



CASE STUDY

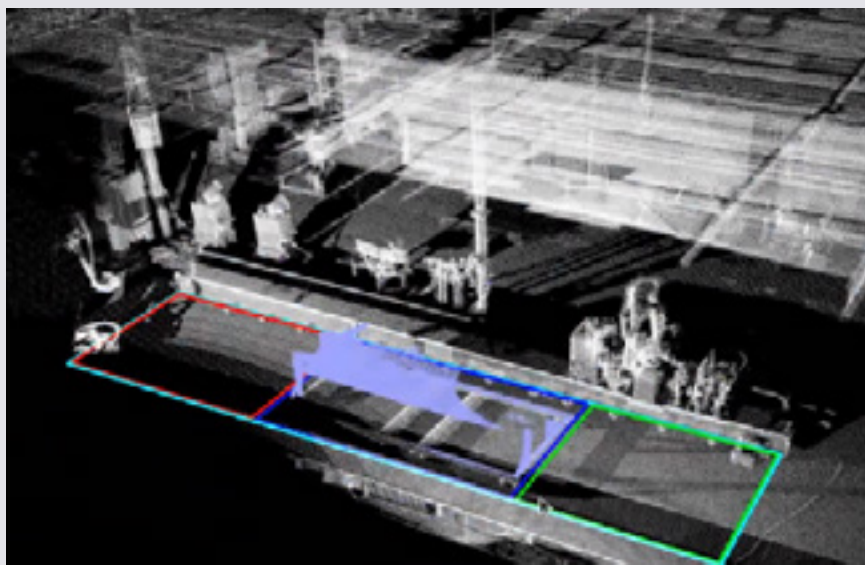
Scan, Find, Paint: A vision into the future of automation using LiDAR for part detection

OVERVIEW

One of the world's largest aerospace manufacturers partnered with Aerobotix to develop a cutting-edge robotic paint system for their newest series of jetliners. Looking towards the future, this manufacturer requested a more dynamic robotic painting solution which traditional robotic methods could not achieve. Some traditional methods rely upon pinned positioning and common tooling for repeatable manufacturing. In this case, pinned positioning was not an option but with common tooling. Aerobotix developed an advanced vision solution leveraging an external LiDAR system. Using a predefined relationship between the vision system and the robot reference frame, the system then recognizes the relationship of the loaded parts to the robot.

To develop an automated part detection system featuring non-contact, non-robotic motion that detects and finds multiple aircraft components within a hazardous rated C1D1 rated paint booth to $\pm 0.50''$ accuracy with zero operator input.

CHALLENGE

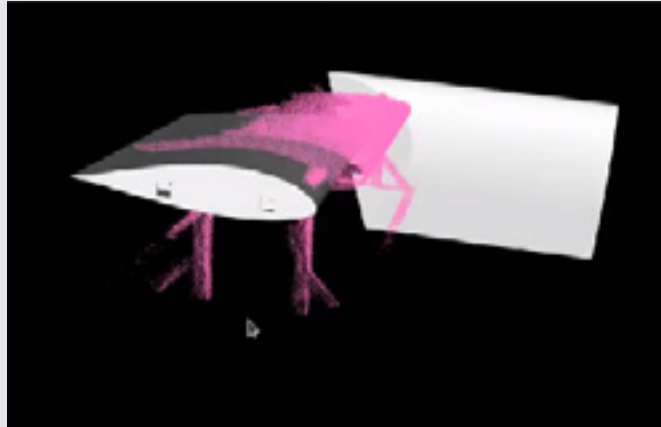


Three zones and a single aircraft wing are identified after the LiDAR scanners perform a sweep of the room during the part segmentation process.

Automated Part Location and Verification System (APLV)

SOLUTION

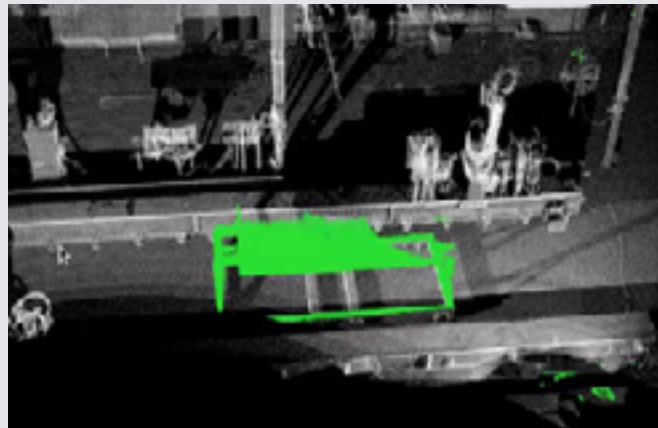
The APLV system consists of two commercial off-the-shelf LiDAR scanners, positioned outside the booth with retractable shutters. When the shutters open, the scanners capture a point cloud of the booth and the loaded parts. Using 3D models provided by the customer, the APLV recognizes the part by comparing the 3D model to the returned point cloud. Next, the vision system translates the part's positional data from the 3D reference frame to the robot reference frame. This automatically updates the robotic paint paths for the new position of each part.



A 3D model of the aircraft wing and its point cloud counterpart align for part verification.

Aerobotix developed a one-touch solution for updating robot paths in a flexible and dynamic work environment. Using the models from the customer, we pushed the boundaries of what is possible with part positioning and reference frame correlation.

RESULT



The aircraft wing is located and verified. The green indicates a successful part location and verification.

CONTACT

To learn more about this process, contact us at info@aerobotix.net. You can visit our website at www.aerobotix.net.

ABOUT

Headquartered in Huntsville, Alabama, Aerobotix specializes in the creation of cutting-edge automated robotic solutions for high-value, high-precision components, aircraft, and vehicles. We have more than 130 robotic systems installed in the U.S. and abroad, providing exceptional results and savings for our clients.