OCTOBOTICS TECH

CASE STUDY /

Cargo Hold

A renowned Ship owner leveraged OCRV-D™ to address maintenance delays and generate actionable repair plans in days - a process that previously took weeks.

Inspected Asset: Cargo hold of a 15 year old Bulk Carrier

Challenges

- Vessels require periodic monitoring to maintain structural integrity and operational availability due to corrosive environments and various other factors
- Traditional visual inspections and manual thickness gauging using rope climbers, cherry pickers, man-riding cranes, was risky, costly and took time to complete.
- Manual inspections suffered from reduced speed and compromised inspection quality due to the effects of fatigue and inherent limitations of the human capacity to do continuous work
- Robotic solution available in market could not access complex areas such as webs and frames also they did not had surface preparation capabilities to remove rust scale or loose paint.

Solutions

OCRV-D™:

- Data: Ultrasonic Thickness Measurement & Surface Preparation using OCRV® series robot
- Platform: Autonomous Robotic Solution for surface preparation & thickness gauging with integrated robotic arm.

Results

- One robot took 5 times more UT readings in 12 hours as compared to what 2-3 technicians took during the same duration.
- The Bulk carrier inspection & condition assessment cycle & repair plan was completed in reduced time, restoring the ship to fully operational status.
- Associated risk with using rope climbers for surface preparation and UTM avoided.

60%
decrease in inspection labor and resources

>50%
Cost saving

30%
decrease in total inspection time

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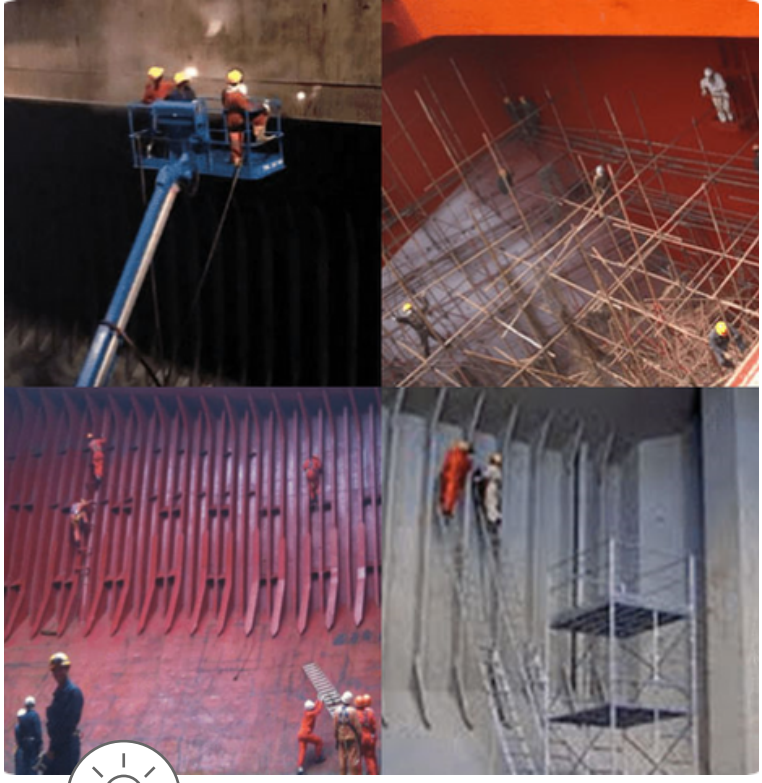
Challenges

Bulk carrier availability is a significant challenge for ship managers aiming to uphold operational readiness and peak performance. Timely completion of ship maintenance is vital in this regard. Vessels, in general, necessitate periodic monitoring to preserve structural integrity and ensure operational availability, especially in corrosive environments and various challenging conditions. However, traditional methods such as visual inspections and manual thickness gauging utilizing rope climbers, cherry pickers, and man-riding cranes proved to be both costly and time-consuming. Manual inspections, a part of the traditional approach, suffered from compromised speed and inspection quality due to fatigue and the inherent limitations of the human body. Once data from these inspections was collected, the subsequent processing and report creation by inspectors took an additional week. This manual and time-intensive process not only incurred significant resource costs but also left room for potential gaps in coverage.

In light of these challenges, ship managers are recognizing the need for more efficient solutions to enhance the monitoring and maintenance processes. The goal is to implement comprehensive tools that can provide a complete health assessment, accurately identify problem areas, optimize workforce utilization, streamline decision-making, and efficiently plan maintenance efforts. This approach aims to ensure the timely exit of the ship from dry dock and the restoration of its operational capabilities.

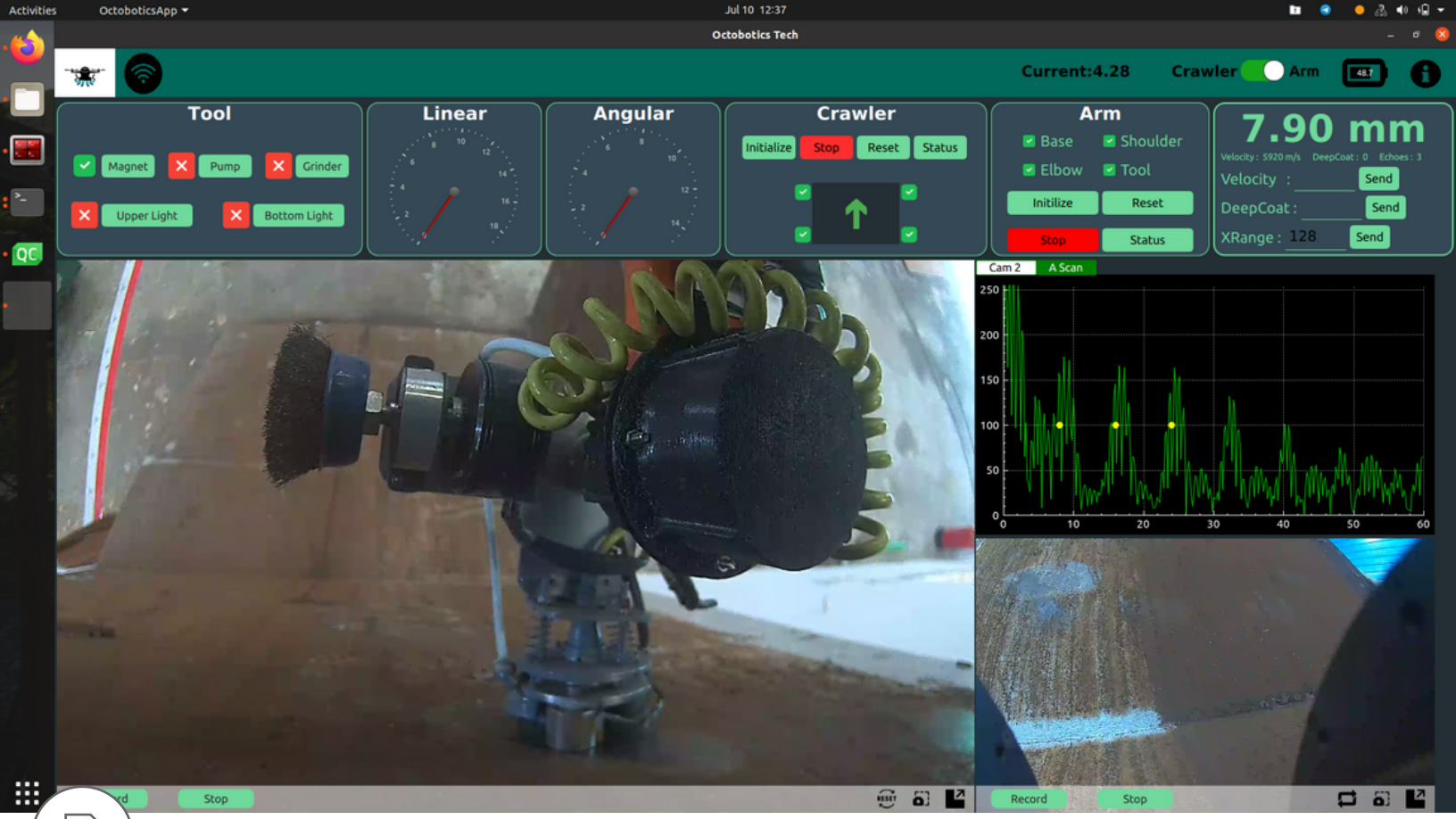


Solutions

The OCRV-D™ emerges as an innovative solution, featuring a magnetic crawler with a versatile robotic arm designed for surface preparation and thickness gauging. Equipped with specialized tools like the needle descaler and grinding wheel, it excels in comprehensive surface preparation, crucial for eliminating rust scale that can lead to inconsistent readings. The strategic inclusion of a robotic arm enhances accessibility to intricate ship structures, including frames and webs, addressing limitations observed in other magnetic crawlers, especially in challenging areas.

The OCRV-D™ employs unique alternate switching technology, enabling skillful navigation through 90-degree convex and 90-degree concave bends even when loaded with a robotic arm. With its mounted 3D lidar, it provides extensive 3D scan data for precise digital reporting. Furthermore, ongoing efforts are directed towards enhancing its capabilities, with a focus on enabling fully autonomous navigation and Non-Destructive Testing (NDT).

To achieve these objectives, ship managers leverage Octobotics tech OCRV-D™ solution, which integrates data from Octobotic's various robotic systems into a software platform. This platform facilitates in-depth analysis and decision-making regarding asset health. The OCRV® series robot, a part of this solution, conducted Ultrasonic inspections for high-density, full-health scans of the carrier hold. The data layers collected by the robot undergo OCRV-D's AI-powered analysis process, providing key insights such as defect assessment, 3D mapping, and autonomous operation. These analyses are then imported into VR-based software modules, empowering ship managers to make targeted repairs, prioritize capital investments, and transition from reactive to predictive maintenance strategies. This comprehensive approach ensures efficient vessel monitoring, enhances decision-making, and ultimately contributes to the overall operational reliability and integrity of the ship.

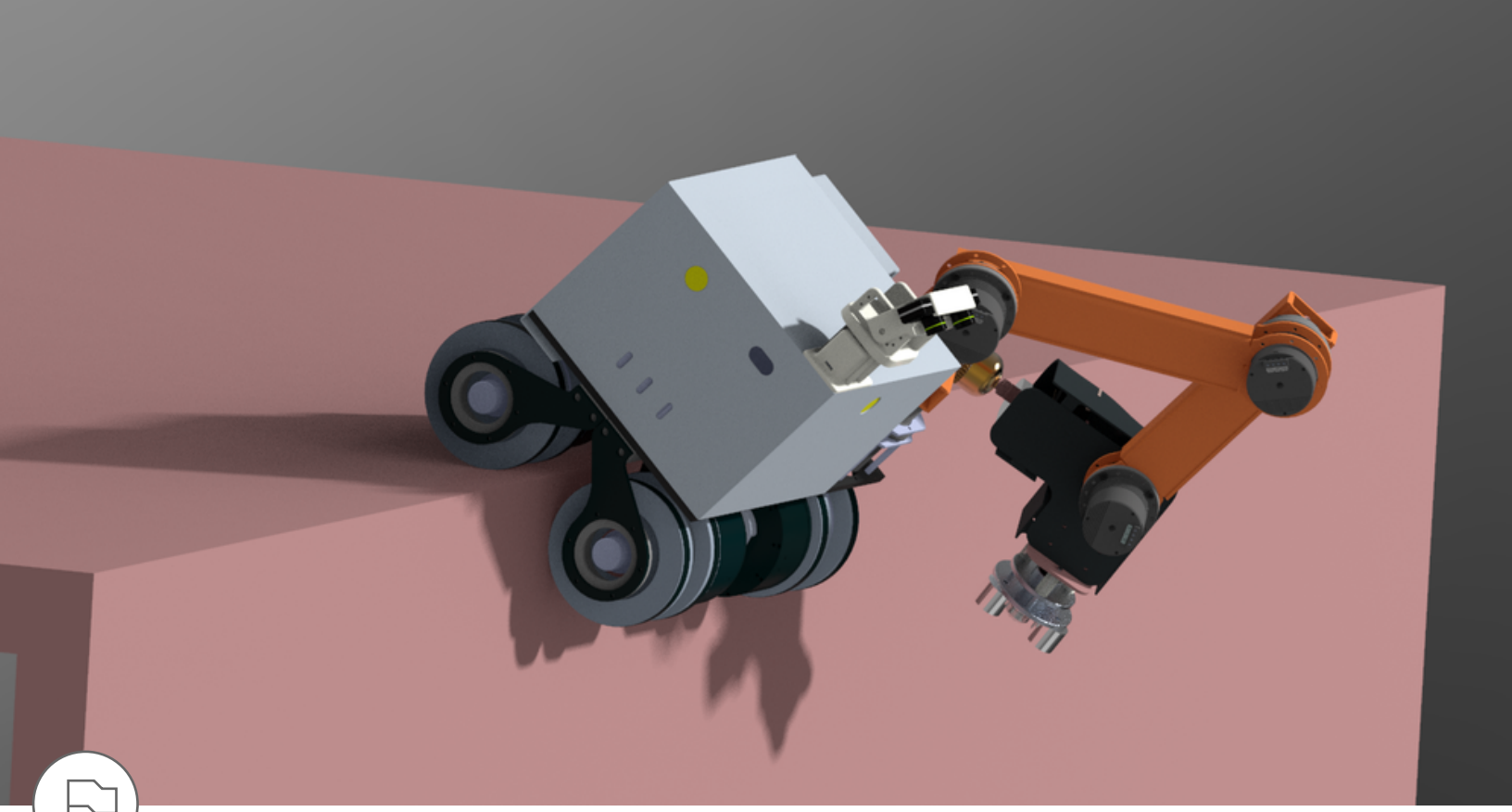


Results

The implementation of Octobotics' robotic solution marked a significant advancement in vessel inspections and maintenance. The robot efficiently carried out thickness gauging of cargo hold hold at a remarkable speed of 1 frame every 5 minutes, collecting three times more Ultrasonic Testing (UT) data readings compared to previous methods. Previously, the dedicated resources of 2 to 3 technicians could only gather approximately 3,000 UT readings over two weeks, with a slower pace of 1 frame in 30 minutes.

The amassed data points were seamlessly integrated into the Octobotics VR Platform, providing critical insights. Leveraging corrosion rate and remaining life analyses, the platform facilitated the generation of an actionable repair plan. This transformation reduced the time required for planning repairs from 18 man-days to just a few days.

The substantial time savings empowered the team to reallocate workers to more critical activities and make informed, data-driven decisions on how to allocate limited financial resources. The platform enabled the vessel manager to dynamically adjust the repair plan based on variables such as time restrictions and budget allocations, providing complete visibility to stack rank and prioritize repairs with confidence.



Results *(continued)*

Rather than opting for wholesale replacements, the platform identified specific locations where targeted repairs could be made, resulting in significant cost, time, and resource savings. This streamlined approach ensured the ship's timely exit from availability and the restoration of its operational capabilities. The empowered manager efficiently deployed repair budgets, procured resources, and created detailed maintenance plans.

With a comprehensive, data-dense picture of asset health, the manager can now continue monitoring the cargo hold's health, proactively plan future availabilities, and identify trends and patterns in the data. The Octobotics VR platform's advanced processing capabilities increased data availability and facilitated the identification of defects that traditional methods might have missed.

In summary, Octobotics' end-to-end solution has revolutionized the inspection, data analysis, and repair planning processes by providing faster, more efficient operations with high-definition data.