Downhole video technology

EXPRO

Innovative technology
Excellence in operations

Downhole video technology

Expro is the leading global provider of downhole video technology to the oil and gas sector. Expro's downhole video technology offers clients a cost-effective way to 'see' downhole problems rather than guessing. Expro's downhole video services can positively identify problems in the wellbore, reducing downtime and costs, and enhancing production.

For many years, Expro's downhole video products and services have excelled in positively identifying areas of concern including fishing activities, casing and tubing integrity, corrosion identification, pinpointing openhole fractures and changes in formation, as well as pinpointing oil, gas and water production from individual perforations.

Our product portfolio includes fibre optic cameras, e-line forward and side-facing cameras, and combination tools mixing camera technology with callipers and logging sensors. These unique products provide both qualitative video imaging as well as qualitative caliper/PL data in order to pinpoint corrosion and mechanical damage, or to identify producing/blocked perforations in high cut water wells. Both these services enable our customers to plan remedial operations with confidence.

These new products demonstrate Expro's expertise in innovation, which complement our ability to perform excellence in operations.

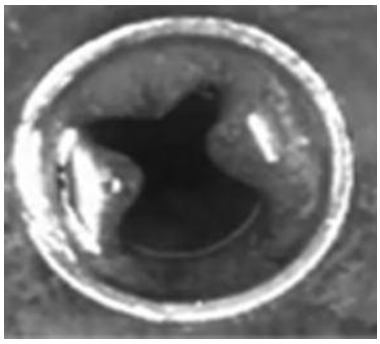
Downhole memory camera

The Downhole Memory Camera enables operators to obtain downhole images on slickline when the cost or logistics of mobilising an electric line unit or fibre optic unit are prohibitive.

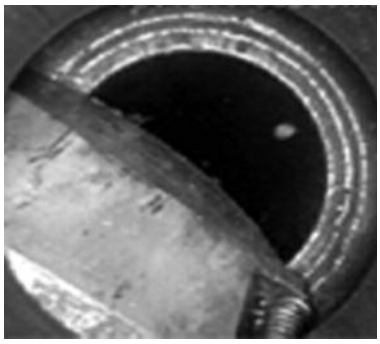
This tool is time-programmable and captures 2000 images per trip into the well. It is ideal for viewing a single obstruction, restriction, fish or casing damage. Other applications include viewing the opening and closing of subsurface safety valve flow tubes and flapper valves.

Benefits:

- **Highly portable and mobile downhole camera**
- **2000 images per run captured every $^{1}/_{2}$ second**
- **Radial Array Lighthead eliminates all shadows**
- **Operates on conventional Slickline or Coil Tubing**
- **Surveys well with H_2S or CO^2**
- **Views mechanical problems**



The Downhole Memory Camera identifies a collapsed collar



Downhole Memory Camera identifies a DHSV Flapper Valve

Hawkeye III electric line camera

This highly portable camera system can be easily transported by pickup truck or helicopter to reach even the most remote locations.

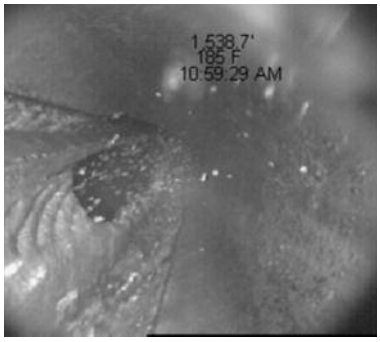
Upon arrival it can be deployed on virtually any conventional single and multi-conductor wireline cable.

For over 15 years operators have found confidence in their decision-making based on the results of our HawkEye III Electric Line Camera. This camera system was designed with portability in mind; the compact system mobilises quickly and can be deployed from virtually any conventional single or multi-conductor wireline cable. The unique backlight design provides a completely unobstructed view of the wellbore, and our patented surfactant keeps the lens and light source free of hydrocarbons or other debris. This system provides a 350 x 280 resolution image real-time at surface at a rate of one image per second. The small O.D. of 43mm allows this camera to enter most profiles and can even be deployed inside tubing or other fishing tools allowing the operator to manipulate fishing tools therefore reducing downtime and expense.

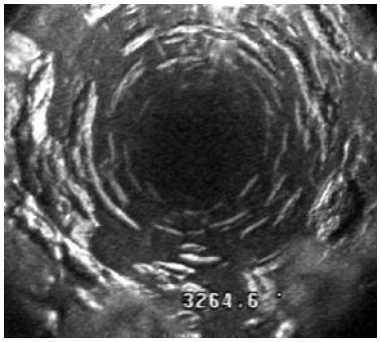
Perhaps the most significant benefit of the HawkEye III is the ability for our operators and any onsite personnel to view the images in real-time at surface. This allows operators the ability to perhaps take a longer look at specific points in a well, or to even flow the well to pinpoint sources of production. Fishing in real-time is also a common application – in many cases this camera has been deployed inside die-collars, overshot, or other open-ended tools allowing them to be manipulated to retrieve a fish with less expense and downtime.

Recently this system has been widely used to evaluate horizontal and open-hole applications. The system can be deployed horizontal with the EXPRO SmarTract™ horizontal tractor, on electric coil tubing, or in some cases through the use of a pump-down sub. Operators have hailed this camera's ability to evaluate fractures, and investigate production in horizontal applications.

Contact us to discover the tool that will reduce downtime, reduce costs, and provide answers you have confidence in, to make remediation decisions.



Client lost production while the drilling rig was drilling an adjacent well on the same pad. After running the camera it clearly shows that they had intersected the producing well



The HawkEye III is also an effective method to asses corrosion. Our optic ability has even detected gas, fluids, and small particles entering and leaving the wellbore through pitting and corrosion

In this case, the HawkEye III camera was deployed to identify a pipe wrench which had fallen beside a WR Prong

Fibre optic video

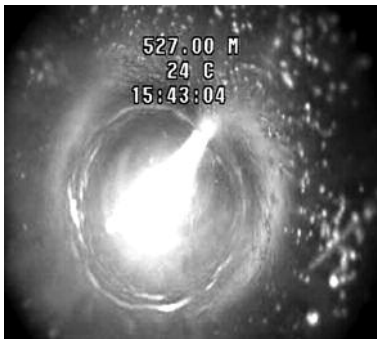
Fibre Optic Video represents the most advanced downhole video technology available.

This system features an industry-leading 550 x 350 resolution and 30 pictures-per-second frame rate. This not only allows for a complete survey of a well for both casing or open hole conditions, but also for the purposes of fluid entry.

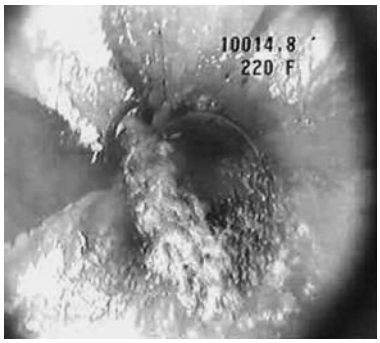
This system is being widely used to identify sources of water, gas, and hydrocarbons perf by perf under both static and flowing conditions. The backlight camera design provides for a completely unobstructed view of the wellbore, while the patented surfactant keeps the lens and light source clear of debris.

Our camera systems can be viewed in real-time at surface, allowing our camera specialists to move throughout the wellbore and pay close attentions to all areas of interest. This camera features a 43mm (1 $^{11}/_{16}$") O.D., allowing us to enter nearly every profile.

Our camera specialists have logged thousands of wells worldwide to provide an accurate visual analysis. Our customers have said that what they appreciate most is that we provide them with the confidence they need to remediate problem wells.



Here the fibre optic camera identifies the top perf of a 3-meter zone producing water



Gas can also be identified with the fibre optic camera, enabling operators to optimise their well and make decisions on future wells

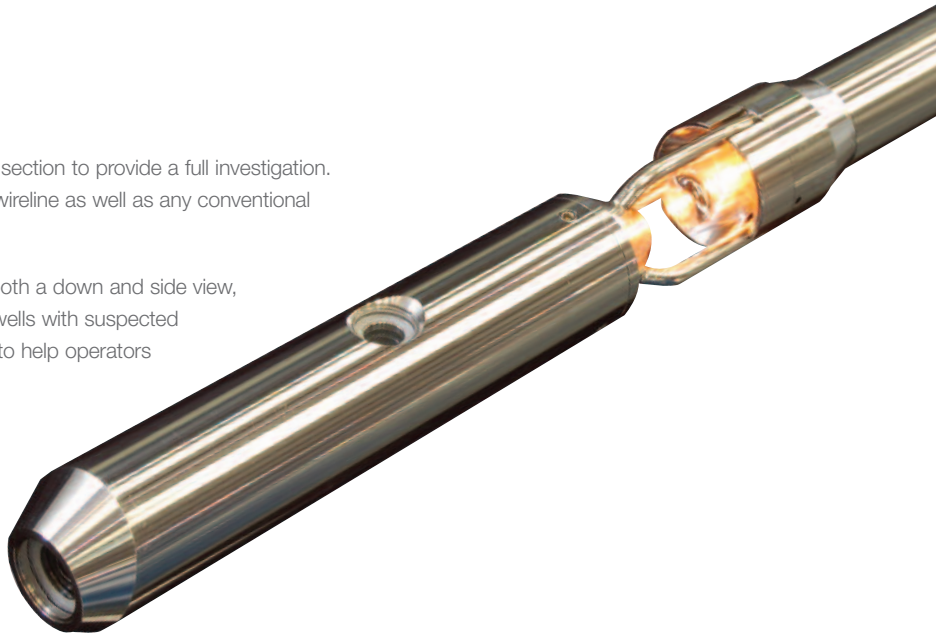
Our patented Surfactant keeps our lens clear while we investigate an oil-producing well

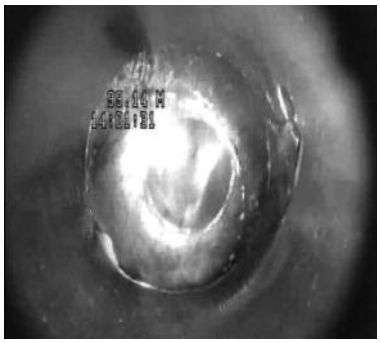
ViewMax side-view camera

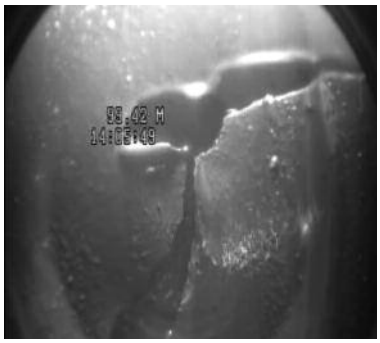
This versatile camera allows the operator to switch between our traditional down view to our new side camera with the flip of a switch.

The entire camera will then rotate 360 degrees on its motor section to provide a full investigation. The ViewMax can also be operated on both our fibre optic wireline as well as any conventional electric line.

Many operators have quickly realised the benefit of having both a down and side view, making the ViewMax their camera of choice. Particularly in wells with suspected casing damage the ViewMax can provide more information to help operators make remediation decisions.







In the picture above, the traditional down view shows parted casing. When the operator switches to the side view, above right, we are provided with another view to help make remediation decisions

The ViewMax provides an excellent assessment of the damage to the lower edge of a window in this multilateral completion

Here the ViewMax examines a collar which has failed a pressure test

The ViewMax clearly identifies a fracture in the conglomerate of this open hole horizontal well

Spotlight on new TECHNOLOGY

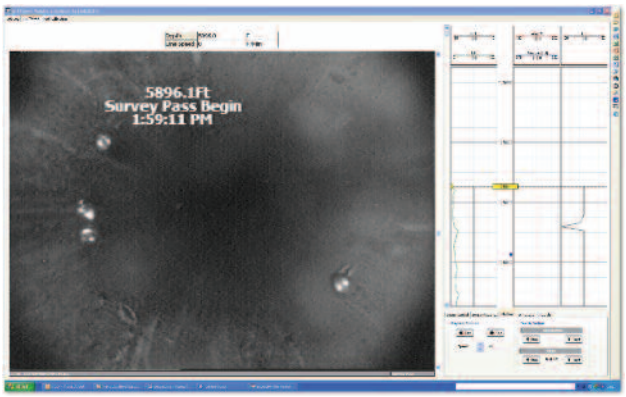
WIT – water investigation tool

The **Expro Water Investigation Tool (WIT™)** combines a downhole video camera with several logging sensors designed to pinpoint Hydrocarbon and water entry points in wells where water cuts are in excess of 50%.

In high water cut wells, traditional electronic sensors used for determining water holdup and phase composition are less than accurate. Even recent array tools have limitations based on their sensor technology and materials combined with their placement within the wellbore. With a camera as the primary sensor, hydrocarbon entry points into a water phase are very clear.

The additional temperature/pressure/spinner sensors help identify water ingress points. A gamma ray and casing collar locator are also included for correlation purposes.

The Expro WIT is especially suited for deviated wells where segregated flow makes fluid ingress and identification more challenging.

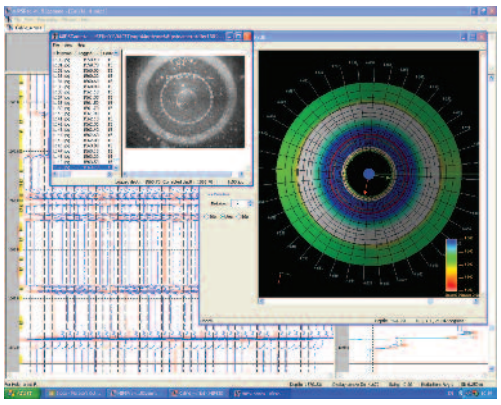


The Expro WIT is especially suited for deviated wells where segregated flow makes fluid ingress and identification more challenging

CalVid

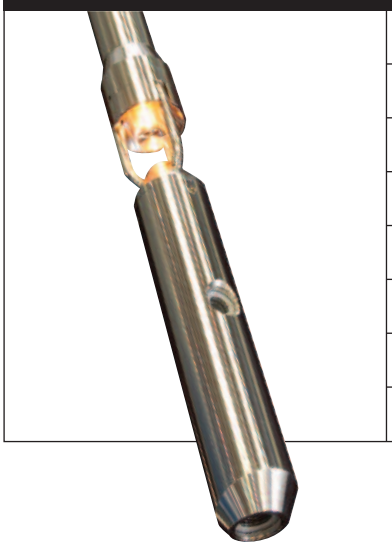
The **Expro CalVid** system combines the accuracy of an electronic multifinger caliper with the visual images of a downhole video camera, resulting in a more accurate representation of wellbore conditions.

Expro's software package allows visualisation of these complementary data streams by integrating the digital caliper data with the individual frames from the camera ensuring that the complementary information can be fully utilised. Caliper tools give accurate measurements of the well bore diameter at the exact arm location, but no feel for the general wellbore condition where the arms are not in contact. A camera gives a good visual representation of the condition of the entire wellbore and in the easiest format to interpret, a picture, but with no measurements. Expro's combined caliper and video string, CalVid, allows wellbores to be measured and visualised at the same time giving operators a fuller understanding of the wellbore. Critical decisions regarding their well and production integrity based on a complete, and accurate assessment of the entire wellbore.



Camera system specification

ViewMax



Description	ViewMax side-view camera
Tool O.D.	$2^{1}/_{8}$" (54mm)
Maximum temperature	257 °F (125 °C)
Maximum pressure	10,000 psi (69 MPa)
Tool length	148" (3.76m)
Tool weight	38 lbs (17kg)
Image resolution	317 x 262 (E-line), 550 x 350 (Fibre)
Frame speed	1.1 seconds/image (E-Line), 30 frames per second (Fibre)

HawkEye III electric line camera

Description	Standard HawkEye III	High-Temp HawkEye
Tool O.D.	$1^{11}/_{16}$" (43mm)	$2^{1}/_{8}$" (54mm)
Maximum temperature	257 °F (125 °C)	350 °F (177 °C) for 4 hrs cont.
Maximum pressure	15,000 psi (105 MPa)	15,000 psi (105 MPa)
Tool length	42" (1.07m)	140" (3.56m)
Tool weight	31 lbs (13kg)	65 lbs (30kg)
Image resolution	317 x 262	317 x 262
Frame speed	1.1 seconds/image	1.1 seconds/image

Slickline / Coil Tubing

Description	Downhole Memory Camera
Tool O.D.	$1^{11}/_{16}$" (43mm)
Maximum temperature	225 °F (107 °C)
Maximum pressure	10,000 psi (69 MPa)
Tool length	161" (4.09m)
Tool weight	58 lbs (26kg)
Image resolution	317 x 262
Frame speed	0.5 seconds/image

Expro's business is well flow technologies and specialised services, and our mission is to:

- **measure**
- **improve**
- **control** and
- **process**

flow from high-value oil and gas wells.

Our expertise is marketed through five segments:
Well Testing & Commissioning, Production Systems, Wireline Intervention, Connectors & Measurements and Deepwater Intervention.

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