OXFORD VISION & SENSOR TECHNOLOGY

OXFORD
VISION & SENSOR
TECHNOLOGY

A total vision system solution for automotive industry

2D & 3D VISION SYSTEM

"With OVST Glazer we have a monthly reject rate fewer than the competitor's daily rate." - Ford Valencia

Exceptional Performance

0.004%

Windshield Reject Rate at Honda Canada 2019

Glazing Technology since

1991

Smart Manufacturing

100%

IIoT Compatibility

MILLIONS OF VEHICLES GLAZED USING OUR VISION GUIDANCE

## OVERVIEW

Automotive Applications

Oxford Vision & Sensor Technology (OVST) is a specialist supplier of vision systems for robot guidance and component inspection applications within the automotive manufacturing sector.

With a range of prestigious customers including Ford, Jaguar Land Rover, Honda, Fiat, Scania, Iveco & Ferrari, you can be assured that our technical ability and commitment to quality is second to none. Millions of vehicles have been glazed using robots precisely guided by OVST vision systems.

General Vision Applications

OVST vision systems can be utilised across a wide range of applications beyond the automotive industry, helping you to improve quality in your operations and ensure customer satisfaction.

Automatic vision inspection systems can enable you to greater automate your processes, bringing cost savings and reducing scrap by getting things right first time. With 100% automated part inspection you can guarantee that faulty components are identified, minimising the chances of costly rework or product recalls further down the line.
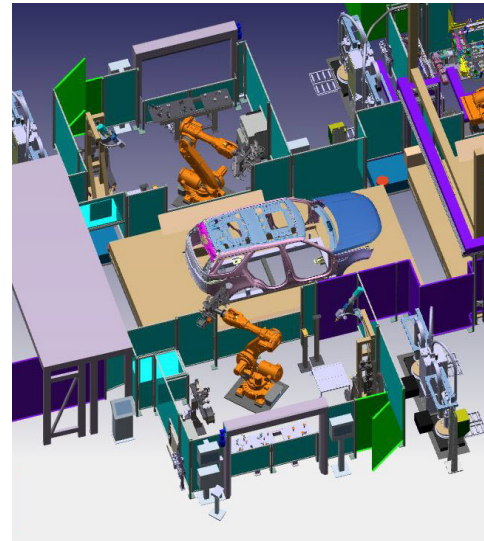
About Us

Oxford Vision & Sensor Technology (OVST) develops, installs and commissions machine vi-sion solutions for a wide range of industrial applications. Using software developed in-house, innovative sensing technologies and cutting-edge third-party hardware, we can offer you an unparalleled service.

Based in Coventry, we have our own workshop, offices as well as state-of-the-art demonstration and training facilities. From here we use our experience and commitment to quality to make sure we meet your needs with the best possible solution.

Your peace of mind is guaranteed with integration partners, distributors and our own technical staff working together to provide the highest level of customer support globally. What's more, our large proven installation base means you can be confident of a robust and reliable solution.

To find out how we can meet your particular needs, get in touch with us today.
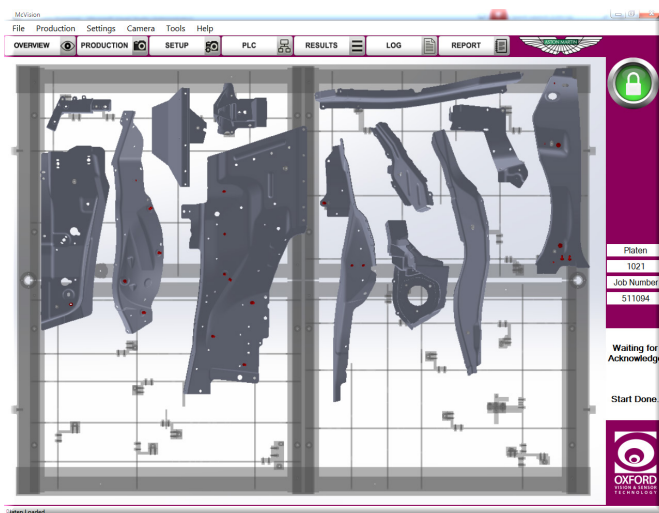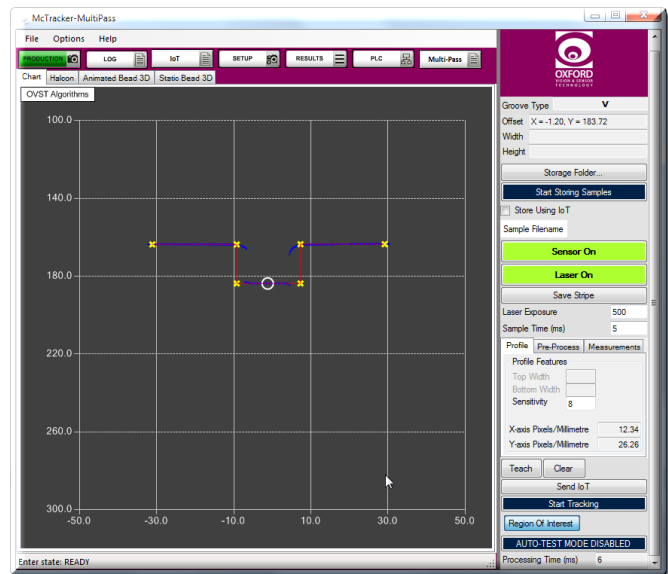
PRESS SHOP
& BODY SHOP

MCTRACKER P.1

Improve the accuracy and consistency of body shop welding operations with McTracker, the weld robot seam system from OVST.

Utilising state-of-the-art laser tracking technology, McTracker enables welding jobs to be taught using simple point-to-point programming, where variances in the positioning and dimensioning of the welding seam are accounted for in real-time.


MCVISION 3D P.2-6

Tightly control the quality of parts manufactured in the press shop with our McVision 3D inspection system. Our inspection systems are totally configurable in hardware and software to meet your requirements and designed to be integrated directly into your production line, enabling automatic inspection of large numbers of sub-assemblies with minimal operator input. Combining application-specific software developed by OVST with the industry leading image processing engine, drag-and-drop vision tools means design alterations can be dealt with by in-house maintenance team. .

PAINT SHOP

DEFECT INSPECTION BY USING DEEP LEARNING TECHNOLOGY (P.15)

Our deep-learning paint inspection solution allows you to catch manufacturing defects in the paint shop early on and is able to distinguish true defects, such as scratches and chips, from troublesome false defects such as dust and small debris. Continual improvement of defect classification is an intrinsic part of deep learning algorithms, meaning OVST deep learning inspection results are much more robust and consistent when compared to the traditional machine vision approaches of other suppliers.
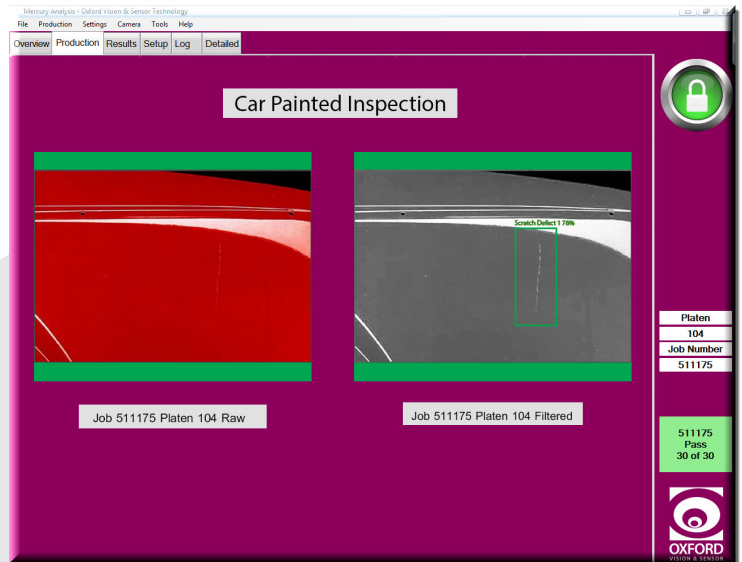
FINAL ASSEMBLY

PRIMER BEAD INSPECTION (P.13)

In automated glazing operations it is essential that adhesive primer is applied the glass prior to the PU adhesive being applied. Using UV light, our Primer Inspection system is able to correctly verify that adhesive primer has been correctly applied, helping to ensure quality at every step of the glass insertion process.
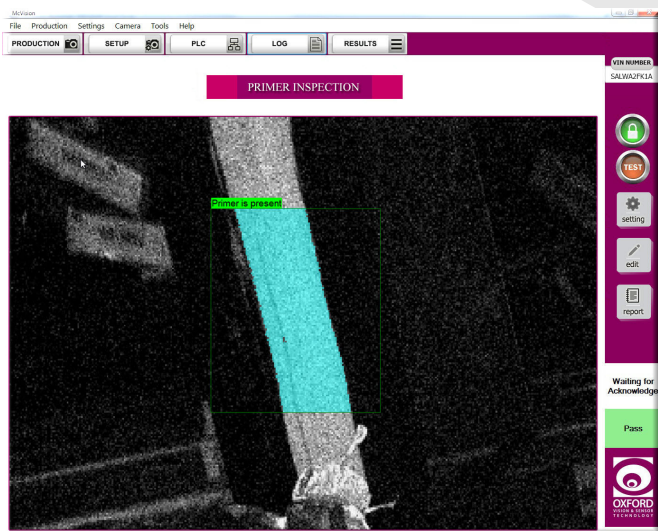
GLAZER (P.7-10)

The OVST Glazer system is able to overcome variations in the position of the car body on the production line, guiding the robot during the automated glass insertion process.

Our MAXVision-Sensor is the ideal 3D sensor for automotive glazing applications, combining three sensing technologies into one cost-effective package allowing you to do away with the excessive hardware and over-engineering traditionally required to tackle model variants and colour sensitivity.

We prefer to let the figures speak for themselves, with the vast majority of our cells running at reject rates well under 1%.
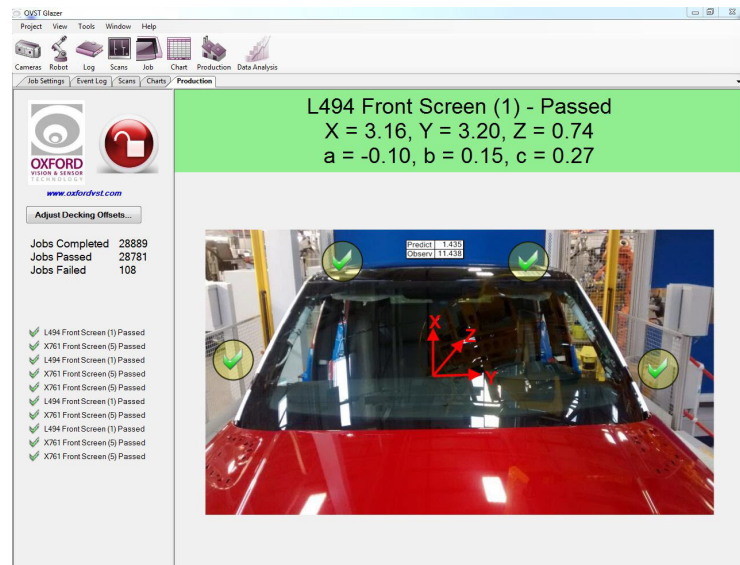
SEALANT BEAD & 3D BEAD INSPECTION (P.11-12)

We can apply and inspect the PU Bead with both red and blue lasers for differnce situation on site.

PU BEAD INSPECTION (P.14)

Correct overlap of the PU bead at the stop point as the robot completes its path is essential to ensure proper sealing is achieved when the glass is decked to the car. The OVST Bead Overlap Inspection is able to verify the shape of bead overlap, checking for a number of fault conditions.
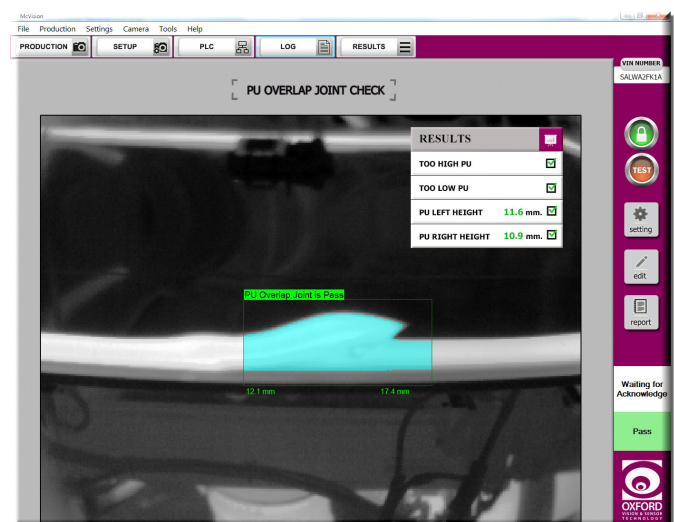
ROBOT WELDING GUIDANCE SYSTEM

McTracker

Utilising state-of-the-art laser displacement sensors and the user-friendly Universal Robot® programming platform, McTracker enables welding jobs to be taught using simple point-to-point programming where variances in the positioning and dimensioning of welding seam on the part are accounted for in real-time.

McTracker is IIoT (Industrial Internet of Things) compatible where information such as production volumes by welding job and tolerance testing can be automatically logged to the cloud allowing you greater control over your manufacturing processes.

TECHNICAL DATA

- Working range Z: 90 - 280 mm.
- Measuring range X: 62-145 mm Z: 190 mm.
- Resolution X: 54-123 µm Z: 4-49 µm.
- Light source: Blue laser.

FEATURES

- Easy setup and maintenance.
- Intuitive display modes: 2D cross-section or 3D surface view.
- Pre-defined profiles for all common weld types: butt joints, lap joints and corner joints.
- Easily integratable: Universal Robot® and IIoT compatible out of the box.

APPLICATION

- Weld seam tracking visualised in 2D and 3D.
- Weld seam defect inspection.
- Dimensional inspection of weld seams and parts relative to defined specification.

INTERFACE
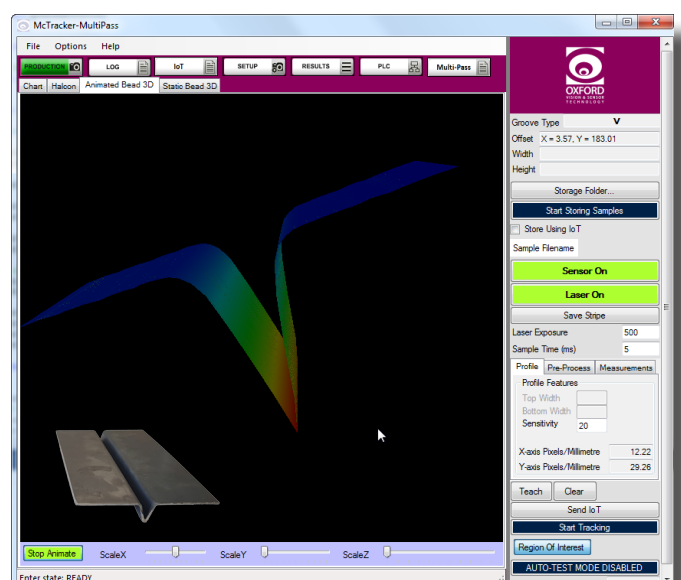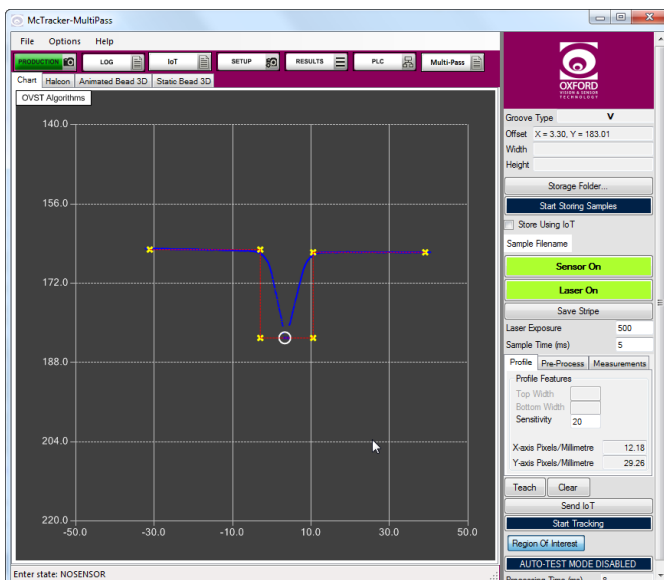
VISION
SYSTEM PRODUCTS

McVision

McVision is the latest addition to the OVST range of advanced inspection systems for the automotive industry.Designed from the outset to be usable by assembly line maintenance staff, the system combines OVST proprietary software development with an industry-leading image processing engine to provide the best in-class-leading multi-camera inspection system that is as reliable as it is user-friendly.

FEATURES

- Multiple grey-scale cameras, configurable as required.
- Easy to use, no programming required.
- Comprehensive log facilities to monitor system performance.
- SPC (Statistic Process Control) utilities built in.
- Wide range of image-processing tools and algorithms available.
- Compatible with a wide range of communication interfaces: Ethernet, PROFINET, PROFIBUS, RS232 and many more.

APPLICATION

- Pre-Inspection - verify part presence and position prior to adhesive being applied.
- Post-Inspection – verify adhesive bead is present and correctly formed after application.

INTERFACE
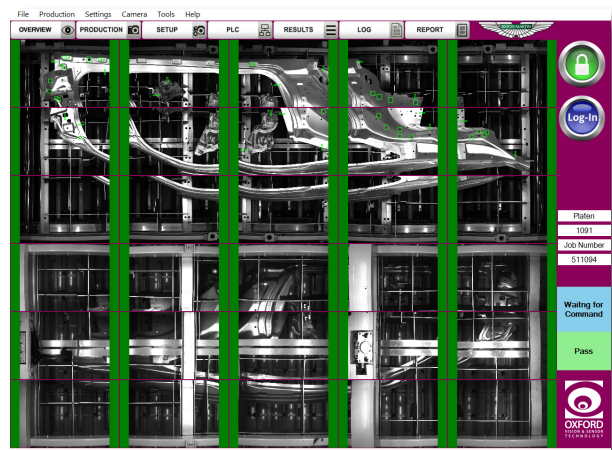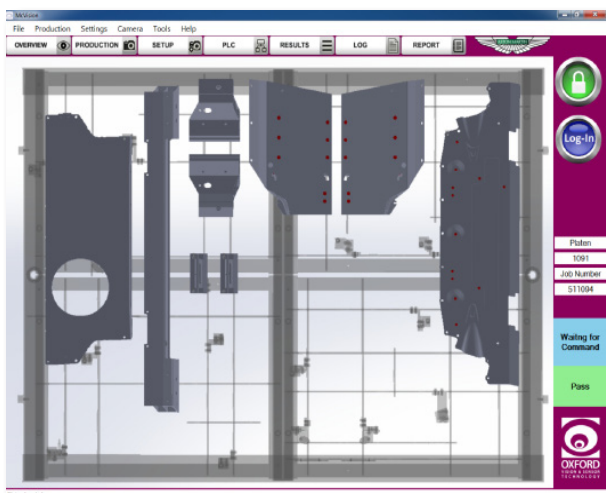
McVision: 3D Inspection Compatible

OVST McVision 3D utilises cutting-edge laser displacement technology to provide full inspection of complex parts in 3D with the same user-friendly GUI, drag-and-drop vision tools and cutting-edge performance of McVision.
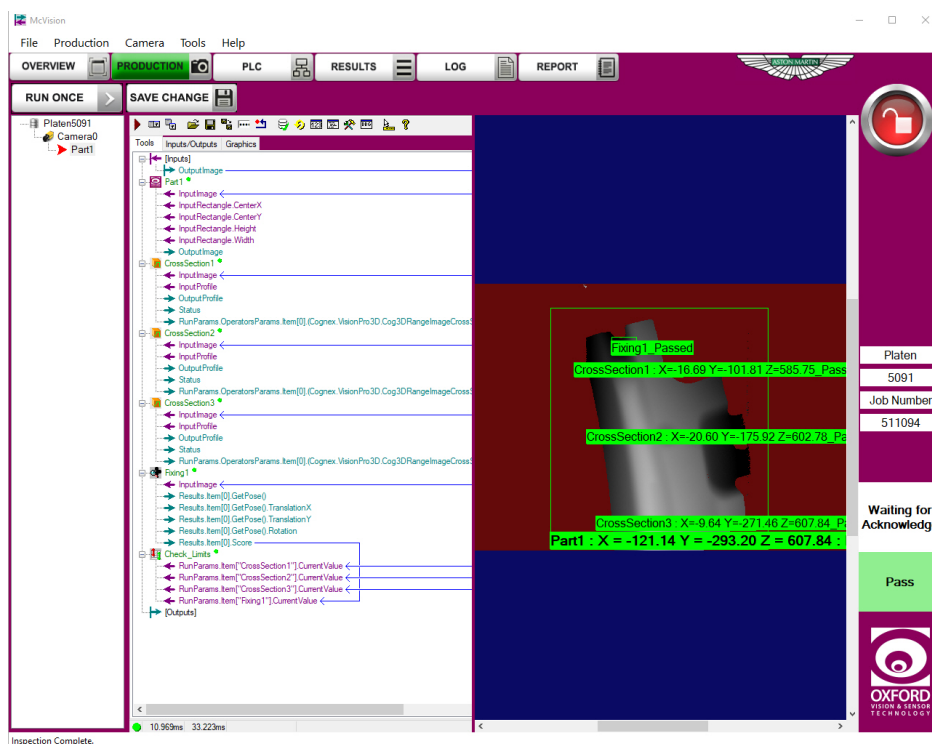
Accurate 3D scans can be rotated and manipulated into any position by the user, aiding trouble-shooting and fault detection on the production line.
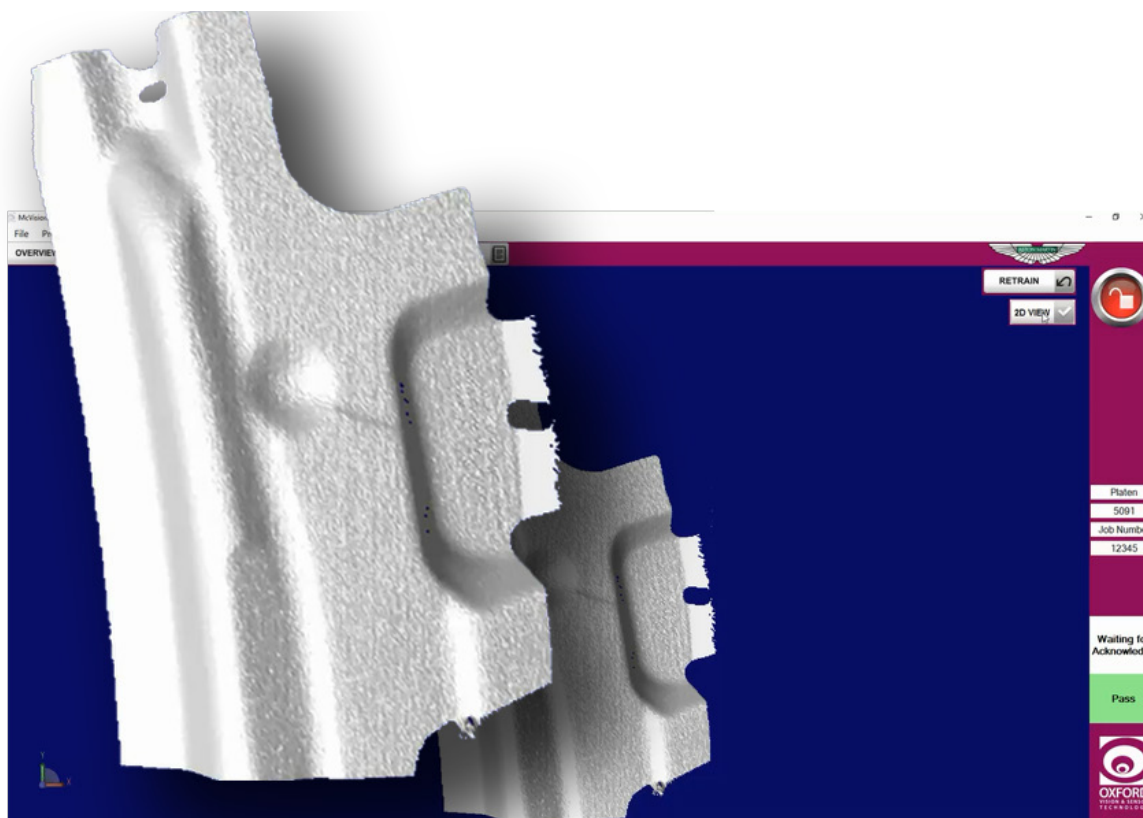
McVision: IIoT and Universal Robot® Compatible

McVision can use for various industrial application and easy to integrated with universal robot and IoT technology.
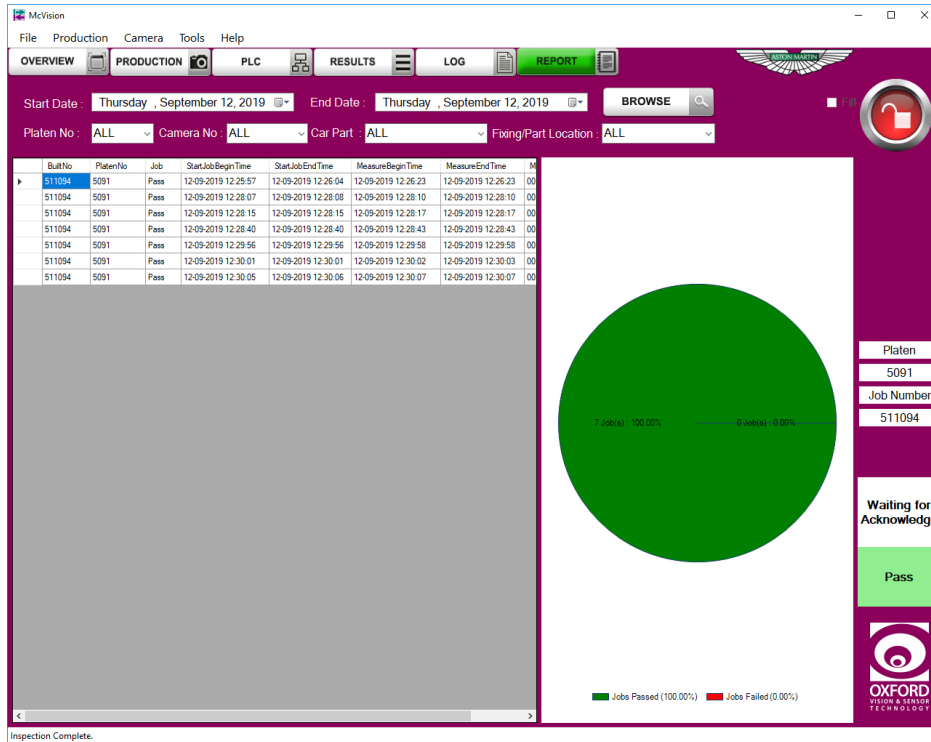
McVision is compatible comes with our Statistic Process Control package, generating insightful reports and allowing data to be exported in useful formats such as .csv. All data produced can also be automatically stored on a cloud database using the services of our cloud partner Witly, making your production IIoT ready and allowing you to enjoy the benefits of built in failure trend analysis facilitating your process improvement efforts.

McVision with Universal Robot

McVision is fully integrated with Universal Robot®, enabling the development of more complex inspection tasks such as robotic 3D inspection of randomly orientated components all integrated under one software package.

Our machine vision solutions have been developed to integrate with Universal Robot. All OVST software can be controlled from the teach pendant from a user-friendly interface that is integrated directly at operating system level.
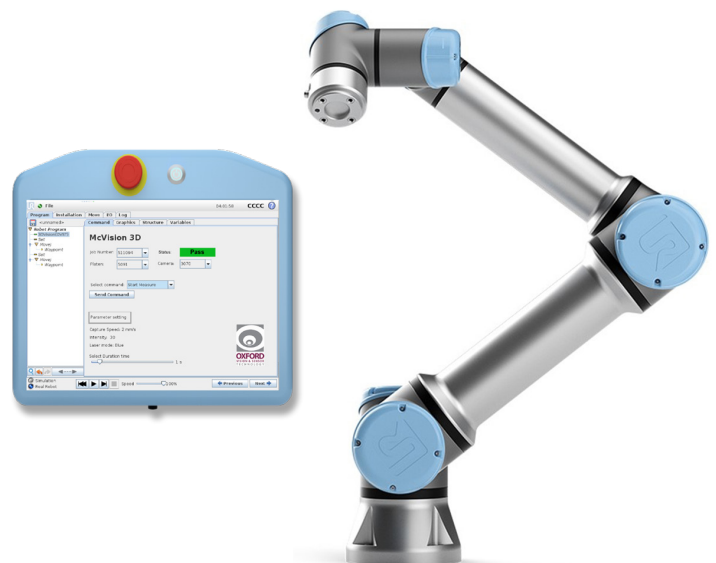
McVision: Car parts Inspection

Aston Martin, Gaydon

Aston Martin utilises the OVST McVision Inspection system on a bespoke 76 camera installation on their production line in Gaydon, UK. Production platens carrying multiple sub-assemblies are inspected in numerous critical locations by up to 30 cameras at two key stages in the adhesive process.

Pre inspection

Prior to the adhesive being applied the pre-inspection system is used to verify that relevant sub-assembly is present and correctly positioned on the platen.
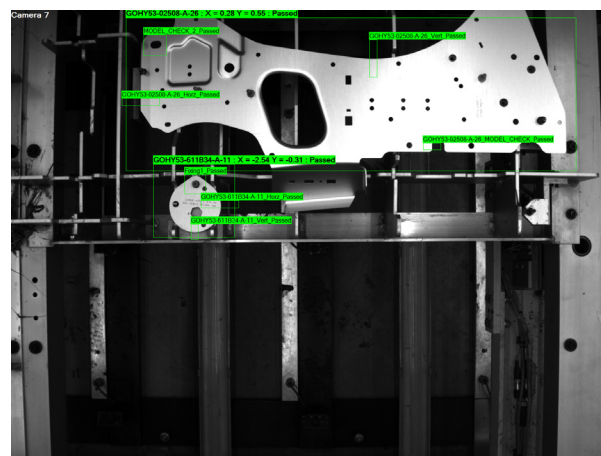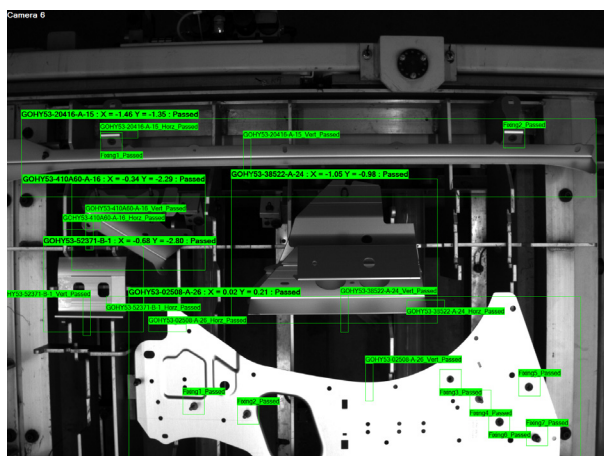
Post inspection

Once the platen has completed the gluing process, it then moves on to the post inspection system where the presence and size of the glue beads are monitored to prevent costly rework further down the line.
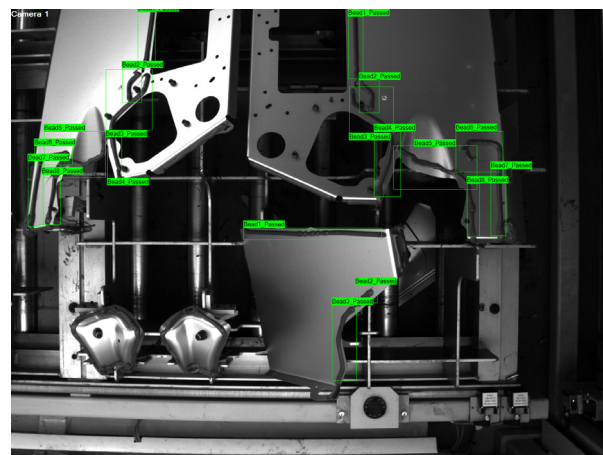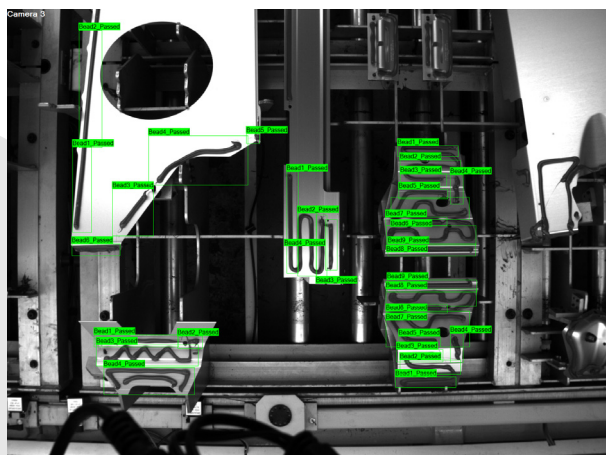
Mercury: Chassis Inspection

Jaguar Land Rover, Solihull

The OVST Mercury inspection system is the proven solution for critical multi-camera inspection task. Utilising as many cameras as necessary alongside optimised machine vision lighting, multiple components can be inspected, confirming their presence and correct orientation.
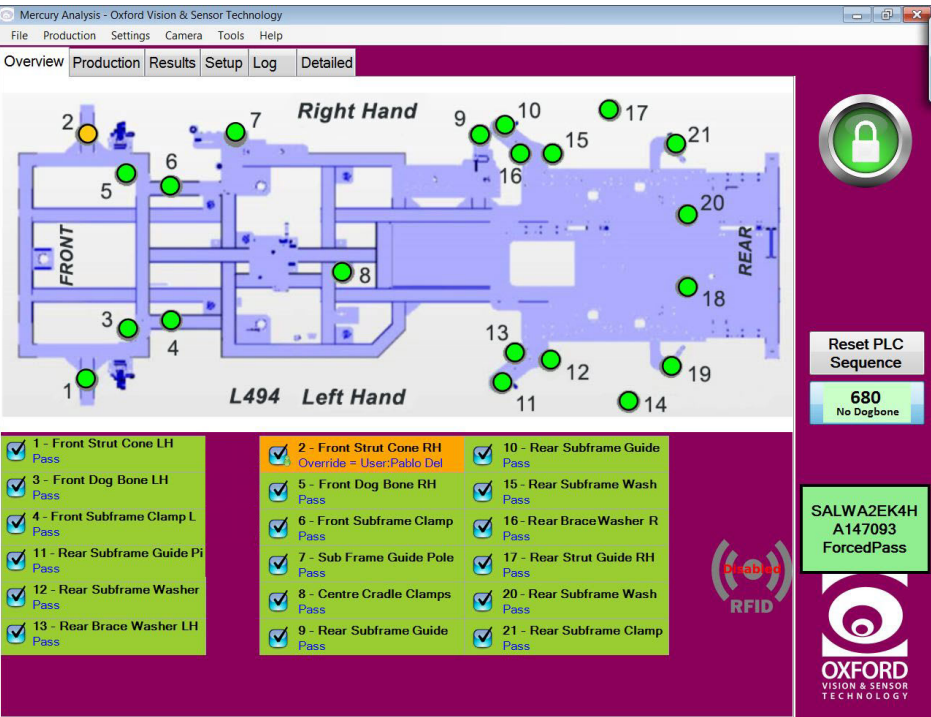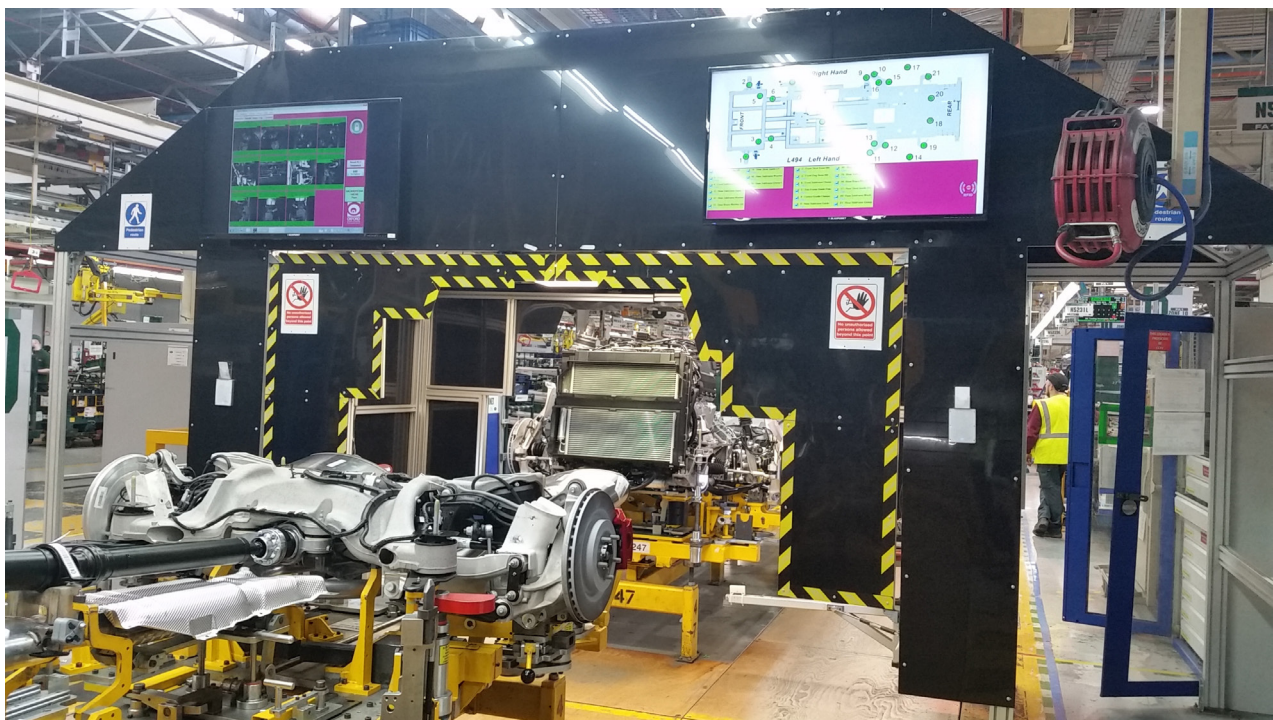
At Jaguar Land Rover 12 cameras inspect 21 positions on the chassis to ensure that key jigs and fixtures are present and correctly orientated prior to the major marriage operation of the car body and chassis. In such critical applications it is vital that the inspection system does not pass any faults. Optimised lighting and high-quality imaging hardware ensure that the OVST Mercury inspection system delivers outstanding performance in such applications.

GLAZER: ROBOT GUIDANCE SYSTEM
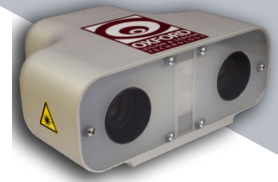
OVST has been at the forefront of final assembly automated glazing since its emergence almost 20 years ago. The OVST Glazer system is able to overcome variations in the position of the car body on the production line, preventing sub-standard results or even damage to expensive inventory.

Our innovative sensors are able to take measurements on the car body, independent of body colour and finish, where translational and rotational offsets in all six degrees of freedom (x, y, z, a, b, c) of the robot can then be produced; applying this offset to the robot's nominal insertion position enables the glass to be consistently inserted with precision in the tens of microns and cycle times in the tens of seconds.

MAX SENSOR TECHNICAL DATA

- Dual 1600 x 1200 stereoscopic cameras.
- Three distinct measurement modes: Stereo, Laser and SRS
- Working range: X ± 50 mm, Y ± 50 mm, Z ± 30 mm
- Accuracy: Stereo ± 20 μm, Laser ± 20 μm, SRS ± 10 μm
- Measurement speed: Stereo ≈ 300 ms, Laser ≈ 200 ms, SRS ≈ 100 ms

FEATURE

- Stereo Mode - Tooling holes and datum reference in car bodies and glasses.
- Laser Mode – Matt surface with a definite feature in its profile.
- SRS Mode – Shiny surface with one or more radii in its profile.
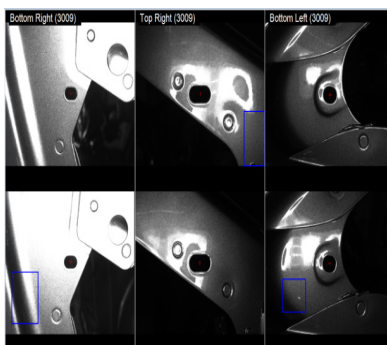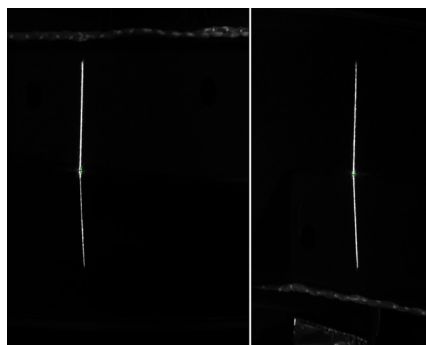
Stereo Mode   Laser Mode   SRS Mode
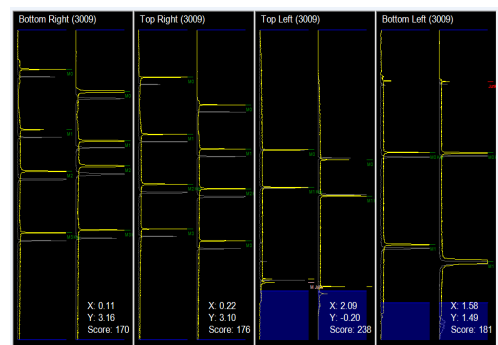
APPLICATION

- Glazing glass insertion.
- Gap and Flush inspection.
- VIN (Vehicle Identification Number) reading and verification.
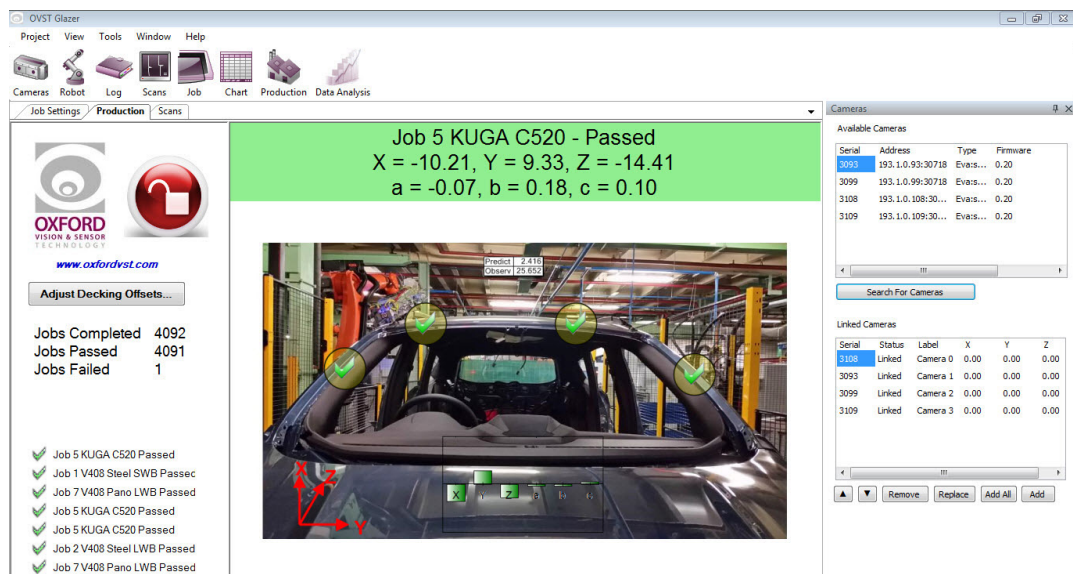
Glazer Robot Guidance: Ford Cologne

Using our innovative SRS measurement mode, our sensors can make measurements on the car body through the glass. The nature of SRS technology means that our sensors can accurately measure the car body without being susceptible to colour variation or different paint finishes, such as gloss and satin. Using four measurements an offset is calculated in all six degrees of freedom, checked they are within specified limits, and used to deck the glass accurately.

Glazer: Automotive Glazing

At the heart of our robot guidance system is our robust Glazer software package. Flexible enough to enable any automotive glazing job to be performed using a variety of hardware and technologies, yet simple enough to be maintained and reconfigured in-house as well as totally configurable to restrict access levels as required.

OVST Systems are designed with an informative graphical user interface Less than 0.004% Reject Rate at Windsheid cell, Honda Canada 2019.
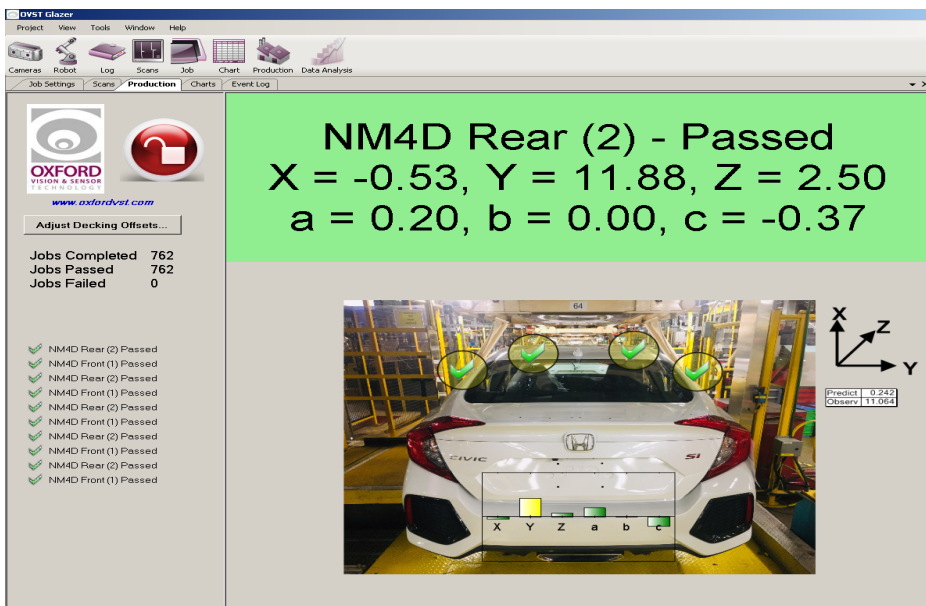
Simulated Glazer System

Real-world Glazer System

Real Glazer application at automotive manufacturers.
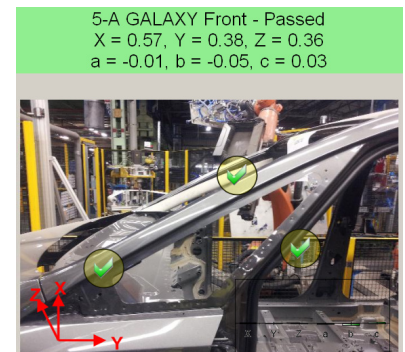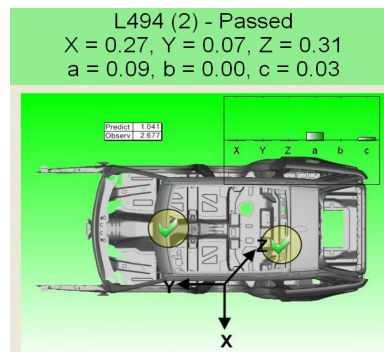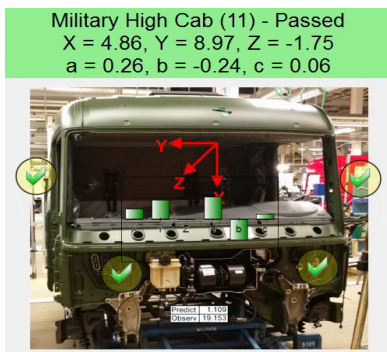
VIN Reading and Verification

Glazer is suitable for VIN (Vehicle Identification Number) applications where the code is to be etched onto the car body in a fixed position. Glazer can guarantee consistent positioning of the VIN on the car body by guiding the robot to the appropriate position and then check that the etching was carried out correctly using OCR (optical character recognition).

L560 - Vin Reading X761COPY(14) - Passed
0:"*SALYA2BN9JA702939*"

0:*SALYA2BN9JA702939*/*SALYA2BN9JA702939*
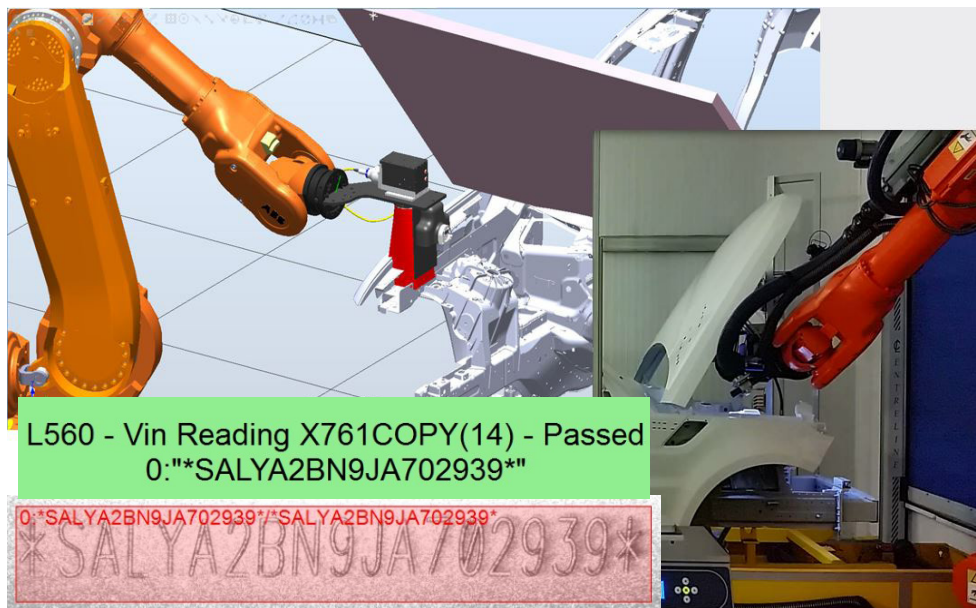
GAP & FLUSH Measurement

Following the decking of the glass to the car the OVST Gap and Flush measurement system can analyse the quality of the glazing result. This system uses the MAX-VisionSensor to measure the gap and flush relative in several positions relative to the car body therefore verifying that the glass has been inserted correctly.
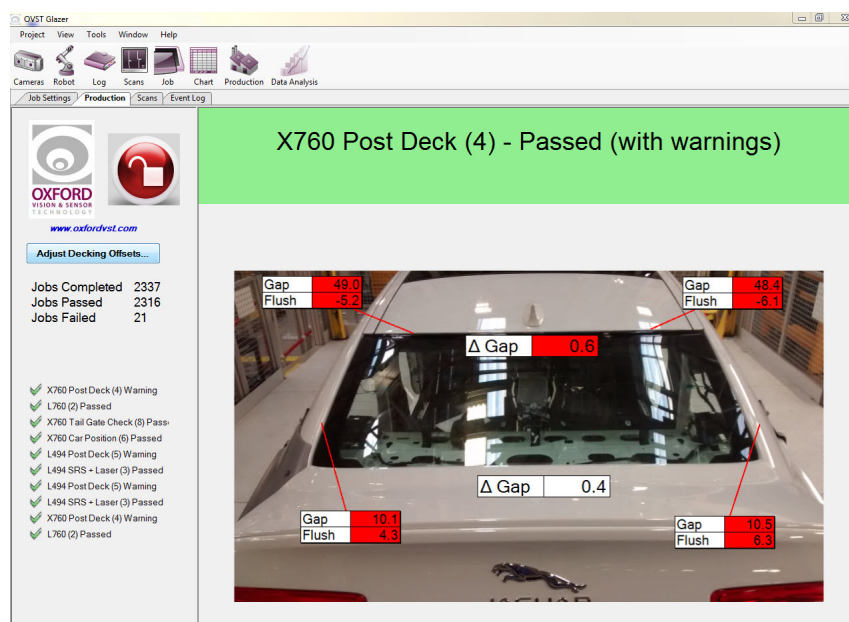
SEALANT BEAD INSPECTION
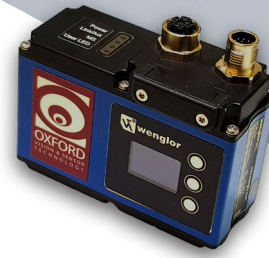
OVST has developed a sealant bead measurement system using based on GigE 3D laser-displacement sensors. When the sensor projects a laser line across the adhesive, this line is displaced by the profile of the bead. By moving the sealant bead through the laser line, a 3D profile of the adhesive bead can be formed from which information regarding the width and height can be deduced.

TECHNICAL DATA

- Working range Z: 90 - 280 mm
- Measuring range X: 62 - 145 mm Z: 190 mm
- Resolution X 54 - 123 um Z: 4 - 49 um
- Weight: 600 g
- Width: 92 mm Height: 78.9 mm
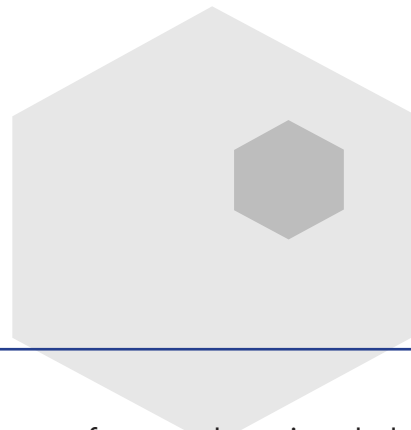
FEATURE

- Red and blue lasers: adaptable to suit any adhesive.
- Application specific algorithms: suited to black and glossy surfaces such as tinted glass.
- Easy to setup and operate: no expert knowledge required.
- Compact and lightweight: compatible with any robot.

APPLICATION

- Inspect the bead path after applying the PU glue.
- Inspect the width, height and shape of the bead in the real world scale (mm).
- Inspect the quality of bead which is not narrow, missing or overlap.

EXAMPLE
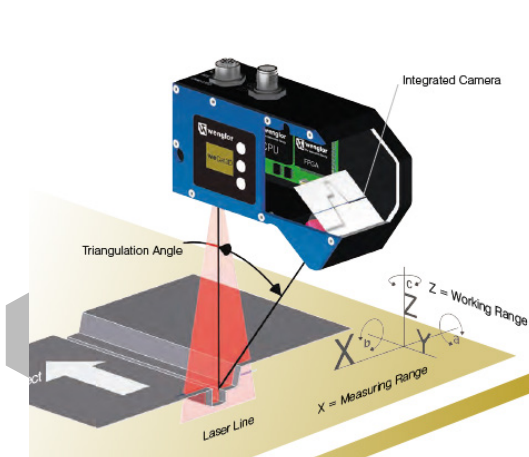
3D BEAD INSPECTION SYSTEM
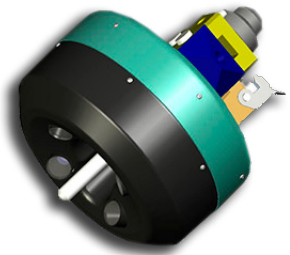
Our 3D Bead Inspection System features advanced functionality not available from other suppliers of automation equipment in this field. Dual measurement sensors ensure accurate detection of the 3D geometry where measurements are taken inline during the glue application process meaning no changes to cycle times.

TECHNICAL DATA

- Weight approx. 3 kg
- Diameter of installation opening 45 mm
- Measurement range Xmin = ± 15 mm Xmax = ± 21,5 mm Z = 33 mm - 110 mm

FEATURE

- Full 3D measurement of the bead's height, width, continuity and geometry.
- Measurement is performed during the adhesive application process meaning no increases in cycle times.
- Automatic tracking – no need to program the sensor rotation.
- Totally retrofittable to existing installations.

APPLICATION

- PU Path Inspection during automated glazing cycles.
- Inspection of bead height, width and geometry relative to specification.
- Ensure continuity of bead during adhesive application process.

EXAMPLE

OTHER AUTOMATIVE APPLICATION:
PRIMER INSPECTION

Prior to the application of the PU adhesive a primer is applied to the glass as a pre-cursor. Using UV light, the OVST Primer Inspection System is able to verify the correct application of the primer ensuring quality at each step of the glass insertion process.

FEATURE

- Primer made visible via UV light illumination.
- Verification of presence and correct positioning of primer on glass.

APPLICATION

- PU primer application in automated glazing applications.

INTERFACE
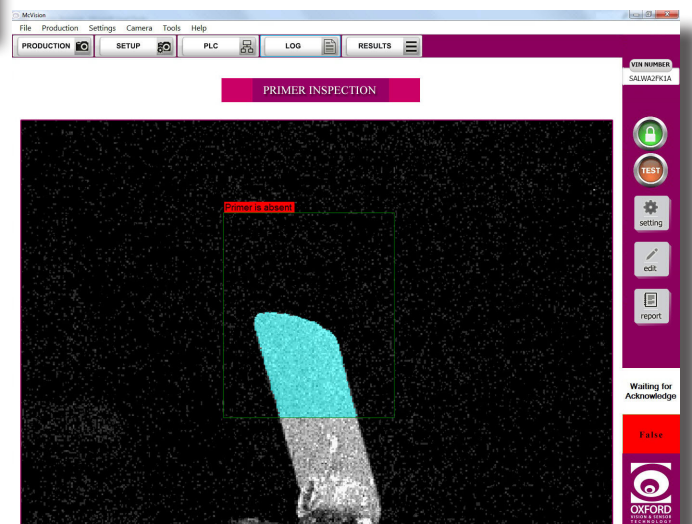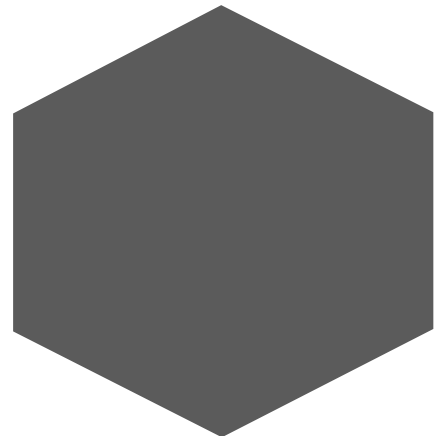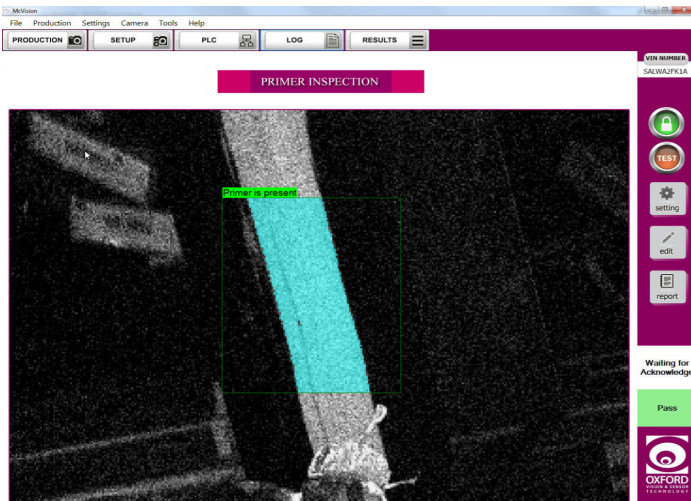
OTHER AUTOMATIVE APPLICATION:
PU BEAD INSPECTION

One particular detail of automated glass insertion requiring careful control is the start and stop of the PU application process. When the robot brings the glass around its complete path under the PU applicator and back to the start point, it is important that the overlap is carefully controlled since this also incorporates where the applicator is turned on and off.

FEATURE

- Measure the shape of bead overlap.

APPLICATION

- Inspect the bead path after applying the PU glue.
- Inspect the width, height and shape of the bead in the real world scale (mm).
- Inspect the quality of bead which is not narrow, missing or overlap.

INTERFACE
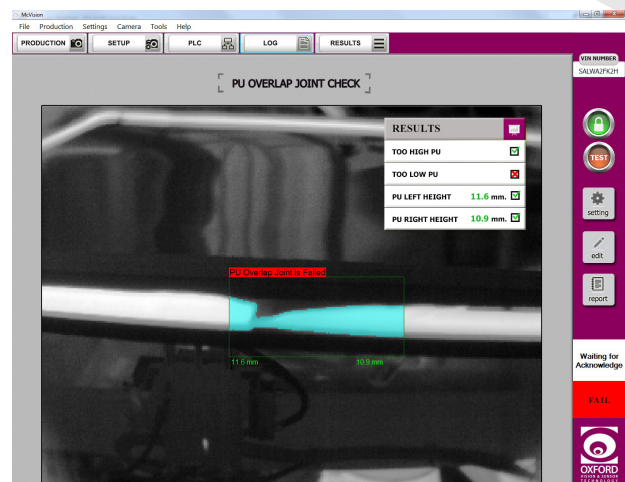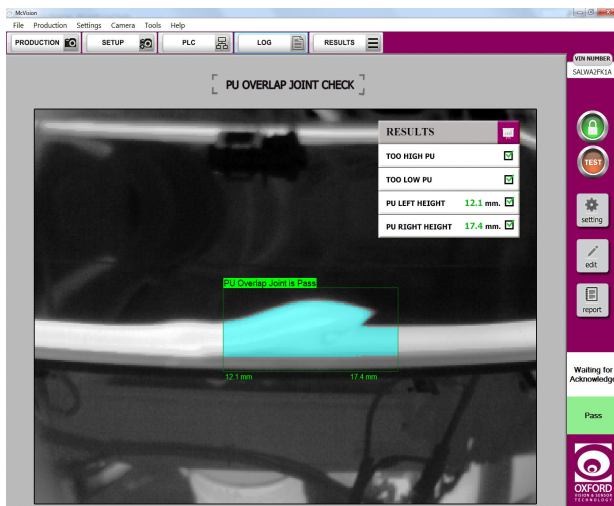
DEFECT INSPECTION WITH DEEP LEARNING

Deep learning-based software aids in the recognition of images, helping machines to distinguish trends and make intelligent predictions and decisions. When deployed as part of a factory-based automation setup, deep learning-based image analysis can combine flexible intuition with computerised speed and consistency to solve machine vision applications that are troublesome to maintain due to an ever-changing population.

OVST has been dynamic in our take-up of and development involving deep learning technology for defect inspection applications. Our paint defect inspection solution, designed for deployment in automotive paint shops, is able to spot defects that may have happened during the paint application process. Our deep-learning approach enables us to accurately distinguish between true and false defects, meaning that troublesome false fail results due to particulate matter or glare are a thing of the past.

FEATURE

- Deep-learning based continual improvement of defect classification.
- Suitable for a wide range of inspection applications outside of the automotive paint shop.
- Fully IIoT ready: Inspection trends, pass/fail rates and failure classification results are all readily available on the cloud giving you greater control over your production processes.

APPLICATION

- Car paint inspection.
- Tyre defect inspection.
- Generic surface inspection application.
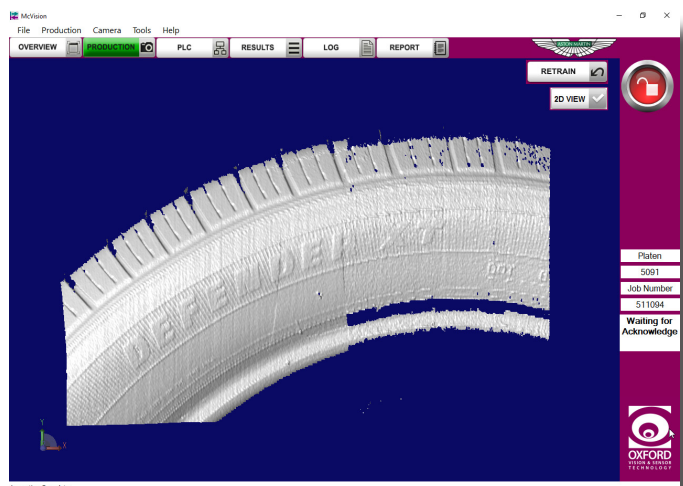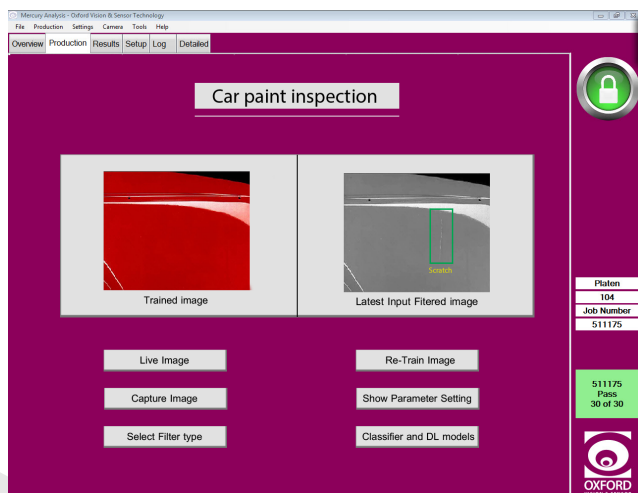
INDUSTRIAL INTERNET OF THINGS

As part of our Industry 4.0 drive, we are pushing to get all of our customers IIoT (Industrial Internet of Things) ready with the help of our partner Witly. All of our machine vision systems can be provided as IIoT ready with cloud-based automatic data collection and analysis built in.

The key benefit of IIoT

- Better informed decision making.
- Clearer picture of process repeatability.
- Predictive maintenance.

Witly Cloud - OVST partner

- **Build apps quickly and easily** - Witly provides you the intuitive drag-and-drop tool to create web and responsive mobile applications in just minutes. You can create fields to store specific information and design its layout based on user's role.
- **Analytics and report** - Provide powerful business analytics and reporting tools which enable your teams to monitor personalized Key Performance Indicators (KPIs) and access the latest reports as part of their everyday activities.
- **Level access control** - Allow information to be shared or restricted based on user role and hierarchy. You can control information access at either module, view or field level.

OXFORD VISION & SENSOR TECHNOLOGY PROFILE

Oxford Vision & Sensor Technology (OVST) develops, installs and commissions machine vision solutions for a wide range of industrial applications. Using software developed in-house, innovative sensing technologies and cutting-edge third-party hardware, we can offer you an unparalleled service.

Based in Coventry, we have our own workshop, offices as well as state-of-the -art demonstration and training facilities. From here we use our experience and commitment to quality to make sure we meet your needs with the best possible solution.

Your peace of mind is guaranteed with integration partners, distributors and our own technical staff providing the highest level of customer support worldwide. What's more, our large proven installation base means you can be confident of a robust and reliable solution.

As part of our Industry 4.0 drive we are pushing to get all of our customers IIoT (Industrial Internet of Things) ready with the help of our partner Witly. Where the Industry 4.0 ready stamp is seen within this brochure indicates a solution can be provided with IIoT functionality.

OUR CUSTOMERS

Aston Martin Gaydon, UK

"OVST Vision System has been operating reliably for over 2 years now and allows the user to customise inspection algorithm with much less effort & no special programming skill required."

Honda Ontario, Canada

"Our OVST Glazer system is very repeatable and maintains a low rejection rate. The glazing system has performed very well on multiple models and OVST has provided great customer support to our facility."

Jaguar Land Rover Solihull, UK

"OVST engineers have provided an excellent service, responding quickly to breakdowns and advising on improvements to the vision systems."

Ford Valencia, Spain

"OVST Glazer is a very stable vision system with an excellent performance. With OVST Glazer we have a monthly reject rate fewer than the competitor's daily rate. Also the OVST technicians give us a quick and great support on breakdowns."

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High quality turnkey vision systems providing exceptional value through performance reliability and longevity

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