APPLICATIONS
- Real-time production logging
- Through-tubing perforation
- Conventional slickline mechanical services
- Fishing and jarring operations with surface readout of downhole forces
- Pipe recovery services, tubing cutter, and tubing puncher deployment
- Nonexplosive, precision setting of bridge plugs, frac plugs, and cement retainers

BENEFITS
- Improve the quality and safety of mechanical operations
- Enable well interventions with greater scope, control, and certainty
- Remove risk and additional runs from operations
- Improve well and reservoir performance, in any environment, in any location, anywhere in the world
- Limit operational footprint

FEATURES
- Perform accurate depth measurement and correlation
- Monitor tool status in real time
- Assess job performance and actual wellbore makeup
- Confirm operational effectiveness in situ, in real time
- Command the deploy toolstring from surface
- Digitally communicate with downhole technologies
- Maintain production without interrupting operations

LIVE* digital slickline services enable performing a wider range of activities with precision, certainty, and control, anywhere with slickline access. A digital slickline has an integral coating for digital two-way communication and is deployed using a standard slickline unit and pressure control equipment. Sensors in the downhole digital cartridge measure cable tension, detect shock and well deviation, and monitor internal temperature.

LIVE services’ depth correlation capabilities confirm operations are on depth and provide the exact position of the downhole tool at all times. This continuous depth correlation means operations can be adapted in real time, and that the success of the job can be confirmed before pulling out of hole.
**LIVE Perf** digital slickline perforating services enable thru-tubing perforation, tubing cutter/puncher deployment, and pipe recovery with accurate depth control in real time. Multiple safety features are incorporated into the design to ensure safe operations. The appropriate D-Trig digital activation device module is chosen based on the type of detonator used. It is connected to the control module, which incorporates the safety systems and receives the firing signal from the surface, initiating the firing sequence. The pressure/temperature safety sub below will prevent any power from being sent to the detonator if the pressure and temperature do not exceed a preset level. In addition, a controlled safety fuse can isolate the downhole battery from the initiation circuits, either following a command from the surface, or automatically after a preset time in case of lost telemetry.

**LIVE PL** digital slickline production logging services allow production logs to be run in a variety of well environments and locations where previously, memory logging would have been the only option. Some examples are offshore wells with a reduced platform deck area or crane lifting capacities, as well as remote wells with difficult logistics. When both slickline and electric wireline compatibility is required at the wellsite, the LIVE PL services allow all operations to be conducted with the same unit and line, the only change being the downhole tools run. This can be a determining factor in wells and fields with tight economics.

The LIVE PL services offers any combination of the following sensors or a complete suite of production logs, in multiphase production wells or water injection wells:

- Analog casing collar locator (CCL)
- Gamma ray (GR) and digital CCL for depth correlation
- Inline strain gauge to measure temperature and pressure
- Nuclear density tool—uses a GR source to measure well fluid density
- Inline flowmeter for a high flow rate or fluid velocity measurement in tubing
- Quartz pressure, temperature, and capacitance water holdup measurement tool
- Caged fullbore or continuous flowmeter to measure downhole fluid velocity

The logs are run with greater depth accuracy than is possible with memory production logging, and the logging program can be adjusted in real time to reflect well conditions. The shut-in periods needed for transient buildup tests are reduced compared with memory gauges. Knuckle joints to assist operation in deviated wells and centralizers are available.

All logging tools are provided with a memory backup feature, which records data in downhole memory at the same time as transmission to surface.

**LIVE Act** digital slickline mechanical services increase the quality and safety of conventional slickline operations such as gauge cutter runs, drift runs, and pulling and setting subsurface safety valves. Gas lift valve installation, instance, can be monitored and promptly checked for possible leakage or malfunction.

In addition to accurate depth determination with GR and CCL, advanced sensors provide real-time surface readout (SRO) of downhole head tension, shock, and deviation. The increased knowledge of downhole toolstring status is extremely useful when abnormal or unexpected events occur, especially in deviated wells and during jarring or fishing. In addition, it is used to refine operating procedures to better match the well conditions and for improved assessment of the results. The success of the job can be confirmed while still in the hole. The following tools are exclusive to the mechanical services to LIVE services:

**D-Jar** digital downhole adjustable jar
LIVE Act services measure tension at the head of the toolstring, and the D-Jar digital downhole adjustable jar is electrically released based on that measurement. This brings unprecedented efficiency, flexibility, and control to jarring operations, reducing the stress on the line. Each stroke is initiated and monitored from the surface.

**DCR** controlled release tool
The DCR tool permits a controlled separation of toolstring head and tool assembly, leaving a standard internal and external fishing profile downhole.

**D-Set** digital electrohydraulic setting tool
Plugs for casing and tubing, as well as cement retainers, are usually set with tools that require licenses for ordering, storing, and using explosives. LIVE Set digital slickline setting services use the D-Set tool, an industry-compatible electrohydraulic, battery-powered setting device, controlled digitally from the surface. The actuator uses hydraulic pressure to create pull or movement. Accurate depth control is possible using the downhole GR and CCL.

**GeoLock retrievable monobore lock mandrel**
allows well intervention in monobore and damaged nipple completions, as well as standard ones, and is not limited by gas, high temperature, and pressure.

**GEM-Valve retrievable, wireless subsurface safety valve system**
secures wells containing a damaged control line or valve, or where having a control line is not practical.
Portfolio of LIVE services.

**DIGITAL SLICKLINE CABLE**
- Sandvik 5860 stainless steel alloy
- Sanicro 28 H, S
  - 0.108 in (0.138-in OD after coating)
  - 0.125 in (0.153-in OD after coating)

**DIGITAL SLICKLINE SURFACE EQUIPMENT**
- Standard winch/drum/pulleys/stuffing box
- Surface transceiver and PC

**DIGITAL SLICKLINE CORE EQUIPMENT**
- Digital pressure gauge
- Digital insulated head
- Basic measurement cartridge
- Digital correlation cartridge
- Digital measurement cartridge

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**Mechanical slickline tools**
- D-Jar digital downhole adjustable jar
- DDR digital controlled release tool
- Fluid sampler
- Perforating guns
- Pipe recovery devices and cutters

**D-Set digital electrohydraulic setting tool**
- X Over to ⅝-in SR

**D-Trig digital activation device**
- FloView and FloView Plus
- GHOST-A
- PGMS
- PILS-A
- PBMS
- PFCS

**DPI digital slickline production logging interface**
- Compatible with PS Platform™ production services basic string

**Portfolio of LIVE services.**

*LIVE Act*
digital slickline services

*LIVE Perf*
digital slickline perforating services

*LIVE PL*
digital slickline production logging services

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