Ascension
AUTOMATION SOLUTIONS

JUPITER

AI Vision Software

One platform.
Infinite ways to see.

OVERVIEW

Jupiter is Ascension Automation's native AI Vision software. Capable of 2D colour, 3D laser, stereovision, and near-infrared imaging, all powered by **custom deep learning models**.

We scope the sensing, meticulously build and train the models, **integrate directly** with your PLCs and robots, and deploy to the floor. It's one department, **one accountable pipeline**, all the way from the feasability study to a running cell.

CAPABILITIES

01. 2D Colour Vision

High-resolution colour imaging for surface, print, and presence inspection.

02. 3D Laser Scanning

Laser profiling for true geometry, feature location, and surface anomalies.

03. Stereovision

Passive depth from paired cameras – pose, standoff, and Z-verification.

04. Detection & Anomaly AI

Supervised detection for known defects & anomaly models for the unknown.

05. Generative Defect Synthesis

GAN-generated defect data where real reject samples are scarce.

06. Assembly Tracking

Step-by-step sequence verification, part tracking, and cycle timing.

Tested and proven across automotive, food & agriculture, plastics, and assembly.

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01. SENSING MODALITIES

Most inspection failures are sensing individual failures, not model failures. We start by **matching the modality to the defect physics**, giving the AI something to work with. Jupiter runs all four from the same software stack, routinely combined in one cell.

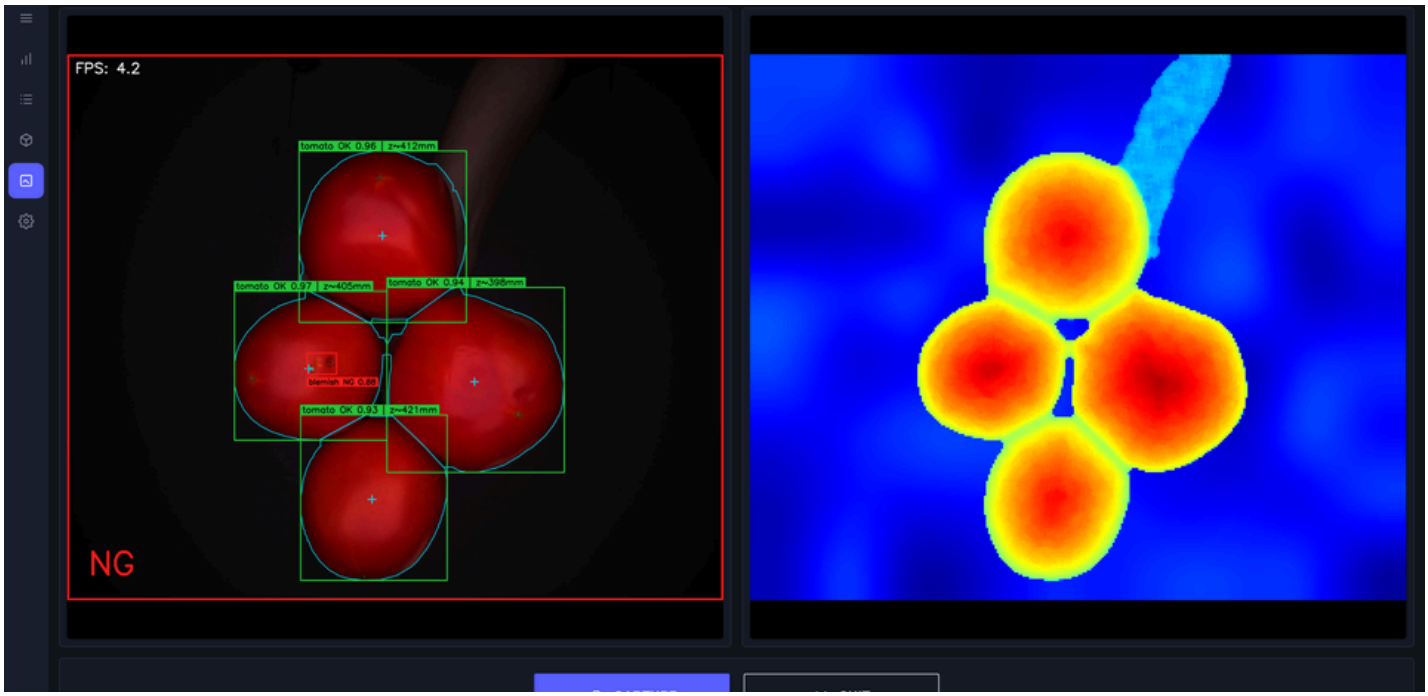
2D COLOUR VISION

`5-20 MP ● up to 75 fps`

Our **highest-volume modality**.

Colour and greyscale area-scan imaging for weld quality, surface defects, print and label verification, presence/absence, and part identification. No lasers or structured light required – controlled lighting, plus a trained model, does all the work.

`Weld quality - Burr/bubble - Label & cap - Surface finish`

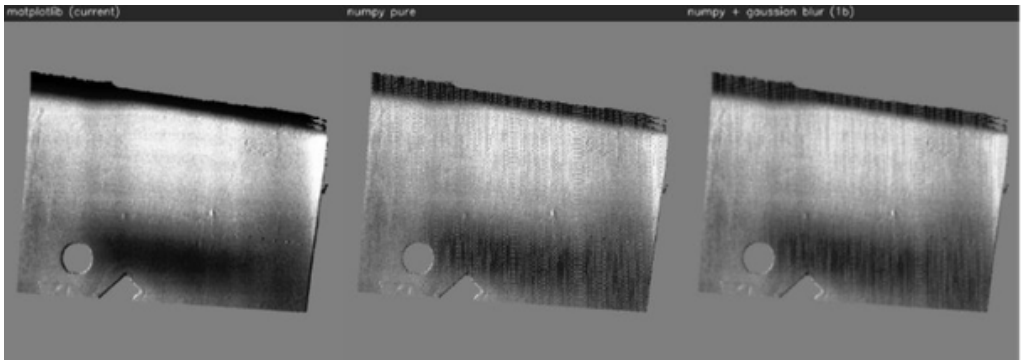


3D LASER PROFILING & SCANNING

30-650 mm range ● 405 / 660 nm

Laser line profiling builds a true height map of the part, so **inspection no longer depends on contrast**. Used for feature location on large weldments, flatness and warp, dimensional verification, and surface anomaly detction where a defect has depth but no colour signature.

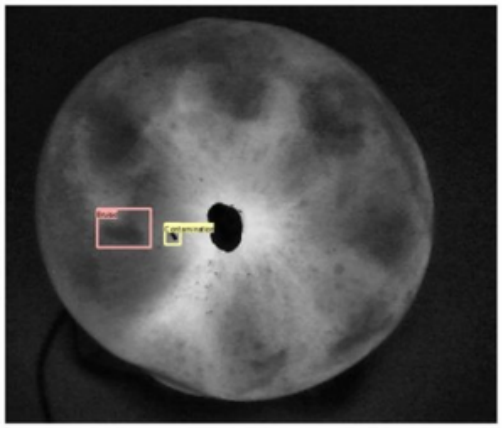
Feature location - Surface anomaly - Flatness / warp - Point cloud

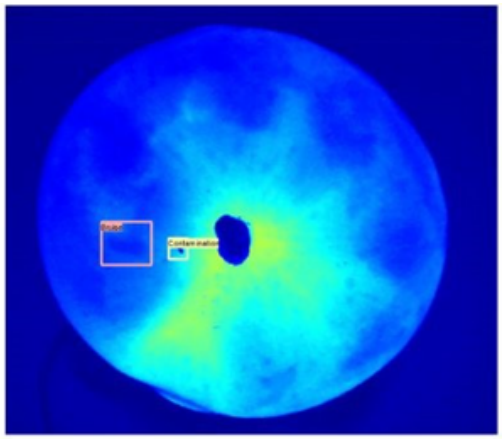


NEAR-INFRARED (NIR)

NIR **sees past the surface**. Where colour vision only reports what is visible on the skin, near-infrared reveals subsurface bruising, internal rot, moisture variation, and contamination – defects that are **invisible to an operator** and to a colour camera **until it is far too late** in the process to correct.

Surface bruise - Internal rot - Contamination - Moisture





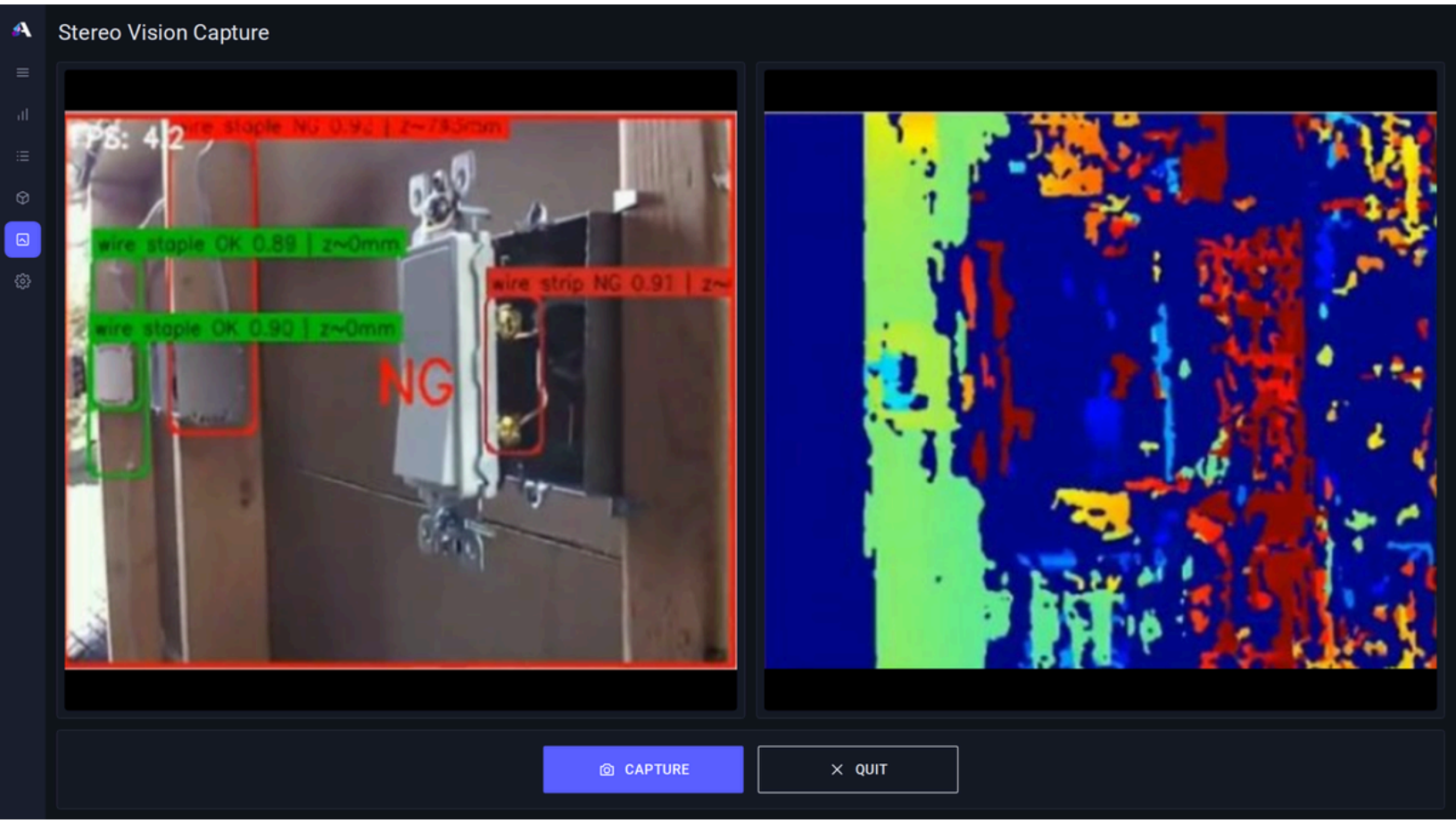
STEREOVISION

16-20.8 fps ● 60–105° FOV

Paired cameras recover depth passively – no emitter, no moving parts, and **a full colour image alongside the depth map**. Used to add a Z-check to 2D detections, confirming that a component is seated, a fastener is proud or flush, or a part is at the expected standoff **before the robot commits.**

Depth + colour - Seating check - Pose estimate - Robot guidance

JUPITER



02. THE AI STACK

Off-the-shelf Vision tools ask you to describe a defect in rules. We **train on your parts and your reject conditions** instead, allowing Jupiter to handle **the variations real production throws at it** – lighting drift, part-to-part colour, pose, occlusion, and the defect nobody wrote a rule for.

OBJECT DETECTION

DETECT - CLASSIFY - TRACK

Localise and classify every part or feature in frame, with persistent tracking IDs across the sequence. Drives sorting, counting, pick guidance, and per-feature pass/fail against your acceptance criteria.

ANOMALY DETECTION

UNSUPERVISED - ANOMALY

Trained only on good parts so it flags defects you've never catalogued. This is the right tool to use when reject types are open-ended or when you can't wait to collect labelled failures before pushing live.

DEFECT SYNTHESIS

GENERATIVE - DATA SYNTHESIS

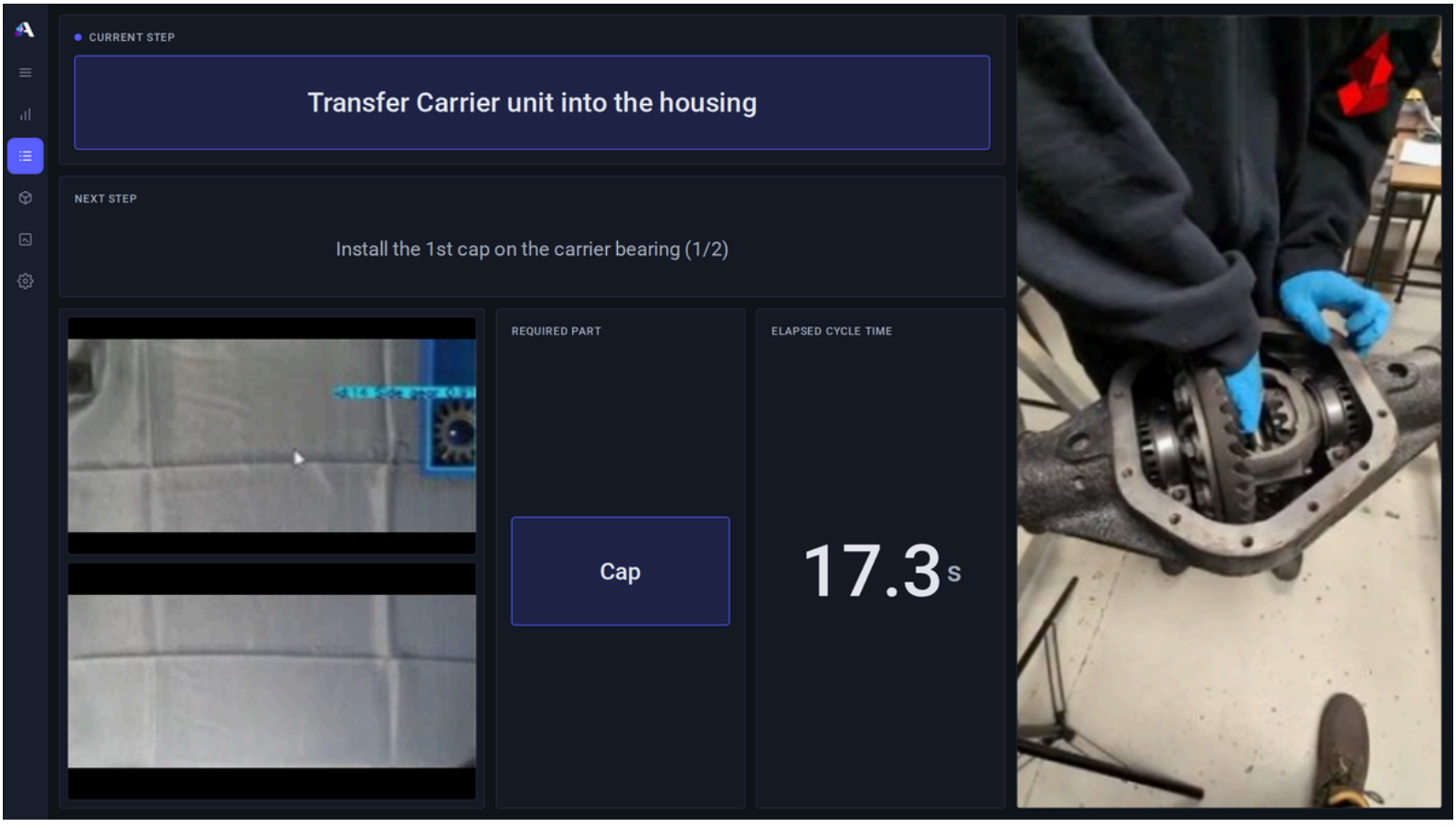
Rare defects make for unbalanced datasets and weak models. Our GAN research generates realistic, labelled defect imagery to fill the gaps – validated with FID and IS before it ever reaches a production model.

ASSEMBLY TRACKING

STATE MACHINE - CYCLE TIME

Vision watches the build and knows which step it's on. Jupiter verifies each operation in sequence, catches skipped or out-of-order steps as they occur, and logs cycle time per station for each line's own reporting.

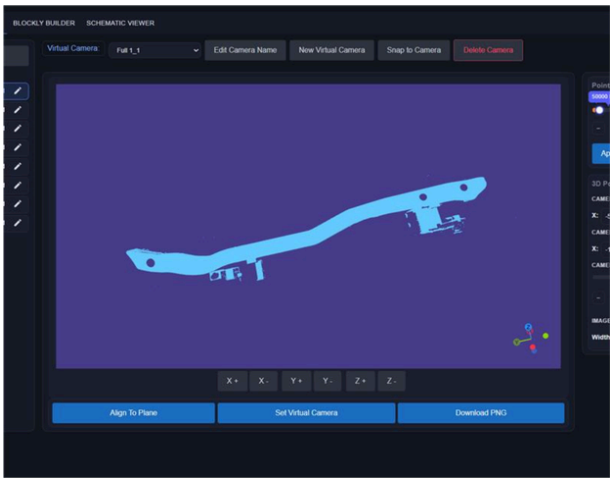
The same software also serves as a guide for the operator. Because Jupiter tracks the current step, it shows the operator the instructions for that step, and only that step, as programmed. Operators follow the same sequence every time and always know what comes next. New or cross-trained operators can be productive sooner, since the work instructions are built into the station and not left to memory or a printed sheet.

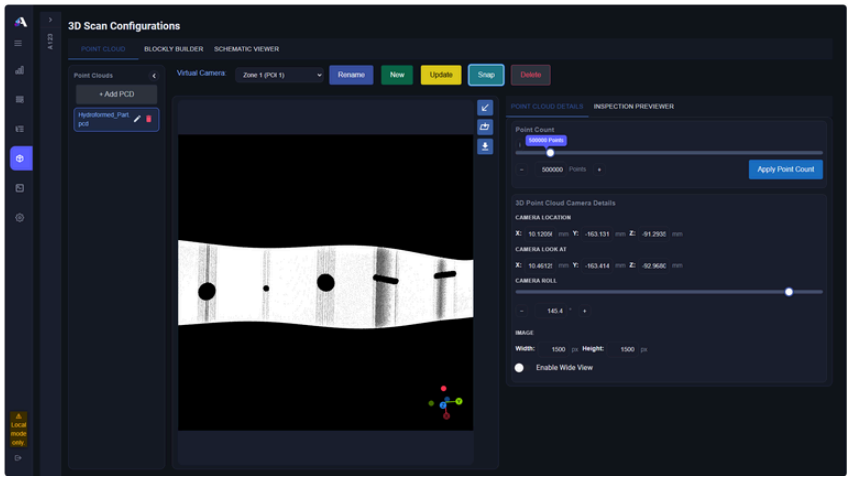


03. SELECTED CASE STUDIES

Five different **projects**, five different **problems.**

Customer names withheld.





How a project **runs.**

01. Feasibility

Sample parts imaged in our lab; modality and lighting proven.

02. Dataset

Capture, label, and balance – synthesised where samples are thin.

03. Train

Model selection and tuning against your own acceptance criteria

04. Integrate

PLC and robot interfacing, HMI, and operator workflow

05. Deploy

Commissioning on the foor, followed by monitoring and retraining.

2D COLOUR - AUTOMOTIVE - TIER-1 SUPPLIER

STUD & BEAD WELD QUALITY INSPECTION

Segmentation models grade each weld on the part and classify the defect when it fails – cracks, burn-through-overlap, porosity, spatter, undercut. Results stream directly to the PLC so the reject never reaches the next station.



ASSEMBLY TRACKING - AUTOMOTIVE, DRIVETRAIN

REAR TRUCK DIFFERENTIAL ASSEMBLY SEQUENCING

Jupiter tracks every single component – caps, spider gears, thrust washers, pin shafts – and drive as state machine through the build. The operator screen shows the current step, the next step, the required part, and live cycle time; out-of-order work is caught the moment it happens.

3D LASER - AUTOMOTIVE, FRAME & WELDMENT

FEATURE DETECTION & SURFACE ANOMALIES ON AUTOMOTIVE FRAMES

Laser profiling builds a height map of large welded frames, locating holes, slots, and brackets independent of surface contrast. It then flags surface anomalies that have depth but no colour signature. Point clouds are retained for traceability.

ASSEMBLY TRACKING - HEAT EXCHANGE MANUFACTURING

COOLER CORE PLATE ASSEMBLY SEQUENCING

Vision verifies plate count, orientation, and stacking order across a multi-step build, with a robot-tended cell and an operator HMI that confirms each step before the next is released. Every plate in the stack is checked – no sampling.

2D + NIR - FOOD & AGRICULTURE

APPLE DEFECT GRADING – EXTERNAL COLOUR, INTERNAL NIR

Two modalities on one line. Colour vision grades the exterior for blemish and shape while near-infrared exposes what colour cannot: subsurface bruising, internal rot, worm holes, and contamination. Fruit is graded on its true condition, not its appearance.

04. FULL PORTFOLIO

ALL SHIPPED PROJECTS - JUPITER AI VISION SOFTWARE

AUTOMOTIVE & METAL FABRICATION

- Stud weld defect detection **2D**
- Weld bead quality inspection **2D**
- Frame feature detection **3D**
- Frame surface anomaly detection **3D**
- Burr detection on machined parts **2D**
- Laser profiling & dimensional check **3D**

ASSEMBLY & SEQUENCING

- Rear truck differential sequencing **TRACK**
- Cooler core plate sequencing **TRACK**
- Tool inventory & check-out tracking **TRACK**
- Component seating verification **STEREO**

FOOD & AGRICULTURE

- Tomato weight estimation & packing **2D**
- Apple external defect grading **2D**
- Apple internal defect grading **NTR**
- Bottle label & cap verification **2D**

PLASTICS & MOULDING

- Injection-moulded tube defects **2D**
- Bubble & void detection **2D**

RESEARCH & DEVELOPMENT

- Generative defect synthesis (GAN) **R&D**
- Unsupervised anomaly modelling **R&D**

05. HARDWARE

2D COLOUR CAMERAS

MODEL	RES	MP	MAX FPS	SENSOR
BFS-US-51S5C	2448 x 2048	5.0	75	Sony IMX250
BFS-U3-63S4C	3072 x 2048	6.3	59.6	Sony IMX178
BFS-U3-120S6C	4096 x 3000	12.3	30	Sony IMX545
BFS-U3-200S6C	5472 x 3648	20	18	Sony IMX183
BFS-U3-200S7C	5404 x 4504	20	18	Sony IMX541

3D LASER PROFILERS – Z-TRAK2

MODEL	MAX HEIGHT MM	STANDOFF MM	OBJECT WIDTH MM	WAVELENGTH	REPEATABILITY ±MM
S2K-0100-B3	100	64.5	185	405 nm	1.00-1.50
S2K-0300-B3	300	195	508	405 nm	4.00-8.00
S2K-0300-R3	300	195	508	660 nm	4.00-8.00
S2K-0650-B3	650	558	1211	405 nm	8.00-25.00

B3 = 405 nm blue · R3 = 660 nm red. The 300 mm models are our standard.

MODEL	FPS	FOV	DIMENSIONS MM	MASS
BX-P5G-30C-XC3	16	60°	304 x 64 x 43.6	860 g
BX-P5G-30C-XC7	20.8	105°	304 x 64 x 40.7	840 g
BX-P5G-30M-XC3	16	60°	304 x 64 x 43.6	900 g
BX-P5G-30M-XC7	20.8	105°	304 x 64 x 40.7	900 g

C = colour · M = mono. GigE.

BOOK A FEASIBILITY STUDY

You provide the part & the problem.
We tell you what Vision can do.

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