sold/donated to other Owner-Clients. These items can range from furniture and doors to door hardware, light fixtures, ceiling tiles, plumbing fixtures, and more. The information collected from the scanning and video process can then be transferred to the rePLANet APP, where it can be used to generate a list of potential recyclable items.

The rePLANet APP is currently under development with the following targets dates for release:

1. Version 1.0, which will identify objects and components for recycling, July 2023.

2. Version 2.0, which will identify the make and model number of the objects and components for recyling, October 2023.

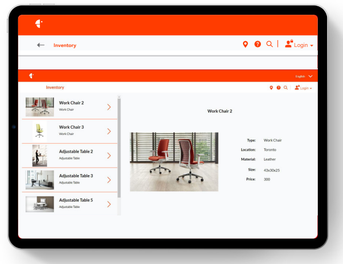
rePLANet

WEAR & TEAR ANALYSIS

The team behind SOVAi has initiated a study to assess the quality of Lidar and video images, with the objective of determining if it is feasible to identify the deterioration and aging of various finishes such as carpet, paint, porcelain/ceramic, laminates, ceiling tiles, and other similar items. The purpose of this analysis is to generate a list of items that require maintenance or replacement, which can be shared with the Owner-Client. This feature is particularly beneficial for projects where renovations or improvements are not planned, but ongoing maintenance is required.

INTEGRATION WITH CLIENT DIGITAL STANDARDS

PARRiT, a Client Digital Standards APP, has been developed and utilized by WZMH Architects for the past two years. The APP is stand-alone and has been designed to facilitate the storage and accessibility of project-related data. The information obtained from the scanning and video process can be easily uploaded and integrated into the PARRiT software platform. This enables the creation of a central database for all project material, providing a common location for all team members to access information about the existing space.



Limitations

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LIMITATIONS OF THE TECHNOLOGY

The scanning process utilizes handheld technology, namely the iPhone 14 Pro, for capturing both Lidar and video data. The accuracy of the resulting BIM model is expected to be within a range of +/- 30 to 50mm. The BIM model is developed at a level of detail (LOD) 200, which implies an approximate geometry of the elements. Within the model, each element is represented as a generic system, object, or assembly, with information regarding its approximate size, shape, quantity, location, and orientation.

SOVAi