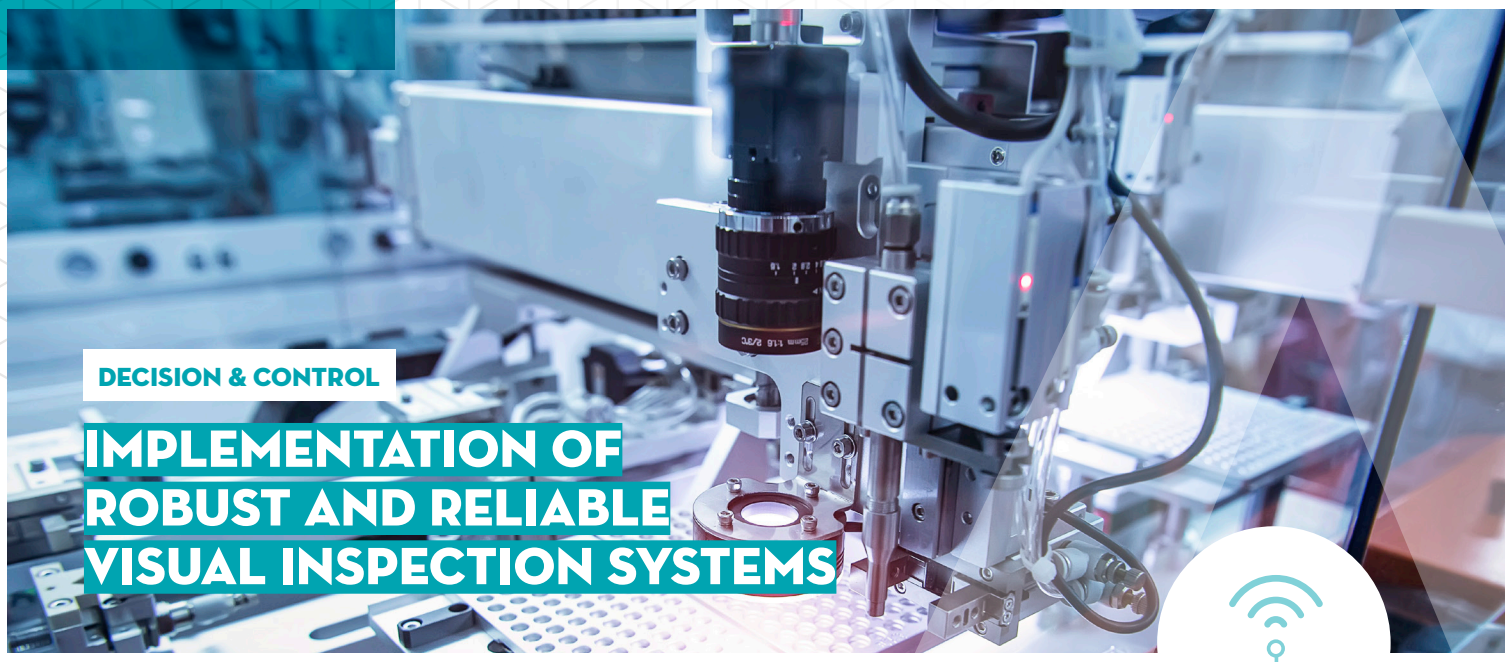


DECISION & CONTROL

IMPLEMENTATION OF ROBUST AND RELIABLE VISUAL INSPECTION SYSTEMS

Flanders Make provides the optimal HW configuration and algorithmic solutions for visual inspection systems in production environments (production line, manufacturing machines, assembly workstation, etc.). We offer robust and easy-to-deploy computer vision algorithms that need little training data.

We provide customised solutions for visual inspection in different applications. One of our key areas is the accurate visual detection of anomalies in products with high variability, such as delamination of machined composites, crack detection in 3D printed soles, quality monitoring of medical pills, etc. We provide the optimal HW configuration and algorithmic solutions for visual in-line or end-of-line quality monitoring in production lines. The solutions are based on commercially available 1D, 2D or 3D vision sensors. Our services include:

- In-line quality monitoring in production lines:
  - Estimation and verification of product features (dimensions, profiles, etc.) for stationary and moving objects, even with high motion speeds (up to 100m/s).
  - Accurate visual detection of surface quality anomalies, including low-contrast and tiny defects that are difficult to detect with the naked eye. The solution that we propose only requires a small amount of model images (typically a few good images per anomaly) and leverages on the creation of accurate photorealistic synthetic data. This solution can be implemented in flexible production lines that contain multiple products.
  - Inspection of anomalies within the immediate surroundings of a production system (e.g. mist detection example described below).
- Embedded machine vision for low-cost (starting at ~100€),high-speed monitoring applications (up to 20 kHz).
- 3D scanning for metrology and CAD-based optimisation (e.g. optimal fitting and stitching to highlight precise deviations in geometrical and surface features) using a Flanders Make optimisation framework that allows productivity improvements while ensuring the same accuracy as provided by commercial systems.

We can build vision solutions without proprietary code and offer the full source code of your solution.

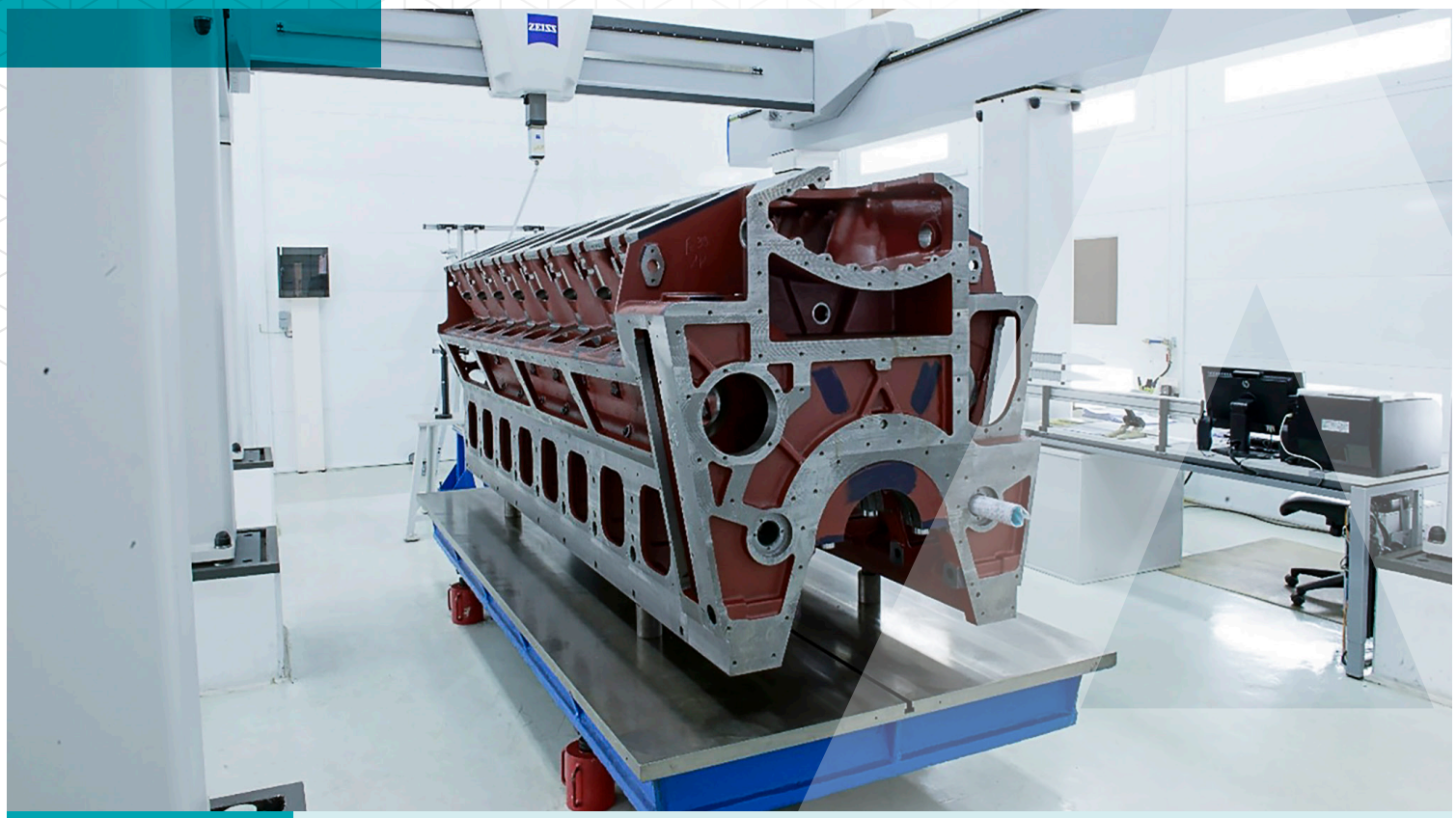
We have developed various unique software tools for these applications:

- Low-cost 1D vision system design toolbox
- 1D/2D visual anomaly detection software
- 3D point cloud reconstruction software

www.flandersmake.be

For more information, please contact
services@flandersmake.be

FLANDERS MAKE



SUCCESS STORY

The Anglo Belgian Corporation (ABC) uses a Flanders Make toolbox for automatic mist detection during endurance testing of combustion engines.

PROBLEM

During tests of big diesel engines (typically used in ships and energy plants), leakage may occur in any of the pipes. Due to the complex piping structures and the large surface in which such leak may occur, it is not economically feasible to use classical pressure sensors. A leak, especially when it consists of fuel and/or oil, can lead to dangerous situations.

SOLUTION

We developed the "Robust vision-based anomaly monitoring and detection toolbox". This toolbox works with online visual image streams. It autonomously trains a background model during a calibration period. Afterwards, this model is used for anomaly detection based on a comparison of intelligently grouped pixel deviations. To compensate for variabilities in the ambient and background conditions, an image processing drift compensation is provided for by retraining the model online (auto-calibration). The toolbox is robust against changes within the scene (that are not related to leak anomalies).

CUSTOMER VALUE

The Anglo Belgian Corporation (ABC) uses the toolbox for automatic mist detection during prototype endurance testing of combustion engines at their production plant in Ghent. This vision-based monitoring system runs continuously and sends a warning signal to the safety system of ABC.
By using this solution, ABC can reduce operator effort during testing. Before this technology uptake, an operator had to be present during the tests. Now, the tests can continue with less supervision. The operator only needs a few visits to the test lab and is connected to the safety warning system.