

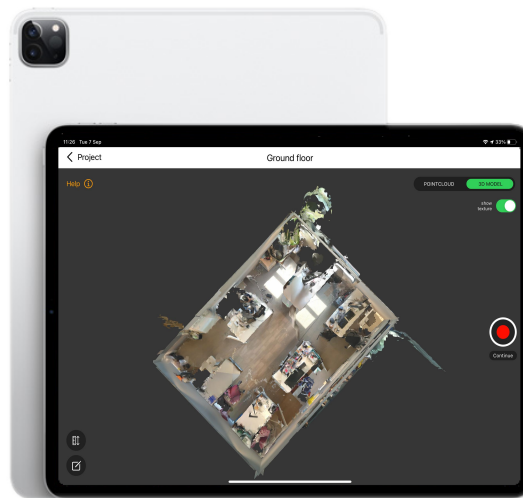


# Manual

v1.1.28

## 1 About

The *WeScan* app allows anyone to scan houses in 3D using just an iPhone 12 or iPad Pro Lidar. The scan can be used to generate a NEN-2580 report or a dollhouse-model for a virtual tour (where the latter will require 360-panorama images). A more detailed guide on how to capture 360-panorama images is included in this manual.



## 2 Installation

The WeScan app can be installed from the Apple App Store after joining our beta test group. When you are invited you can install it through Apple's TestFlight by following this link <https://testflight.apple.com/join/5VhPT8du>

Each build is available to test for up to 90 days, starting from the day the developer uploads their build. You can see how many days you have left for testing under the app name in TestFlight.

TestFlight will notify you each time a new build is available and will include instructions on what you need to test. Alternatively, with TestFlight 3 or later, you can turn on automatic updates to have the latest beta builds install automatically.

To get started, install TestFlight on the device you'll use for testing. Then, accept your email invitation or follow the public link invitation to install the beta app. You can install the beta app on up to 30 devices.

1. [Install TestFlight](#) on the iOS device that you'll use for testing.
2. Open your invitation email or tap on the public link on your iOS device.
3. Tap View in TestFlight or Start Testing; or tap Install or Update for the app you want to test.

## 3 Scanning

### 3.1 Before scanning checklist

We've compiled a number of points that should be followed when scanning a house. Before starting to scan please consider the following checklist:

- ☐ The battery of the iPhone or iPad is fully charged to avoid running out of battery during a scan
- ☐ The sensors are clean, it is advised to wipe them regularly with a cloth to remove any fingerprints or dust.
- ☐ Ask others that are present to move to a different floor if possible, or to a different room such that no one else is captured in the scan. Movements can cause irregularities.
- ☐ Plan the scanning route before scanning. Check and clean the scene from bags laying around or cluttered small objects (such as cables) or moving objects (such as cooling fan, pets or robots). If the room has curtains, use about half of it to maintain the indoor light while keeping the window frame visible.
- ☐ Open all the connected doors if possible so it can be merged with other scans. If it is not possible to open all doors, you can scan these rooms separately by creating a new scan on the same floor and align them later on. Doors should be either open or closed, not half-opened.
- ☐ Start the scan in the center of the biggest room of the floor, and make sure that you hold the device in the upright position (e.g. not pointing at the floor). This is to allow the device to familiarize itself with the environment.

## 3.2 Usage

Once the app has started, you can see a list of previously scanned environments. For scanning a new house, add a new project (see fig 1).

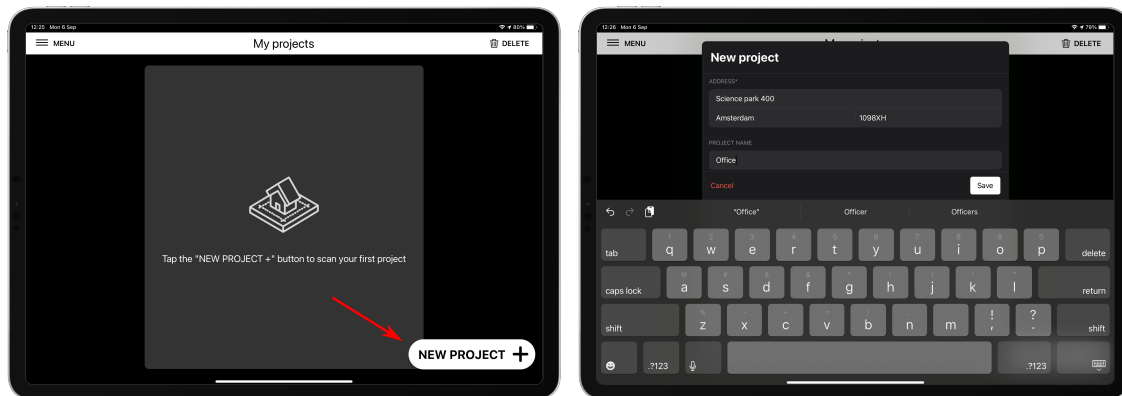


Figure 1: Create a new project

Once the new project is created, you'll be taken to the project-overview page (see figure 2). Here you can edit the address or other properties of the house. In addition, on this page there will be an overview of the different floors that were scanned. To get started with scanning, first create a new floor by pressing the *NEW FLOOR* button. Select the floor-label on the top such as *ground-floor*, or one of the other options).

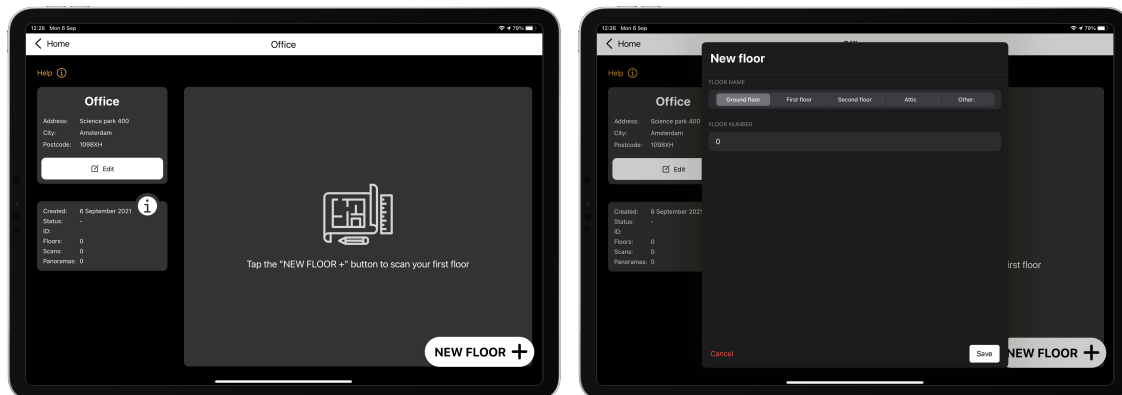


Figure 2: Create a new Floor

Once you created your first floor, you will be presented with the scanning-page (see figure 3). Press on the red record-button on the right to start the scan.

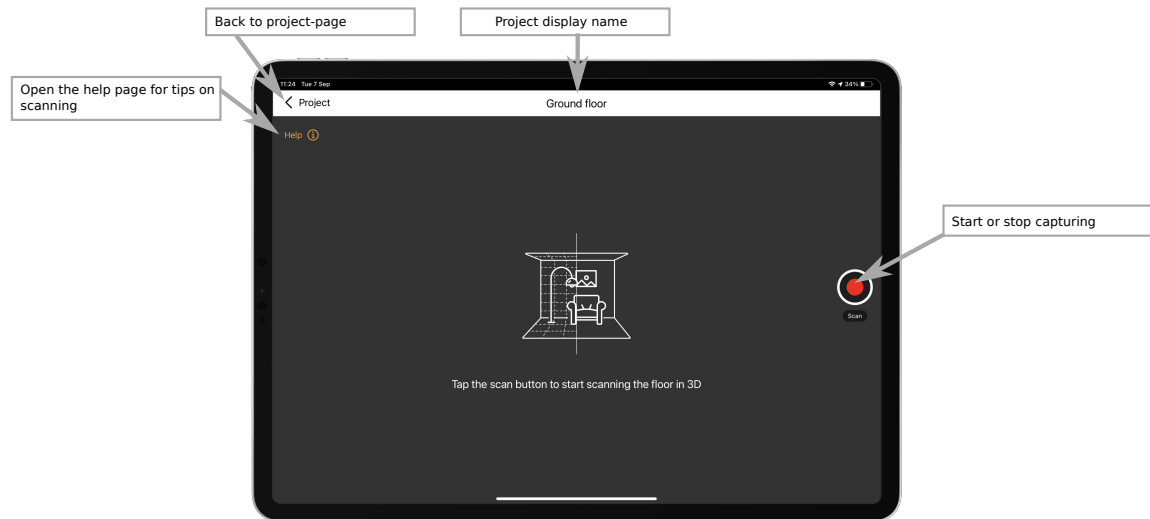


Figure 3: Scanning page

While scanning you can see the mesh being generated, and the top-view on the bottom right indicates your position on the floor. The color of the mesh indicates the distance. Ideally everything that you would like to capture should be colored orange in the mesh at least once. If something went wrong while scanning, such as somebody walking in front of the camera, or the iPhone or iPad is losing track, you can press the cancel button to restart the scan.



Figure 4: Scanning

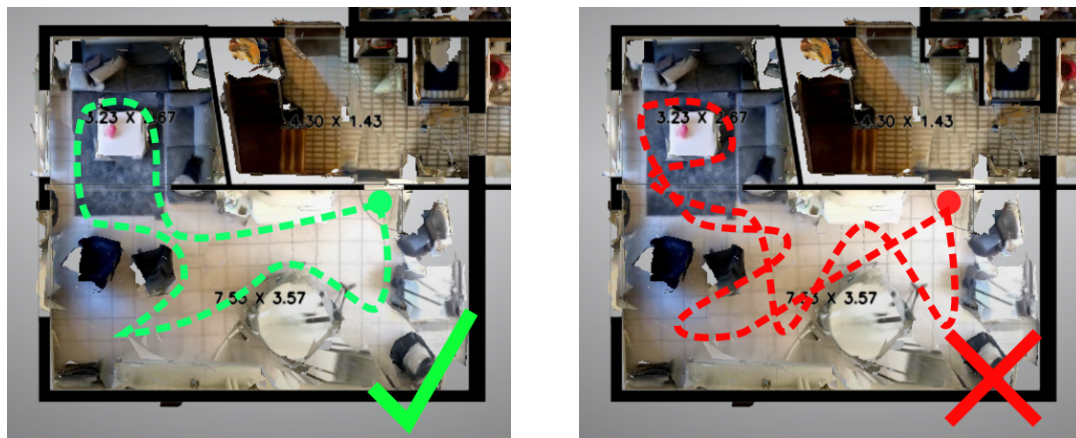


### 3.3 During the scan

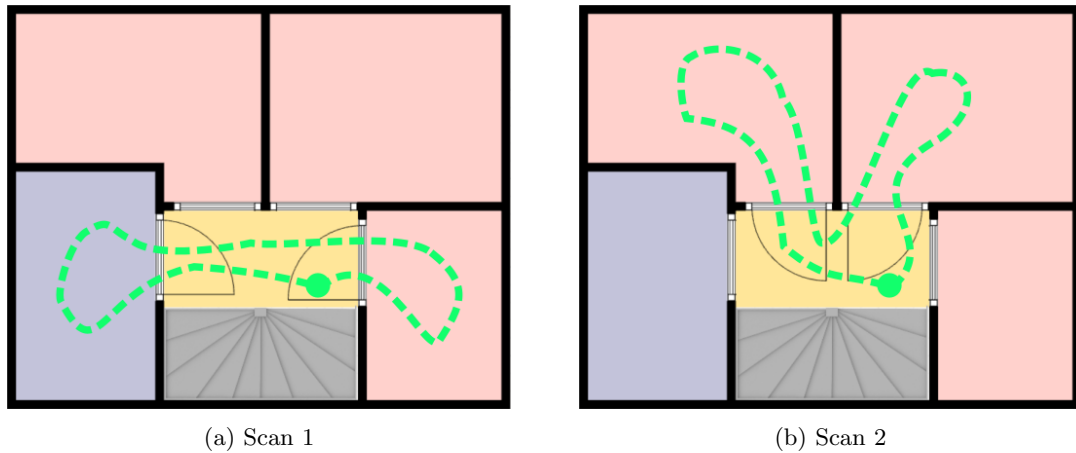
One of the advantages of WeScan is that it allows you to create multiple scans, and merge them together into one scan. This allows for larger area's to be scanned without causing a large drift in tracking. We found best practice is to create several scans per floor, multiple small rooms can be combined into one scan, or one scan for a big room.

Several notes to consider while scanning:

- When scanning, imagine you are painting a room with an air-brush. Move at a steady pace in continuous motion, not too fast or too slow.
- Avoid scanning the same location twice. This will not only slow down the scanning routine, but also degrade the end result. For every room, think what would be the best way to scan it, and rotate either clockwise or counterclockwise through the room until it is fully scanned. From previous experience, it is best to end the scan of a floor in the hallway. For floors where you have to walk through the hallway multiple times while scanning, you can either create separate scans for each section. Or if the floor is small enough, you can avoid scanning the hallway (while just passing through to get to another room) by aiming the iPhone or iPad slightly to the ground to avoid it making an unwanted scan of the wall of the hallway. But be sure to still include the hallway at a later point in your scan.



- For areas that have a lot of overlapping doors that cannot be all opened at the same time: first create a scan where half of the doors are fully opened and the others fully closed, and then create a second scan of the same area with the other doors opened (make sure to start the second scan on the same location as where the first scan ended).



- For large floors, the best results are obtained by making several smaller scans instead of 1 large one. Scans should not last more than 10 minutes. If it is getting close to the 10-minute mark, consider creating a new scan. When you start a new scan on same location it will automatically align itself to previous scans when elements from the previous scan are visible. Therefore, try to find an object that you can point the camera to at the end of a scan and start the new scan on the same object
- Make sure that every room is fully scanned by 1 (or more) scan. Otherwise, when a room is scanned in multiple parts, it will degrade the accuracy of the NEN-report.
- Make sure to include all corners and walls in the scan. This means that the corner should have been within at least 3m distance of the camera while scanning (indicated by the color turning orange in the mesh-view). Sometimes walls or corners are blocked by curtains, cabinets or other objects, in these cases try to find at least 1 spot on wall that can be scanned by opening or moving the curtains or other objects before starting the scan.

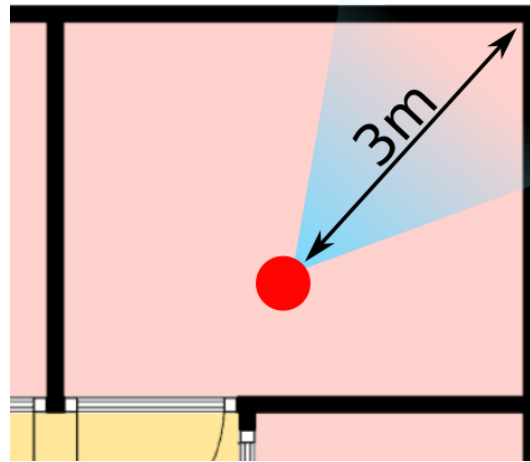
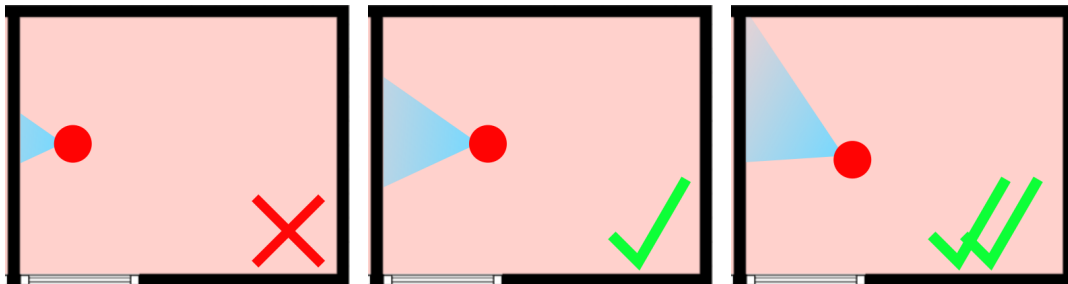


Figure 7: Optimal distance to a corner

- Make sure to include the staircase for each floor, including the area above the staircase. If you start a new scan on a new floor, re-scan the staircase leading to lower level as well (just a few staircases to create an overlap between the 2 floors). It is important to have an overlap between scans of 2 floors, such that they can be aligned later on.
- Do not rotate 360 degrees in single spot, this may cause the tracker to loose track. If the location is too narrow, you can walk backward instead of doing a full rotation.
- We suggest to keep at least 0.5m distance between the device and the object or wall. If the wall is texture-less, it is best to not point the camera directly at the wall, but hold in an angle to include other objects along the wall or corners



- Reflective objects can be a bit more challenging to capture. Try scanning from different angles or sides to ensure these areas can be sufficiently captured.
- Thin objects like fences can be challenging to capture, so it is best to avoid them when possible.

- Make sure all surfaces of the wall are visible in the scan. For example, when scanning a kitchen, make sure the wall area below the hanging cupboard is clearly visible.
- Please check the screen from time to time (also with the top view) to ensure all parts are well recorded.
- Check the mesh for potential holes in the scan, if there are holes in the scan, it reduces the quality of the scan.
- While scanning, it may happen that suddenly the model appears to be moving while you are standing still. When this happens, stop the scan and try to scan the same room again. The most common reason for the iPhone or iPad to lose track is when scanning too close to a textureless wall. To prevent it from losing track try to move back a bit.
- For multiple scans per floor, weScan automatically tries to relocate itself when pointing the camera to a previously scanned area, but in case weScan could not relocate itself after about 10 seconds it will suggest to start a manual scan. (see section 4.1)
- While for the NEN-report the focus of the scan should be the walls, for creating a dollhouse model it is important to also include other objects like tables, chairs, sofas etc... . To scan these sufficiently it is best to make a full rotation around the object and make sure to scan it in 1 go. Make sure there are no gaps visible in the objects on the scan. After scanning it is best to check the mesh for any holes or issues. And try again if there appear to be issues with the mesh.

## 4 Scan completed and annotating

Once the scan is completed, it may take a few seconds to store and texture the model. In case you wish to turn off texturing, you can do so on the home-screen and select *Menu*→*Settings* and turn off *Automatically texture scan*. Once completed, you'll be able to see the 3D model of your scan

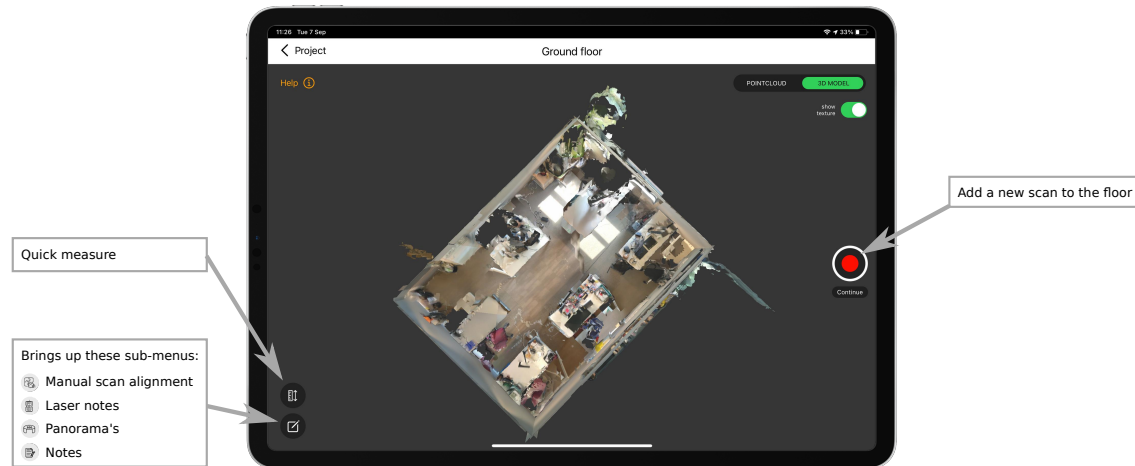


Figure 9: 3D model viewer

From here you will be able to add multiple scans to the floor (see next section) or finalise the floor with additional annotations. When pressing the *edit button* on the bottom left a number of sub-menu's will appear for adding additional annotations. You'll find the dedicated chapter for more information about these here:

- Manual Scan alignment (section 4.1)
- Laser notes (section 4.2)
- Panorama's (section 4.3)
- Notes (section 4.4)

## 4.1 Manually aligning scans

Normally weScan tries to automatically relocate itself when adding a new scan to an existing floor when pointing the camera to a previously see area. However, in case weScan is unable to automatically it will ask to start a manual scan, meaning that you will have to manually align the scan. After finishing a manual scan weScan will open the Manual alignment tool (see figure 10) and will automatically select your latest scan. Otherwise, you can open the manual alignment tool by pressing the *edit-button* on the bottom left (see figure 9) and select the puzzle icon on the top.

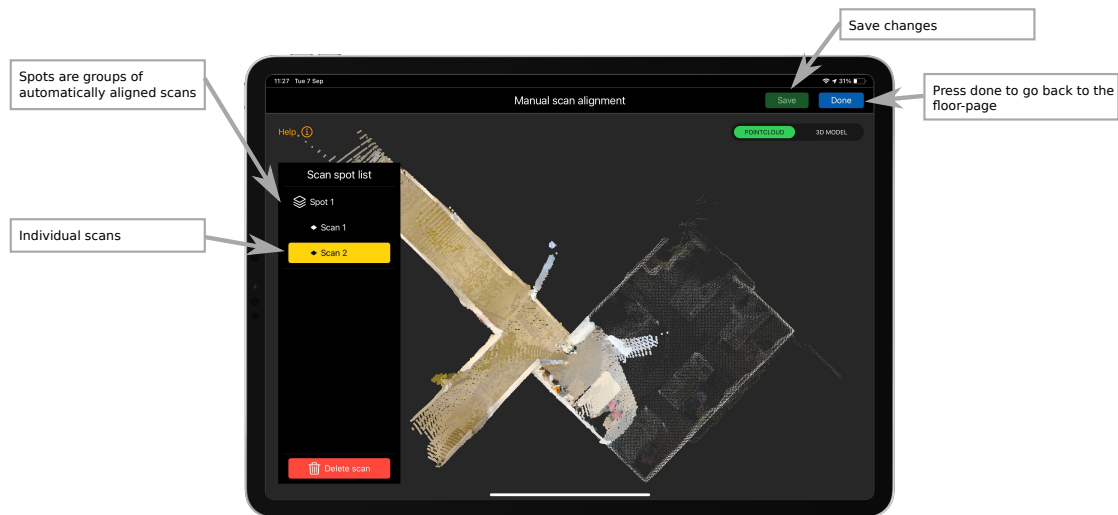
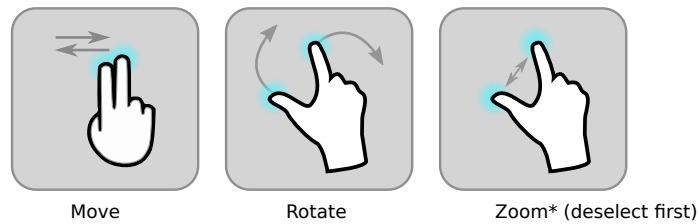


Figure 10: Manual alignment tool

To align the selected scan with the other scans use the following gestures to drag them to the correct location.



Or for zooming the camera, temporarily deselect the scan you are aligning, then you can zoom the camera to the desired distance and reselect the scan again to continue aligning.

## 4.2 Adding laser measurements

To improve the quality of the model, we recommend adding a few laser measurements. These measurements will be used to calibrate the 3D model accordingly. To open the *laser notes page*, select the bosh-laser icon from the edit-menu.

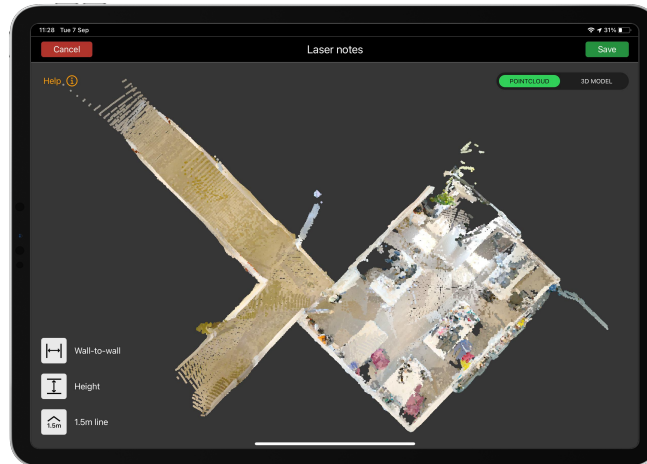


Figure 11: Adding laser notes

weScan offers 3 different laser-notes to be annotated, each with a specific purpose

**Wall-to-wall.** For the best results weScan requires at least 2 wall-to-wall measurements to be added per floor for calibrating the model. In addition to having 2 extra measurements for challenging rooms such as a bathroom or balcony. In general it is best to simply take the length and the width of a floor if possible, or otherwise the largest 2 distances on that floor. We emphasize on the point that these measures should be between 2 opposing walls, and should not be taken from a window, door or cupboard. To add such a measurement, tap the icon as shown on the left and drag a line between 2 walls on the 3D model. Proceed with adding the measurement that you measured using a laser measuring device.



**Height.** The room-height notes which will be used to improve the accuracy of the height measurement. To add a room-height note, tap on the icon shown on the left, and tap on a room which you measure the height off. Proceed to fill in the correct height.



**1.5m line.** For the NEN2580 standard, areas below the 1.5m line may not be considered as living area. Therefore, for the NEN2580 report we require the 1.5m line to be annotated for areas where it appears. To annotate this, press on the icon on the left and drag between the position where you believe the 1.5m line is located. It is possible to use a stick of exactly 1.5m to find the intersection of the wall and the 1.5m line.



Once completed, press save to finalise the laser notes.

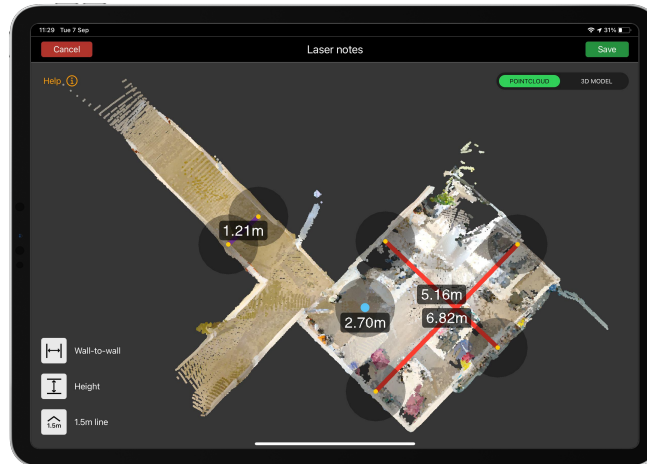


Figure 12: After adding laser notes

### 4.3 Adding panoramas

For generating a virtual tour, it is required to take panoramas. Our scanner works with the Insta-360 ONE X camera. For the first time, the 360-camera requires to be configured, to do so install the Insta-360 app for IOS (<https://apps.apple.com/app/id1491299654>). After opening the Insta-360 app and connecting to the ONE X it is configured. You can now directly connect to the Insta-360 ONE X camera by connecting to it in the WiFi settings. Follow the following steps to start capturing panorama's:

1. Swipe down in the top-right to open the Controll center menu (see figure 13a)
2. Long press the WiFi symbol (see figure 13b)
3. Long press WiFi again (see figure 13c)
4. Select you 360-camera (e.g. ONE X) (see figure 13d)
5. Go back to weScan and after a few seconds the 360-camera should appear above the red capture-button on the right. If it does not automatically switch to the 360-camera, you can manually select if from the menu (see figure 13e)



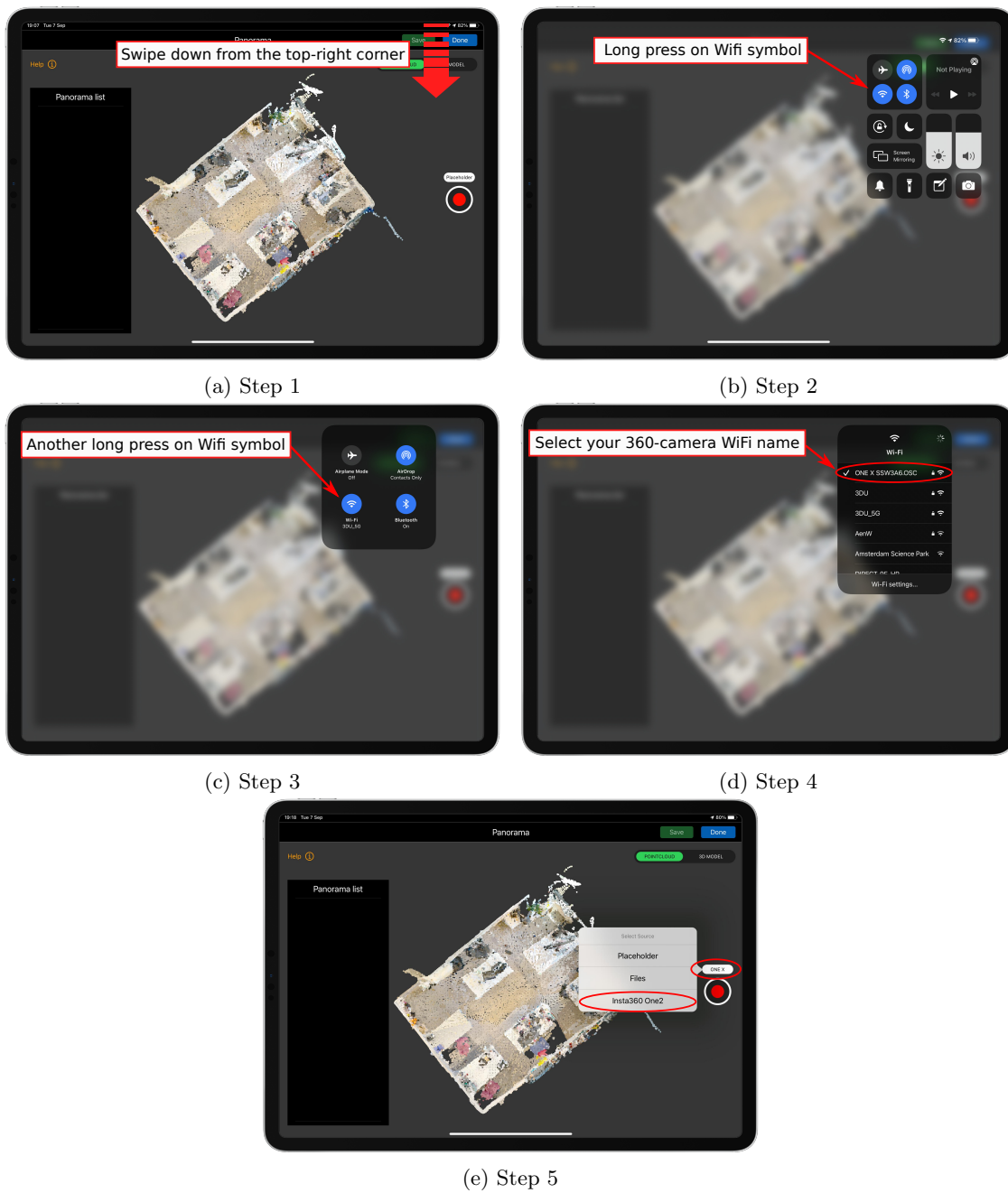


Figure 13: Configuring insta-360 camera

Once Insta360 is selected, you can press the capture button, and wait a few seconds for the panorama to be sent to the iPad. Then drag the blue dot to the correct location on the screen to annotate

the panorama-location using two-finger gestures and press *Save* on the top right (see figure 14). The annotation should be accurate within 1.5m, it is important that the annotation matches the room it is taken in, in addition make sure not to annotate too close to the wall (at least 1m from the wall).

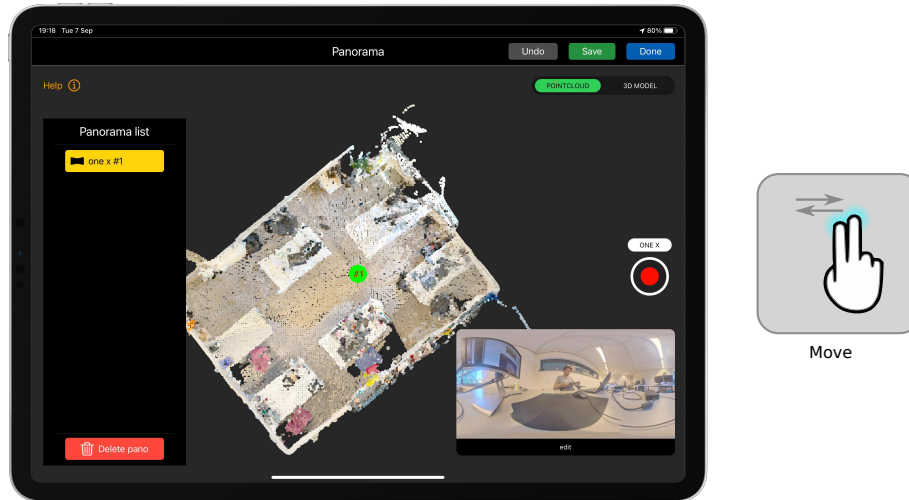


Figure 14: Adding panorama's

When capturing panorama's, there are a few things to consider

- Create a panorama for every room, and hallway.
- Make sure no person (including yourself) are not captured in the panorama
- For the virtual tour, it is best to create panorama's in a natural walking path. E.g. that for every panorama you take there is at least 1 other panorama location that can be seen from that location. This is to prevent panorama's being behind walls in the virtual tour.

#### 4.4 Adding notes

For situations where you may want to add notes to the floor, you can do so within the app by pressing on the notes-button from the edit-menu. For houses with more than 1 floor that don't align well, it is best to take a picture from the outside of the house to show such differences between the floors. To add more than one note per floor, it is best to edit a previous note and add the messages there. Notes can be used to indicate important aspects of the house for creating the measurement report such as reporting rooms which have windows with less than 0.5m<sup>2</sup> area (which may not be considered living area for NEN2580)

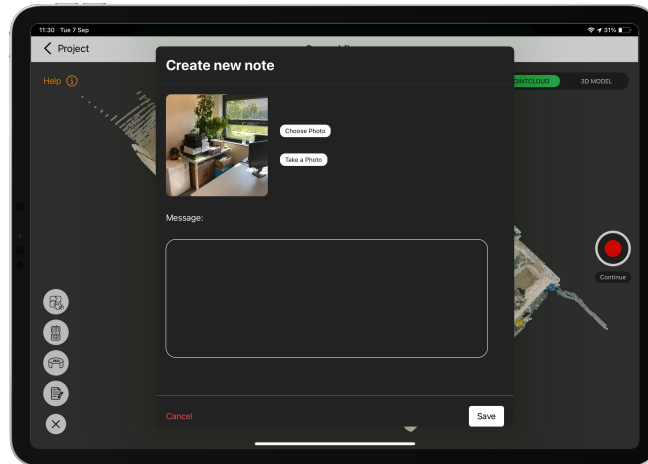


Figure 15: Adding floor notes

## 5 Uploading

Once you have completed scanning the house, make sure to complete the following checklist:

- ☐ Make sure the 3D model does not contain any major flaws, such as large holes, missing area's or is messed up due to iPad losing track.
- ☐ In case multiple scans were made for a floor, make sure they are roughly aligned
- ☐ Added sufficient laser measurements as mentioned in section 4.2

Make sure you are connected to a WiFi network, and press the upload button which can be found on the project-page(see figure 16). When the model is fully uploaded, we will be able to process the scan within 1 working days.

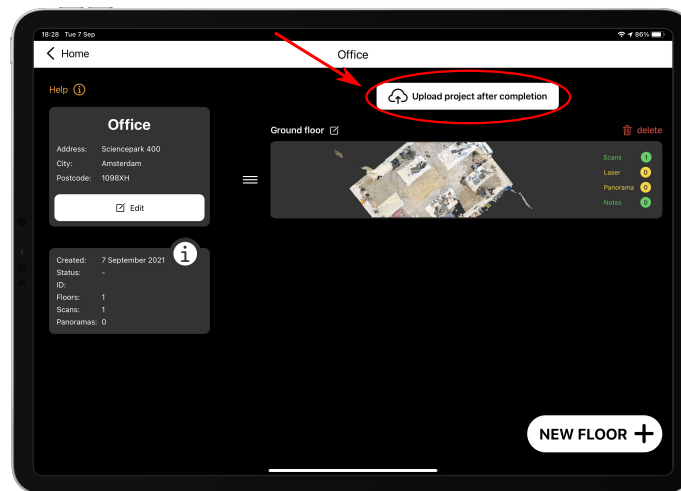


Figure 16: Uploading

And finally, once everything is finished processing you can see the *HD* version in the app. (see figure 17).

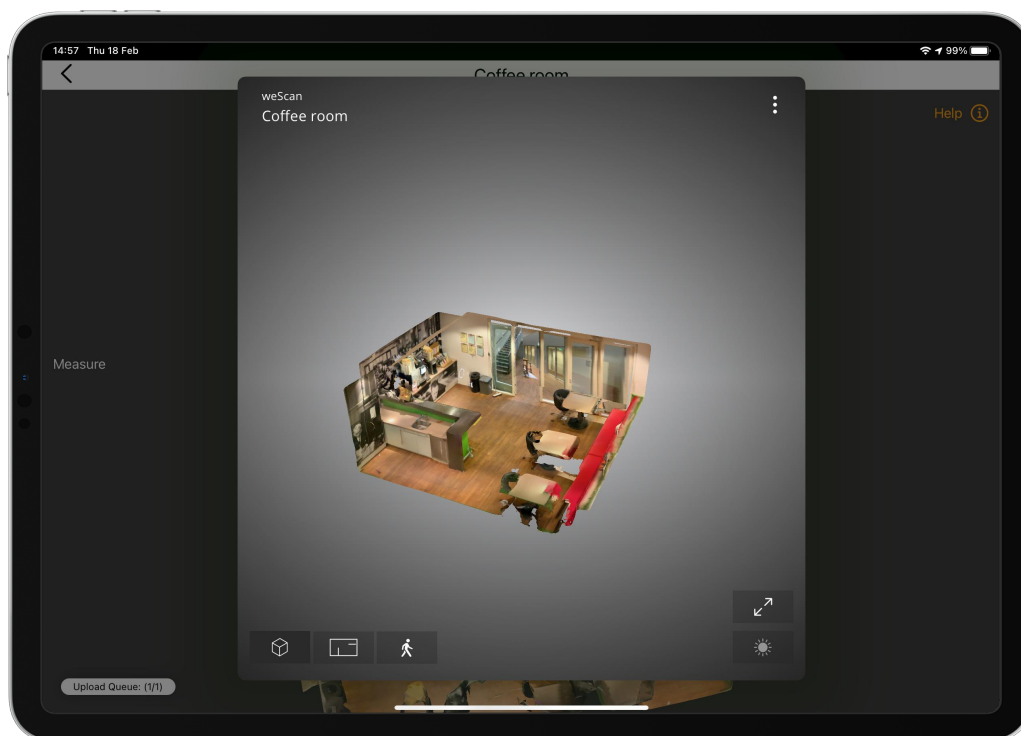


Figure 17: weScan Webviewer

## 6 Specific situations

### External buildings

In case there are external buildings like a shed, it is best to create a new floor and label it according to the building type.