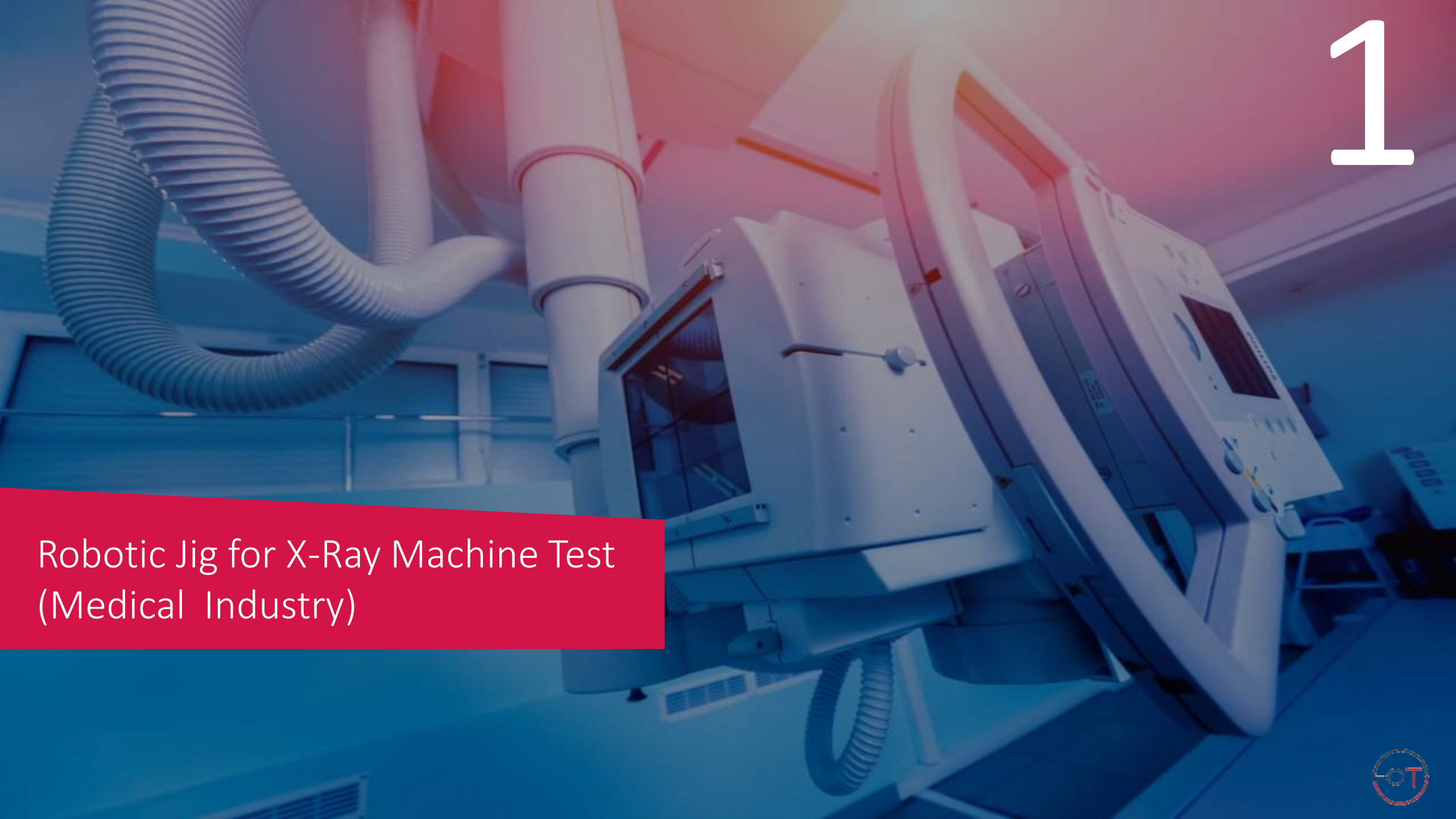

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Robotic Jig for X-Ray Machine Test (Medical Industry)

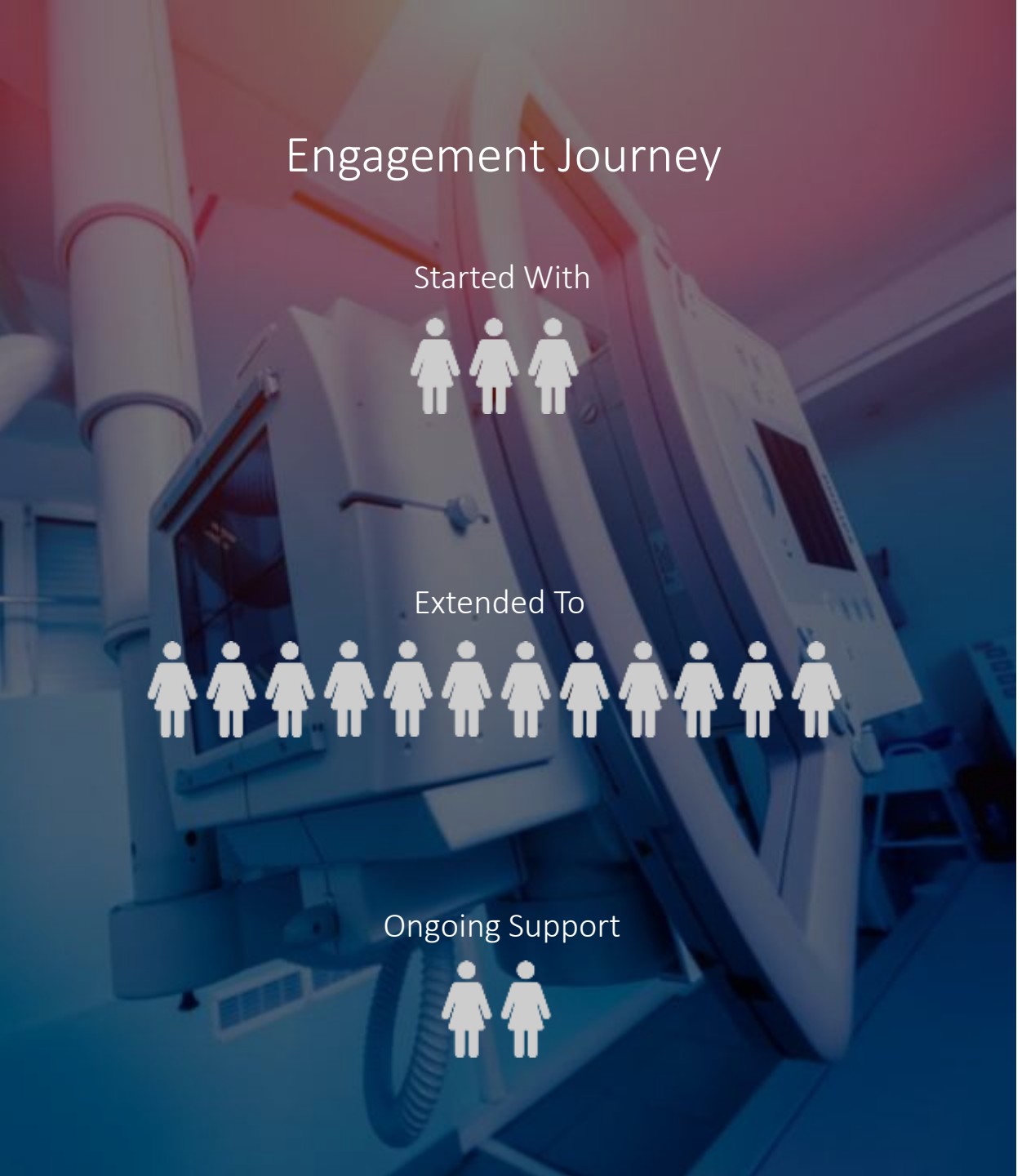
Client Background

The Client is a Medical Machine manufacturer, with operations all over the World. The client offers complete one stop solution for X-ray.

A solution for automating the testing of X-ray machines involves a high-speed robotic jig equipped with sensors. This specially designed jig can test all variants of X-ray machines in one comprehensive package, significantly increasing the testing speed.

Challenge

The challenge was to build a system that test X-ray machine with good speed and less human interference(Test engineer need to go in test cell very less times). Also, the system must operate in reliable and safe manner after the good speed execution.



Solution

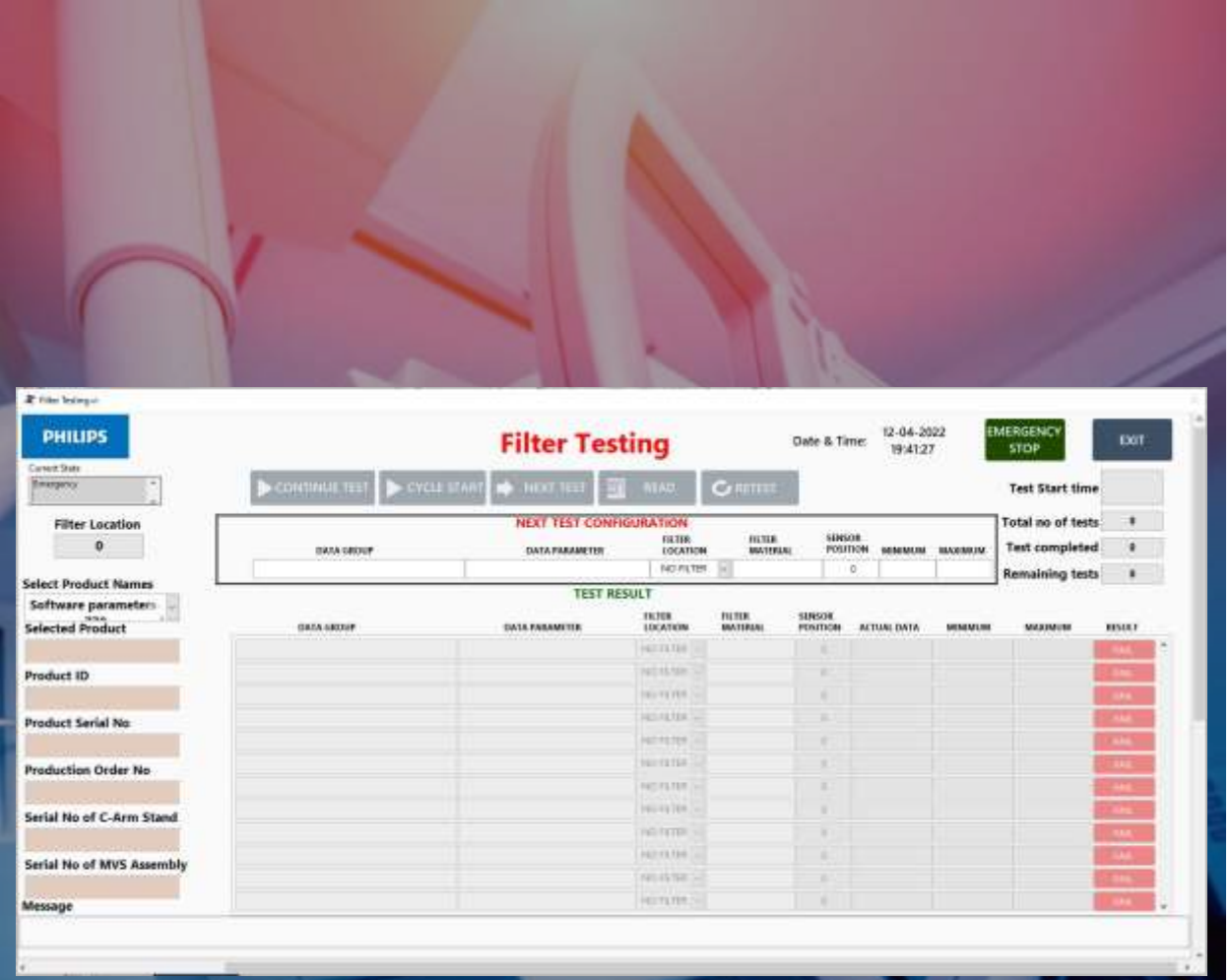
The solution provided had PLC with high-speed counter up to 200 KHz and designed the software such that it can control the Servo Drives with Pulse Train Output with Encoder counter input for positioning of test filters and test sensors. 5 axis robotic jig equipped with test sensors. While starting the machine in auto mode 5 axis homing position achieved by PLC. Lab-view was designed such that minimum no. of human effort required and machine test automatically as per test sequence. The testing GUI was user friendly. Testing report generation along with testing activity.

The Lab-View GUI had features including manual as will as automatically testing of machine. The position and RPM were taken as feedback with speed setting of Servo Motor and as per test sequence.

Solution

With Manual Operation, An operator can switch filter positions and different types of sensors position's like (sensor up/down, sensor forward/reverse) for any troubleshooting and some specific operation.

While running the machine in auto mode operator just has to select test sequence and product type also need to enter product serial no. ,batch no. etc. As machine runs in auto mode actual filter position and sensor position taken as per test sequence operator just need to press next cycle button and start cycle for next action as per message shown in PC display. PLC continuously check all interlocks status and if any signal was dropped it would automatically stop the machine and message were generated for appropriate events, so problem analysis was made easy and fast.



Benefits

Overall Speed of the testing increased. Operator not need to enter physically in test cell during testing. which was as per the customer requirement. Event after such as EM press, the machine operated in a safe and reliable manner and all axis goes to home position. The PLC took the feedback of each interlock before starting the machine in auto mode. The customer had the flexibility of operating it in auto as well as manual mode. The customer even had the flexibility of feeding the data sensor height or position and modify test sequence as per the product.

Benefits against alternatives

Overall speed of machine increases thus resulting higher testing rate of machines. Also, the system operates in clean & low noise functioning of all stations due to servo-controlled drive. The user gets flexibility to choose the parameters and enter it manually which is critical. Also, provided is the best singling cycle time which reduces the human errors and increase the accuracy and efficiency of the machine test.

Value Proposition

Optimized Solutions added significant value by integrating LabVIEW software with a test cycle resumption feature, enhancing operational efficiency. The system's high-speed PLC counters and precise control mechanisms ensured accurate, user-friendly testing with minimal errors and training needs. Dual-mode operation provided flexibility for both manual and automatic testing. Continuous interlock checks and automatic shutdowns enhanced safety and reduced downtime. By eliminating the need for operators to enter the test cell, safety and efficiency were further improved. Additionally, the system's flexible axis lengths accommodate future X-ray machine generations, ensuring long-term adaptability and cost-effectiveness.