Extended Reality: The Future of a Safer and Cost-Effective Solution for Unmanned Inspections

Author (Rameshwar Kumar Maini)
Affiliation (CEO/President, Zentech Incorporated)

Author 2 (Ravi Kumar Maini) – *Presenting Author*
Affiliation (Director of Operations, Zentech Incorporated)

Author 3 (Ajai Peter)
Affiliation (Director – Technical Services, Zentech Incorporated)

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ABSTRACT

The paper reviews the future of safety in the Oil and Gas and LNG industries by way of advancing technologies that remove the need for humans to enter hazardous spaces. From corporate administration to Class Societies, from engineers to the general public, using these innovative technical advancements allow the safest way to see the internals of tanks, confined spaces and difficult to reach spaces. Safely completing tasks is the #1-way corporations in the modern era are depicting their overall success on a project.

Traditionally, entering confined spaces or hazardous areas onboard a rig, ship or vessel is quite an orchestration of personnel, equipment, and safety. Health, Safety & Environment (HSE) personnel are needed to check air quality, scaffolding to reach difficult areas, secondary personnel to 'watch' the actual team working, and then a number of permits and safety equipment make what would seem as a quick and easy task, a task that could easily take 2-3 weeks. All this not only becomes a stress to onboard staff and management but increases downtime, overhead and costs, significantly.

This paper explores the advantages of bringing extended reality through unmanned aerial vehicles (UAVs) and drones together with terrestrial laser scanners to safely create images, videos, and point-clouds to increase safety measures while decreasing costs and vessel downtime. A comparison of traditional ways, using HSE personnel, atmosphere gauges, scaffolding, manpower and other resources, and modern ways, using the Elios UAV and the FARO S150 terrestrial laser scanner with a single operator.

This paper seeks to answer the question: How does a company, in today's world, ensure the safety of their personnel while keeping costs down?

It is hoped this analysis and study will inform all engineering and surveying divisions within the Oil & Gas and LNG industries on how to safely conduct practices from now into the future.

Keywords: OJME, 9th Offshore Jack Up Middle East, Conference, UAV, Unmanned Aerial Vehicle, Drone, Elios, Flyability, Laser Scanning, FARO, LIDAR, Terrestrial, Oil and Gas, LNG, Modification, Site Survey, Safety

INTRODUCTION

The purpose of this article will be to conclude and justify that modern day technological advances are the preferred method for keeping personnel safe and to keep project costs low. This will be done by ensuring cost effectiveness through safe practices that do not require human interaction with spaces, less downtime by having to ready

construction equipment, a long list of work permits, and additional personnel – all requiring significant additional cost.

1. UAVs, Drones and Capture Cameras/Scanners do not require humans to enter confined spaces or hazardous areas, thereby making it safer for Capture Team.
2. UAVs, Drones and Capture Cameras/Scanners allows for less chance of human-error in measuring, sketches, and note-taking.
3. By minimizing human entrance in to confined spaces, hazardous spaces, and difficult to reach areas, the cost of life is alleviated and added construction and safety measures are unnecessary; all the while minimizing downtime.
4. Adhering to the latest regulations of Class Societies for unmanned inspections.

METHODOLOGY

Analysis of current practices of inspection through traditional means versus extended reality, with the added caveat of creating detailed imagery, videos and point-clouds with modeling capability, measurements, wall deflections, to name just a few.

RESULTS

Extended reality offered a considerable cost savings to the Project. Safety concerns with traditional inspections required more personnel, scaffolding, fall protection gear/equipment and additional secondary structures. As an additional added benefit, extended reality was able to capture more data, imagery, and a point-cloud immediately usable for the project. A 1-man team was able to capture all the information with only 1-yard hand to assist. The needs of the project were completed within the day, with no construction equipment, no HSE personnel or "air-quality" checks, nor additional safety equipment.

CONCLUSION

Extended reality is a combination of the very best innovative technologies brought together by an elite team of technicians that has proven safety is Job 1, while maintaining a high-level of cost effectiveness and efficiency. With all signs pointing to the way we embrace the future; extended reality is at the foundation and will be an integral part of saving the Oil and Gas and LNG industries lives and making them fiscally sound and responsible.

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