

FUGRO QUICKVISION®

Surveying and positioning assets when installing them subsea, usually requires physical hardware to be deployed near or attached onto the structure. Hardware such as bubble levels, acoustic transponders, marker buoys or a docked ROV traditionally facilitated such measurements. With QuickVision® we replace these physical objects with Augmented Reality counterparts. In this way we simplify, reduce risk and speed up subsea installation projects.

PROBLEM

Traditionally, subsea installation projects require time-consuming and risky installation of positioning equipment onto the asset to be installed. Depending on requirements, this can be bubble-levels, motion-sensors, inclinometers, acoustic transponders or an ROV docking onto the structure. There are even situations where none of those traditional methods are possible or allowed.

SOLUTION

QuickVision® offers a flexible and robust method by providing an Augmented Reality toolset that can be combined into a fit-for-purpose, touchless survey solution.

The following tools and functionalities are available:

- The **Bounding Box** is used to measure position and orientation of a structure by aligning a bounding-box model of the structure to be surveyed.
- The **Structure Model**, similar to the bounding box, is using a 3D CAD drawing when available in order to show an accurate model in the scene.
- The **Inclinometer** can measure attitude/ inclination of an object using a virtual protractor. The protractor tool can automatically detect an edge in the image.
- The **Compass Rose** makes it possible to measure the heading of a structure by aligning the northing line of the compass to the structure.
- A **Level Line** draws a leveled plane/ horizon on the image from which the height of an object can be inferred.
- The **Virtual Marker Buoys** indicate the proposed location of a structure. As the ROV is moving around the location the buoys will remain at the position defined by the geographical location. The marker can be a full 3D CAD of the asset or a model of a bounding box.

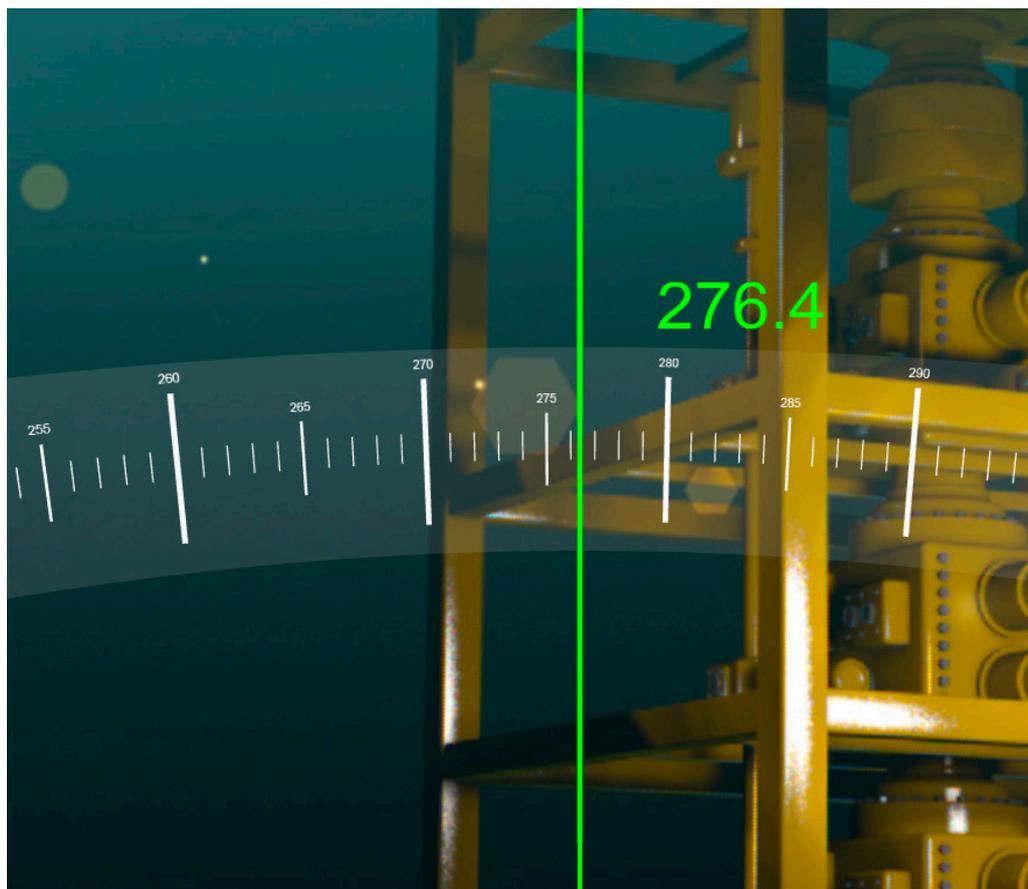
TECHNOLOGY

Common for all these tools is that they make use of ROV navigation sensors to accurately draw and represent real world positions and orientations of the virtual tools in the video.

QuickVision® uses camera hardware specially designed to accurately mix the reality of video with virtual measurement tools. The image acquisition is precisely timestamped, uncompressed and synchronised with ROV INS/AHRS, motion sensors and other navigation systems.

The camera is factory calibrated to account for optical distortions and to provide precise and accurate Augmented Reality.

All data is processed and integrated in Fugro's Starfix® integrated navigation suite. A seamless procedure for camera to ROV alignment has been implemented using MEMS technologies, ensuring that no dedicated ROV time is needed for camera calibrations.



QuickVision® - Compass Rose

HARDWARE

The solution is built on a Fugro proprietary subsea camera. The 4000MSV rated housing comes integrated with a state-of-art MEMS sensor. The MEMS sensor facilitates an automated alignment procedure of the camera to ROV AHRS, so that the full advantage can be taken of the ultra-high precision Fiber Optic Gyro (FOG) commonly available on ROVs.

Functionality	Measured quantities	Typical accuracy
Virtual inclinometer	Pitch-roll, inclination/direction	0.25°
Bounding box	Full position and orientation	1 m, 2°
Level line for height/altitude determination	Height	0.5 m
3D structure model	Full position and orientation	0.5 m, 1°
Heading compass	Heading	2°
Virtual marker buoys*	Indicates a location of interest	-
Camera to FOG alignment	Rotational offset camera to AHRS	0.01°

*Precision and accuracy are derived from the ROV navigation suite and contains no user or automatic detection of image features



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