NavVis

STATE OF MOBILE MAPPING SURVEY

GEO WEEK

BIM+

LiDAR News
HOME OF THE LIDAR INDUSTRY

GIM INTERNATIONAL

Contents

Introduction

Presenting the findings of an international mobile mapping survey conducted with professionals in the laser scanning, surveying and AEC industries →

Introduction

The laser scanning and surveying industry is undergoing a seismic shift. Mobile mapping technology has radically changed the way we work, reinventing workflows and generating whole new categories of deliverable.

It's an exciting time for both the professionals in the field and the customers they serve. But this dynamic environment also raises some important questions:

a. Which categories of device do organizations currently own and operate, or are planning to make investments in?

b. Do professionals see the value in deploying both mobile mapping and terrestrial scanning devices on the same projects?

c. Which value drivers are most critical for a successful laser scanning business?

d. What are the most important attributes in a mapping device?

e. How confident are laser scanning professionals that mobile mapping would meet their expectations for accuracy?

To find concrete answers, NavVis and partners Geo Week News, BIMplus, Lidar News and GIM International conducted one of the biggest and most ambitious surveys in the geospatial industry.

Over the course of September 2021, professionals from all over the world were invited to share their perspectives on the State of Mobile Mapping.

This report brings together the most interesting findings, with data-driven insights that the whole of the geospatial community will benefit from.

> **Mobile mapping is driving significant change in the laser scanning and surveying industries. We worked with partners to collect data about this impact from an industry perspective. With this report, NavVis brings these changes to light.**
>
> **FELIX REINSHAGEN**
> NavVis CEO and co-founder

Key Takeaways

With this survey, NavVis in partnership with Geo Week News, BIMplus, Lidar News and GIM International set out to understand the state of mobile mapping in 2021. And with these results, we have succeeded.

Regarding the key questions we'd set out at the beginning of this report, the learnings are:

Mobile mapping will become a standard feature of the surveying toolkit
Currently, 39% of respondents own and operate a handheld mobile mapping system, while a further 21% are planning to invest in the next 12 months. We also know that 28% own and operate a backpack mobile mapping system, and a further 23% are looking to invest in the next 12 months.

Accuracy, speed & integration are key
The top three mapping value drivers which respondents believe are essential to be successful in their business are point cloud accuracy & high-quality imagery (64%), scanning speed and time spent on site (50%), and a seamless software workflow from scanning to data deliverables (43%).

The myth that mobile scanners are not accurate enough has been busted
Only 26% of laser scanning professionals thought that mobile mapping could not achieve their accuracy expectations.

Hybrid workflows are the future
Professionals could see the value of deploying both mobile mapping and terrestrial scanning devices on the same projects. The concept of a hybrid workflow is endorsed by 86% of the audience.

Point cloud quality is essential
Participants said that point cloud quality & resolution (76%) were the most important features of a mobile mapping device, followed by accuracy (71%) and scanning speed (60%).

About the participants

Outlining the scope of the survey and the demographic picture →

About the participants

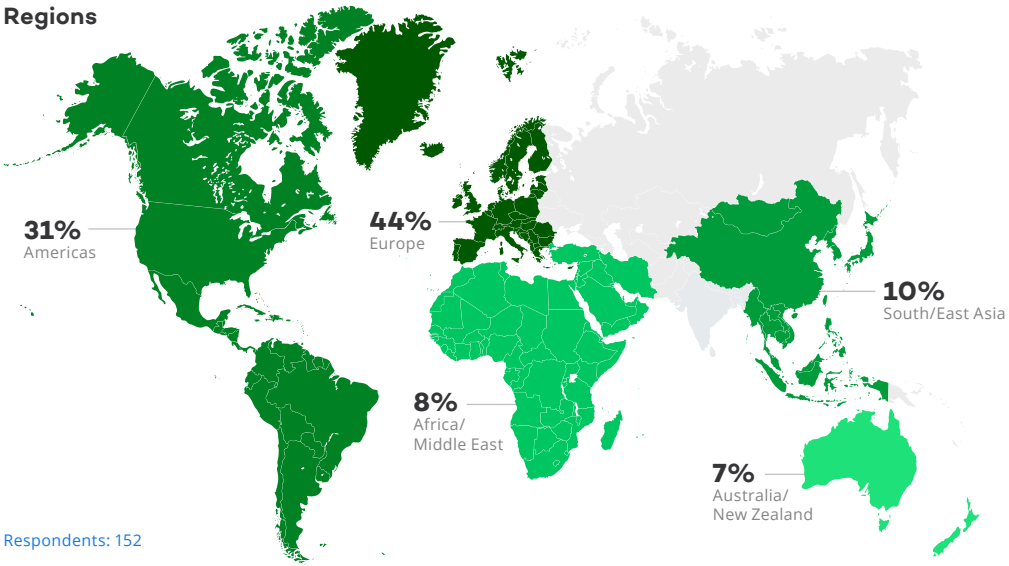
Let’s begin by outlining the scope of the survey, and the demographic picture we have of the participants. For the purposes of data protection, the names of people, companies, and other identifying characteristics are not mentioned in this report.

We put questions to 152 people from all over the world, spanning Europe, South & East Asia, the Americas, Africa & Middle East, and Australia.

The biggest group of professionals hail from Europe, making up 44% of our pool, followed by Americas at 31%.

Figure 2

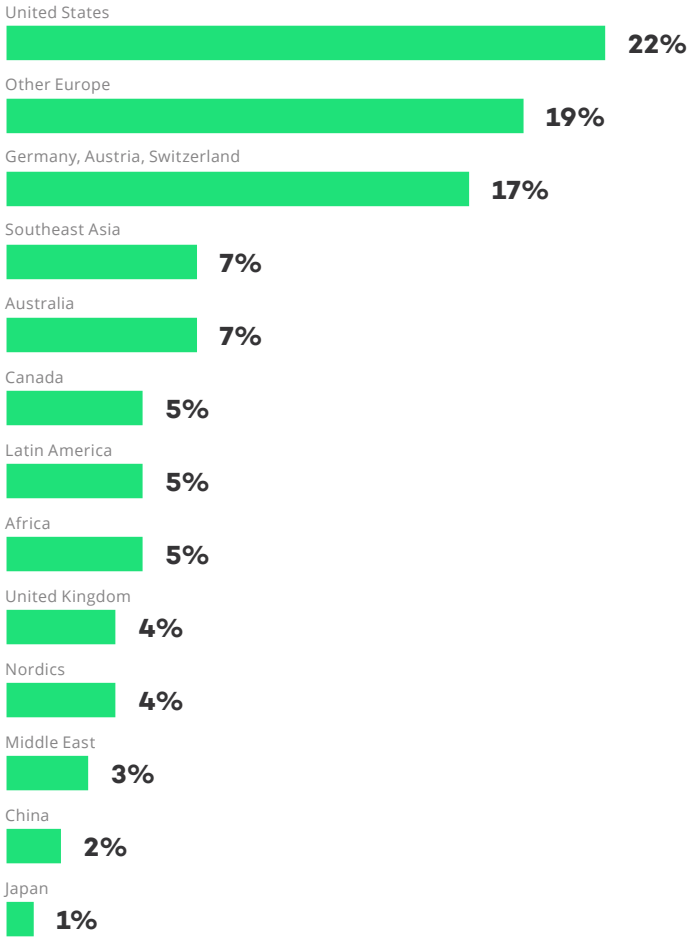
Regions



Respondents: 152

Figure 1

Locations



Respondents: 152

About the participants

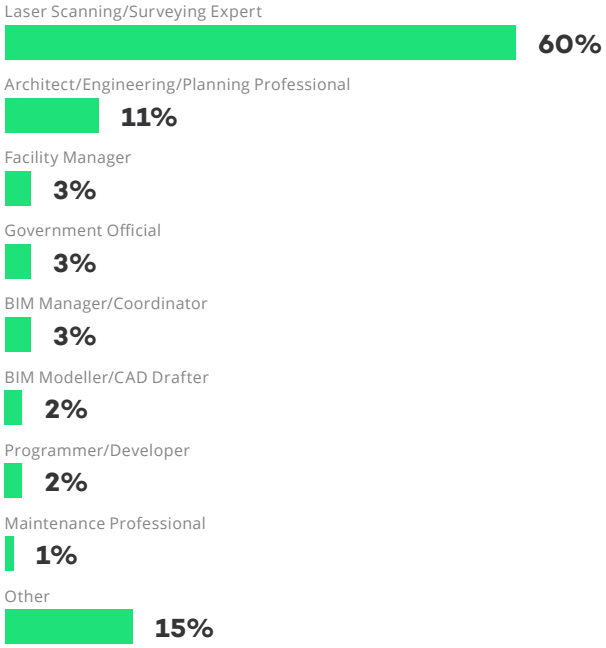
In terms of job function, respondents were asked to choose from a list of occupations which best described their occupation.

At 60%, by far the biggest group of respondents self-identified as experts in laser scanning and surveying. The next biggest group at 11% were architecture, engineering and planning professionals. The caveat, however, is that a more sizeable group of 15% preferred to identify as “other”.

In line with our grouping of laser scanning and surveying experts, there was a rough correlation with the type of company they worked for, with **53% working for companies providing surveying or laser scanning services**. Similarly, 14% worked at companies providing Architecture, Engineering & Construction (AEC) services.

Figure 3

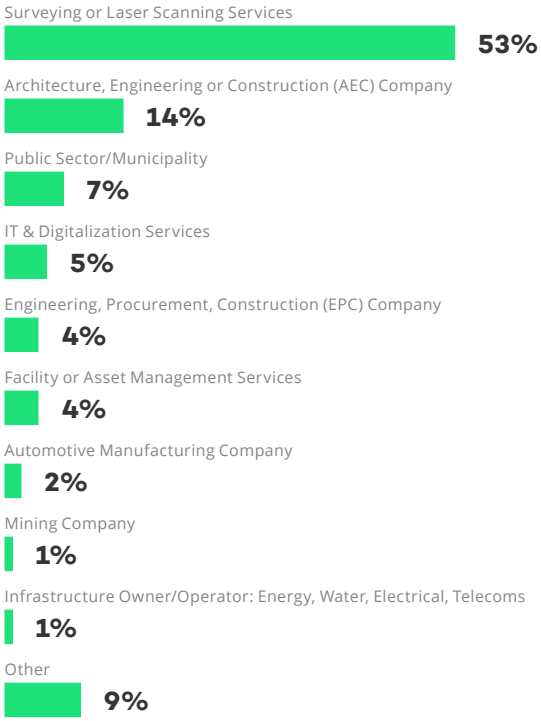
Which of the following best describes your job function?



Respondents: 152

Figure 4

What type of company do you work for?



Respondents: 152

About the participants

Let's quickly cover two more demographic matters that are of relevance to this report – company size and client type – and then we'll move on to the substance of the survey proper.

When asked about the number of employees that their company had in total, 22% said that they had a headcount of between 5 and 20 personnel. The weighting is more or less even for other responses, however.

For example, 19% worked for companies with between 51 to 200 staff, while another 16% said that their company had less than 5 employees, and 14% said between 21 to 50.

What this indicates is that nearly three quarters of the people who took part in the survey are working for small to medium-sized businesses. This reflects upon the relative maturity of mobile mapping as a going concern; the pool of companies employing more than 500 people is comparatively small – 19% – but steadily growing into the double digits.

The next point of interest is about their clients and customers. Specifically, which industries and sectors they hailed from.

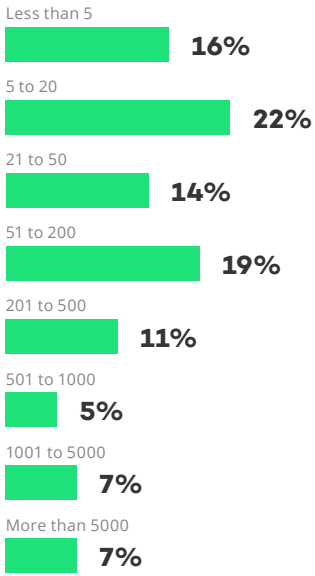
Respondents could choose more than one answer for this question, so the figures don't add up to a round total. But needless to say, **62% of their clients are architecture or engineering firms**, followed by 55% for construction companies, and 53% for public infrastructure and municipalities.

Working further down the list, we see a healthy showing for building owners and real estate companies, facilities management firms, oil & gas owners and operators, and manufacturing companies too.

Given how so many of the choices were felt to be applicable to their circumstances, the implication is that our respondents are experiencing demand for their services across a broad range of sectors.

Figure 5

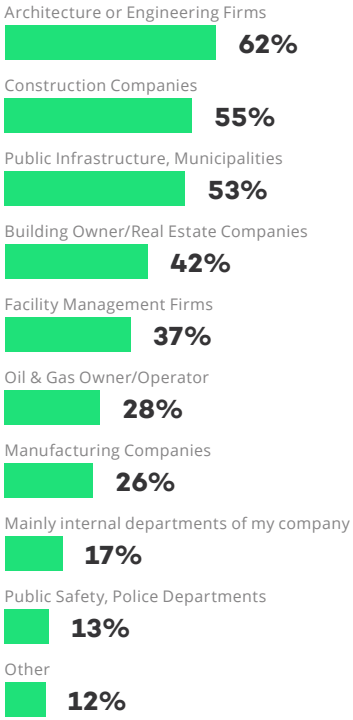
How many employees does your company have in total?



Respondents: 152

Figure 6

Who do you see as your clients?



Respondents: 152

Laser scanning today

Mapping scenarios, use cases & software landscape →

Laser scanning today

We asked respondents to tell us the most common scanning use cases they were engaged in, whether for themselves or their clients. Once again, they were allowed to select more than one option.

The types of mapping environments most often worked on are topographic & site surveys (53%), followed by residential & office buildings (47%), construction sites (46%), industrial buildings (44%), and road, rail & bridges (44%).

Let's dig into the data a bit further here. By looking at the responses from the Americas in isolation, we found that uptake for topographic & site surveys was slightly higher at 58%.

Conversely, when considering responses from Europe alone, the frequency of the mapping scenario for residential & office buildings climbs higher to 51%.

Next question in the survey was about the most common scanning use cases required by their cli-ents. Respondents could pick more than one option.

The most common scanning use case by a large margin is as-built documentation, represented by 3D or Building Information Modeling at (72%) and 2D with (54%).

Next comes construction verification (47%), and clash detection for new design versus existing structures (34%).

Looking at region-specific responses, however, shows that scanning for prefabrication and shop drawings climbs from 24% worldwide to 31% in the Americas.

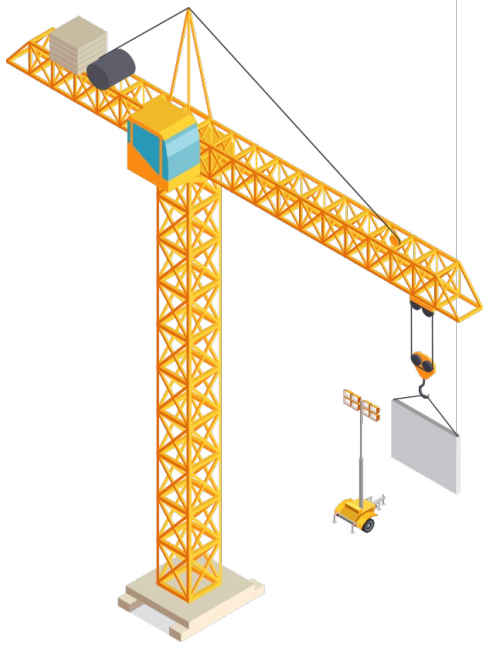
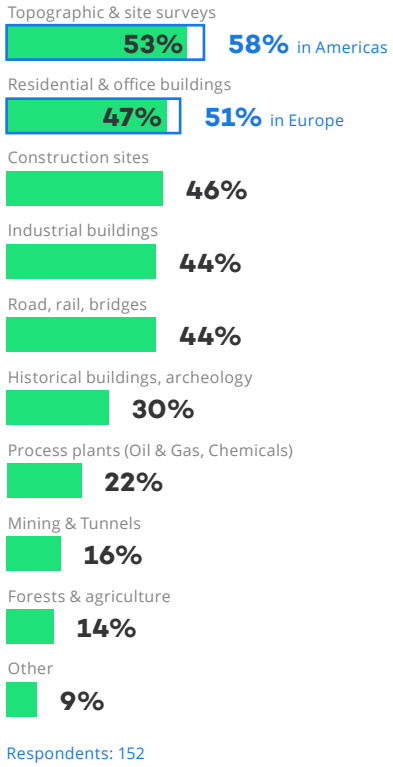


Figure 7

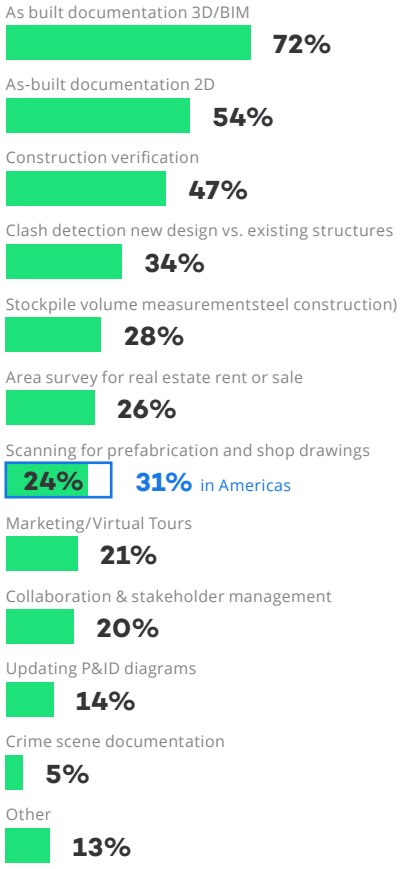
What types of mapping environments do you work on most often?



Respondents: 152

Figure 8

What are the most common scanning use cases for you or your clients?



Respondents: 152

Laser scanning today

So now we have an idea of the clients and their requirements, what form do the deliverables take?

Choosing from multiple options, respondents told us that current client deliverables include point clouds (78%), 3D / BIM models (67%), imagery (61%), surveying work (59%), and 2D floor plans (53%).

Considering regional differences, we can see that the demand for 3D/BIM models is a bit higher in the Americas (71%), as is the need for imagery (67%).The survey wasn't exclusively about hardware. We also asked respondents to tell us which software packages and applications that they were using on a regular basis.

There was a very strong showing for Autodesk in these answers, with AutoDesk AutoCAD (66%), AutoDesk Revit (45%), and AutoDesk NavisWorks (23%) taking the top three positions. Bentley MicroStation (22%) pipped Autodesk BIM360 (16%) so that it wasn't a complete monopoly, but no other vendor came even close.

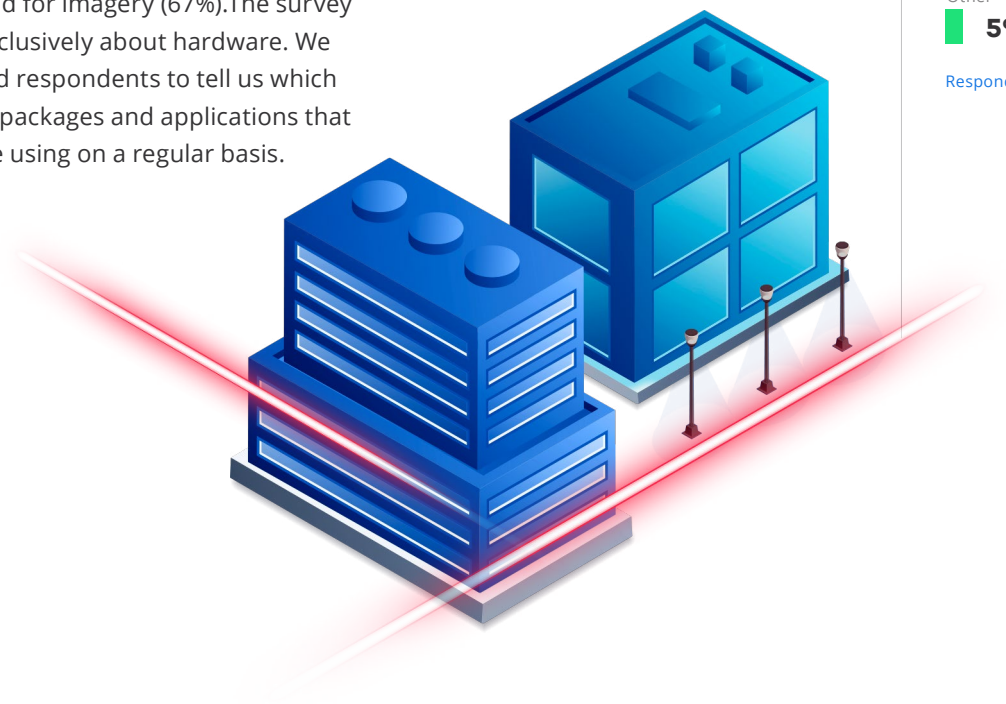
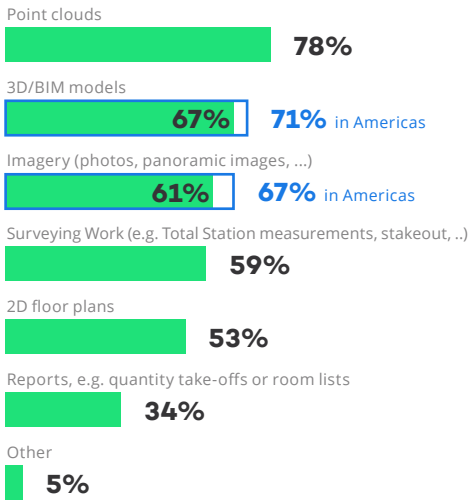


Figure 9

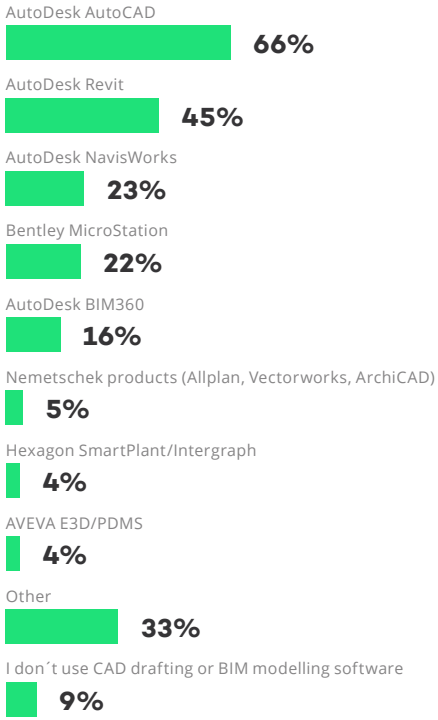
What are your current deliverables?



Respondents: 152

Figure 10

Which of the following software do you use on a regular basis?



Respondents: 152

Important product characteristics

The most important product features in a laser scanning device →

Important product characteristics

Next, we drilled down to questions about hardware and tools. From the selection of attributes, which are the most important when deciding the type of scanning device to invest in?

Respondents overall said that point cloud quality & resolution (76%) was the most important feature, followed by accuracy (71%) and scanning speed (60%).

There's an intriguing reshuffling of priorities when we view these answers through a regional filter, however:

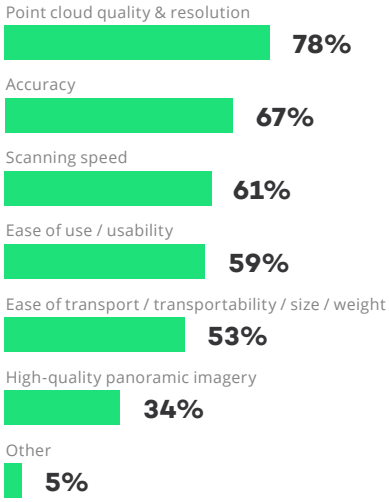
- The top three attributes are scanning speed (79%), point cloud quality & resolution (76%) and accuracy (70%) in Europe...
- ...while point cloud quality & resolution (75%), accuracy (73%), scanning speed (52%) is the preferred order in the Americas.

Considered less essential worldwide are usability (37%), transportability (26%), and high-quality panoramic imagery (26%).

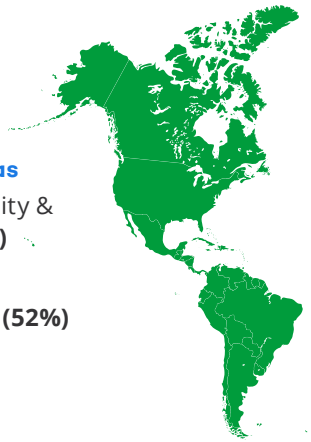
This last statistic is something of a discrepancy when we cross reference the answers to the question about most requested client deliverables, where imagery came third at 61% worldwide and 67% in the Americas.

Figure 11

Which product attribute is (or would be) most important when deciding what kind of scanning device to buy?



Top 3 - Europe
Scanning speed **(79%)**
Point cloud quality & resolution **(76%)**
Accuracy **(70%)**



Top 3 - Americas
Point cloud quality & resolution **(75%)**
Accuracy **(73%)**
Scanning speed **(52%)**

Important product characteristics

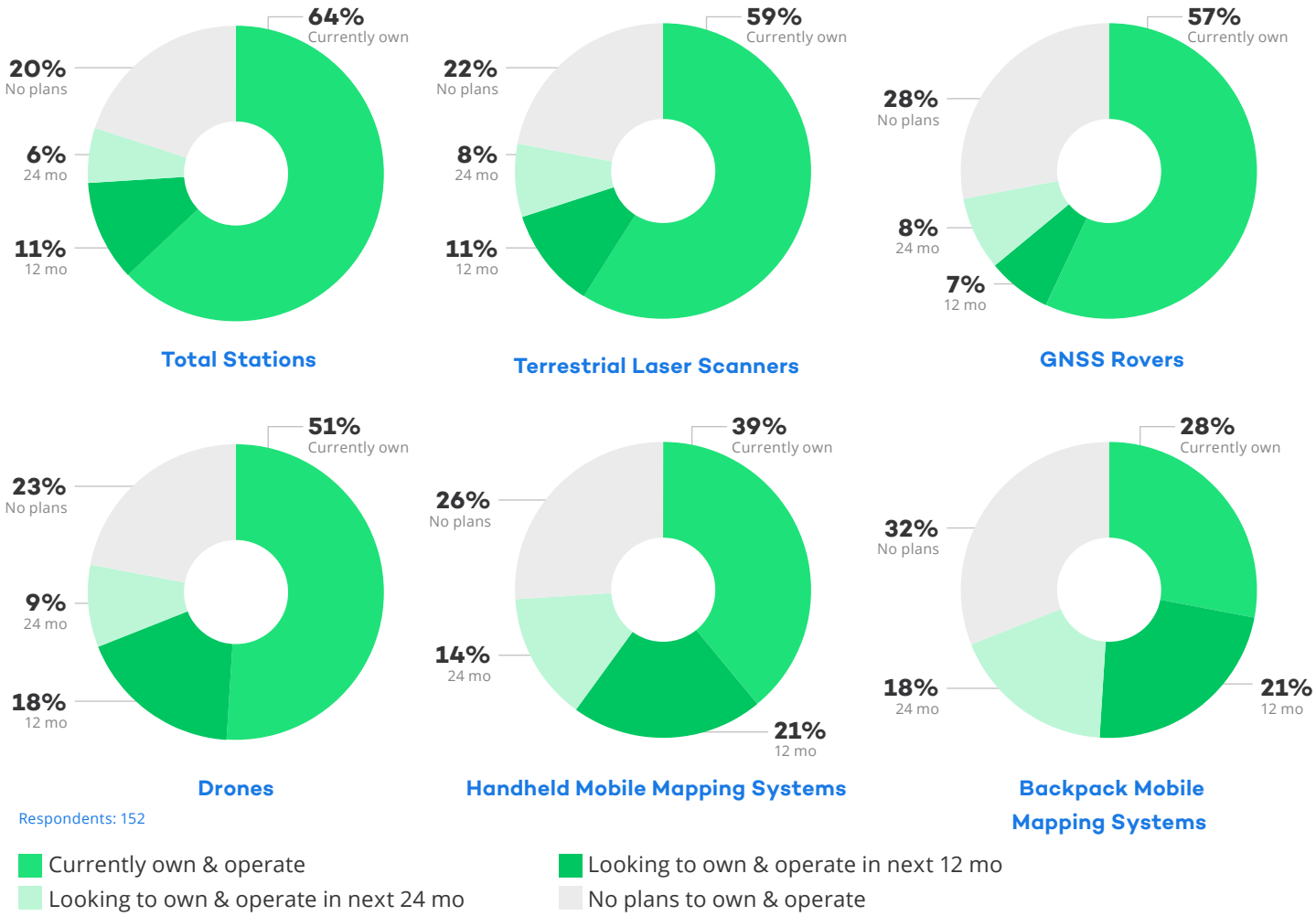
Let's discuss the status quo of the laser scanning toolbox. Choosing from multiple options, which devices does an organization currently own and operate, or planning to own and operate within the next two years?

Currently, 39% of respondents own and operate a handheld mobile mapping system, while a further 21% are looking to invest in the next 12 months.

Further down the chain, we can see that 28% own and operate a backpack mobile mapping system, and a further 23% are looking to invest in the next 12 months.

Figure 12

Which of the following surveying devices does your organisation own & operate or are you looking to own and operate in the next two years?



Adoption barriers & buyer intent

What are the obstacles to using a mobile mapping device? →

Adoption barriers & buyer intent

In this section of the survey, we wanted to understand the reasons why a laser scanning professional would be reluctant to apply mobile mapping technologies to their work. What are the barriers to using a mobile mapping device?

Selecting more than one answer, **the leading reason was limited budget (39%)**. Close behind was the perception that such devices are too expensive for the results they deliver (32%), a lack of accuracy (30%), and compatibility with existing workflows (23%).

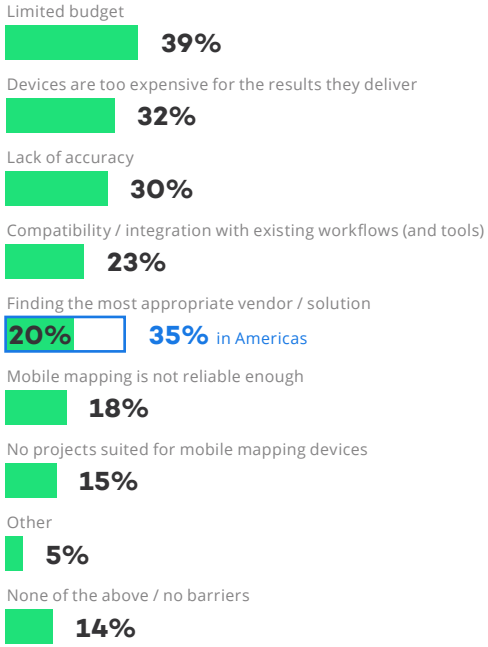
From a regional perspective, while finding the most appropriate vendor or solution got 20% of responses worldwide, it is the second biggest barrier in the Americas with 35% of answers.

Among those who are looking to own such a device, they're most likely to consider investing in the NavVis VLX mobile mapping system (43%) by a large margin. The options trailing behind in distant second and third would be Leica BLK2Go (28%) and GeoSlam products (26%).

More insights concerning NavVis VLX is that this statement of intent grows to 54% when looking at Europe alone, in a region where client categories like facility management companies, building owners & real estate, manufacturing companies, and AEC firms have a stronger showing among our respondents.

Figure 13

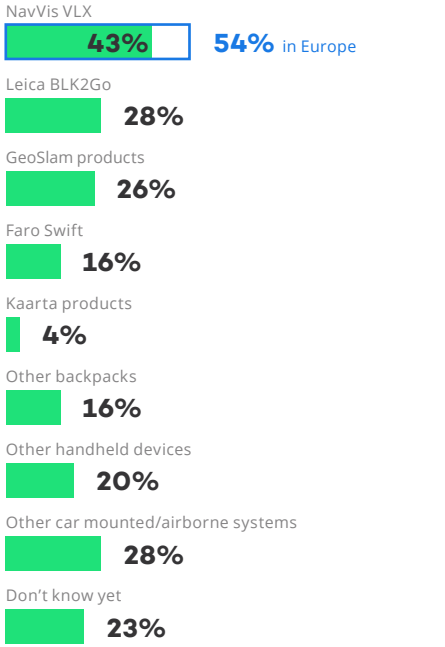
What are the key barriers or questions in your organisation around using mobile mapping devices?



Respondents: 152

Figure 14

Which of the following mobile mapping devices would you consider buying?



Respondents: 130

The business of mobile mapping

Identifying the value-drivers most critical for laser scanning and surveying professionals to be successful in their business →

The business of mobile mapping

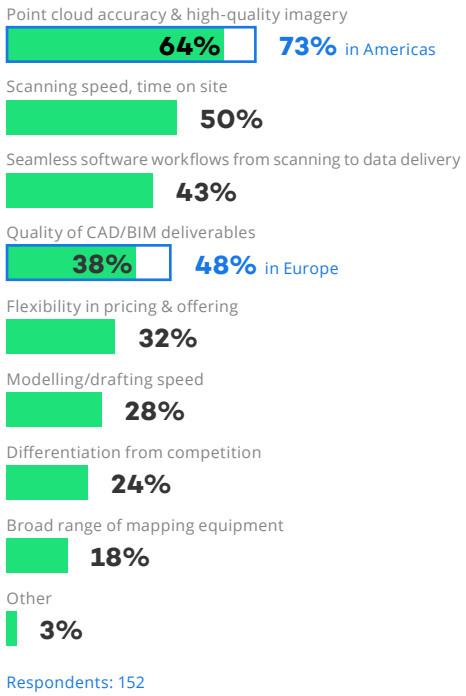
Here we come to perhaps the most critical question of all. What are the value-drivers most important for laser scanning and surveying professionals to be successful in their business?

From a range of choices, **the top three mapping aspects which respondents believe are essential to be successful in their business are point cloud accuracy & high-quality imagery (64%), scanning speed and time spent on site (50%), and a seamless software workflow from scanning to data deliverables (43%).**

The priority for point cloud accuracy & high-quality imagery is even higher in the Americas (73%), which the quality of CAD/BIM deliverables jumps from 38% worldwide to 48% in Europe.

Figure 15

Which of the following aspects are most important for you to be successful in your business?



Respondents: 152

For the last section of the survey, we presented respondents with a series of statements and asked whether they agreed or disagreed with them.

The attitudinal statement that had the strongest resonance was that professionals could see the value of deploying both mobile mapping and terrestrial scanning devices on the same projects. This concept of a hybrid workflow won over 86% of the audience.

At the opposite end of the spectrum, the least popular statement was concerning accuracy. **Only 26% of laser scanning professionals thought that mobile mapping could not achieve their accuracy expectations.**

Summarising the other findings:

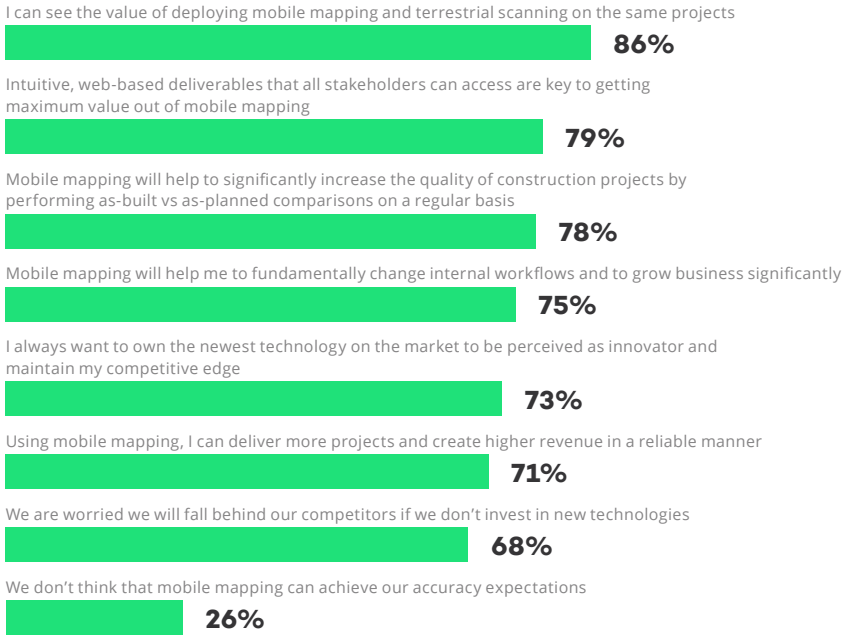
- 75% agreed that mobile mapping will help them to fundamentally change internal workflows and to significantly grow their business.
- 73% said they always want to own the newest technology on the market to be perceived as innovative and maintain their competitive edge.
- 71% agree that by using mobile mapping they can deliver more projects and create higher revenue in a reliable manner.
- 68% said they are worried they will fall behind their competitors if they don't invest in new technologies.

Two of the statements had strong divergences based on the region. While 79% overall said that intuitive web-based deliverables which all stakeholders can access are key to getting maximum value out of mobile mapping, the bias in Europe was 84% compared to 67% in the Americas.

Elsewhere, 78% overall agreed that mobile mapping will help to significantly increase the quality of construction projects by performing as-built vs as-planned comparisons on a regular basis. But again, there was a stronger lean of 84% in Europe compared to 65% in the Americas.

Figure 16

To what degree do you agree or disagree with the following statements?



Respondents: 152

62% of our respondents also see great potential to offer new services to their clients using mobile mapping devices. Another 33% are not yet decided, while only 5% are convinced that it's not for them.

What might these new areas of business be? Here's a sample of statements we were given:

> **Asset Management – collect data at all stages of the asset life cycle so the client has a database of all their different assets, and this data can be used for asset management purposes.**
>
> **SURVEYING EXPERT**
> Australia

> **Integration of assets to planimetry and visualization of 2D data in geographic information systems. Updating of assets and status of the different companies. Vegetation identifications in urban sectors.**
>
> **SURVEYING EXPERT**
> Latin America

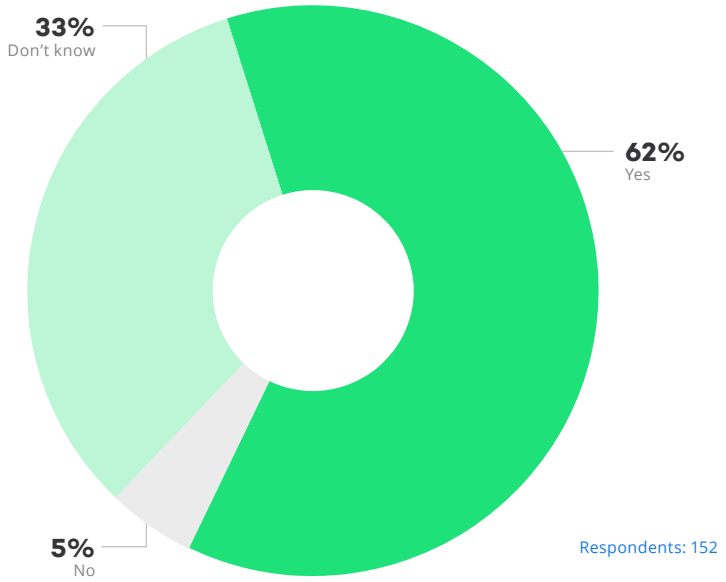
> **Mobile device used for survey and then BIM compared to physical asset for progress and quality monitoring.**
>
> **PROGRAMMER/DEVELOPER**
> Europe

> **Mapping sites daily in oil and gas, or during construction. Working in the video game or film industry. Quickly mapping floorplans or site plans, assuming the software becomes more automated in the future."**
>
> **SURVEYING EXPERT**
> Canada

> **General, and efficient, scan-to-BIM services. And more generalized deliverables suited for a broader range of customers.**
>
> **SURVEYING EXPERT**
> Nordics

Figure 17

In the future, do you see potential to offer new services to your end-clients by using mobile mapping technologies (excl drones)?



Wrapping up

A bright future for mobile mapping →

Wrapping up

With this survey, NavVis in partnership with Geo Week News, BIMplus, Lidar News and GIM International set out to understand the state of mobile mapping in 2021. And with these results, we have succeeded.

We have a clearer picture about the professionals using mobile mapping devices, where they're located, and the size of their businesses. Plus, we know a lot more about their clients, their use cases, and the deliverables they're asking for.

Regarding the key questions we'd set out at the beginning of this report, the learnings are:

- Currently, 39% of respondents own and operate a handheld mobile mapping system, while a further 21% are planning to invest in the next 12 months. We also know that 28% own and operate a backpack mobile mapping system, and a further 23% are looking to invest in the next 12 months.
- Professionals could see the value of deploying both mobile mapping and terrestrial scanning devices on the same projects. The concept of a hybrid workflow is endorsed by 86% of the audience.
- The top three mapping value drivers which respondents believe are essential to be successful in their business are point cloud accuracy & high-quality imagery (64%), scanning speed and time spent on site (50%), and a seamless software workflow from scanning to data deliverables (43%).
- Participants said that point cloud quality & resolution (76%) were the most important features of a mobile mapping device, followed by accuracy (71%) and scanning speed (60%).
- Only 26% of laser scanning professionals thought that mobile mapping could not achieve their accuracy expectations.

This is the State of Mobile Mapping in 2021. But the work doesn't stop here. The goal is to conduct a survey like this on a regular basis, and over time we'll be able to track the growth and development of this fledgling industry as a service to everyone engaged in it.

We plan to revisit many of these themes, for example the confidence in mobile mapping accuracy or the expansion into new services and document the directions they've taken.

It's a tremendously exciting time to be working in the laser scanning, surveying, and AEC fields. And with our mobile mapping devices and reality capture solutions, NavVis will accompany those professionals on their journey every step of the way.

NavVis

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Bridging the gap between the physical and digital world, NavVis enables service providers and enterprises to capture and share the built environment as photorealistic digital twins.

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