# Path Following with Part Tracking

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Vision Guided Motion systems combine machine vision with precision motion control. Motion of the tool and work pieces is controlled based on the position data generated by the vision system.

The **Path Following with Part Tracking system** developed by ORMEC uses a smart camera to locate and recognize the shape of a parts in 2D space. The camera application software calculates differences in geometry relative to a 'golden part'. Data from the camera is sent to an SMLC motion controller. The tool mounted on the XYΘ gantry downstream of the camera follows the modified path while tracking the moving part.

**Applications**: dispensing, cutting, material removal, contouring, insertion, parts assembly and transfer

**Industries:** garment, wood processing, automotive, pharmaceutical, semiconductor, packaging

## Benefits of an ORMEC Solution

Automating with vision guided motion provides:

- Increased production rates when conveyor and tool feed rates are increased.

- Increased quality with reduced rejects.

  - Elimination of the human error associated with hand/eye processing and slower feed rates needed to manually make adjustments.

  - Uniform and more accurate path following as the work pieces are processed

- Decreased costs when a manual labor step is eliminated.

## Application

An XYΘ gantry is mounted above a conveyor and tool orientation is controlled by rotary servos mounted above the conveyor. An up-stream smart camera executes a single vision inspection of the part as it enters the field of view. A pattern recognition algorithm in the
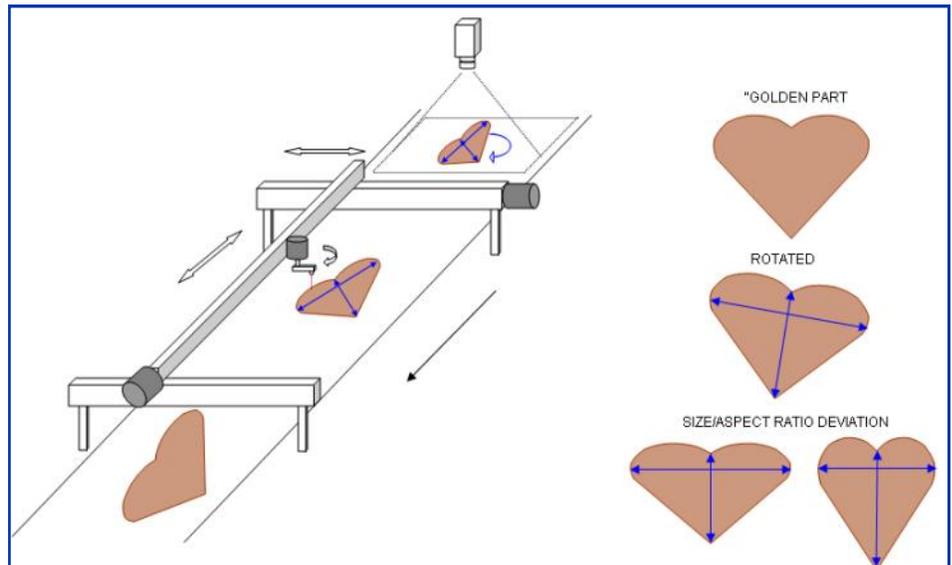


camera compares the image to a 'golden part' (previously trained) and calculates deviation in size and scale as well as the part location and orientation on the conveyor.

The vision data is automatically converted to real world position units with built-in coordinate transformation software in the camera. The vision data is sent to the motion controller which uses it to modify the 'golden' path trajectory to match the inspected part. Communication between SMLC controller and camera is over

Modbus TCP (other options available). When the inspected part reaches the gantry work envelope, the tool begins path following motion at a specific feed rate while tracking the moving part. The System will handle multiple parts (queue) between vision inspection and tool areas. This allows the camera and tool mechanism to be installed at any distance from each other. System is programmed to detect and reject parts based on various defects in size and scale differences, chips, deformations, etc.

## Integrated System

### ORMEC Control Hardware
- SMLC multi-axis motion controller
- ServoWire drives

### Software
- CoDeSys
- ServoWire Pro

### Communication Interfaces
- Modbus TCP
- Ethernet IP, Profibus, RS-232 (also available)

### Vision system  or Smart camera
- Cognex  Insight smart camera
- DVT, Keyence or other brands may be used
- Vision application specific software tools.
  - Edge detection, measurements, color discrimination
- Controlled light source (application specific)

### Key points
- Parts can be loaded in random location and orientation. The system will automatically compensate.
- Vision system needs to be trained for a 'golden part' .
- Motion control system needs to be taught a motion path for a 'golden part'.
- Controlled lighting allows camera to handle broad spectrum of part colors or part-to-background contrast.
- System can be expanded to control elevation of tool with an additional Z-axis.

## System configuration
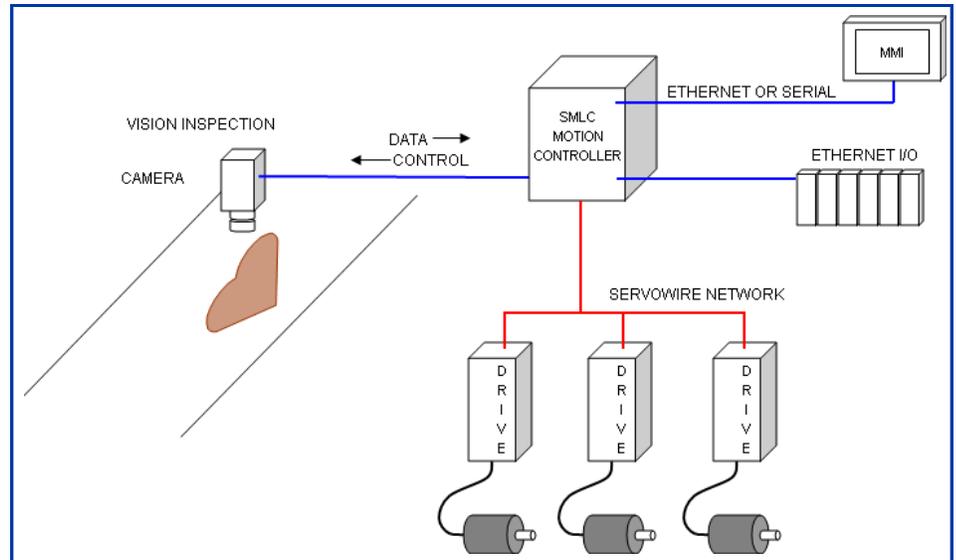




### SMLC multi-axis controller

The SMLC is a powerful and robust a complete machine control solution that combines a motion controller with high performance PLC capability.

This motion controller is programmed using open standard IEC61131-3 CoDeSys Software.

### HMI touchscreens

Cost effective flat panel  touch screens are available in a variety of sizes and functionality. This gives operators an effective means to control machine operation including  status conditions and alarms.



### ServoWire SD Drives

ServoWire SD drives provide high-performance servo operation using digital networking technology based on IEEE-1394b (FireWire). This drive supports a variety of high performance servo motors.

### Expertise
At ORMEC we are experts in motion control solutions and have  a wealth of experience  in a wide variety of industries.  As your automation partner, we offer a comprehensive range of automation integration services.

For  more information on Path Following  with edge tracking and other Motion Guided Vision applications  please contact us by phone (585) 385-3520 or email us at sales@ormec.com