



eBook

Overcoming the Challenges of Scanning Large Spaces

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The challenge of large spaces

Large spaces can pose a daunting task for even the most experienced scan technicians. Architecture, engineering, construction and commercial real estate properties are often empty, open and repetitive, making it especially difficult when trying to create an accurate 3D digital twin with the Matterport Capture app.

No matter the structure you've set out to scan — including warehouses, office buildings, apartment complexes and more — each comes with its own unique challenges. However, one consistent obstacle is present across every single facility: time.

Shop Talk 10:



Scanning Large Spaces



When facing a space that is 10,000 square feet or larger, it's important to approach the project with a meticulous plan. Structures of this size cannot be successfully captured in a few hours, as larger and complex buildings may take several days to complete. Taking the time to do it right is essential to success, and working with your client to understand their needs will guide your process. While some errors can be accounted for while on the job, the best way to prevent any potential issues with your final product is to take proactive steps before you capture a single scan point.

Read on to learn some of the best practices as outlined by the experts at Matterport to successfully scan a large space and consistently create an accurate model for every client.

Selecting the right tool

Using the right tools for projects will save you time and labor in the long run. It may seem intuitive that the size of the structure at hand should be the leading factor in determining what you'll need to best capture it. However, that is not always true.

To select the best camera for the project, consult your client to get a thorough understanding of the goal for the model. If you're scanning an apartment complex to be shown to potential buyers, navigation and overall user experience will guide you in choosing how to scan for your final product. Comparatively, an internal model for employees should prioritize a high level of detail above any user experience concerns.



Accuracy ranges across capture devices; depending on the specific use case, deploying a combination of products may be necessary to fulfill your client's needs.

If the structure requires a significant amount of scans to accurately render it, consider the storage space and capacity on your capture device. This is especially noteworthy when using the **Matterport Pro2** at a rate of 20MB per scan or the **Leica BLK360**, which can go slightly over 30MB per scan. Having the maximum amount of RAM in your iPad or iPhone is helpful in reducing your overall scan and processing time.

Another consideration that is often overlooked are doorstops. Entryways should be kept open at a consistent angle across each scan, and depending on the facility, you may need to deploy heavy-duty doorstops to do so. You should also be prepared with a backup camera and power pack that can be plugged into while using the device, as scanning could take hours at a time, draining your battery.

Once equipped with the best tools for your project, proactive planning and troubleshooting is essential in overcoming the challenges of capturing a large space.

Correcting alignment errors

One common warning you may receive in the Matterport Capture app is that you've run into an alignment error.

This typically occurs when there is not enough data to pull from, often as a result of too much space between each scan point. The camera doesn't have a gyroscope to indicate distance between captures, and only recognizes movement based on the overlapping similarities that exist across the new scan and previous ones.



Coping with Sunlight

To overcome alignment errors, include more scanning positions. Instead of going the maximum distance, shorten the space between each point.

Although this may seem time consuming, aligning them together will be more efficient and accurate. It is important to remember that you should always have a consistent amount of space between each of your scan points to make for a more consistent navigation experience. This also makes aligning the scans in capture more efficient.

Another potential cause of alignment errors may be infrared light. In bigger spaces, ambient or indirect light can come from large windows or bright walls. Scanning at a different time of day when the sun is less prominent can help minimize this. However, you may want to instead utilize blinds when possible, as even scanning when it's cloudy only disperses light and does not fully prevent its effect.

If infrared light is unavoidable indoors, the Pro2 may not be the best device to use, whereas the Leica BLK360 and **compatible 360 cameras** will not be affected at all.



Detecting misalignment

Misalignment issues are a type of alignment error. Noticing them, however, requires close attention from the user. While a notification appears when the latter is detected, misalignments do not trigger a notification and will be hard to retroactively correct. This is because the system has assumed the images are correctly aligned. This error is more common in large facilities, as it often is a result of the similarities across architecture in redundant spaces.

Scan technicians can take two key steps to reduce the chances of a misalignment:



Scanning
Repetitive Spaces

1. Use AprilTags

These are large QR codes that are temporarily placed on the walls of the structure. Before scanning, confirm the Assisted Alignment toggle is turned on in the Matterport Capture app. Once you verify this setting, the app puts more emphasis on the 2D data when aligning between scans, using the tags as alignment targets.

All supported cameras can detect these markers since they become part of the 2D panorama imagery. The Capture app recognizes these markers, and using visual cues such as the size and location of the AprilTag, it uses depth information to fine-tune the alignment.

2. Reduce the distance between each scan point

The other method to avoid misalignment is to reduce the distance between each of your scan points. This error can also be caused by a lack of data, so generating more scans can help to overcome it.

Making the time to place AprilTags and to map out your path of alignment can help ensure the system is able to accurately render your scans, preventing misalignment from compromising your final product.



Proactive steps to prevent merged floors

Merged floors are similar to misalignment errors in that users will not receive a message notifying them that this mistake has occurred. The system is not able to automatically identify the issue, making it nearly impossible to notice.

In larger spaces, merged floors are especially prevalent as there is little variation in the staircase between each level. The error typically occurs when too many stairs are skipped between each scan.

To avoid this, take a smaller, consistent amount of steps to maintain a more seamless alignment path. It's important to remember that the camera movement should be equal as you continue to ascend. This can be achieved by taking a scan every three stairs rather than trying to reach the maximum distance between each.

By walking the property before you begin to capture it, you can get a clearer understanding of the best path of alignment. Afterwards, start scanning on the lowest floor and then gradually begin to work your way up and through the building. Without taking the steps to prevent merged floors, your model may be rendered entirely useless.



Managing larger files

If you upload a model with 1,000 or more scan positions, the processing engine may not be able to complete the entire render. If the system does successfully process the full project, navigation may be very difficult for end users due to the size of the file that is generated. In larger spaces, this may be unavoidable.

If the client emphasizes user experience as a major consideration for the final product, you can link together smaller models to overcome potentially unmanageable file sizes. Before scanning, split the space into quadrants or regions, then capture each as a separate project. This allows you to maintain accuracy throughout scanning without having to sacrifice any accessibility or navigation for potential end users.

Empty warehouses, convention centers and banquet halls can be double or more the size of office and retail buildings. However, it's

important to remember that the complexity of your model and the size of its file does not directly correlate to the square footage of the facility. Instead, the surfaces within a space will increase the amount of polygons required to create an accurate 3D mesh. If there are more curved surfaces, your model may require devices with more processing power to view it.

If you are concerned about the amount of data a project will generate, it's important to discuss these potential solutions with clients to ensure that they are satisfied with the final outcome.



Planning for the best outcome

What is the best way to avoid many of the time-consuming issues associated with scanning large spaces? Taking proactive measures and undergoing meticulous planning. The time invested in your project before you take a single capture will spare you from inaccuracies that could compromise the entire rendering process.

Have a clear understanding of the layout you're scanning in advance and take the time to map out the exact path of alignment you plan to take while rendering your model. One helpful method is to utilize an actual floor plan to draw your course, and know that wherever you need to pick up your pen or pencil, you will have to break the path of alignment. While these disruptions will naturally occur in even the best-planned scans, minimizing these breaks will make alignment easier and reduce the risk of misalignment.

While you are scanning, pay attention to the distance between each scan point, including the steps you take while ascending staircases or fire escapes. To create an accurate rendering of the building and improve navigation, it's important to ensure that a similar distance is maintained between each.



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Consistency is key. Try to avoid any situations that could obstruct your path, including construction or day-to-day business operations. Accounting for additional days to work around these situations may be necessary, as it will help to ensure that alignment is maintained throughout your project.

Maximizing your business results

It's easy to assume that because a building is empty, it will be easier to scan regardless of its size. However, non-repeating architecture, areas with furniture and unique features are actually some of the best conditions for using 3D imaging technology, making larger properties a more difficult project for scan technicians as they often lack many of these identifiable traits.

To ensure that you are able to provide your client with the best product possible, work with them to fully understand the use case. This will help guide you in selecting the proper tools for the job, and also will give you an opportunity to better understand the requirement and expectations for the end product.

No matter if you're showing tenants their new home in an apartment complex or giving first-year students a virtual tour of their beautiful campus, taking the time to capture an accurate representation of each facility is crucial in preventing project delays and user experience issues.

For any additional support or troubleshooting when it comes to the best practices for capturing large spaces, the team at Matterport can help.

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About Matterport

Matterport is the industry leader in 3D capture and spatial data with a mission to digitize and index the built world and advance the way people interact with the places they inhabit and explore. Matterport's all-in-one 3D data platform enables anyone to turn a physical space into an immersive digital twin and share it with others to connect and collaborate in 3D.

The Matterport platform helps thousands of customers in 130+ countries realize the full potential of a space at every stage of its lifecycle including planning, construction, appraisal, marketing and operations. The company has been serving the real estate and photography industry since its inception and is also being adopted by major brands in architecture, engineering, construction, facilities management, insurance, restoration, retail, travel and hospitality.

Learn more at matterport.com. Or contact your regional office today at matterport.com/contact-us

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