# UT THREE

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VEHICLES • COMMUNICATIONS

# DYNAMIC LASER SCANNIN

## A NEW COLLABORATIVE MICRO INSPECTION SKID WILL DELIVER HIGH ACCURACY INSPECTION CAPABILITIES ON SMALL ROVS

Small Inspection-class ROVs are regularly being used offshore for general video inspection (GVI) in order to significantly reduce project costs.

These vehicles can be easily deployed from vessels of opportunity and only require a minimal crew to complete simple inspection scopes.

Unfortunately, the capability of these small ROVs is limited by the range of sensors they can deploy, often due to challenges with the size and weight of the survey payloads. This prompted 2G Robotics to partner with iXblue and Nortek to overcome this limitation and deliver an all-in-one navigation integrated survey skid for inspection-class ROVs that can perform dynamic laser scanning and high resolution stills image mapping.

The new Micro Inspection Skid enables small ROVs to achieve more than just GVI, expanding the number of applications that they can be deployed for. This innovative payload expands their capability to include quantifiable measurements of damage, localised pipeline and asset inspection, dam and infrastructure modelling, high resolution seabed mapping and military mine countermeasures target identification.

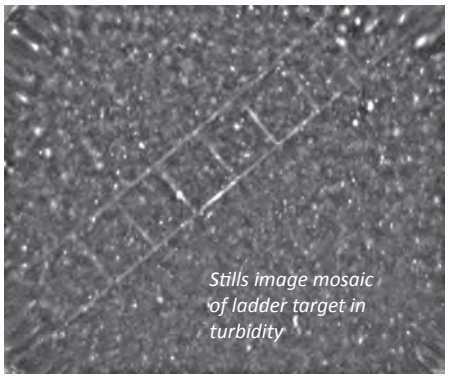
By employing a low cost ROV and cost-efficient vessel, these survey tasks can be completed at a fraction of the cost of a typical project.

Testing with the inspection skid was conducted in a Canadian freshwater lake where a shipwreck was found and modelled in real-time. This survey was conducted in a small harbour and demonstrated that the system can be used for marine archeology and search and rescue operations to create 3D models of subsea targets.

This 3D modelling functionality was previously only available on Work-class ROVs and therefore not feasible to deploy for non offshore oil & gas applications.

Over the last few months, field testing was completed to validate the accuracy of the system. By deploying and scanning a variety of dimensionally controlled targets it was proven that this sensor package could achieve a measurement error of less than 3cm with these cost-efficient navigational sensors.

Results were obtained in a turbid harbour environment, and the below images of a ladder target illustrate how laser data often exceeds video or stills image performance in high particulate environments.



*Stills image mosaic of ladder target in turbidity*

This compact inspection package is made possible by incorporating the newest compact sensors available on the market: 2G Robotics' ULS-500 Micro laser scanner and OBSERVER Still Camera, iXblue's

*Stills image mosaic of shipwreck captured with Micro Inspection Skid*

# G ON ROVs

*Skid base on an ROV*

Rovins Nano Inertial Navigation System (INS), and Nortek's DVL1000.


This package achieves the size and weight requirements needed for deployment on inspection-class vehicles. The skid is pre-calibrated and can rapidly integrate with any small inspection-class ROV including the Saab

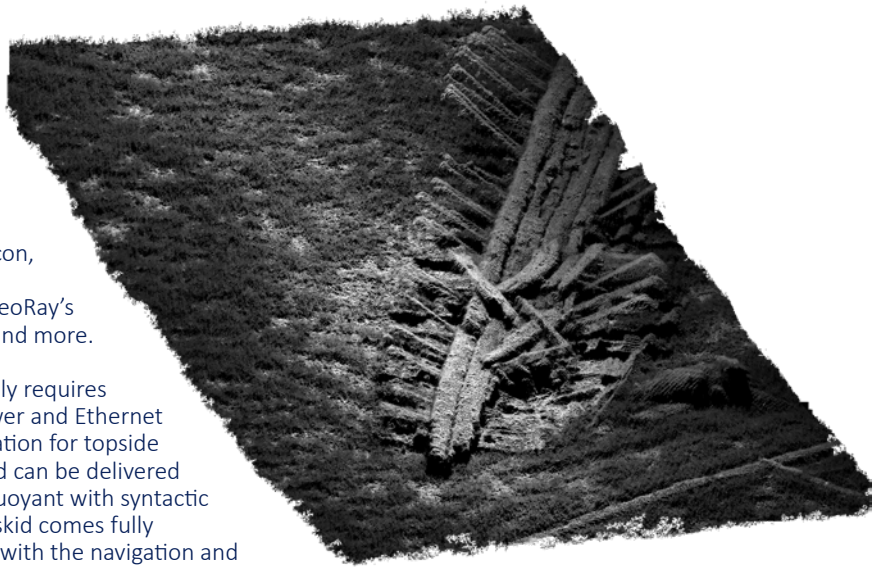
*Rovins Nano*

Seaeye Falcon, Seatronics' VALOR, VideoRay's Defender, and more.

The skid only requires 24VDC power and Ethernet communication for topside control, and can be delivered neutrally buoyant with syntactic foam. The skid comes fully assembled with the navigation and sensor package fully calibrated to provide a truly plug-and-play solution.

Raw data from the laser and stills camera can be viewed in real-time during the survey, and data is post-processed using the 2G ViewLS software to apply navigation data, clean the laser point cloud, and enhance stills images.

The complete software solution delivers an efficient data workflow for survey operations that includes real-time data QC and simplified post-processing to minimise data preparation time and training requirements. The iXblue Delph INS navigational post-processing software can be added to enhance the data accuracy.



*Laser data of the shipwreck*

This skid delivers high resolution stills images (at up to 7m range) to provide wide area, geolocated, image mapping capability. Images are light-levelled and undistorted allowing for accurate image mosaics to be created.

High resolution laser data is collected and processed in real-time to allow for quantifiable measurement of critical target features.

The iXblue Rovins Nano accepts navigation data from the Nortek DVL, as well as an optional depth sensor and USBL, combining these inputs with its inertial measurements to deliver the required vehicle position accuracy for dynamic laser scanning.