

Freeform Edge Tracking

Sam Rubin, Sr. Systems Engineer

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

The **Freeform Edge Tracking with Part Tracking system** developed by ORMEC uses a smart camera to locate a complex curvature edge of moving parts in 2D space and streams the position and orientation to an SMLC motion controller. A tool downstream will accurately track position and slope of the edge of the part as it moves.

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

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

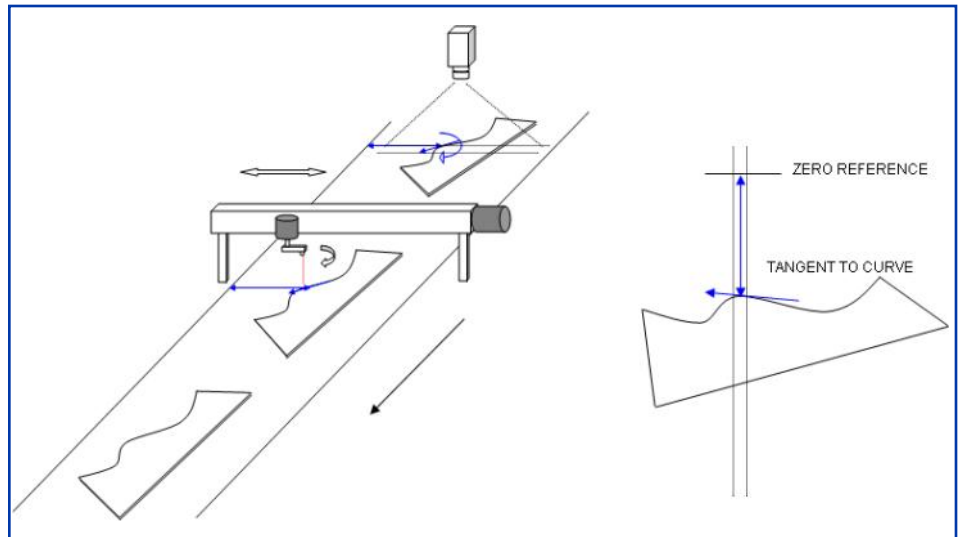
Benefits of an ORMEC Solution

Automated 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

The system consist of a linear slide mounted perpendicular to and above the conveying system. Tool orientation is controlled by a rotary servo mounted on the slide. The smart camera upstream runs free-running inspections of the narrow sections of the parts edge and



measures its position and angle. The vision data is automatically converted to real world position units with built-in coordinate transformation software in the camera. The tool will track the edge while maintaining the desired angle of the edge tangent. When the part is finished the tool returns to a parked position.

Communication between the SMLC motion controller and the camera is over Modbus TCP (other options available). The system will handle multiple parts (queue) between the vision section and the tools area. The camera and tool mechanism can be installed at any distance from

each other. The motion controller calculates the run-in and run-out trajectory based upon the slope of the leading and trailing sections of the edge.

This guarantees a very smooth, 'bumpless' tool motion in and out of the part's edge. The system is programmed to detect and reject parts based on various edge defects such as chips, deformations, missing sections, 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)

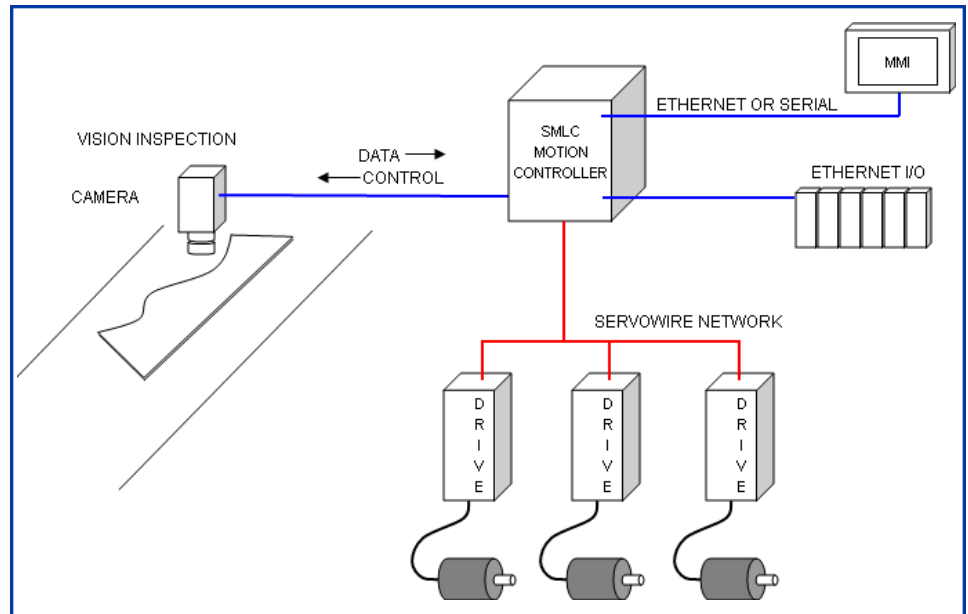
Vision system or Smart camera

- 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 for this.
- Vision system does not need to be trained 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 part tracking and other Vision Guided Motion applications, please contact us by phone (585) 385-3520 or email us at sales@ormec.com