

VXelements ™

FULLY INTEGRATED 3D MEASUREMENT SOFTWARE PLATFORM



CREAFORM

AMETEK

VXelements™

3D SOFTWARE PLATFORM AND APPLICATION SUITE

The Intelligence Behind Creafom's 3D Measurement Technologies

VXelements is a powerful integrated 3D software platform that works in complete synergy with the entire fleet of Creafom's 3D measurement and scanning solutions. It gathers all essential elements and tools into an intuitive, user-friendly working environment.

Thanks to its sophisticated algorithms, VXelements gives users the capability to generate 3D measurements with unmatched accuracy and data quality, empowering them to use Creafom's optical solutions to their full potential.

VXelements is the intelligence behind your 3D measurement and scanning devices, as well as their application complement, offering a real solution to your business challenges. This software is continuously improved to ensure that you always get the most out of your Creafom measurement technologies.



SOFTWARE PLATFORM

VXelements combines acquisition and application modules into the same simple, easy-to-use interface, providing a complete solution rather than a simple measurement device alone.

VXelements™

ACQUISITION

Included with all of Creafom's 3D measurement technologies

VXscan™ **VXprobe™** **VXshot™**

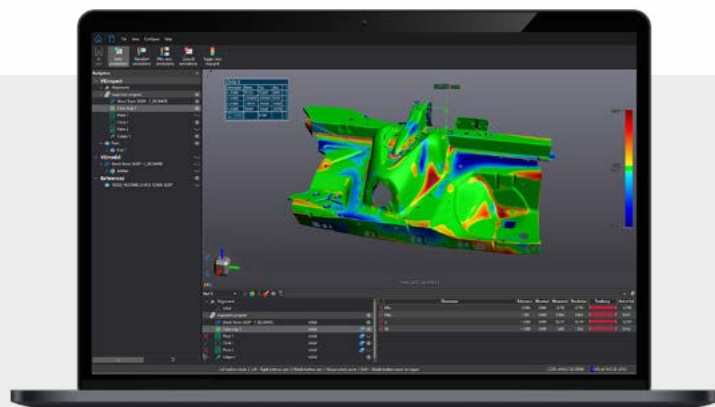
APPLICATION

Available to process 3D scan data

VXmodel™ **VXinspect™** **VXscan-R™** **VXtrack™**

FREE VXelements Viewer

VXelements Viewer is a downloadable, free-of-charge software solution that enables users to visualize both a mesh in 3D and a complete VXinspect inspection program. With VXelements Viewer, users can also review inspection results in order to improve collaboration with colleagues and clients and accelerate the validation and approval processes.



What can VXelements offer you?

SUPERIOR QUALITY 3D MEASUREMENTS

Thanks to its advanced image processing and mesh generation algorithms, VXelements produces superior accuracy and data quality from 3D measurements, making the results user-independent and maximizing device performance according to application.

INTUITIVE AND INTEGRATED PLATFORM

With VXelements, both the 3D data acquisition and post-treatment occur in the same intuitive and integrated platform to guarantee optimal user experience, seamless interaction with the device, and the shortest time to usable mesh or 3D data.

CONTINUOUS IMPROVEMENT

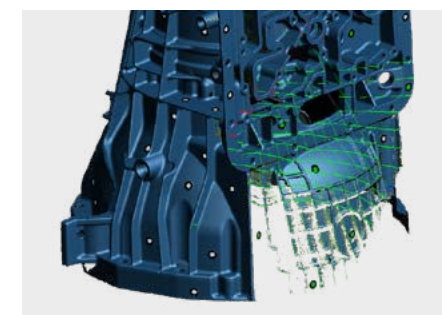
VXelements is continuously evolving, earning the investment of its valuable users, who all benefit from the addition of new features. New algorithms are regularly developed to improve VXelements' 3D measurement capability while consistently making the user experience simpler, faster, and more intuitive.

ACQUISITION MODULES

VXscan™

A 3D scanning acquisition and optimization module that provides high performance while remaining intuitive for all users regardless of their prior experience or level of expertise.

Thanks to its user guidance during scanning sessions, VXscan extracts superior mesh quality while providing users with innovative, continuously improved features, including the following:



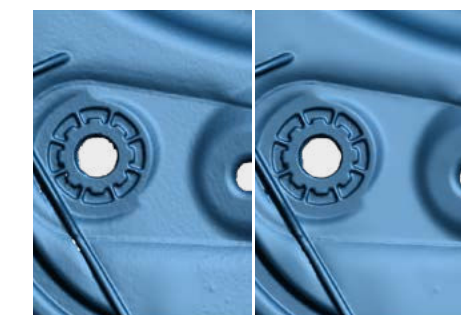
LIVE MESH VISUALIZATION

What you see is what you get



SMART RESOLUTION

Intelligent resolution levels where you need them



MESH ENHANCEMENT

Sophisticated algorithms for optimal mesh quality

VXprobe™

A user-friendly touch probing module that is used for 3D data acquisition and compatible with all major metrology software.



VXshot™

A powerful and unique photogrammetry software module that offers the best photogrammetry with unrivaled accuracy through its unparalleled ease of use and real-time user guidance.



VXmodel™

SCAN-TO-CAD SOFTWARE MODULE

The simplest path from 3D scans to your computer-aided design or additive manufacturing workflow

Integrated into VXelements, VXmodel™ is post-treatment software module designed to optimize meshes and prepare 3D scans for 3D printing. VXmodel also enables designers and engineers to finalize 3D scan data and use it in their reverse engineering and product development workflows.

With a fast processing time that promptly optimizes the mesh and extracts all needed geometrical information, designers and engineers can quickly go back to the CAD workflow they already know.

Satisfied with its performance and complete toolset, thousands of users have already endorsed VXmodel, selecting it as their favorite complement to CAD software.

VXmodel is an ingenious assistant, helping you throughout your product development cycle. Thanks to its intuitiveness and efficiency, VXmodel enables you to accelerate your product development process and, thereby, your time-to-market.



▶ SEE IT IN ACTION

What can VXmodel offer you?

INTUITIVE INTERFACE

Thanks to VXmodel's intuitive interface, users who value simplicity and speed can navigate the software with ease and confidence and without previous learning.

COMPLETE TOOLBOX

With advanced design and modeling capabilities already included in CAD software, VXmodel offers all the complementary tools and features for mesh optimization and seamless integration into scan-based design and reverse engineering processes.

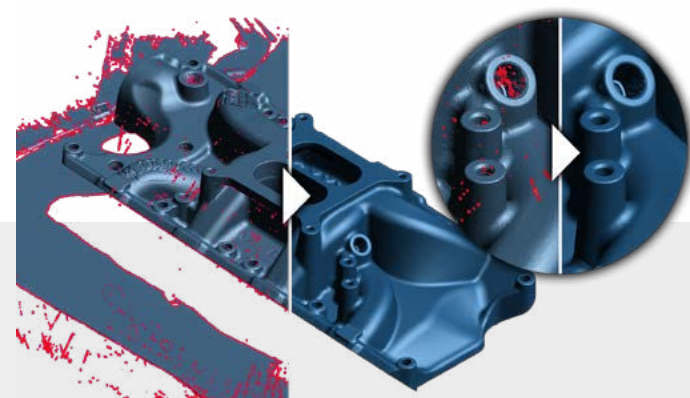
WORKFLOW INTEGRATION

VXmodel provides the fastest shortcut to bridge 3D scanning and CAD modeling workflows, giving designers the opportunity to return to their favorite CAD software quickly.

APPLICATIONS

MESH OPTIMIZATION + 3D PRINTING

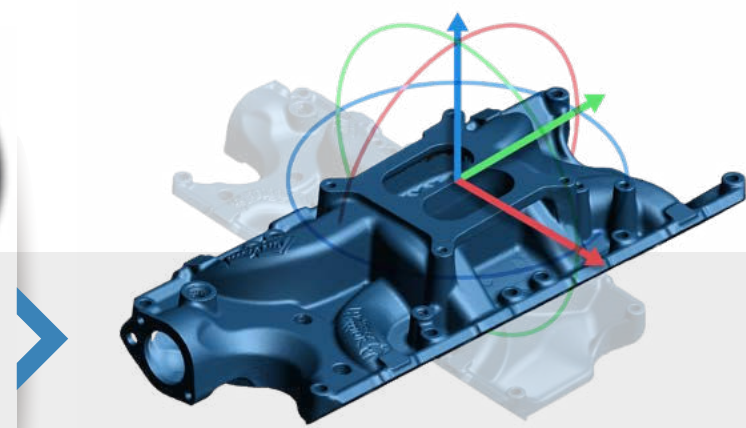
With its powerful preparation and improvement tools, VXmodel enables users to quickly edit the mesh and align 3D scan data. Once the 3D scan has been improved and cleaned, a useable and optimized mesh is ready for 3D printing or any other application.



STEP 1 EDIT MESH

VXmodel provides simple, yet efficient tools to prepare the 3D scan mesh for reverse engineering or 3D printing.

- Clean mesh
- Fill holes
- Merge meshes
- Decimate mesh
- Make mesh watertight



STEP 2 ALIGN

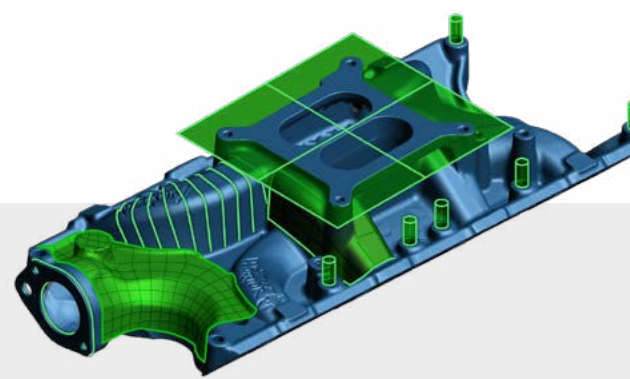
3D scans must be aligned to the coordinate system before exporting, which is a simple but crucial finalization step. The VXmodel alignment tool is highly flexible and straightforward.

- Entity-based alignment
- Best fit alignment

APPLICATIONS

PRODUCT DEVELOPMENT + REVERSE ENGINEERING

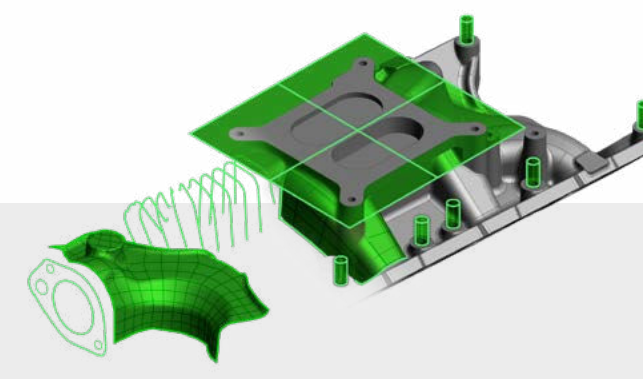
VXmodel only provides the needed tools and features to integrate 3D scan data into your favorite CAD software, where all design and modeling capabilities are already available. With its intuitive functions, you can easily extract the required information from the mesh and transfer it to the CAD platform in order to generate the CAD entities for your 3D modeling.



STEP 3 EXTRACT ENTITIES

VXmodel enables users to easily generate NURBS surfaces for characterizing freeform regions. Geometric entities can be easily extracted from the mesh to complete the design in any CAD software.

- Auto surface
- Manual surface
- 2D/3D entities
- Curves
- Cross-sections



STEP 4 TRANSFER TO CAD

VXmodel allows users to export 3D data to any CAD platform using standard formats (.iges, .setp, .dxf). With a simple right-click, geometric entities can be transferred directly to the following CAD software:

- SOLIDWORKS
- Autodesk Inventor
- Solid Edge

VXinspect™

DIMENSIONAL INSPECTION SOFTWARE MODULE

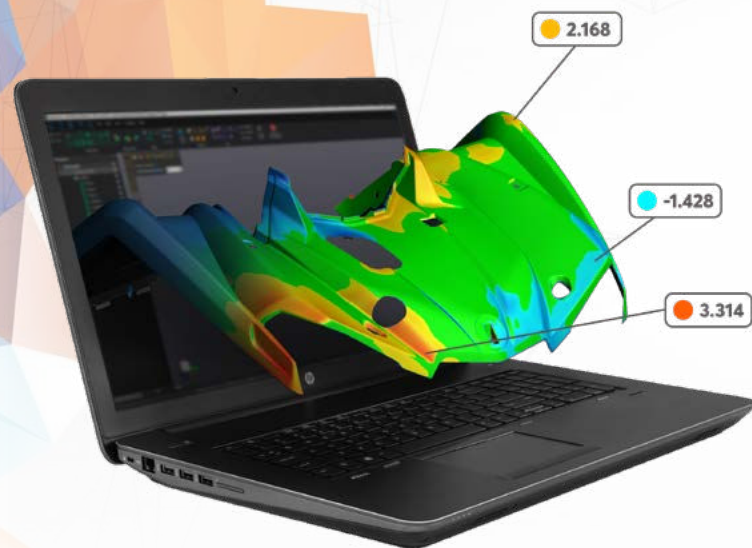
The most intuitive and integrated inspection solution

VXinspect™ is 3D inspection software integrated into VXelements that enables quality control and quality assurance professionals to perform dimensional inspections and generate inspection reports based on meticulous engineering requirements.

Whether for performing simple dimensional analysis or building an extensive inspection program, VXinspect offers a complete toolset for all inspection workflows, with no compromises on measurement quality or geometric dimensioning and tolerancing (GD&T) requirements.

Thousands of users, satisfied with its performance and intuitiveness, have already endorsed VXinspect, considering it the 3D inspection software that offers the most value for the money spent.

VXinspect is a resourceful assistant, helping you throughout the inspection process. Thanks to its simplicity and efficiency, VXinspect enables you to validate the conformity of manufactured parts and deliver higher quality parts to your customers faster.



SEE IT IN ACTION

What can VXinspect offer you?

INTUITIVE INTERFACE

Rigorous development has led to VXinspect's powerful tools and features, which are accessible and easy to learn, as well as simple to integrate and operate thanks to the intuitive interface.

COMPLETE TOOLBOX

With VXinspect, manufacturing and metrology professionals have access to all the features needed to conduct first article inspection (FAI), quality control (QC), and quality assurance (QA) during the manufacturing process.

HARDWARE INTEGRATION

Along with offering both the acquisition and inspection functions within a single software module, VXinspect offers perfect integration with Creafom's technologies, adding even more value to the offer.

VXinspect is available in two versions, according to your inspection requirements and workflow.

VXinspect is a user-friendly software for scan data inspection that streamlines single-part root cause analyses.

VXinspect|Elite is a complete inspection and dimensional analysis software for advanced quality control applications.

| | VXinspect™ | VXinspect™ Elite |
|---|------------|------------------|
| IGES/STEP CAD file import | • | • |
| Single point inspection (probing, photogrammetry) | | • |
| Mesh inspection (scanning) | • | • |
| Complete part alignment toolset | • | • |
| Complete dimensional inspection toolset | • | • |
| Reporting toolset | • | • |
| Multiple part inspection | | • |
| 2D & 3D GD&T | | • |
| Certification | NIST | |



STEP 1 MEASURE

VXinspect works in multiple measurement modes by seamlessly integrating photogrammetry, single-point touch probe, and non-contact measurement (scan).

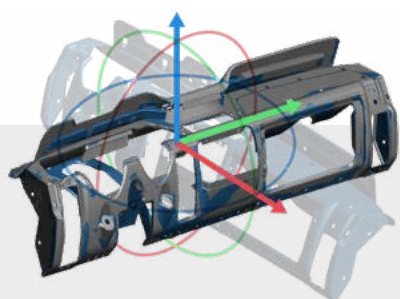
- 3D scanning
- Probing
- Photogrammetry



STEP 2 IMPORT

VXinspect supports CAD import or any mesh for direct measurement comparisons with reference 3D models, leading to a better understanding of manufacturing defects.

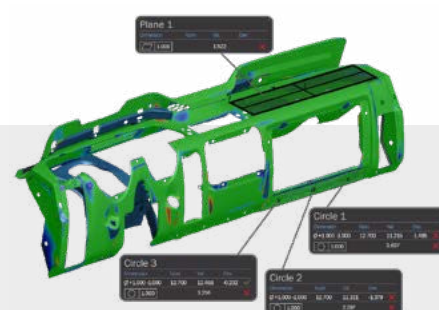
- .IGES
- .STEP



STEP 3 ALIGN

As an object's position and orientation in space are crucial during the inspection, VXinspect includes a complete alignment toolset to fulfill inspection requirements and generate more accurate results.

- Best-Fit
- Feature-based (PLP, Points, etc.)
- Datum
- Reference Point System (RPS)



STEP 4 ANALYZE

Thanks to its sophisticated algorithms and calculation methods, VXinspect combines simple, yet powerful tools and features to fully analyze the inspected parts.

- Colormap (3D deviation comparison)
- Geometric features
- Cross-sections
- Calipers
- GD&T



STEP 5 REPORT

VXinspect makes it easy to create and share inspection reports in multiple formats.

- Customizable reports
- Multiple formats (PDF, Excel, XLS, CSV)



STEP 6 REPEAT

When a repeat inspection is required, VXinspect can quickly move from one part to the next with minimal steps.

- Multiple part inspection
- Automatic measurement extraction

VXscan-R™

DIGITAL TWIN ENVIRONMENT SOFTWARE MODULE

The most intuitive and integrated programming and acquisition platform for 3D scanning

VXscan-R™ is an offline programming software that enables non-experts in 3D scanning or robotics to obtain optimal dimensional measurements in the shortest cycle time.

With VXscan-R's scanning intelligence and dedicated functions, programming robot paths, and optimizing the line of sight and scanning speed become simple and easy, simplifying the deployment of automated quality control solutions.

VXscan-R is the key to more efficient robotic cell management, solving programming and security issues and helping non-experts feel more confident when working with robotic systems.

Thanks to VXscan-R, automated quality control is now accessible to all, resulting in better decision-making and better part quality. Resources normally assigned to measurement can be redirected to added-value tasks, increasing organization efficiency.



SEE IT IN ACTION

What can VXscan-R offer you?

ACCESSIBLE TO NON-EXPERTS

With VXscan-R, anyone, regardless of previous experience in 3D scanning or robotics, can program robots and operate them with ease and confidence.

DIGITAL TWIN CAPABILITY

VXscan-R's offline programming capability avoids monopolizing cell time while giving access to a complete environment for program preparation and simulation.

SOFTWARE INTELLIGENCE

VXscan-R offers perfect integration of robot path planning, scan parameter adjustment, and smart resolution capability for optimal scanning results and cycle time.

MAXIMUM FLEXIBILITY

With no fixed configurations, VXscan-R is compatible with a variety of different cells layouts and robots.

TWO MODULES



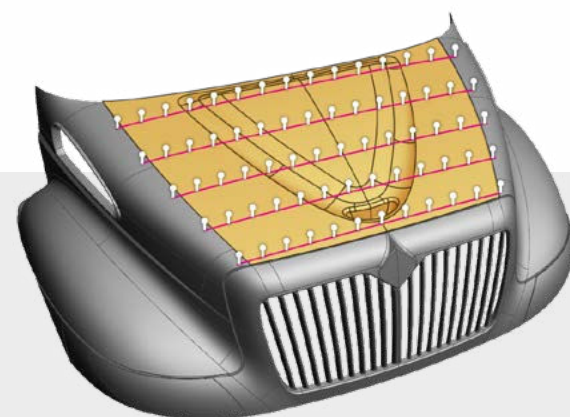
VXscan-R Plan | Complete module for project preparation, simulation, and validation

VXscan-R Plan enables automated quality control professionals to import CAD, configure scanning parameters, create robot paths, simulate scans, and export simulations to metrology software.



VXscan-R Execute | Intuitive user interface for shop-floor operators

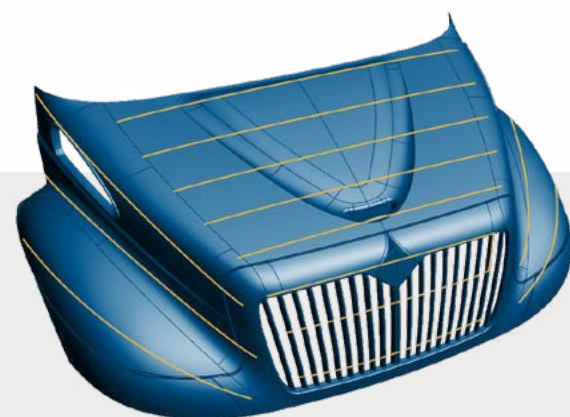
VXscan-R Execute enables operators to import part parameters, start the measuring program, and change parts when the robot has returned to its home position.



STEP 1 PROGRAM THE ROBOT

VXscan-R uses CAD models to create the optimal sensor positions for surface inspection. Users can pick surfaces, edges, or points on the CAD model for automatic path generation or program the robot path manually with the jog feature while VXscan-R is detecting singularities and avoiding collisions.

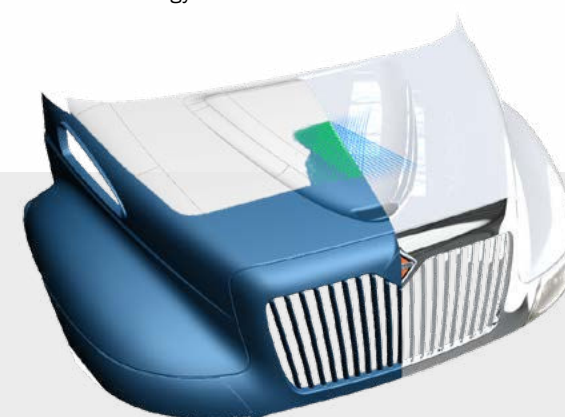
- CAD alignment
- Parametric programming with surface, edge, point picking
- Jog feature



STEP 2 SIMULATE + VALIDATE

Using realistic simulations, VXscan-R generates robot paths free of collisions and singularities, which are optimized for the scanner's characteristics.

- Scan simulation
- Connection to robot
- Collision detection and avoidance
- Program execution



STEP 3 MEASURE

VXscan-R guides shop-floor operators in the execution of their tasks when measuring parts.

- Automatic photogrammetry
- 3D scanning with automatic mesh generation
- Smart resolution capability
- Hold and resume programs



STEP 4 TRANSFER TO INSPECTION SOFTWARE

Perfect for standardization, VXscan-R is compatible with leading inspection software products.

- VXinspect
- Polyworks
- Metrolog X4

VXtrack™

DYNAMIC TRACKING MEASUREMENT SOFTWARE MODULE

An accurate and repeatable tool to track multiple objects in time and space

VXtrack™ is a dynamic tracking module that enables production and process engineers to obtain the position and orientation of multiple objects in time and space. Because measurements are taken simultaneously and accurately, VXtrack can easily control displacements, drive assembly processes, and measure deformations.

Thanks to the simplicity of optical tracking, VXtrack is ideal for numerous applications, including calibrating and guiding robots, monitoring complex assembly processes, and compensating for both machine tool positioning errors during manufacturing and deformations during testing.

VXtrack is the perfect tracking companion, helping you monitor multiple objects in 3D space and time. Thanks to its accuracy and efficiency, VXtrack enables you to accelerate manufacturing and quality control processes.



What can VXtrack offer you?

CUSTOM INTERFACING

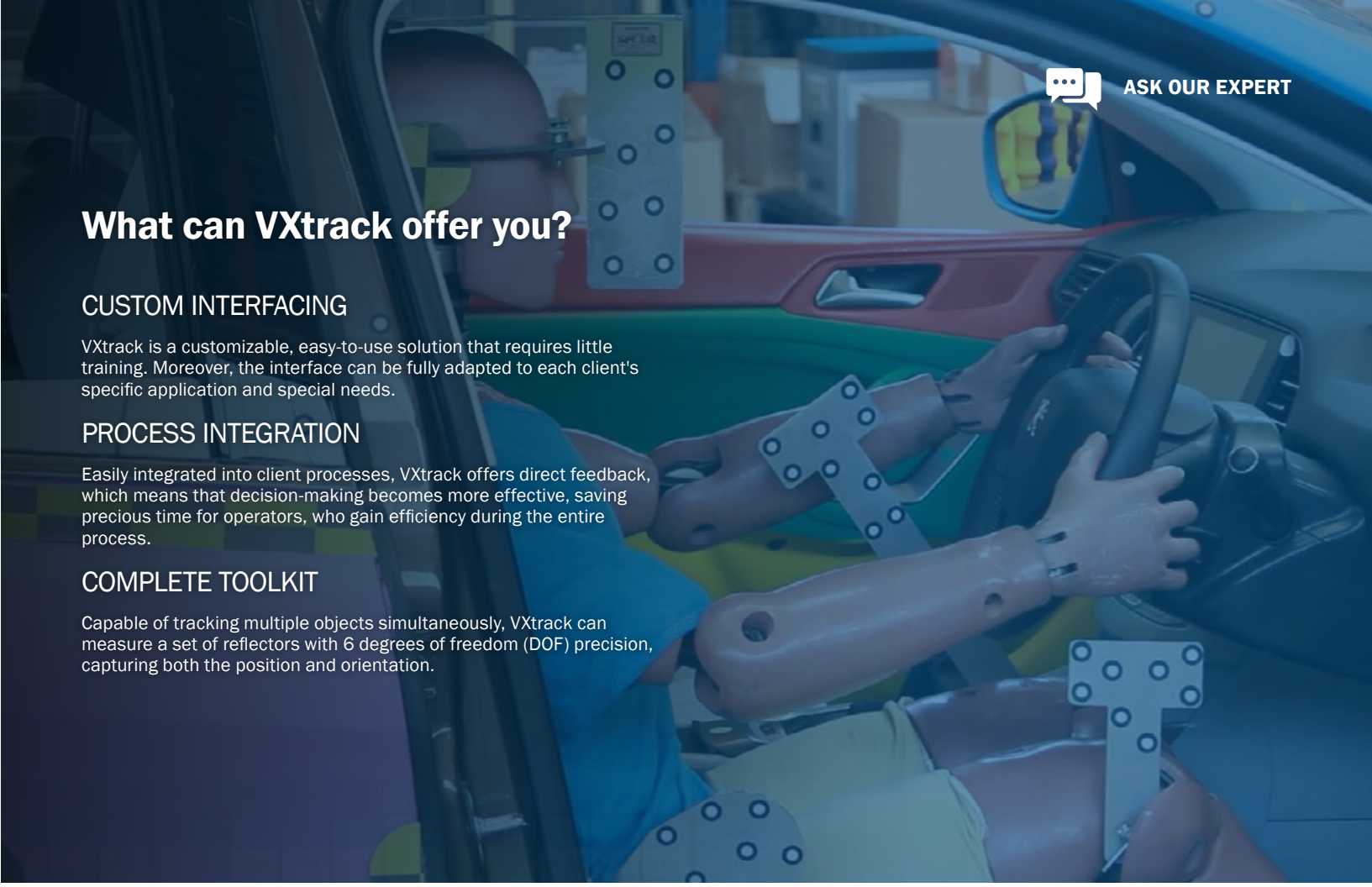
VXtrack is a customizable, easy-to-use solution that requires little training. Moreover, the interface can be fully adapted to each client's specific application and special needs.

PROCESS INTEGRATION

Easily integrated into client processes, VXtrack offers direct feedback, which means that decision-making becomes more effective, saving precious time for operators, who gain efficiency during the entire process.

COMPLETE TOOLKIT

Capable of tracking multiple objects simultaneously, VXtrack can measure a set of reflectors with 6 degrees of freedom (DOF) precision, capturing both the position and orientation.



APPLICATIONS



AEROSPACE

- Assembly control and monitoring
- Deformation monitoring (wings, landing gears, and tires)



AUTOMOTIVE

- Movement monitoring on running parts (engine, exhaust, and wheels)
- Dynamic process control (doors and hood closing)
- Deformation monitoring (chassis and seats)
- Crash test preparation (prepositioning)



ROBOTICS

- On-site calibration and assessment
- Real-time course correction
- Computerized guidance of assemblies

MAIN FEATURES

- Rate of up to 6,600 3D points per second
- 6 DOF measuring (position and orientation) of a rigid set of reflectors
- Synchronous measurement of the reflector set
- Measuring volume from 9.1 to 16.6 m³ (320 to 586 ft³)
- One unique system for 3D inspection and 3D dynamic measurement
- Real-time curve display in VXelements
- Export to .csv format
- API for interfacing with third-party applications
- Acquisition synchronization capability through external trigger input

TECHNICAL SPECIFICATIONS

| | C-Track™ | | C-Track™ Elite | |
|---------------------------------|----------------------|----------------------|----------------------|----------------------|
| | 9.1 m ³ | 16.6 m ³ | 9.1 m ³ | 16.6 m ³ |
| Measurement Rate (reflectors/s) | Up to 6,600 | | | |
| Repeatability | 0.013 mm (0.0005 in) | 0.020 mm (0.0008 in) | 0.010 mm (0.0004 in) | 0.015 mm (0.0006 in) |
| Volumetric Accuracy | 0.068 mm (0.0026 in) | 0.100 mm (0.004 in) | 0.050 mm (0.002 in) | 0.075 mm (0.003 in) |

WHICH APPLICATION SOFTWARE IS RIGHT FOR YOU?

Thanks to their advanced algorithms, Creaform's application modules are engineered to process 3D scan data for diverse applications. By selecting your application, find the right module for you.

VXmodel



Product Development



Reverse Engineering



Additive Manufacturing

VXinspect



Quality Assurance



Quality Control

VXscan-R



Digital Twin Environment



**Automated 3D
Measurements**

VXtrack



Dynamic Tracking



**Assembly Control &
Monitoring**



Robot Calibration