

Technische Rundschau

10/2021 · 15 October 2021

UNOFFICIAL ENGLISH TRANSLATION

The original article was published in German in Technische Rundschau, a trade magazine published in Switzerland. Prepared for CRETEC. The German original remains the reference.



Detection from three and a half metres above

German-language article in a Swiss trade magazine. The clipping includes a second CRETEC product item, which is also translated. Captured viewer controls and the adjacent advertisement remain unchanged. Original publisher artwork, logos and advertisements are retained in their original language.

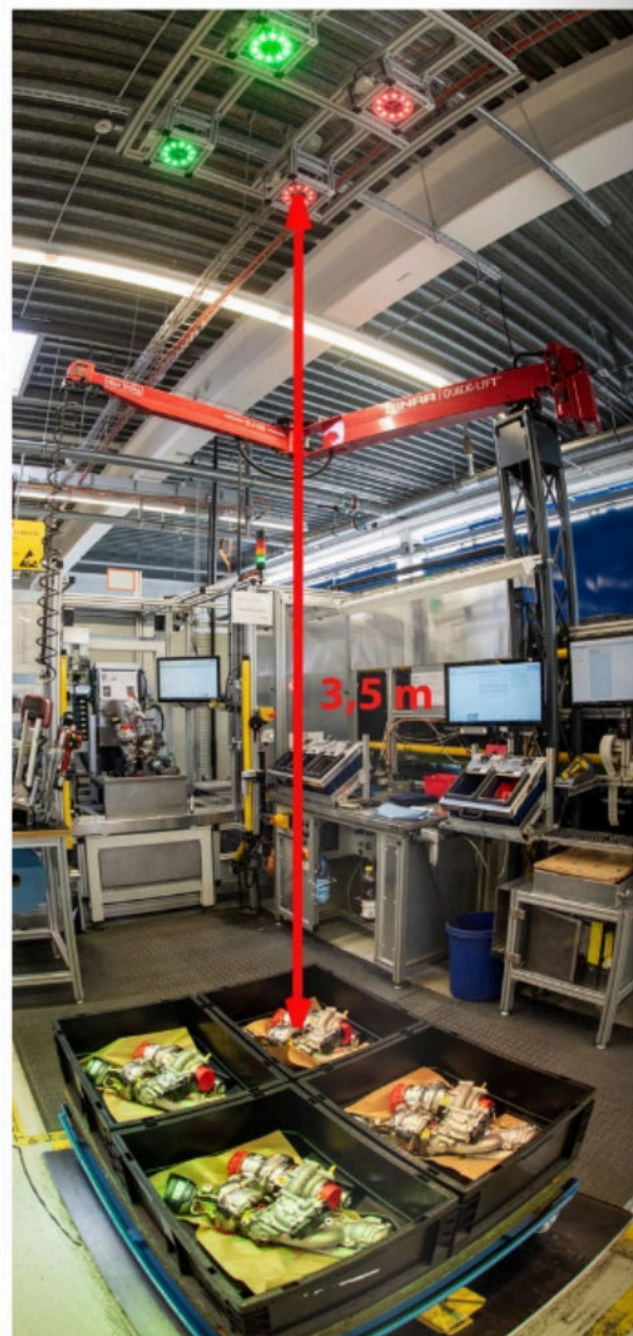
Detection from three and a half metres above

A uniform hardware and software basis for vision applications, integrated scalably into global corporate communication, brings wide-ranging benefits in efficiency, operational reliability, economy and sustainability. Cretec's vision philosophy, integrated into the customer's PC-based automation system, unlocks new capabilities.

At a major automotive supplier in Germany, Cretec GmbH from Büdingen fully integrated HALCON vision software as a standard into its PC-based automation platform. This decisively increases flexibility in assembly production with respect to quality and cycle rates, through to shipping. Applications and parameter changes can be checked and modified centrally at any time, independently of the current settings. If higher quality requires a higher-resolution camera or a colour camera, the update can be implemented very quickly. The automotive supplier can scale this independently, without an integrator.

Previously, a smart camera read 2D codes on a rotating component and output the rotational position. Markings were partly labels and partly laser-marked. Even when the scanner system could read a code, the

Despite a distance of 3.5 m, the vision application detects the finest details of twelve features. In addition to the monitor, a red-lit box alerts the worker to a fault. Images: Kamillo Weiss, Cretec.



downstream operation repeatedly failed to do so. This first project by the Büdingen vision specialists reduced the former reading/cycle time from eight seconds to a minimum of 21 milliseconds. A camera mounted directly on the dome controls the dome lighting, with optimised uniform light for code and plain-text reading. In addition to reducing the cycle time, Cretec's combination of dome and dark-field lighting in one product, controlled directly by the GigE camera, ensured significantly better reading performance. The customer receives products from various suppliers marked using different lasers. The former smart camera could read only one supplier's DataMatrix codes. Cretec's system now reads every supplier's codes in a fraction of the previous cycle time.

The compact VisionCube mount was integrated into the station. A high-resolution camera is connected directly to the station computer via Gigabit Ethernet and sends data to the customer's system. The vision kernel is based on the proven, finely detecting HALCON Steady software. With this optimised lighting, code quality can be analysed with extreme reliability, assigned to the appropriate quality grades, stored as results and integrated into internal and external corporate communication. Data validation and verification comply with common international standards for 1D codes (ISO 15416) and 2D codes (ISO 15415, ISO 29158, AIM/DPM). DataMatrix-code data, verification classification and plain text are stored in the customer's system. To the customer's delight, the solution has run reliably in weekly

three-shift operation for more than three years without problems.

This was the start of further solutions for sometimes very demanding PC-based complete vision applications across an entire assembly line. The customer's team, including Frank Sperling and Steffen Müller, worked with Cretec's technicians to establish and develop a standard. Applications can now be implemented quickly, efficiently and reliably by the customer's own personnel without an integrator. Sperling, the customer's machine-vision specialist, notably stated that the total investment associated with the new applications was only about half that of the former individual solutions using smart cameras. Stability at all these assembly stations and throughput were also significantly improved.

Automotive customers are interested only in absolutely defect-free, reliable products. Complete turbocharger assemblies are placed in boxes with shaped plastic trays for shipping and remain protected there until they reach the end customer. Four boxes form a layer, and three layers fit on a shipping pallet. New handling was intended to support automation. In theory, plugs might not be installed or connector housings might be damaged, requiring complete documentation. The packed turbochargers have a height difference of about 1 m between the first and third layers. The vision application had to cope automatically with this changing



**IHRE UNTERSTÜTZUNG
BEI DER EXPANSION**

**SWITZERLAND
GLOBAL
ENTERPRISE**
enabling new business

Global vernetzt, lokal verankert:
Wir helfen Ihnen, in Ihrem Wunsch-Absatzmarkt die richtigen Leute zu treffen, damit Sie Ihr globales Projekt erfolgreich umsetzen können.

Buchen Sie eine unverbindliche Erstberatung
und erfahren Sie, wie Sie Ihr Exportvorhaben erfolgreich in die Tat umsetzen können:
s-ge.com/mem-02

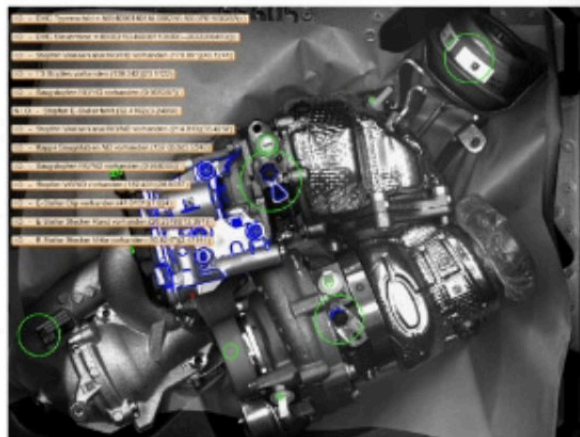


Three of the twelve features stand out: a 3 mm-wide plastic web, the nameplate and the approximately 5 mm × 5 mm DataMatrix code.

distance while inspecting a range of features. Technological experience was needed to fulfil these complex requirements smoothly. Other vision integrators had no solution, but Cretec delivered an impressive, reliably functioning system. The application was extended repeatedly with new features that could not have been imagined at the project's outset. It has been running since January 2021 and saved several times its investment cost within just six months.

The vision system had to be outside the handling and crane area, requiring a minimum height of 3.5 m. A high-performance industrial PC and complete integration into the customer's software environment solved the task. Four LED ring-lighting modules with integrated cameras were installed below the factory ceiling, each centrally above a box position. The camera directly synchronises control of the high-performance strobe lighting. This also excludes daylight interference and overlapping illumination. Four 20 MP zoom cameras with autofocus lenses reliably detect whether a small plastic web only 3 mm thick is intact and complete, from up to 3.5 m away. The small DataMatrix code (5 mm × 5 mm) and the nameplate with customer data are also read with absolute reliability. The code guarantees rapidly implemented 100% traceability. The twelve features include the presence and correct positioning of the plugs.

Colour evaluation can be added very quickly with only a little software or configuration work; the hardware can remain unchanged. With the 20 MP monochrome camera and sequential



Up to twelve features are inspected during final inspection in the packaged state. All data and images are documented.

switching of the red, green and blue lighting channels, images can be combined into an RGB image without a Bayer filter, with correspondingly greater image information. Differently coloured plugs and other features can thus be detected reliably. Its physical resolution corresponds to that of a comparable 60 MP colour camera.

If a feature of a complete turbocharger in its packed tray is faulty, it is immediately marked red and displayed as a circle on the monitor image. At the same time, the boxes appear illuminated in green or red, so the worker sees a fault indication without the monitor. Data and images from every box are stored. The automotive supplier thus guarantees that each turbocharger assembly is defect-free when sent to the customer in its precisely packed tray. In the event of a complaint, a six-step plan allows all values and images collected at the assembly and quality stations to be supplied to the customer within 24 hours.

Since commissioning, the system has run continuously without problems at 15 pallets per shift, three shifts per day and seven days per week, including additional shifts. The question of the payback period for this quality-assurance inspection station produced an impressive result after only a short time. A complaint about a delivery of 24 supposedly faulty assemblies was rejected thanks to

CRETEC GmbH
DE-63654 Büdingen
+49 6042 565 2595 10
mail@cretec.gmbh

complete traceability proving defect-free components and images documenting correct packaging. It is easy to see that this alone amortised the final-inspection and packaging system's cost. The automotive supplier's image among customers is also enhanced by the 100% quality of its products. (jvo)

Packed with machine-vision flexibility

Cretec's modular QBIC system is the result of consistent synergies between networked, scalable, complete vision solutions for complex automation, quality assurance and traceability. Users achieve a chain of clear benefits across the



entire value chain.

According to the manufacturer, the consistently mobile platform design with modular hardware and software ensures high flexibility in complete system solutions and significantly shortens project development and installation.

Versatile QBIC modules with broad capabilities are connected directly into an autonomous system through control, data analysis and communication.

A QBIC module requires a footprint of only 0.8 m × 0.8 m and has a maximum height of 2 m. Integrated retractable wheels allow it to pass quickly through normal office doorways and connect to other QBIC units. The FlexiBowl feeder, for example, reliably recognises and handles sensitive parts measuring 1 to 250 mm and weighing 1 to 250 g.

Complete QBIC solutions cover a broad range of applications: pick-and-place, registration and classification tasks, ID codes, inspection, 2D and 3D measurement, surface inspection, decision-making and sorting processes.

CRETEC GmbH · Industriestrasse 35 · DE-63654 Büdingen
+49 6042 565 25 95-10 · mail@cretec.gmbh
www.cretec-cybernetics.com