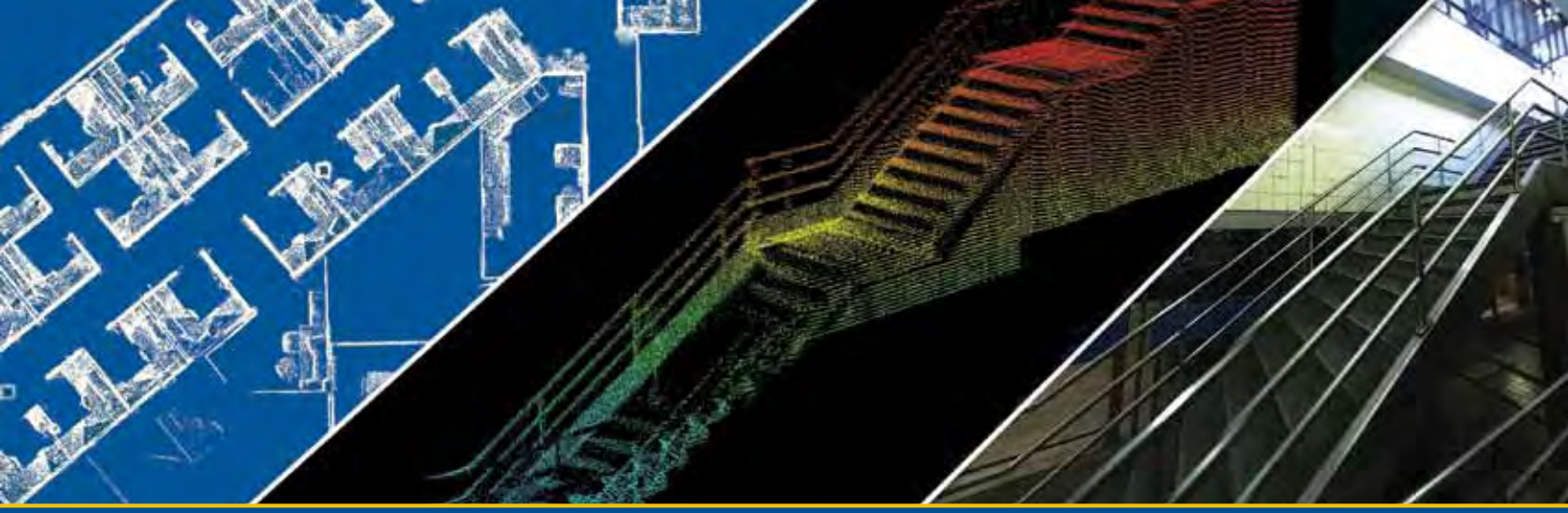


Trimble

TRIMBLE INDOOR
MOBILE MAPPING SOLUTION

TRIMBLE INDOOR MOBILE MAPPING SOLUTION (TIMMS): HIGH EFFICIENCY, MAXIMUM FLEXIBILITY, ALL-IN-ONE PACKAGE

Documenting the condition of indoor structures is a necessary but often times daunting task. Generating detailed indoor models is critical for building life cycle maintenance and the data must be used by multiple audiences for a host of applications including space optimization, planning renovations, evaluating facility emergency planning and environmental performance monitoring or so called 'green BIM' initiatives. Generally, in order to collect the data for such applications the more complex a structure is, the longer the acquisition and processing time to generate usable data. This is due in part to the tools available for contractors, namely static LiDAR and spatial imaging systems. These systems, while precise, require multiple setups and hours to process data in order to construct accurate representations of 3D interiors.

What is needed is a seamless collection tool which offers precision, an intuitive workflow which collects 3D LiDAR and 360 spherical video simultaneously in real world coordinates, and the ability to create complex 3D models or simple 2D floor plans – all of which can be collected at walking speeds and presented in a web interface for rapid visualization and dissemination to a variety of users. These capabilities are available with TIMMS, the industry's first and only all-in-one solution for indoor mapping.

THE COMPLETE SOLUTION

TIMMS is the optimal fusion of technologies for capturing spatial data for indoor and other GNSS denied areas of all sizes and locations. It provides both LiDAR and spherical video of a facility, enabling the creation of accurate, real-life representations of an interior space and all of its contents. The maps created are geo-located, meaning that the real world positions of each area of the building and its contents are known. Each pixel from the camera system and every point from the LiDAR have a latitude, longitude and elevation associated with it without the need of any external infrastructure to provide positioning information – TIMMS is totally self contained. Utilizing inertial technology and powerful processing software, TIMMS can be initialized immediately and can perform wide area mapping of a facility for extended periods of time. For the user, this means less time setting up equipment and more productivity, while ensuring consistent accuracy. Once the data is processed, the resulting spatial data can be rendered in a 360° panoramic viewer, allowing the user to be fully immersed in the interior space, able to zoom, pan and measure items of interest as desired.

Because of its tremendous efficiency and speed, TIMMS is very effective even for facilities extending over several city blocks. This allows the user to obtain holistic 3D indoor geospatial views of all kinds of infrastructure including:

- Plant and factory facilities
- High-rise office, residential, and government buildings
- Airports, train stations and other transportation facilities
- Music halls, theatres, auditoriums and other public event spaces
- Covered pedestrian concourses (above and below ground) with platforms, corridors, stair locations and ramps
- Underground mines and tunnels

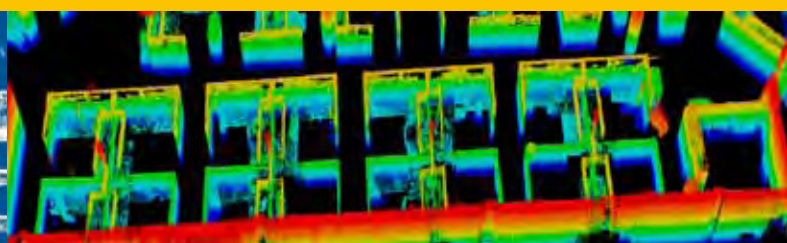
TIMMS DELIVERS A REVOLUTION IN FACILITIES MANAGEMENT

Until now, professionals involved in **B**uilding **I**nformation **M**odelling (BIM) had a choice: acquire quick but limited 2D data (floor plans) of interiors and interior structures, or acquire more detailed but also more time-consuming 3D LiDAR data. TIMMS eliminates this unnecessary compromise by doing both at the same time; all in a single pass, at low cost, with high accuracy.

TIMMS offers multiple views of both data and images.

2D Schematic - accurate floorplans are easily created using TIMMS

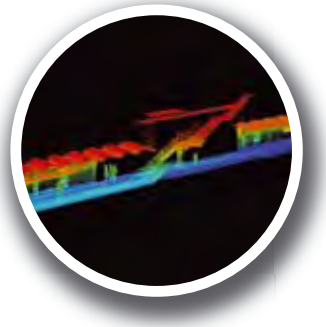
3D LiDAR: can quickly be generated from TIMMS data



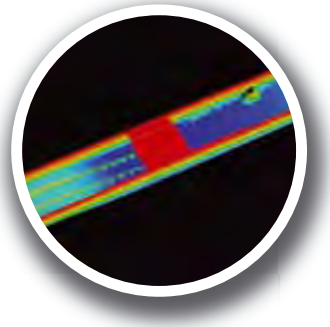
COMPONENTS

TIMMS integrates hardware and software required for high accuracy, reliability, and ease-of-use. TIMMS can also be customized to suit your specific requirements; no matter what your inside mapping project requires, Trimble can integrate the right components to develop the perfect solution.

Law Enforcement/Public Safety/ First Responders:
Clear layouts for first responders



MEP Projects:
Clear Lidar imagery



Mining:
Accurate measurements for mine mapping and safety

AEC Projects:
3D Modeling

Survey:
2D, 3D, Full Measurements, LiDAR, Modeling and 360° imagery

A typical configuration includes:

1. **Inertial Measurement Unit (IMU):** available in a variety of offerings to meet the needs of individual projects
2. **LiDAR:** TIMMS can be customized with any LiDAR equipment to meet any requirement
3. **GNSS Antenna:** a first position fix is obtained with Trimble's BD960 antenna
4. **Indoor Georeferenced Spherical Camera:** Image data collected is 360 degree and georeferenced
5. **Ruggedized Display:** made to stand up to harsh environments
6. **Electronics Bay:** An integrated computer management system (CMS) consists of a POS navigational system along with LiDAR computers with time tagging and data logging. Stores all data and includes removable hard drive for taking the data with you for processing
7. **Battery System:** automatic power management ensures constant power as well as the ability to plug in the unit to a standard outlet to save power during down time
8. **Robust chassis and wheels:** allows TIMMS to access hard to reach areas as well as stand up to harsh settings

CAD: can be created from the 3D data

WHY CHOOSE TIMMS?

TIMMS is a high-efficiency, easy-to-use, end-to-end solution that provides tremendous flexibility in collecting, accessing, displaying, and analyzing 360° spherical imagery and LiDAR data. TIMMS is all you will ever need for producing end-user deliverables such as: floor plans, volumetric analysis, visualizations of the building interior from multiple perspectives and as-built data for planning / displaying modifications to interiors. No matter what the specific application, the benefits are numerous:

- Efficient, high-accuracy data acquisition of georeferenced spherical imagery and LiDAR data
- Lower data acquisition cost for as-builts
- Eliminated data re-acquisition costs
- Reduced infringement on operations: Map over 75,000 square feet in a single day
- Full customization available, based on user requirements – optimize the standard sensor suite to fit your particular application
- Flexible Pricing Model: Designed to allow customers to optimize their cost of ownership of TIMMS data.
  Options include:
  - **Data-Only:** Trimble, as a service partner, will collect, process, and deliver the facility data to you. This eliminates the cost of the system entirely and you pay only when you need the system for a specific job
  - **Purchase:** For those companies who collect facilities data frequently, outright purchase of the system is available with Trimble maintenance and technical support
  - **Lease:** For users who require the system for a fixed period of time

  By selecting the right plan for your needs, your cost of acquiring facilities data is optimized making TIMMS the only system capable of delivering a rapid payback of your investment.

WHO CAN USE TIMMS?

Because TIMMS is a highly productive and reliable method for mapping any interior structure, all facility stakeholders can utilize and benefit from the TIMMS data. Some of those who will benefit most include:

ARCHITECTURAL, ENGINEERING AND CONSTRUCTION CONTRACTORS (AEC)

Architects, engineering consultants, and technicians can utilize TIMMS for producing georeferenced LiDAR and spherical video rapidly, which is critical for visualizing the job. The more comprehensive the data, the less re-work is required and jobs are completed on time and on budget.

MECHANICAL, ELECTRICAL AND PLUMBING (MEP)

With TIMMS data of the entire facility, these professionals can add multiple layers of data from other devices such as static scanners to gain a comprehensive view of projects. Clash detection with existing building features and other types of analysis are facilitated cost effectively through TIMMS.

LAW ENFORCEMENT/PUBLIC SAFETY/FIRST RESPONDERS

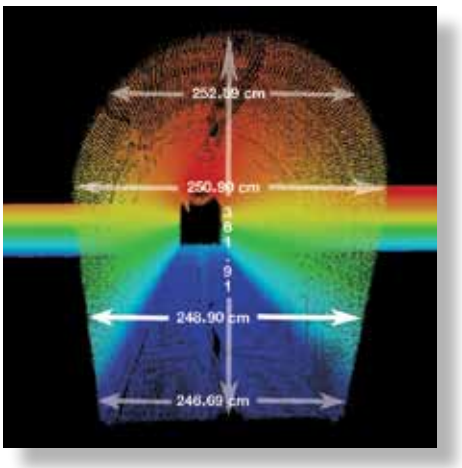
Detailed 360 degree imagery provides situational awareness giving personnel the total picture of an indoor environment. LiDAR data can be used for accurate measurement of interior features and both data types can be accessed through the internet, giving decision makers in multiple locations real time access to the same data. The data can be used for training and simulation purposes as well.

MINING

Mapping underground mine tunnels and chambers can greatly improve overall mine safety.

OWNERS/FACILITY MANAGERS

BIM-aided jobs can lead to short and long term operational savings. Not only is the cost of data acquisition with TIMMS a fraction of the cost of static scanners, keeping data on a facility current is facilitated.



TIMMS provides the most accurate and thorough way of measuring interior distances.

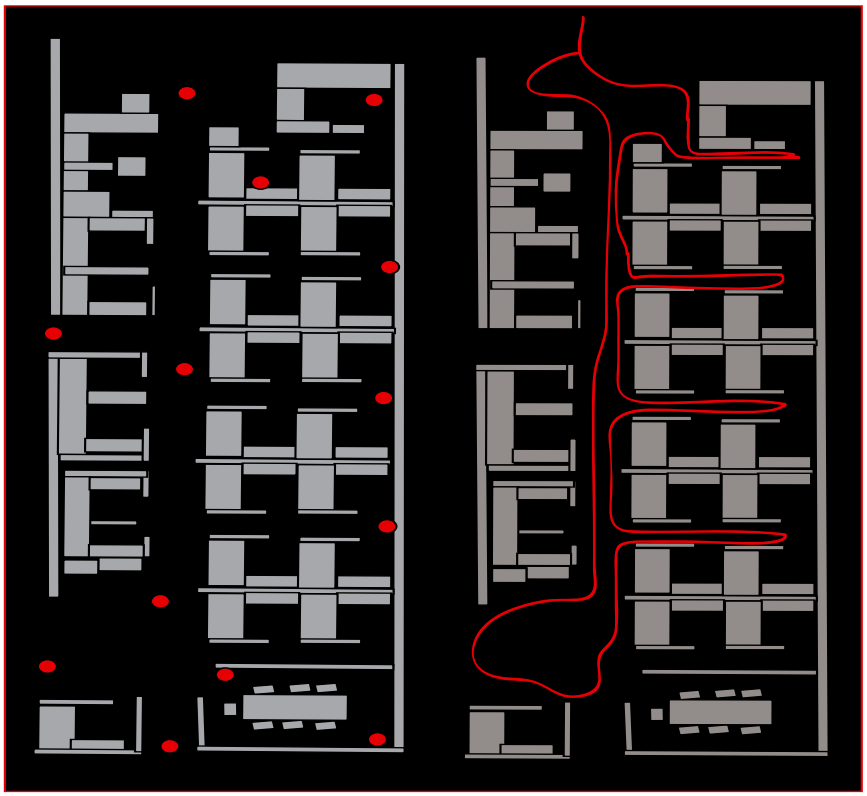
Spherical Video: create a complete global view of any indoor space

TECHNICAL ADVANTAGES

TIMMS offers significant technical advantages over other methods for indoor mapping:

- **Little or no LiDAR shadowing:** being mobile allows TIMMS to move in and around structures. Static methods require multiple setups to capture the same level of data, increasing costs
- **Extended range of operations:** no need for frequent stops to re-calibrate
- **Able to start mission anywhere...** indoors or out, no need for GNSS. TIMMS is self contained utilizing industry leading inertial technology which provides reliable and repeatable high accuracy over long duration missions
- **Simple workflow:** utilize POSPac MMS to derive the georeferenced point cloud of the structure in addition to the spherical video. Upload to Trimble's Connected Community (TCC) anywhere in the world, where users can share, visualize and analyze the data quickly and efficiently using a standard web browser
- **Long battery life:** offering extended range of operation
- **Extended modeling capabilities** with any third party software which utilizes 2D or 3D LiDAR data
- **Fully Customizable:** another industry first – TIMMS can be adapted with custom hardware and software to meet your specific needs
- **Perform wide area mapping** with the ability to layer in multiple types of data (e.g. pipes, mechanical) using static scanners, providing a truly holistic model with multiple levels of detail

Static Terrestrial Lasers Versus TIMMS:



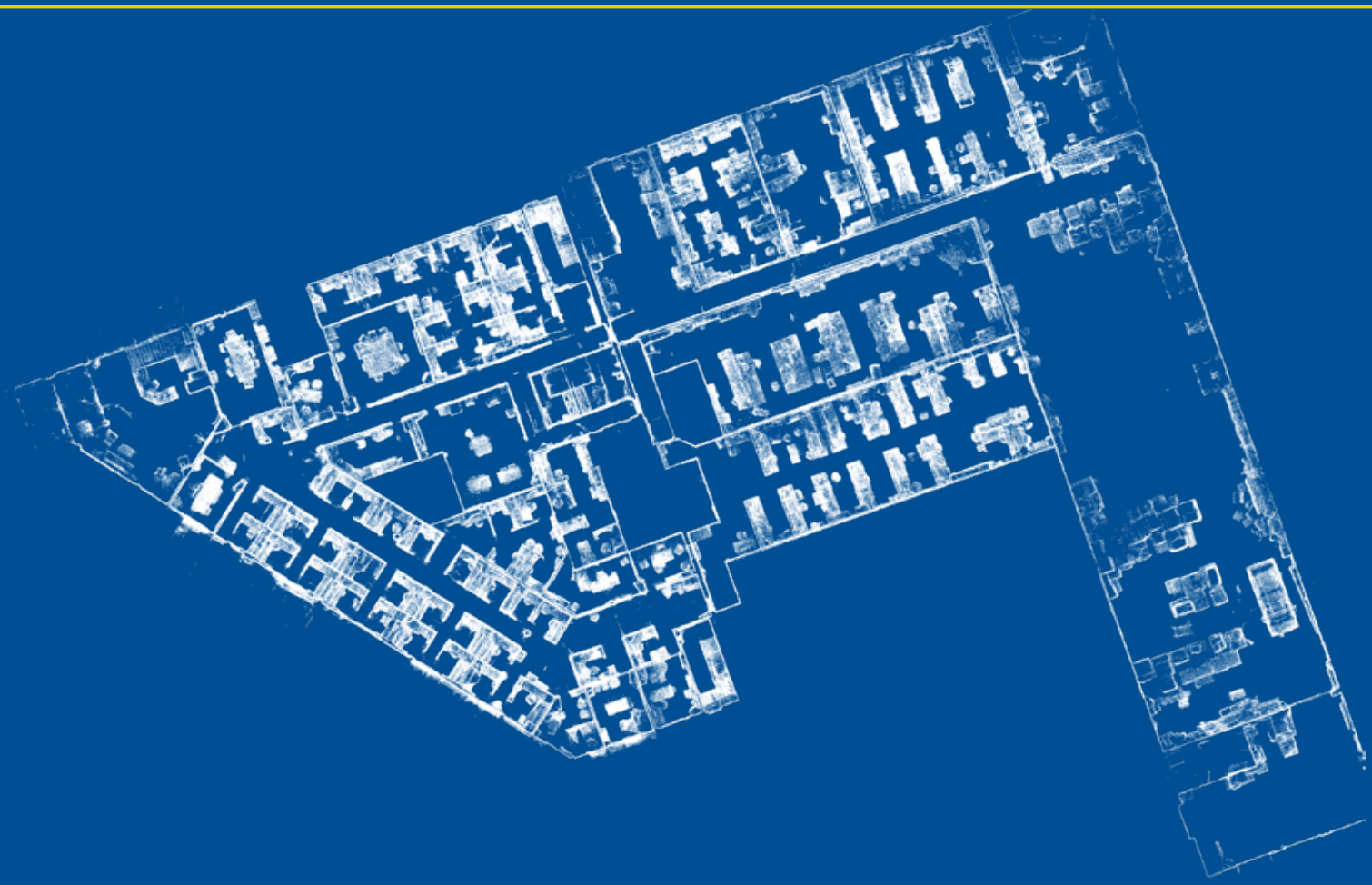
Above: Image on the left illustrates the number of setup points for static scanners to collect a typical area. On the right, TIMMS trajectory illustrates ease of data collection in walking around objects to capture total views without shadowing effects.

TIMMS Imagery via Trimble Connected Community (TCC):

Above: Trimble Connected Community (TCC) data is viewed and manipulated online, anywhere in the world, making information available to all.

WORLDWIDE, WORLD-CLASS CUSTOMER SUPPORT

TIMMS and its entire workflow are supported by 24 hour, 7 day per week telephone emergency support, as well as full on-site consulting and training services. So whether you're looking for assistance on using your system with a new sensor, or need some support with data post-processing, we are here to ensure that you get the most value out of your investment.



Applanix, a Trimble Company
85 Leek Crescent Richmond Hill
ON Canada L4B 3B3
T 905.709.4600 F 905.709.6027
indoor-mapping@trimble.com

www.trimble.com