



## Q&A: FARO Laser Scanner Focus<sup>3D</sup>

### ***Q: What is the FARO Laser Scanner Focus<sup>3D</sup>?***

A: The FARO Laser Scanner Focus<sup>3D</sup> is a high-performance 3D laser scanner for detailed measurement and 3D documentation. Its intuitive touch screen makes it as easy to operate as a digital camera. The Focus<sup>3D</sup> uses laser technology to produce incredibly detailed three-dimensional images of complex environments and geometries in only a few minutes. The resulting image is an assembly of millions of 3D measurement points in color which provides an exact digital reproduction of existing conditions. The Focus<sup>3D</sup> creates this virtual copy of reality at a blazing speed of up to 976,000 measurement points per second.

### ***Q: Which are the features of the FARO Laser Scanner Focus<sup>3D</sup>?***

A: The FARO Laser Scanner Focus<sup>3D</sup> offers unique features and can be simply operated using its intuitive touchscreen display. The key features include:

- **Small and Compact:** With a size of only 9.5 x 8 x 4 in<sup>3</sup> (24 x 20 x 10 cm<sup>3</sup>) and weighing just 11 lbs (5.0 kg), the Focus<sup>3D</sup> is the smallest laser scanner ever built
- **Intuitive Touchscreen Display:** The user-friendly color touch display allows for complete control of all scanner functions and operations
- **Integrated Color Camera:** Photorealistic 3D scans with up to 70 megapixels of parallax-free color overlay
- **Storage on Secure Digital (SD) Card:** SD cards allow for secure management and transferring of scan data to a PC within seconds
- **Data Processing and Interfaces:** Data is automatically processed using auto-registration and transferred to industry standard software
- **Built-in Powerful Battery:** The integrated lithium ion battery can be quickly charged even while in operation, and enables up to five hours of use without a main power supply
- **Stand-alone Solution:** Ultraportable design allows for operation without external devices

### ***Q: Laser scanners have been around for 30 years. What's new about the Focus<sup>3D</sup> compared to other/previous laser scanners?***

A: The Focus<sup>3D</sup> sets new efficiency standards: The long range of more than 390 feet (120 meters), the level sensor, the compactness and ease of use and the auto-registration at no extra cost result in up to 50 percent savings of scan and processing time compared to conventional laser scanners.

Second, due to its intuitive touchscreen display control capabilities, the Focus<sup>3D</sup> is as easy to operate as a digital camera. The device is also entirely self-contained in operation, so neither additional devices nor cables or a laptop are needed.

Third, it's the smallest and lightest laser scanner ever built. With dimensions of just 9.5 x 8 x 4 in<sup>3</sup> (24 x 20 x 10 cm<sup>3</sup>) and weighing only 11 lbs (5 kg), the Focus<sup>3D</sup> can be carried conveniently with only one hand.

Last but not least, the price of the Focus<sup>3D</sup> is a revolution by itself. A 3D laser scanner has never been this affordable. FARO offers different Focus<sup>3D</sup> models and pricing options.

### ***Q: What are the core benefits for users?***

A: The FARO Laser Scanner Focus<sup>3D</sup> is ideal for the 3D documentation of spaces and objects. Its core differentiating benefits are:

- **Mobility:** Due to its light weight – 11 lbs (5.0 kg) – and small size – 9.5 x 8 x 4 in<sup>3</sup> (24x20x10cm<sup>3</sup>) – the FARO Focus<sup>3D</sup> Laser Scanner offers 3D measurement to go. The minimal size and weight of the scanner allows for easy handling. It can be carried with merely one hand. With only a quarter of the weight and a fifth of the size of its predecessor, it is the smallest and lightest laser scanner ever built.
- **Speed:** The FARO Laser Scanner Focus<sup>3D</sup> operates at a speed of up to 976,000 measurement points/second. Compared to other laser scanners, the Focus<sup>3D</sup> can save up to 50 percent of scan and processing time. By measuring three dimensions in one step, Focus<sup>3D</sup> essentially speeds up production processes.
- **Ease of use:** Thanks to its intuitive touchscreen the Focus<sup>3D</sup> is as easy to operate as a digital camera. It is also entirely self-contained in operation, so neither additional devices nor cables or a laptop are needed.
- **Flexibility:** The FARO Laser Scanner Focus<sup>3D</sup> is ideal for a multitude of applications in various industries (building information management, plant construction, reverse engineering, historic preservation, forensic crime scene documentation). FARO offers different Focus<sup>3D</sup> models and pricing options. A powerful battery provides energy supply for up to five hours of operation; charging quickly, even while in operation.
- **Precision:** The Focus<sup>3D</sup> creates a precise 3D digital image of reality with a distance error of only ±2mm. The integrated color camera creates photo-realistic 3D scans with up to 70 megapixels of parallax-free color overlay. As the scans represent an exact digital reproduction of spatial relations, 3D documentation makes clear what has been measured and eliminates sources of error.

**Q: How does the Focus<sup>3D</sup> measure?**

A: While rotating 180 degrees, the Focus<sup>3D</sup>'s laser measures distance coordinates to the object. With the recorded data from the rotation angles, millions of space coordinates can be detected which, when combined together, provide a realistic reprint of the object.

- **Distance**: The scanner uses a laser beam which is reflected back to the scanner by the object. The distance is measured in millimeter accuracy by the phaseshift between the sending and receiving beam.
- **Vertical angle**: The laser scanner's mirror – revolving at a 360° angle – deflects the laser beam in a vertical direction onto the object. The angle is encoded simultaneously with the distance measurement.
- **Horizontal angle**: The horizontal angle is encoded simultaneously with the distance measurement.
- **Computation of the 3D coordinate**: Distance, vertical angle and horizontal angle make up a polar coordinate ( $\delta, \alpha, \beta$ ), which is then transformed to a Cartesian coordinate (x, y, z).

**Q: What are the areas of application of the FARO Laser Scanner Focus<sup>3D</sup>? In which target industries can the scanner be applied?**

A: Thanks to its simple controls and compact design, the Focus<sup>3D</sup> can be used for a multitude of applications. Whether used in architecture and plant construction, reverse engineering and quality control or historical preservation and forensics, industries and users who traditionally work with two-dimensional plans and schematic diagrams are increasingly discovering the advantages of three-dimensional planning and documentation tools.

Potential applications include:

- **Documentation of indoor environments**: With the Focus<sup>3D</sup> it is possible to quickly produce 3D documentations of interiors and technical installations such as building services, conveyor systems or process installations.
- **Documentation of outdoor environments**: The Focus<sup>3D</sup> is well suited for 3D documentation of buildings, building sites, roads and landscape features. Objects within a distance of approximately 390 feet (120 meters) can be recorded (depending on surface reflectance and ambient light).
- **Product and component documentation**: From inspection of large machine components to in-product design or reverse engineering, the Focus<sup>3D</sup> measures products and components of every possible shape and size and produces precise data and three-dimensional surface models from them.

***Q: How can the scan data be stored and transferred to a PC/laptop?***

A: The Focus<sup>3D</sup> stores all data on a SD card – this makes data management easy and allows secure transfer of scan data to a PC in seconds via a standard interface. Using SCENE WebShare, images can be shared on the internet.

***Q: How is the FARO Focus<sup>3D</sup> Laser Scanner applied in Architecture and Civil Engineering?***

A: The Focus<sup>3D</sup> is a powerful device that allows architects, civil engineers and surveyors the fast, complete and exact 3D documentation of the actual state of buildings and construction sites. Sample applications include the following:

- **Excavation control**: Simple and exact control of the volume and dimensions of excavation holes.
- **Deformation control**: Documentation of deformation processes and surveillance of counter-measures.
- **Facade inspection**: Three-dimensional inspection of the skeleton construction works and facade parts before their fitting.
- **Structural inspection and maintenance**: Fast and cost-efficient inspection of the prescribed structural resilience and ongoing monitoring of wear and tear.
- **Free-form components inspection**: Precise dimensional control of complex free-form components.
- **Renovating and modernizing the build environment**: Exact geometric as built documentation of objects as basis for renovation or extension buildings.
- **Construction progress monitoring**: Complete documentation and surveillance of construction progress for legal and technical purposes.

***Q: What are the industry-specific benefits the device offers?***

A: The FARO Laser Scanner Focus<sup>3D</sup> allows the fast, complete and exact 3D documentation of the actual state of buildings and construction sites and the easy sharing of the scan data via the Internet with FARO WebShare. In addition, the Focus<sup>3D</sup> offers a revolutionary price-performance ratio. Further benefits of the device for architecture and civil engineering include:

- **Mobility**  
Because of its compact size and low weight, the FARO Laser Scanner Focus<sup>3D</sup> can easily be taken to construction sites. Its mobility allows using 3D documentation as a standard tool for ongoing quality management. Any place can be scanned in 3D to assess conditions and progress of buildings and sites.

- **Speed**  
The FARO Laser Scanner Focus<sup>3D</sup> enables rapid recording of the current conditions of buildings and sites. Also, civil engineering businesses can share 3D documentation via WebShare with partners for faster and improved collaboration. In hazardous surroundings and conditions (e. g. damaged buildings) it is an advantage to be able to finish the scan of the building in only a few minutes.
- **Ease of use**  
The FARO Laser Scanner Focus<sup>3D</sup> makes recording the current condition of buildings and sites simple. Three-dimensional documentation has become an easy task that can be executed by non-experts. It doesn't require an external expert or a long-term training. This allows for more regular and precise quality checks.
- **Precision**  
The FARO Laser Scanner Focus<sup>3D</sup> creates precise scans of buildings and sites, which in turn enable better planning and quality control. Thanks to the 3D laser scanning technology, the distance measuring error is just  $\pm 2\text{mm}$ . Even free-form components can be measured precisely. In addition, wear and tear can be identified at an early stage with regular scans. The Focus<sup>3D</sup> also allows for the complete and precise documentation of the construction progress on the fly.
- **Flexibility**  
The FARO Laser Scanner Focus<sup>3D</sup> can be used in multiple scenarios and in different phases of a construction's or building's life-cycle. It is ideal for building information management (BIM): new construction, construction progress, facility management, building refurbishment, building assessment and structural damage. In addition, the Focus<sup>3D</sup> has the same applications in the city development process.

***Q: Can I use the Focus<sup>3D</sup> with my CAD software?***

A: The Focus<sup>3D</sup> and its SCENE software are compatible with the most common CAD software applications. The SCENE software can be used to export scan data to more than 50 common software solutions, such as:

- **General CAD:** AutoCAD, Microstation, Rhino
- **Plant construction:** AVEVA PDMS, Intergraph PDS, AutoCAD Plant 3D, Microstation, Rhino
- **Architecture:** AutoCAD Architecture, REVIT Architecture
- **Civil engineering/surveying:** AutoCAD Civil 3D, PolyWorks Surveyor, Carlson, Microsurvey Point Cloud CAD
- **Heritage:** 3D Reconstructor
- **Quality control:** Geomagic Qualify, PolyWorks Inspector, Rapidform XOVI
- **Forensics:** AutoCAD, SCENE Forensics, Microsurvey MapScenes
- **Reverse engineering:** Geomagic Studio, PolyWorks Modeler, Rapidform XOR
- **Tunneling:** RR Tunnel, Amberg TMS
- **Visualization:** Pointools

**Q: Are there different versions of the FARO Laser Scanner Focus<sup>3D</sup> and what accessories does FARO offer for the Focus<sup>3D</sup>?**

A: FARO offers different Focus<sup>3D</sup> models and pricing options. The accessories include:

- **Tripods:** With a number of light-weight but rigid carbon-fiber tripods, dollies and click-mount systems, the Focus<sup>3D</sup> can be positioned and moved quickly.
- **Attachment systems**
  - **Surveyor's kit:** A tripod adapter ('Wild three-claw system') and a height adapter to match the tachymeters on standard surveyor tripods are available.
  - **Mounting options:** With multiple metric and standard mounting configurations and screw threads, the Focus<sup>3D</sup> has options for almost every imaginable application.
- **Suitcase/backpack:** In addition to a waterproof and extremely sturdy Pelicase with a significant number of compartments for important accessories, a light Rimowa case and an ergonomically designed backpack with tripod holder are also available.
- **Spare batteries and chargers:** With a spare battery and a quick charger (charging time of only one hour), it is possible to carry out even the most time-consuming scan projects cable-free. A car charger with a 12V plug enables the battery to be charged on the go.

**Q: Where can I order the Focus<sup>3D</sup>?**

A: You can request an individual quote or order the FARO's Focus<sup>3D</sup> laser scanner at [www.faro.com](http://www.faro.com).