Trimble X9

3D LASER SCANNING SYSTEM

Versatile advanced 3D laser scanning system you can depend on, built on proven Trimble laser scanning technologies.

The power to do more

Proven

Simple and efficient field workflows suitable for all users.

Powerful Trimble® Perspective software to easily manage and validate projects in the field with auto-registration.

Smart auto-calibration and self-leveling optimized to increase productivity and function.

Laser pointer for georeferencing and single point measurements.

Versatile

High speed scanning to save time and effectively increase scan density.

Range, accuracy and data quality to support a wide range of applications.

High sensitivity with all scan modes to capture dark and shiny surfaces fast.

Flexible operation with tablet, phone or one-button workflow.

Durable, compact and lightweight with backpack for safe and easy transport.

Reliable

Trusted auto-calibration and survey grade self-leveling for dependable data quality.

High IP55 rating for dust and water protection.

Wide operating temperature range for demanding environments.

Backed by 2-year standard warranty.

Trimble®

DATASHEET

Trimble X9

3D laser scanning system

SYSTEM OVERVIEW

Trimble X9 3D laser scanning system	New Trimble X-Drive center unit design with combined servo drive/scanning mirror, integrated HDR imaging, automatic calibration, survey-grade self-leveling and laser pointer now provides higher speed, range, accuracy and sensitivity.
Trimble Perspective software	Easy to use software for scanner control, automatic infield registration, georeferencing, 3D visualization, annotations, measurements, processing and export for delivery.

SCANNING PERFORMANCE

GENERAL

	Scanning EDM laser class	Laser class 1, eye safe in accordance with IEC EN60825-1
	Laser wavelength	1530–1570 nm, invisible
	Field of view	360° x 282°
	Beam divergence/Beam diameter	0.8 mrad/7.95 mm @ 10 m
	Scan speed	Up to 1000 kHz

RANGE MEASUREMENT

	Range principle	High speed, digital time-of-flight distance measurement
	Range noise[1, 2]	< 1.5 mm @ 30 m
	Range[3]	0.6 m–150 m
	High sensitivity EDM	Dark (asphalt) and reflective (stainless steel) surfaces

SCANNING ACCURACY

	Validation	Guaranteed over lifetime with auto-calibration
	Range accuracy[1,2]	2 mm
	Angular accuracy[1,4]	< 16"
	3D point accuracy[1,4]	2.3 mm @ 10 m, 3.0 mm @ 20 m, 4.8 mm @ 40 m

SCANNING PARAMETERS

SCAN MODE	DURATION[5,6,7] (MIN:SEC)	SPACING (MM) @ 10 M	SPACING (MM) @ 35 M	SPACING (MM) @ 50 M	NUMBER OF POINTS (MPTS)	MAX FILE SIZE (MB)
Indoor	0:50	15	-	-	6.8	32
Standard	2:03	8	26	38	27.2	95
	3:33	5	18	25	61.2	204
	5:36	4	13	19	108.8	340
High speed	1:27	8	26	38	27.2	175
	3:15	4	13	19	108.8	610
	6:08	3	9	13	244.8	1,250

IMAGING PERFORMANCE

	Sensors	3 coaxial, calibrated 10MP cameras
	Resolution	3840 x 2746 pixels for each image
	Raw image capture	Fast - 15 images - 158 MP - 1 minute - with HDR 3 minutes Quality - 30 images - 316 MP - 2 minutes - with HDR 6 minutes
	Settings	Auto Exposure and HDR Auto White Balance correction and indoor/outdoor presets

AUTOMATIC LEVEL COMPENSATION

	Type	Automatic Self-leveling, selectable on/off
	Range	± 10° (Survey Grade), ± 45° (Coarse)
	Upside down	± 10° (Survey Grade)
	Survey grade accuracy	< 3" = 0.3 mm @ 20 m

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AUTOMATIC CALIBRATION		
	Integrated calibration system	Full auto-calibration of range and angular systems when required with no user interaction or targets
	Angular calibration	Applies a correction to the collimation error, i.e., the deviation of the horizontal, vertical or sight axis
	Range calibration	Applies a distance correction in the albedo and the distance measurement
	Smart calibration	Monitors environmental temperature, ambient light, vibration, instrument temperature and vertical speed for optimum performance

TRIMBLE REGISTRATION ASSIST		
	Inertial navigation system	IMU tracks instrument position, orientation and movement
	Auto-registration	Automatic scan orientation and alignment with last or pre-selected scan
	Manual registration	Manual alignment or split screen cloud to cloud
	Visual checks	Dynamic 2D and 3D viewing for QA
	Refinement	Automatic registration refinement
	Registration report	Report with project and station average error, overlap and consistency results

GENERAL SPECIFICATIONS		
WEIGHT AND DIMENSIONS		
	Instrument (including battery)	6.045 kg (13.33 lbs)
	Internal battery	0.35 kg
	Dimensions	178 mm (W) x 353 mm (H) x 170 mm (D)
POWER SUPPLY		
	Battery type	Rechargeable Li-Ion battery 11.1V, 6.5Ah (Standard for Trimble optical instruments)
	Typical duration	3.5 hours per battery (3 batteries included)
ENVIRONMENTAL		
	Operating temperature	-20 °C to +50 °C (-4 °F to +122 °F)
	Storage temperature	-40 °C to +70 °C (-40 °F to +158 °F)
	Ingress protection rating	IP55 (dust protected and water jet)
	Relative humidity	95%
	Equipment pollution degree	4
OTHERS		
	Laser pointer	Class 2 laser with a wavelength of 620–650 nm
	Remote control	Trimble T10x tablet or comparable Windows®10 tablet or laptop via WLAN or USB cable
	Push button	One-button scan operation
	Communications/Data transfer	WLAN 802.11 A/B/G/N/AC or USB Cable
	Data storage	Standard SD Card (32 GB SDHC included)
	Accessories	Backpack for easy transport and airline carry-on Lightweight carbon fiber tripod with bell connector Quick release adapter for X9 and carbon fiber tripod
	Warranty	2 year standard

DATASHEET

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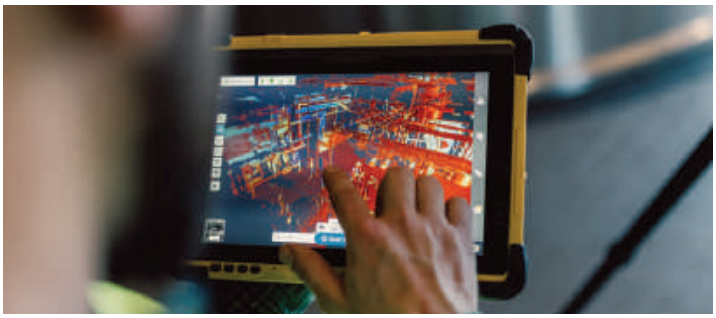
TRIMBLE PERSPECTIVE		
SYSTEM REQUIREMENTS		
	Operating system	Microsoft®Windows®10
	Processor	Intel®8th Generation Core™ i5 processor or better
	RAM	16 GB or better
	VGA card	Intel HD Graphics 620 or better
	Storage	512 GB Solid State Drive (SSD), 1 TB recommended
FEATURES		
	Scanner operation	Remote control or cable
	Trimble registration assist	Automatic and manual registration, refinement and reporting
	Data interaction	2D, 3D and Station View
	In-field documentation	Scan labels, annotations, pictures and measurements
	Auto sync	Automatic data sync from one-button operation
	Georeferencing	Laser pointer for georeferencing and precision point measurement
	Reports	Registration, Field Calibration and Diagnostics reports
	Data redundancy	Data stored on SD Card and tablet
	Data integration	Export formats to support Trimble and non-Trimble software File formats: TDX, TZF, E57, PTX, RCP, LAS, POD



1 Specification given as 1 sigma.
2 On 80% albedo. Albedo given @ 1550 nm
3 On matte surface with normal angle of incidence. High speed range of 120 m.
4 After automatic calibration and self-leveling within ± 10°.
5 Durations for scan times include self-leveling time within ± 10°.
6 Self-leveling will take ~ 10 seconds longer when scanner is not within ± 10°.
7 Scan times can increase up to 45 seconds for full calibrations after startup or idle time until thermal stabilization. Full system checks occur every 30 min.

Specifications subject to change without notice.

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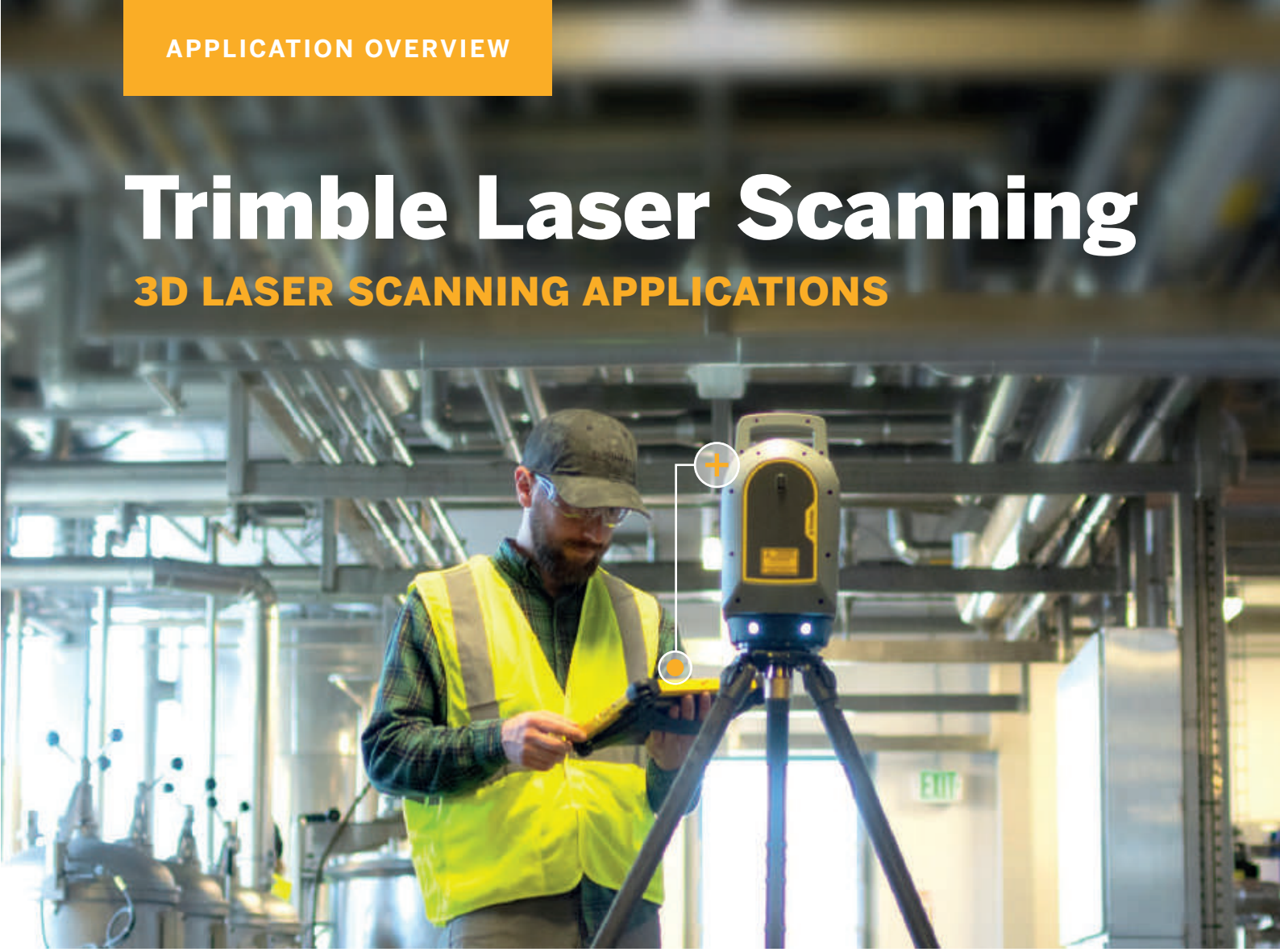
APPLICATION OVERVIEW

Trimble Laser Scanning

3D LASER SCANNING APPLICATIONS



A Scanning Solution For Every Challenge

From routine field operations to highly specialized custom applications, a project is only as good as the data behind it. That's why we hold every Trimble 3D laser scanning system to the highest standards of quality, reliability, and ease of use. With unique capabilities to meet application and budget requirements, choose the Trimble 3D laser scanning solution that meets your needs.

The Trimble® X7, X9 and X12 3D laser scanners support a breadth of applications with speed, range and accuracy options. Driven by Trimble Perspective field software, each scanner provides intuitive registration workflows and full project visibility for users with any level of experience to validate and deliver projects in the field. In addition, the Trimble SX12 long-range scanning total station facilitates large survey projects and integrates with scanning workflows.

Trimble RealWorks™ 3D scanning software and Trimble Business Center survey software provide advanced application-specific tools for registration, analysis and design to enhance deliverables.

With Trimble, you get dependable instruments, comprehensive field workflows and office software you can apply to a vast range of applications.

Trimble®

Topographic & General Surveys

Quickly capture features for land title surveys, buildings, roads, intersections, site improvements, encroaching elements and complex structures. Also use it to:

- Document and highlight features or items of interest using annotations with pictures.
- Assign labels to each scan to create logical scan groups and add annotations and measurements while continuing to scan.
- Use auto-classification tools to extract data corresponding to the ground, buildings, powerlines, signs, vegetations, and more.
- Create as-builts of road corridors, intersections, roadway surfaces, lane stripping, flow lines, manholes, right of ways, overhead power lines, and other features.

Civil Infrastructure

Create as-built documentation for drawings or models for bridges, tunnels, dams and other civil infrastructure with an instrument range that allows for operation from a safe distance and the scan resolution to effectively capture areas of interest. Also use it to:

- Incorporate scan information in clearance calculations, modeling, inspections, renovations, and expansion work.
- Leverage high-speed data capture and quickly capture area scans to reduce downtime for critical infrastructure projects.
- Benefit from HDR image quality for visual inspection and sharing of information.
- Register in the field to verify scan data is complete before importing to Trimble Business Center or Trimble RealWorks at the office.

Industrial Survey

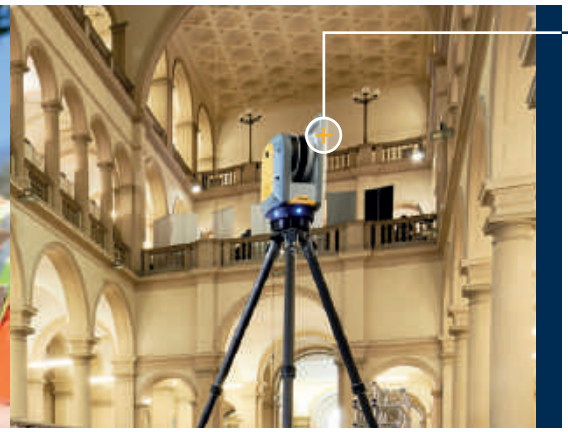
Create accurate as-builts of complex industrial facilities for modeling and revamp designs. Also use it to:

- Take high-resolution area scans for more detail on points of interest and safely capture inaccessible areas from a distance.
- View details of existing conditions for critical decisions.
- Enhance in-field documentation with annotations and pictures of tie-in locations inside Trimble Perspective.
- Georeference scans to plant coordinate systems using Trimble RealWorks target-based registration and survey control for export-to-plant design software to do piping layouts, check fabrication spools, and detect interferences with CAD models.

Forensics

Use high-speed scanning and imaging to capture information at crime scenes and vehicular accidents and minimize road closures, even in extreme weather conditions. Also use it to:

- Add annotations with pictures to points of interest and take measurements in the field.
- Consider the Trimble X12 laser scanning system to generate unmatched high-resolution image quality, even at night, with the LED spotlights.
- Consider the benefits of the X7 and X9 laser scanning system automatic field calibration for court documentation.
- Register in the field to verify complete data capture before leaving the scene.
- Export data to Trimble Forensics Reveal software for creation of 2D/3D diagrams and animations for investigation and reconstruction.



Cultural Heritage

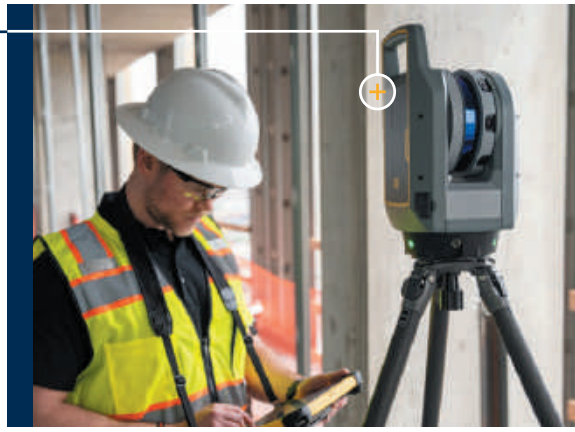
Plan restoration efforts or simply capture history. Historic preservation projects require great detail to inspect or monitor surface deterioration as well as high-resolution imagery for documentation, analysis and restoration. Also use it to:

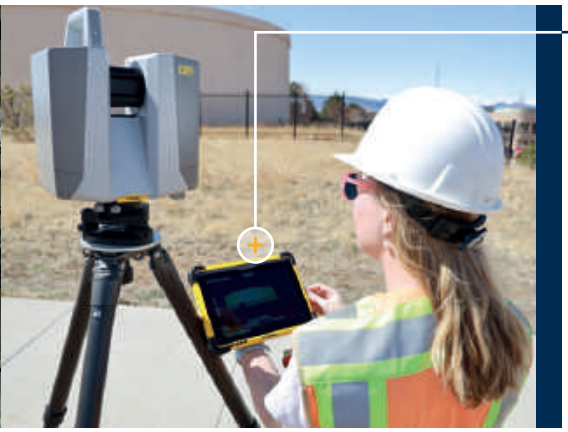
- Retain important details with high-resolution area scans on points of interest and safely capture inaccessible areas from a distance.
- Digitally preserve fragile artifacts for re-creation.
- Document and share the site with high-resolution panoramas and clear color imagery.
- Add annotations in the field with images to highlight areas of interest back in the office.
- Check data quality before leaving the site to eliminate costly and time-consuming field revisit.

Digital Twin

Safely and effectively create as-built models for scan-to-BIM and renovations and provide clarity for adaptive reuse, building extensions and inspection of facades and elevations. Also use it to:

- Optimize commercial building design accessibility.
- Produce colorized point clouds and panoramas to clearly view the project off-site.
- Register in the field to eliminate the risk of return visits, especially where access permits are difficult to obtain.
- Transfer data to Trimble Business Center, Trimble RealWorks or other CAD software for final analysis and design.





Tank—Calibration & Inspection

Quickly and safely produce accurate data for precise storage tank analysis, saving time and money. Also use it to:

- Reduce downtime with high-speed scanning for reliable operation in extreme conditions.
- Efficiently capture precise details of storage tanks and surrounding containment areas to document verticality, roundness, and integrity.
- Easily capture and verify data in the field before importing into Trimble RealWorks Storage Tank module.
- Calculate tank volume filling tables and secondary containment volumes, perform deformation analysis for tank repairs, and create reports meeting API 653 standards.

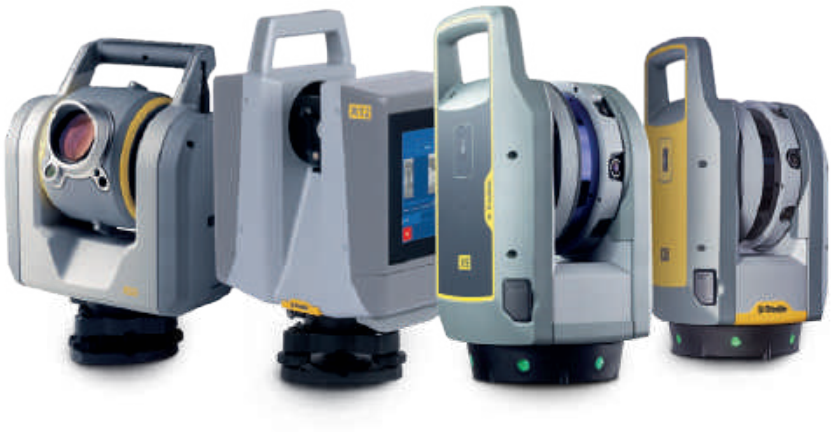
Shipbuilding Surveys

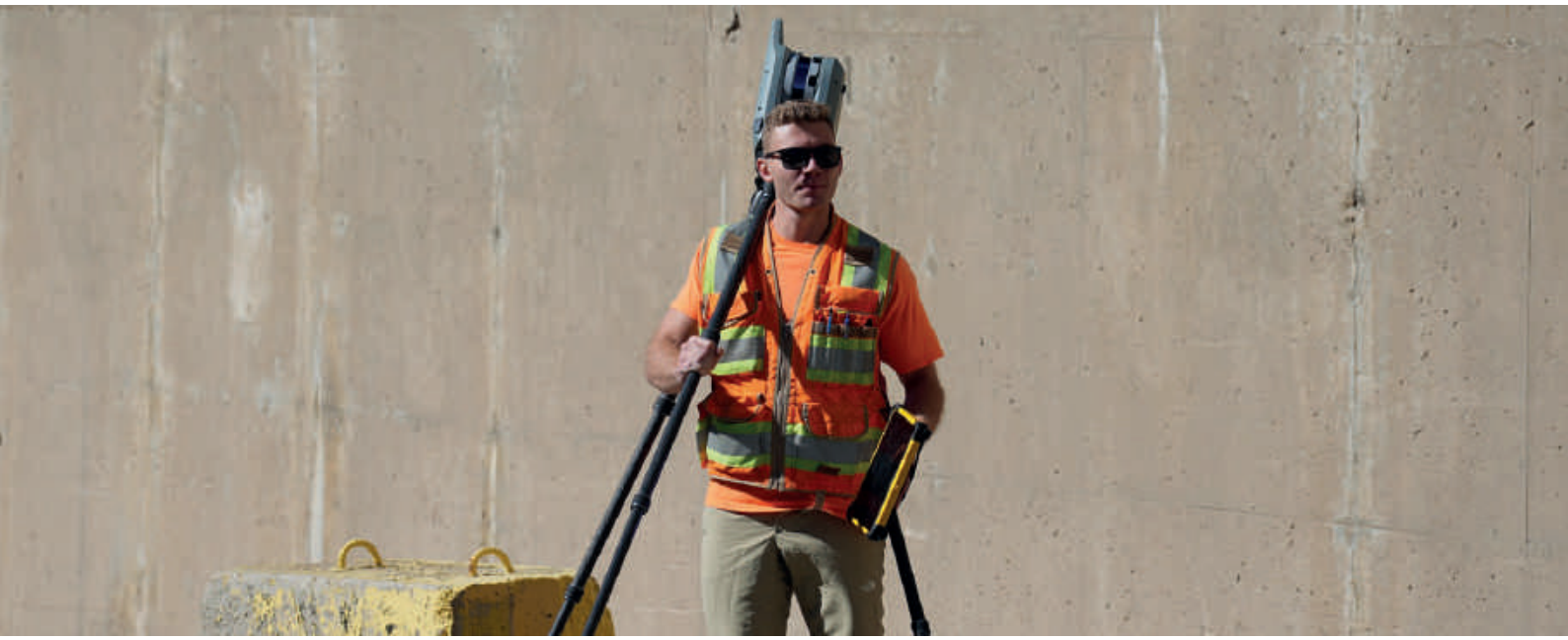
Whether your ship is at port or in drydock, Trimble has the scanning solution to create as-builts for new construction, renovation, and optimization. Also use it to:

- Effectively operate in the confined spaces of ships especially with the Trimble X12 laser scanning system which has the best minimum scan range in the industry of 0.3 meters.
- Capture data of the hull, on deck or in holds with high resolution at sufficient range.
- Quickly scan ballast tanks in preparation for water treatment systems for retrofit to comply with IMO mandates.
- Obtain the level of detail needed by the naval architect before the ship leaves port.

Trimble Laser Scanning

With Trimble, you get laser scanning solutions you can apply to a vast range of applications to capture complex real-world data with the confidence of getting it right the first time.





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