



Seeing is believing

GeoDrilling International gets an exclusive first look at Robertson Geo's RGeo-eye – a world-first four-core, high-speed borehole camera system

Above: RGeo-eye is a world-first from Robertson Geo, a slimline, full-colour, downward view camera, operating on a four-core or coax cable at a high transmission rate

RGeo-eye is a slimline, full-colour, downward view camera, operating on a four-core or coax cable at high transmission rate and is fully compatible with existing Robertson Geo winches and surface systems.

Borehole video cameras have a wide variety of applications including borehole and casing integrity inspection; water well monitoring; surveillance of mines, shafts, caverns and voids; pre-logging borehole examination; assessing concrete piles and damage detection in dams, bridges and subsurface structures. Video logs are being used globally across a variety of sectors including the water industry, for geotechnical inspections, in the mining industry and for oil and gas applications.

Video logs are a cost-effective method of inspection, providing data that cannot be obtained by other means and are now being routinely adopted across a variety of sectors in many diverse applications.

Local and industry regulations often require video inspection of

newly installed well casing and many consultants and contractors require verification that the well was installed in compliance with the design criteria of the geologist or engineer. The video log then constitutes part of the permanent record of the well and can be used as an integral component of the contractual acceptance procedure.

A video log can capture the depth of static water level, total depth of the well, joint condition, location of perforated section(s) and detection of any anomalies that could have appeared during installation.

For water wells, downhole video logs are an essential way to monitor the condition of existing or previously used wells and to investigate potential causes of production loss. A video log can collect visual proof of casing condition, downhole pump condition, biological build-up on the well casing and perforated sections, loss of filter pack material and damage to casing which could allow ingress of sediments potentially leading to pump failure.

High-quality video data, especially when collected routinely, can be used to identify potential failures before they happen. This ensures that the condition of the well is kept optimised, saving significant costs in well repairs whereby remedial action can be undertaken in a controlled manner avoiding operational crises.

In some instances, maintenance itself may result in damage to a well. The act of removing or installing a pump, treating or attempting to repair casing or attempting to remove a blockage can have unexpected consequences such as pump detachment or damage to the column pipe, well casing or electrical wiring. Video logs are useful in these instances, as they can identify lost equipment, such as a pump, tools, tremie pipes or drill string rods accidentally dropped down the well. With a diameter of only 43mm the RGeo-eye camera can easily descend past column pipes to view a pump without disturbance.

In the mining industry, video logs are used for the inspection ▶

“Video logs are a cost-effective method of inspection”

Seeing is believing

New Four-Core 3,000m (10,000ft) world first high speed wireline borehole camera system

RGeo-eye®

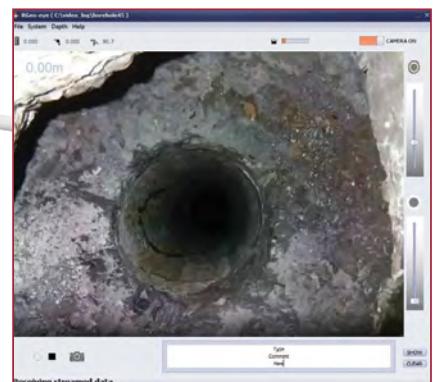
is a slimline full colour downward view camera, operating on a 4-core or coax cable at high transmission rate, fully compatible with existing Robertson Geo winches and surface systems.

It offers pressure ratings of 5000psi and a minimum 75°C temperature rating (with 85°C & 100°C versions to be released in Q4 2020 and a 125°C version in development).

The software package provided with the RGeo-eye® camera system allows extensive operator control including - video resolution, frame rate, lighting, white balance, 'snapshot' mode and real time video annotations. Video is recorded in AVI and converted to MP4 for storage and replay.



RGeo-fast® delivers a world beating 1 Megabit/sec communication speed for high resolution video feed from downhole in air or water filled open or cased boreholes while allowing real-time viewing.



The acquisition software allows screen shots to be captured and text editing while viewing/recording. Where more detail is required, full colour 'snapshot' images can also be captured at 1600 x 1200.



RGeo-eye at a glance

- The RGeo-eye camera system is a new introduction of a design and build development by the North Wales-based OEM Robertson Geo. It has a deep operating range, operates on industry-standard four-core wireline cable, and offers pressure ratings to 5,000psi and a minimum 75C temperature rating. It is set to lead an exciting and innovative development of downhole camera use for the geophysical data market
- The system incorporates RGeo-FAST delivering one-megabit/sec communication speed enabling the acquisition of high-resolution video feed from downhole (to 3,000m) in air or water-filled open or cased boreholes while allowing real-time viewing for the surface operative
- The camera has autofocus, a frontal LED internal array with adjustable lighting intensity, and a viewing resolution of SVGA (800 x 600) at 25 frames/sec
- The acquisition software supplied with RGeo-eye allows screenshots to be captured and text editing while viewing/recording. Where more detail is required, full colour 'snapshot' images can also be captured at 1,600 x 1,200
- First release of the RGeo-eye camera is rated at 75C with 85C and 100C versions to be released in Q4 2020. A 125C version is also in development for release by mid-2021
- The software package provided with the RGeo-eye camera system allows extensive operator control including – video resolution, frame rate, lighting, white balance, 'snapshot' mode and real-time video annotations. Video is recorded in AVI and converted to MP4 for storage and replay.



The RGeo-Eye is a robust, easy to deploy downhole camera at 1,000 x 43mm and only 5kg

- ▶ of shafts, drifts, old stopes, risers, roofs or mine workings that may be unsafe to enter.

Videos can also be used to safely inspect flooded underground workings. For flooded workings and for dewatering projects a video log can be used to record water level conditions where they are not continuously monitored. This can help determine if the pumps are working efficiently or if pump capacity needs to be increased.

For exploratory boreholes, prior to geophysical logging, a video log can determine the depth of surface casing, location of lithological contacts, water level and areas of possible blockages or washouts with videos also being an accurate way to detect contact and fault zones. They can be used to identify fractures and locate cascading water entering the borehole above static water level.

In piling applications, video cameras can be utilised for the internal and external assessment of deep concrete piles. When investigating historical piling, where there may be a paucity of

information regarding the details of the installation, there is sometimes little choice but to conduct some exploratory drilling.

Boreholes can be drilled into the pile itself and the camera video can then reveal the pile depth, confirming the pile is in the rock socket and to determine the underlying lithology, concrete composition and condition, as well as detecting voids, inclusions, fractures and discontinuities from the concrete pouring process. Where additional proof of compliance to rigorous standards is required, sample piles may be drilled internally and video logged to confirm the integrity of the installation.

For geotechnical applications, videos can be used for dam safety, bridge inspection and underwater pilings. Camera use for reservoir or dam safety includes the inspection of outlet works to identify any evidence of jointing and cracks, or to help detect ingress or egress of water seepage within the works conduit.

Across all sectors, the drilling process itself can sometimes be

halted by problems such as loss of drilling fluid circulation, unexpected voids or downhole problems with equipment. In order to first understand and then rectify the problem a video inspection can often be the most cost-effective solution. In many cases the slimline RGeo-eye camera can pass through the drill string and bit without the need to remove the whole drill string.

Future developments planned for the RGeo-eye camera include a software facility to extract a 360-degree side view from the data and additional lighting options to provide illumination for voids and caverns and shafts up to 1,000mm diameter

In a world where social, environmental and corporate responsibility are now pre-requisites, the need for robust digital records are essential for conformance to standards across all sectors. Video logs can augment the compliance process by providing an irrefutable image record in a highly cost-effective manner. Seeing can be truly believing. ♥

“A video inspection can often be the most cost-effective solution”