FARO Laser Scanner Focus\textsuperscript{3D}
The Leader in 3D Documentation
FARO® Laser Scanner Focus³D X 330

Xtra range - 330 m
Due to the extra-long range of Focus³D X 330, laser scanning of high or long objects has become possible: bridges, dames, excavations, towers, pillars, cranes, facades – you name it.

Xtra scanning - even in bright sunlight
Xtreme flexibility to perform outdoor scanning projects every time, everywhere. Even in the brightest sunlight.

Xtra-Safe - with the best laser class
With the class “1” laser, the Focus³D X 330 ensures non-hazardous operation for the user.

Xtra positioning - integrated GPS
Effortlessly determine the position of the scanner. This helps to facilitate the registration process and provides the exact time and location of the users’ scans.

Universal - indoor and outdoor measurements
Ideal for surveying, BIM, 3D documentation, construction supervision, reverse engineering, historic preservation or forensic crime scene documentation – thanks to its simple controls and compact design, the Focus³D is ideally adapted to all sorts of applications.

Xpand your horizon!
Fast and exact indoor and outdoor measurements in three dimensions: Simply at your fingertips

FARO now offers an ideal solution for measurement every time, everywhere – no matter of time or location. New features such as extra long range - 330m, scanning in full sunlight and integrated GPS make the Focus³D X 330 user capable to perform eye-safe laser scanning especially in outdoor environments: surveying sites, construction, architecture, historical preservation or forensics.

FARO’s laser scanner records up to one million measurement points per second and produces a precise, three-dimensional image of its surroundings. With suitable apps in FARO’s 3D App Center this image can be analysed and imported into a wide range of software applications. The fast and accurate laser scanner Focus³D offers everything you might expect from a professional 3D laser scanner – with FARO’s established and well-known level of simplicity.

Our brand new, highly convenient data sharing solution: SCENE Webshare Cloud offers the opportunity to easily and securely share your scan data for worldwide presentation and collaboration without the hassle of setting up and maintaining servers and software.

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One 3D Documentation System – a multitude of possible applications

### Scanning of outdoor environments
The Focus3D is well suited to 3D documentation of buildings, building sites, roads and landscape features. Objects within a distance of 330m can be easily recorded – even in full sunlight.

### Measurement method

#### Distance
The scanner uses a laser beam which is reflected back to the scanner by an object. The distance is measured in millimetre-accuracy by the phase-shift between the sending and receiving beam.

#### Vertical angle
The mirror deflects the laser beam in vertical direction onto the same object. The angle is encoded simultaneously with the distance measurement.

#### Horizontal angle
The laser scanner revolves 360° horizontally. 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 \((d, \alpha, \beta)\), which is then transformed to a Cartesian coordinate \((x, y, z)\).

### Performance specification Focus3D X 330
- **Range Focus3D X 330**: 0.6 – 330m
- **Measurement speed**: up to 976,000 points/second
- **Ranging error**: ±2mm
- **Ranging noise**: @10m – raw data: 0.3mm @90% refl., @25m – raw data: 0.3mm @90% refl.
  @10m – raw data: 0.4mm @10% refl., @25m – raw data: 0.5mm @10% refl.
- **Integr. colour camera**: Up to 70 mio. pixel
- **Laser class**: Laser class 1
- **Weight**: 5kg
- **Multi-Sensor**: GPS, Compass, Height Sensor, Dual Axis Compensator
- **Size**: 240 x 200 x 100mm
- **Scanner control**: via touchscreen display and WLAN

### Performance specification Focus3D S
- **Range Focus3D S 120**: 0.6 – 120m
- **Range Focus3D S 20**: 0.6 – 20m
- **Measurement speed**: up to 976,000 points/second
- **Ranging error**: ±2mm
- **Ranging noise**: @10m – raw data: 0.6mm @90% refl., @25m – raw data: 0.95mm @90% refl.
  @10m – raw data: 1.2mm @10% refl., @25m – raw data: 2.2mm @10% refl.
- **Integr. colour camera**: Up to 70 mio. pixel
- **Laser class**: Laser class 1R
- **Weight**: 5kg
- **Multi-Sensor**: Compass, Height Sensor, Dual Axis Compensator
- **Size**: 240 x 200 x 100mm
- **Scanner control**: via touchscreen display and WLAN

### Scanning of indoor environments
With the Focus3D it is possible to quickly produce 3D documentations of interiors and technical installations such as building services, conveyor systems or process installations.

### 3D product and component documentation
Whether for inspection of large machine components, during product design or reverse engineering – the Focus3D measures products and components of every possible shape and size and produces precise data and three-dimensional surface models from them.
Industries such as surveying, construction, civil engineering and BIM depend on reliable, fast and accurate data. Information and spatial reference are essential through all phases of surveying and construction projects.

FARO’s Laser Scanner Focus 3D X 330 with its 330m scan range, integrated GPS and the possibility to scan in full sunlight offers the user the ideal outdoor solution, smoothing the workflows, making processes faster and more efficient, delivering accurate data and satisfying statutory requirements.

Scanning of large or distant objects: Due to the xtra long range of the Focus 3D X 330, all kinds of high, long or difficult to access objects can be easily scanned and analyzed.

Project supervision: Whenever there are excavations, bridges, towers, open pit mines, roads, railways, reservoirs, dams, pipelines to be built, there is a need for close monitoring of the individual project phases to meet the project’s requirements.

Deformation monitoring: Determining if the surveyed structure or object is changing shape or moving. Saves time and rework during construction.

Large volume calculation: When measuring loose material in bulk, e.g. in barges, silos or in warehouses, large volume determination on a regular basis is an important consideration. Laser scanning allows for fast, accurate and reliable dimensional calculations.

Quality control: Precise laser scanning ensures that the final as-built condition fits design intent and minimizes the chance of potential problems.

Benefits

- Time-saving, rapid, simple and complete recording of the current condition of surveying or construction sites
- Real-time, digital 3D data capture and analysis of materials, volumes, structures, topography.
- Due to xtra long range, enhanced registration of data and rapid capturing of high resolution data increases users' productivity.
- Precise positioning due integrated GPS
With the Focus 3D, FARO provides architects and civil engineers with an efficient tool for rapid, seamless and precise documentation of the current status of buildings and building sites of every kind.

Weighing just five kilograms, the Focus 3D laser scanner is ideal for mobile usage on the building site. It records foundation excavations, building shells and complete buildings in 3D – completely, quickly and cost-effectively.

**Building documentation easier than ever**

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**Applications**

- **Facades inspection**: 3D dimensional inspection of building shells and facade components before final assembly.
- **Structural analysis and maintenance**: Rapid and cost effective control of the specified load-bearing capacity of supporting structures as well as wear and tear.
- **Construction progress monitoring**: Seamless capture and monitoring of construction progress for legal and technical documentation.
- **Built environment**: Precise geometrical recording of existing properties as the basis for conversions or extensions.
- **Free-form components inspection**: Precise dimensional check of complex components such as free-form shape elements.
- **Deformations control**: Documentation of deformation processes and monitoring of countermeasures.
- **Space optimization**: By prior creation of 3D models.

**Benefits**

- Rapid, simple and complete recording of the current condition of buildings and building sites
- Immediate processing of the data in all commonly used CAD programs.
- Simple variance comparison in the construction process and in the case of final building inspections.
- SCENE WebShare Cloud for simple and secure online sharing of scan data via the Internet
- Revolutionary price/performance ratio
Inspection and Reverse Engineering

**True magnitude shown in the 3D scan**

Particularly in the case of very large or very complex components and shapes, conventional measuring instruments quickly reach their limitations.

With the Focus³, even these shapes can be precisely captured, inspected and re-engineered.

**Benefits**

- Cost-efficient, quick and accurate capture of as-built geometry of large products
- Automated in-process control of production allows for comprehensive 3D inspection and monitoring of parts
- Reduced scrap and rework due to early and comprehensive 3D quality control

**Applications**

- **Reverse engineering:** Copies of products and components for which there are no construction plans and/or CAD data available.
- **Interior fixtures and fittings:** Precise 3D CAD documentation of complex interiors of ships, cars or aircrafts as a basis for planning of conversions.
- **Manufacturing documentation:** Complete 3D documentation of the manufacturing status of complex machine components.
- **Quality control:** Precise 3D documentation and dimensional inspection of large and complex components such as rotor blades, turbines, ship propellers, etc.

**Process Industry and Digital Factory**

**Precise 3D data saves time and money**

Technical plants like refineries, power plants and production sites are complex structures which require exact 3D CAD data in order to convert, repair or extend them.

With the FARO Focus³, complete and precise 3D as built data can be captured easily, precisely and completely.

**Benefits**

- Extreme time savings and high fidelity for 3D documentation of complex factory and plant installations
- Risk minimization in brownfield projects where access is difficult or expensive and where schedules are tight
- Brownfield costs can be reduced by 5-7%, contingencies for rework to less than 2%. Schedules can be compressed by as much as 10%
- Efficient control and monitoring of health and safety as well as environmental regulations

**Applications**

- **Conversions and extensions:** Precise 3D documentation of the current state of the property as the planning basis for conversions and extensions.
- **Offsite production:** Possibility of precise-fit off-site assembly, thanks to exact 3D CAD data and dimensional control.
- **Asset management:** Simplification of facility management and maintenance through comprehensive 3D documentation.
- **Training:** Virtual access to remote facilities allows for off-site training or simulation.
- **Site supervision:** Improved coordination between different trades and comprehensive documentation and supervision of all work.
**Shipbuilding**

**Benefits**
- A fast and reliable technology to capture complex as-built situations in engine and pump rooms
- Complete 3-dimensional information of the actual conditions
- Risk minimization in projects where access is difficult and schedules are tight

**Applications**
- As-built documentation: 3D laser scanning solutions ensure that ship hulls and components can be digitized when original drawings are missing or inaccurate (as it is often the case with old vessels).
- BWT Retrofit: Upcoming legislation requires the installation of Ballast Water Treatment systems onboard all ocean-going vessels. 3D laser scanning can overcome challenges such as measuring the limited space in engine rooms, and capturing reliable data for the retrofitting installation process.
- Ship repair: Providing a fast and accurate way to inspect ship parts during repair, 3D laser scanning can be used to verify design specifications to ensure proper fit.

**Tough industrial environments**

3D laser scanning is used in naval engineering to aid assembly, and to assist repair and retrofit activities.

To ensure accurately fitting parts, it is necessary to continuously perform measurements in each phase of the production process.

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**Facility and Asset Management**

**Benefits**
- Complete and precise 3D documentation of the current status of buildings and building sites
- It is especially suited to facilities managers, architects, construction engineers, construction experts and surveyors
- The optimum basis for the planning and execution of building projects as well as for the management of properties

**Applications**
- Documentation: The Focus® accurately records the inventory data that is needed by Facility Managers – be it the structural situation on a production plant or the building services equipment in an office block.
- Planning of structural alterations: The scan data provides an accurate three-dimensional model of the actual status of the building. As a result Facilities Managers can run through the usage options for rooms even before planning actually begins.
- Replanning of technical modifications: Changes to technical equipment, such as pipes, air ducts and electrical supply lines, can be depicted and checked in advance in the virtual model. This offers a stable basis for replanning.

**Efficient processes with 3D scans**

Three-dimensional building data offers facility managers valuable assistance – from technical facility management through to property management.

The FARO Focus® provides complete and precise 3D documentation of the current status of buildings and building sites as well as their assets such as power components, machinery and pipe work.

With the Focus® the required data can be recorded with ultimate ease. This scan data can be used for building management, collision detection for retrofits, as-built documentation for CAD modelling and other plant design tasks.
**Heritage & Archeology**

**Benefits**
- Simple, fast and complete recording of the current condition of heritage sites or archeological objects
- Digital 3D capturing of complex forms of historic buildings at a high level of detail
- Enhanced registration of large object data and remote functionality connect multiple data sets accurately
- An ideal device, particularly when there are no up-to-date construction plans

**Applications**
- **Reconstruction:** Detailed 3D data for reconstruction of lost appearance of components of historical sites or archeological objects.
- **Restoration:** Creation of 3D models for restoring purposes preserving the original building substance without the necessity of scaffolding usage.
- **Conservation:** Precise 3D CAD documentation for preservation and protection of historical/archeological material and inventory.

**Law Enforcement & Forensics**

**Benefits**
- Fast, accurate and reliable data
- Authentic, complete and precise 3D copy of reality
- Reproducible 3D documentation at your fingertips
- Easy conversion of captured scenes to ortophotos and CAD

**Applications**
- **Crime scenes investigation & analysis:** Complex and timely investigations made easier and faster by the Focus3D.
- **Bullet path reconstruction:** Quick and accurate reconstruction of bullet paths made possible by combining traditional investigative methods with cutting-edge laser-scanning technology.
- **Crash investigation & analysis:** Handling, investigating and analyzing road incidents, their cause and impact made fast and reliable using FARO laser scanners.
- **Passive safety of cars:** Reducing consequences of accidents with laser scanner tested passive safety systems can be vital for passenger survival.
- **Fire Investigation:** Detailed fire scene reconstruction.

**Built for the field**
- The fast and accurate Focus3D is an ideal tool suited to performing rapid and complete 3D recordings of crime and accident scenes, insurance damage or passive car safety testing. The scanner converts weeks work into hours.
- All details of relevance in any subsequent reconstruction of the crime or accident area covered. Similarly, in order to develop appropriate safety concepts for events, laser scans deliver the relevant 3D topography information.
SCENE WebShare Cloud

- Easy data sharing and collaboration
- Best possible security level
- Minimal set up and maintenance effort
- Persistent measurements & annotations
- Hosting service offered by FARO
- Support for mobile devices

Data sharing without limits

With SCENE WebShare Cloud, FARO offers a comprehensive service to provide users with simple access to 3D documentation. Neither technical training nor specialist skills in 3D laser scanning are necessary to work with the intuitive user interface.

Digital data, such as 3D documentation, often has to be available to many different project partners. Previously, users having their own internet server, could use SCENE WebShare to present their laser scan projects to clients and project partners. Now FARO goes considerably further, offering the SCENE WebShare Cloud solution, a hosting service with various packages at different prices.

Check it out on our demo server at: www.websharecloud.com
Accessories

Surveyor’s Kit for the Focus³D X 330

- All in one
- The kit includes: Focus3D-X330, PowerBlock battery, Power Dock, 32GB SD card, SD card reader, SD card cover, optical cleaning set, quick charge power supply, car power supply, ruggedized protection and transport cover in aluminium, panorama Quick Release, rugged transport case with wheels, license SCENE software, 1 year maintenance contract for SCENE software.

Tripods

- Stable base
- Light weight tripod
  Enables the mounting on any support such as a fixed post, robot arm, rail etc.
- Surveying tripod
  Elevating tripod with double gear reduction and included extension to reach 290 cm. Anodized aluminium parts are weather-proof.

Adapters

- Secure grip
  - Panorama Adapter Quick Release
    Fits to standard photo tripods with 3/8” screw and Surveyor tripods with 5/8” screws
  - TMS Adapter
    With its two standard “Wild-studs”, it can hold two prisms. They support the quick survey of the scanner position.

Suitcase / backpack

- Always at hand
  In addition to a waterproof and extremely sturdy Pelicase with lots of compartments for important accessories, a light and elegant Rimowa case and an ergonomically designed backpack including tripod holder are also available.

Software compatibility

The Focus³D and it’s SCENE software are compatible with the most common CAD software applications. SCENE can be used to export scan data to over 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
- Civil engineering / Surveying: AutoCAD Civil 3D, PolyWorks Surveyor, Carlson, Microsurvey
- Heritage: 3D Reconstructor
- Quality control: Geomagic Qualify, PolyWorks Inspector, Rapidform XOR
- Forensics: AutoCAD, SCENE Forensics
- Reverse engineering: Geomagic Studio, PolyWorks Modeler, Rapidform XOR
- Tunnelling: RR Tunnel, TMS
- Visualization: Pointools

You are in good hands

Learn more

Discover the possibilities

The Focus³D has an intuitive control concept, enabling even inexperienced users to get started straight away. Valuable tips and suggestions are to be found in a training video that can be watched on the touchscreen of the scanner. However we also offer workshops, seminars and training courses for specific applications and tasks. In these, we teach you how you can use your Focus³D even more effectively.

Customer service

We are there for you

- On the phone: Our customer service staff is available from 8am to 5pm from Monday to Friday.
- Telephone number: +49 7150 9797 400 or 00 800 3276 7378
- E-Mail: support@faroeurope.com

Maintenance contract

Within the scope of the FARO maintenance contract, our experts conduct inspection, maintenance and calibration. Customers with a maintenance contract get a 10% discount on accessories, as well as free recertification, repairs, software updates and advice.