




FARO®



**The FARO®
solution to
optimize your
assembly
workflows**



**Improve Quality,
Lower Costs and
Boost Revenue
Generation**

Whatever your challenge at work, 3D laser projection technology will save time, money and frustration by providing critical information needed to make better decisions, faster. With human errors minimized and quality optimized, your organization will cut costs and boost revenue generation, harnessing the power of smart data.

BuildIT Projector, when coupled with a Tracer Laser Projector, is the world's only all-in-one solution for laser-assisted templating and verification — it's the complete solution for the industry-leading companies of tomorrow.



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The world's only **all-in-one** solution for **laser-assisted templating** and **verification**

Managing large, heavy, physical templates costs time and money. And using them on the manufacturing floor leaves lots of room for human error — which results in waste and costly rework.

How can companies today eliminate these problems? Is there a solution that can improve quality, lower costs, increase throughput and enable business growth?

FARO's commitment to its customers is to help them make better decisions faster — and the complete FARO Tracer Laser Projector and FARO BuildIT Projector Software solution is a prime example of this. When realized with the ScanAlign automatic alignment feature, you have what you need to optimize your workflow — saving time and money with increased precision and quality.

Dramatically reduce the alignment time with ScanAlign

ScanAlign is a feature which turns finding and measuring retro-targets into a one-click step. There's absolutely no user intervention — it automatically aligns to retro-targets by scanning a pre-defined region, reducing the need for the operator to manually go in and measure each point during the process.

ScanAlign saves an incredible amount of time and money when incorporated into the manufacturing floor workflow. Take for example one organization that manufactures large poles. This company spent two hours per pole for a total of four manufactured per day. With four Tracer alignments per pole, that meant 16 alignments per day.

By leveraging ScanAlign, they cut down their alignment time by saving three minutes per alignment, for a total of 48 minutes saved per day. Now, they are able to produce more poles per day, with a potential \$1,200 added revenue per day. By the end of the year, this company generates an additional \$300,000 — and saves hundreds of hours of work — thanks to FARO solutions.

TRADITIONAL ALIGNMENT METHOD

- ⚠ Slower (typically 5-10 min)
- ⚠ Requires Training
- ⚠ Manual Process

ScanAlign

Available in BuildIT Projector 2021.5*

Simplify your operator's projection workflow by **fully automating** the alignment step. A click-and-drag procedure can be reduced to a single click operation.

NEW 100% AUTOMATIC METHOD

- ✓ Faster (typically <2 min)
- ✓ No Training
- ✓ Hands-free

*BuildIT Projector Premium license required

No matter the industry, quality control is what stands between staying ahead of the competition and falling behind — and accurate information is what drives quality control.

What could your organization do with the extra time and cost savings that FARO Technologies provide?

FARO Tracer Laser Projectors

Advanced 3D laser imaging system for guided assembly and in-process verification



Applications & Industries

- Shipbuilding and Marine Construction
- Automotive and Heavy Equipment
- Construction and Rigging; templating for pre-fabrication
- Aerospace and Defense
- Composites
- Railway

Benefits

- Reduces the time for layout, set-up and assembly, significantly increasing production throughput
- Facilitates standardized workflows and minimizes operator variations during assembly
- Detects and reduces manufacturing errors in real time which reduces scrap and rework
- Mitigates use of physical templates

Tracer^{SI}

Represents a first-of-its-kind advanced laser imager and high-accuracy projection system, with superior scanning capabilities throughout its entire projection volume. The combination of high-contrast imaging, accurate and repeatable projection, and powerful yet easy-to-use BuildIT Projector Software establishes a new industry standard for repeatable laser-guided assembly.



Tracer^M

Accurately projects a laser line onto a surface or object, providing a virtual template which operators and assemblers use to quickly and accurately position components with absolute confidence.



Tracer ^{SI} Features	
Alignment	Retro-Targets or Feature-Based (without the need to place targets)
ScanAlign Compatible	Yes
In-Process Verification (IPV)	Yes
Auto-Focus	Yes
Gray-Scaled Scanning	Yes

Tracer ^M Features	
Alignment	Retro-Targets
ScanAlign Compatible	Yes
In-Process Verification (IPV)	No
Auto-Focus	No
Gray-Scaled Scanning	No

Going beyond virtual templating and positioning, Tracer^{SI} enables targetless, Feature-Based Alignment and In-Process Verification (IPV). The system accurately projects CAD-based laser images onto any surface, providing operators with an intuitive and virtual sequencing solution to outline parts, artifacts, or areas of interest.

Tracer ^{SI} Specifications	
Performance	
Positional Accuracy	0.25 mm @ 5 m (0.010 in @ 16.4 ft)
Range - Projection	1.8 to 15.2 m (6 to 50 ft)
Range - IPV	1.8 to 15.2 m (6 to 50 ft)
Range - Feature Detection	1.8 to 15.2 m (6 to 50 ft)
Projection Angle	60° Az x 60° El
Focused Line Width (1/e2)	0.5 mm (0.02 in)
Inspection Scanning Speed	5,000 to 50,000 pixels/sec
Beam Steering Speed	130 rad/sec
Projection Volume	900 m ³ (32,000 ft ³)
Focus Type	Advanced Autofocus Feature
Multitasking Capabilities	Multiple simultaneous projection images
Multi-Projector Array	Multiple Tracer ^{SI} projectors can be controlled from a single computer
Hardware Specifications and Environmental	
Power Input	120/240 VAC 3.0/1.5A 50/60 HZ
Operational Temperature Range	10 - 35°C (50 - 95°F)
Connectivity	Ethernet LAN CAT 6 Shielded 100Base-T
Projector Size	L 445 mm x W 239 mm x H 338 mm (L 17.5 in x W 9.4 in x H 13.3 in)
Projector Weight	17.24 kg (38 lbs.)
Laser Classification	
Laser Class	Two Models: CDRH IIIa, Class 3R (<5 mW)* CDRH II, Class 2 (<1 mW)* Complies with IEC 60825-1:2014
Projection Laser Wavelength	532 nm, Green visible
Compliance and Certifications	
Electrical Safety	IEC/EN 61010-1
EMI/EMC Specification	FCC Part 15.101, Subpart B EU/EMC Directive 2014/30/EU EN 61000-6-2, EN 61000-6-4 IEC/EN 61326-1 EN 301 489 ETSI ICES-003
Environmental	2011/65/EU, RoHS2 2002/96/EC - WEEE
Marking Label	UL, CE

*Product complies with radiation performance standards under the U.S. Food, Drug and Cosmetics Act (FD&C Act) 21CFR 1040 and international standard IEC 60825-1: 2014



Both Laser Projectors, when paired with BuildIT Projector Software that has the new ScanAlign feature, can be used to automate alignment with retro-targets.

In addition, proprietary IPV technology can scan assembled or placed components to ensure conformance and proper positioning, while detecting errors in real time. As a result, non-conforming

parts and assemblies can be identified and fixed immediately, allowing manufacturers to save costs.

With FARO's advanced Tracer Laser Projectors, users can now project and verify with a single system for a powerful and extremely cost-effective solution.

Tracer ^M Specifications	
Performance	
Projection Range	1.8 to 15.2 m (6 to 50 ft)
Angular Field of View	60° Az x 60° El
Focused Line Width	0.5 mm (0.02 in)
Positional Accuracy	± 0.25 mm @ 4.6 m (± 0.010 in @ 15 ft)
Hardware Specifications and Environmental	
Power Input	100/240 VAC 50/60 Hz
Ambient Temperature Range	10 - 35°C (50 - 95°F)
Connectivity	Ethernet LAN CAT 6 Shielded 100Base-T
Laser Emission	532 nm Laser, 5 milliWatt max/ CW, Class 3R Laser Product*
Certifications	EU - RoHS UL listed
Complies With	EU/EMC Directive 2014/30/EU Laser Safety IEC 60825-1: 2014a EN 61010-1:2001/CSA-C22.2 No 61010-1 EN 61326-1:2006 EN 301 489 FCC Part 15, Subpart B, Class A ICES-003 2011/65/EU-RoHS
Dimensions	
Projector Size	L 445 mm x W 239 mm x H 338 mm (L 17.5 in x W 9.4 in x H 13.3 in)
Projector Weight	17.24 kg (38 lbs.)

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FARO BuildIT Projector Software

All-in-one software to plan, generate and operate laser templating and verification workflows.

Increase productivity and quality with accurate, laser-guided assembly and verification.



Compaction Instructions: 10 Minutes @ 26 mmHg

B FARO BuildIT Projector Software is the world's most complete Imaging Laser Projector software. Built on the popular BuildIT Metrology platform that has been serving manufacturers for over 20 years, BuildIT Projector features a modern and intuitive interface to generate, plan, and operate imaging laser projection and verification workflows.

BuildIT Projector Software enables the powerful and industry-unique features of the Tracer Laser Projectors, including In-Process Verification and Feature-Based Alignment in the Tracer⁵¹. These features make the Tracer Laser Projectors and BuildIT Projector Software the world's only all-in-one solution for laser-assisted templating and verification.

BuildIT Projector has two components:

1 BuildIT Projector Planner enables manufacturing engineers to set up laser templating and verification routines — including sequencing, part placement and verification.

2 BuildIT Projector Operator is the software that the assemblers use during their workflows.



Applications & Industries

- Paint and Decal Templating
- Assembly Alignment
- Building Assembly
- Prefabrication
- Composites
- Ply Lay-Up

Benefits

- Increase Efficiency
- Maximize Quality
- Minimize Cost

Capabilities

- Creating projection plans directly from design data
 - Import 3D CAD files from native (CATIA® V4 V5 V6, Siemens NX™, Parasolid®, CREO® (Pro/E), Inventor®, SolidWorks®, AutoCAD®), or neutral formats (IGES, STEP, SAT, JT) and use them to easily generate projection plans
 - Choosing to import native CAD preserves the highest fidelity and keeps the CAD names and tree structures, avoiding any potential conversion errors
- Laser-assisted assembly
- In-Process Verification (IPV)
- Foreign Object Debris (FOD) detection
- Feature-based (targetless) alignment
- Remote app running on any mobile or tablet device
- Gamepad controller remote functionality
- Login/logout commands and user level profiles
- Automation, from UI drag-and-drop to full Python scripting, enabling Industry 4.0
 - Streamline repetitive or redundant workflows
 - Communication with external applications (light indicators, PLC, robots)

The bottom line: A laser templating solution with In-Process Verification delivers unmatched value by significantly reducing scrap and rework.

Software Packages

Capabilities	Planner	Planner Premium	Operator	Operator Premium
Import CAD	.iges/.step only	All CAD	No	No
Creation of projection plans	Yes	Yes	No	No
Projection simulations	Yes	Yes	No	No
Running projection plans	Yes	Yes	Yes	Yes
ScanAlign (automatic retro-target alignment)	No	Yes	No	Yes
Creation of automation projects (includes layer automation)	No	Yes	No	No
Running layer automation	No	Yes	No	Yes

Hardware Requirements

Hardware Requirements	Minimum Requirements	Recommended Requirements
Operating System	Microsoft Windows 10, 64-bit	Microsoft Windows 10, 64-bit
Processor	Intel Core i3 or AMD equivalent	Intel Core i7 or AMD equivalent
RAM	8GB RAM	16GB RAM+
Hard Drive	20GB free solid state hard drive space	250GB or more of solid state hard drive space
Graphics Card*	Integrated graphics OpenGL 4.0	NVIDIA Quadro series or AMD Radeon Pro series OpenGL 4.2+ 2GB memory (VRAM)

*We recommend updating the video driver to the most recent released version from the manufacturer website