

# TrueView™

VISION GUIDED ROBOTIC SYSTEMS

Fully Engineered. Proven.



Vision Guidance Software  
by Braintech

PROVIDING SOLUTIONS, CHANGING INDUSTRY



## RIGID PARTS HANDLING

### GENERAL INFORMATION:

Major automotive powertrain plants in U.S. and Canada are now benefiting from professionally installed high performance ABB TrueView Systems. Below are some examples of operations where TrueView has eliminated the need for part fixturing and precision dunnage:

- Engine head 3D location in dunnage, transfer and decking onto engine blocks
- Intake manifold 3D location in dunnage, transfer and decking onto engine blocks
- Axle knuckle identification, 3D location and transfer from non-precision dunnage
- Transmission bell housing 3D location and transfer from wire basket
- Rough casting 3D location and transfer from hanging conveyor into de-gating machine
- Empty dunnage bin 3D location and robotic de-stacking

### APPLICATION SPOTLIGHT: Engine Head Decking

#### BACKGROUND & CHALLENGES:

A major automaker assembles V8/V10 engine heads onto V configuration engine blocks. "Engine Head Decking", must be performed with a high degree of precision and 'no-touch' zones must be kept free of contamination. Until now it has not been feasible to automate this process using robots due to lack of knowledge of changes in part position from ideal. Fixtures, positioners, and precision dunnage have been used in the past to 'present' parts to the robot in the same location however, these are custom, complicated and expensive. Past attempts with 2D vision systems to guide the robot have also failed due to tilting of parts in 3D space. The only practical alternative therefore has been manual removal and decking. The manual operation poses serious issues including high rate of ergonomic injury, contamination and damage to parts and high capital and maintenance costs due to need for human assist devices and floor pits.

A truly flexible, fixture-less system was therefore needed to perform the head decking operation. The engine heads arrive at the head decking station inside 4'X4'X1' semi-constrained dunnages. The 3D position and orientation of each part in the dunnage is unknown and can vary by as much as  $\pm 30\text{mm}$  in x, y and z as well as by up to  $\pm 10$  degrees in tilt angles. Each head must be intercepted using a four-pronged robotic end-effector, grasped and transported to the location of the engine block and accurately placed over the corresponding mating surface. The mating has to take place with an accuracy and repeatability of  $\pm 0.20\text{mm}$ .

#### THE TrueView SOLUTION:

A single compact video camera is housed in an enclosure and integrated into the robotic end-effector. Specialized high durability lighting units are also provided to properly illuminate the scene of interest. Before each pick-and-place cycle, the robot positions the camera over the bin containing the engine heads. The vision guidance system captures a single image and performs its analysis. The end result is the complete 3D position (x, y, z) and orientation (roll, pitch and yaw angles) of the part.

The 3D position data for each part is transmitted to the ABB robot controller via Ethernet. The robot controller uses the information to adjust its entire path including approach and grasp points to match the location of the given engine head. The robot then proceeds to intercept and grasp the part out of the bin and transfer and position it on the engine block with a high degree of precision. In extreme cases when the part is heavily tilted to one side, the vision guidance system can perform two measurements (coarse then fine) to achieve higher accuracy and reliability. This decision is made automatically by the vision guidance software running under the eVisionFactory™ software platform.

LOCATE, INSPECT, HANDLE, TRANSFER, ASSEMBLE... & PROFIT.



INNOVATIVE SOLUTIONS  
FOR COMPLEX APPLICATIONS

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### THE BENEFITS OF VISION GUIDED ROBOTICS (VGR):

**VGR handles variations intelligently and in real time (e.g., part position, type, style, quality) which makes it now possible to:**

- use robots without investment in custom tooling, fixturing or other precision positioning devices
- run multiple models and part styles in a single manufacturing line without the need to re-tool

**VGR increases quality by:**

- preventing damage and contamination to parts caused by manual handling
- detecting defects through inline visual inspection of every part
- significantly reducing process variability

**VGR reduces capital, operational and maintenance costs by:**

- labor reallocation to more human productive tasks and elimination of ergonomic issues
- elimination of precision fixtures, dunnages and other custom positioning devices
- increasing equipment utilization (same robot is used to process multiple part styles without added investment)

### WHY TrueView IS THE SUPERIOR CHOICE FOR VGR:

**TrueView is professional grade...**

- built on the eVisionFactory software platform specially designed for VGR
- professionally designed and rigorously tested hardware
- seamless integration, data communication and error handling
- fully tested, engineered, Proven!

**TrueView is flexible and scalable...**

- eVisionFactory solution environment provides unprecedented flexibility & configurability to meet an application's unique and changing needs
- eVisionFactory's common intuitive user interface and operation makes technical training transferable from one solution to the next
- eVisionFactory ensures commonality across installations and across guidance technology types (2D, 2.5D, 3D, single and multi camera)
- features true Single Camera 3D capability (patented SC3D™ technology)
- Autocal3D™ feature automatically performs camera-robot calibration in under 5 minutes (traditional manual vision system calibration can take upwards of 5 hours and requires expert technicians)
- AutoTrain™ feature eliminates the need for part CAD models or manual measurement
- is COTS (complete-off-the-shelf) compliant; this reduces initial cost and complexity while increasing reliability and maintainability

**TrueView is professionally supported...**

- ABB global support by trained VGR technicians
- eVF™ integrated real-time remote support increases system uptime significantly

TrueView INTEGRATED VGR TECHNOLOGY...ONLY FROM ABB



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ROBOT AUTOMATION SALES

248.391.9000