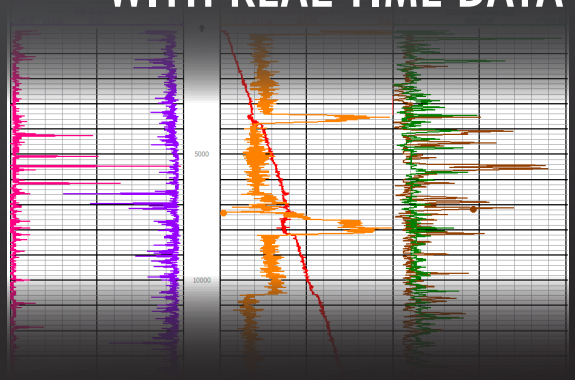
# THE SLICK-E-LINE® SYSTEM

## CONVENTIONAL SLICKLINE WITH REAL-TIME DATA



**ONE CREW. ONE SYSTEM. ONE RIG-UP.**

PARADIGM

# The Slick-E-Line® System

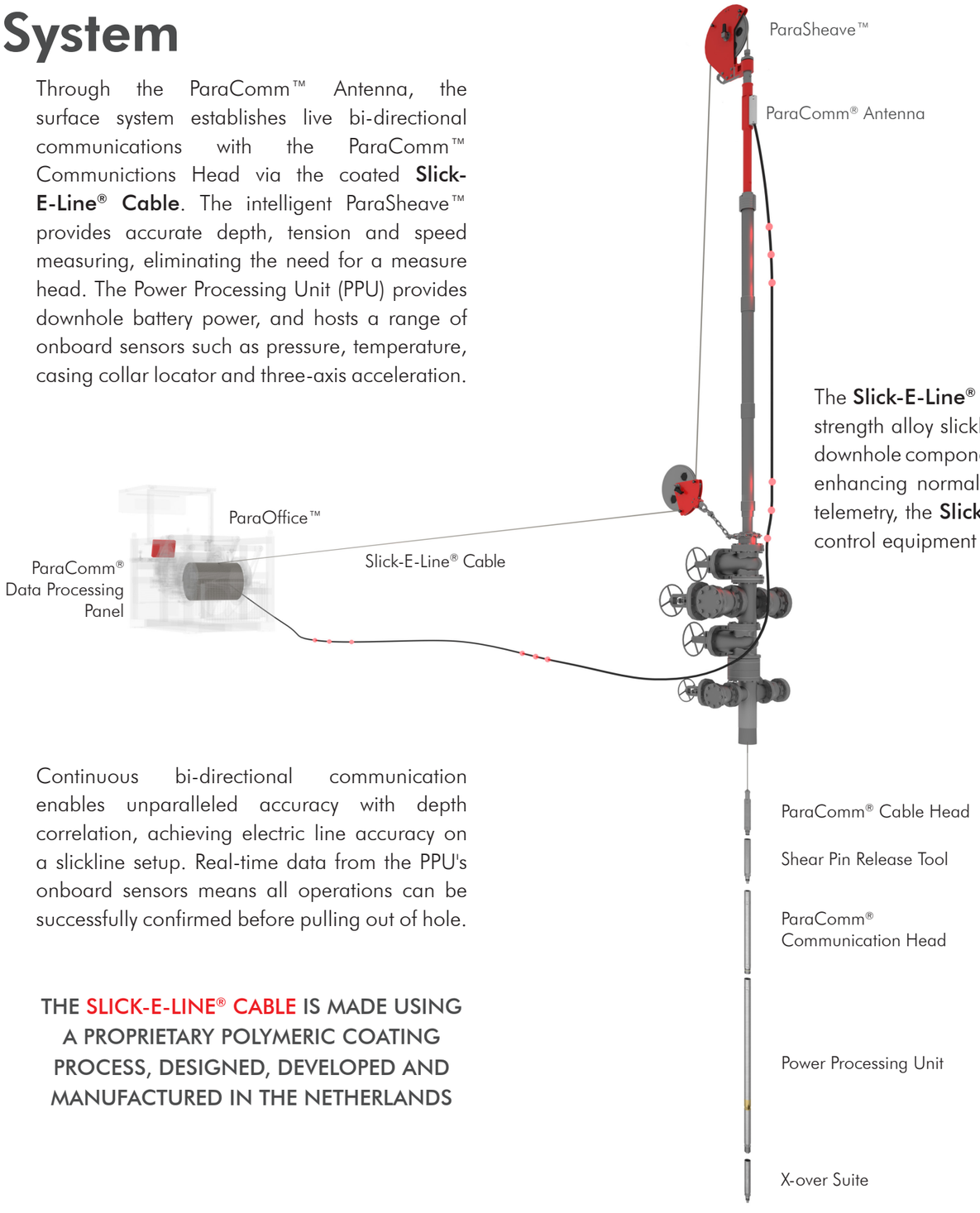
## ONE CREW. ONE SYSTEM. ONE RIG-UP.

The **Slick-E-Line® System** combines the versatility and efficiency of slickline with real-time data capabilities of electric line. Leveraging decades of experience, the cutting-edge **Slick-E-Line® System** incorporates the latest ParaComm® telemetry to bridge the gap between cased-hole electric line and slickline services. Augmenting any slickline equipment spread with live real-time data at surface gives service companies and operators the information needed to make real-time operational decisions, for the most efficient well intervention operations. One operational crew for slickline, cased hole logging, well integrity, perforating and setting operations, all with simpler and safer pressure control, and a smaller footprint.

**COMBINING CONVENTIONAL SLICKLINE CAPABILITY WITH REAL-TIME DOWNHOLE DATA, THE SLICK-E-LINE® SYSTEM WITH PARACOMM® TELEMETRY IS A PARADIGM SHIFT**

The system's surface equipment comprises an intelligent top sheave known as the ParaSheave™, a contactless communication device known as the ParaComm® Antenna, and a surface acquisition panel known as the ParaComm® Data Processing Panel. The downhole toolstring also comprises three standard elements; the ParaComm® Cable Head, the ParaComm® Communications Head (PCH), and the Power Processing Unit (PPU).

Through the ParaComm™ Antenna, the surface system establishes live bi-directional communications with the ParaComm™ Communictions Head via the coated **Slick-E-Line® Cable**. The intelligent ParaSheave™ provides accurate depth, tension and speed measuring, eliminating the need for a measure head. The Power Processing Unit (PPU) provides downhole battery power, and hosts a range of onboard sensors such as pressure, temperature, casing collar locator and three-axis acceleration.



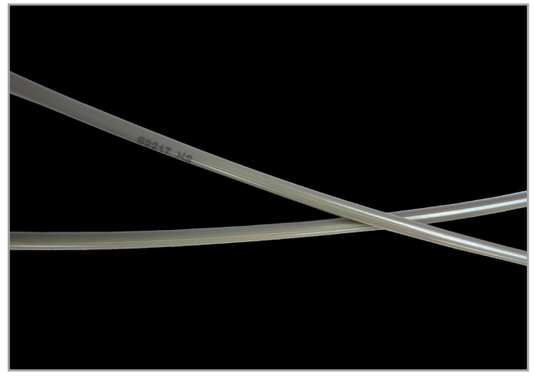

Continuous bi-directional communication enables unparalleled accuracy with depth correlation, achieving electric line accuracy on a slickline setup. Real-time data from the PPU's onboard sensors means all operations can be successfully confirmed before pulling out of hole.

**THE SLICK-E-LINE® CABLE IS MADE USING A PROPRIETARY POLYMERIC COATING PROCESS, DESIGNED, DEVELOPED AND MANUFACTURED IN THE NETHERLANDS**

# Slick-E-Line® Cable

The **Slick-E-Line® Cable** comprises a proprietary polymeric coating and a high-strength alloy slickline. The coating significantly reduces friction and abrasion to downhole components, as well as enabling bi-directional telemetry. Simultaneously enhancing normal mechanical slickline operations and enabling bi-directional telemetry, the **Slick-E-Line® Cable** is deployed using standard slickline pressure control equipment for fast rig up and safer operations.

| Dimensions | Typical |
|---|---|
| Slick-E-Line® diameter | 0.160" |
| Standard Lengths | 25, 30 or 35 kft |
| Breaking Load | 3,240 lbs |
| Line Stretch | 3.4 inch / kft / klbs |
| Sheave Wheel Diameter | min. 20" |
| Max. Working Pressure | 15,000 psi |



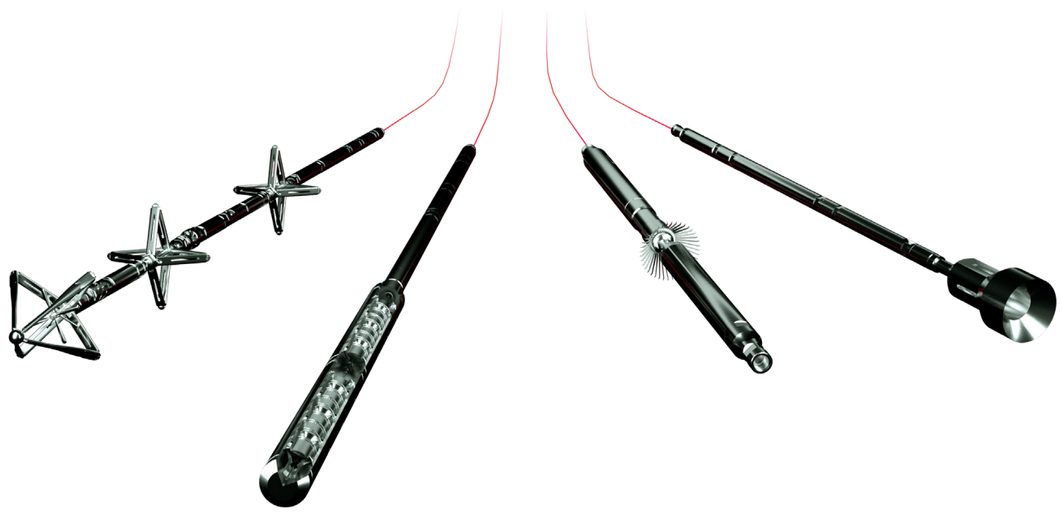
# Slick-E-Line® Service Capabilities

From mechanical slickline operations to production logging and well integrity measurement, the **Slick-E-Line® System** covers a wide range of demands.

Fully ruggedized downhole electronics allow the system to be used for perforating and pipe recovery operations as well as traditional mechanical jarring. Plug setting, dump bailing, tubing punching and operation of other electromechanical tools is all possible, with the **Slick-E-Line® System**'s real-time two-way communication from the surface.

A wide range of interfacing cross-overs allow the **Slick-E-Line® System** to operate with most industry-standard logging and well integrity tools, including Sondex, Probe and Spartek.

- All conventional slickline operations
- Intelligent drift
- Production logging
- Well integrity monitoring
- Fluid sampling
- Reservoir evaluation
- Explosive initiation
  - Perforating
  - Pipe cutting/recovery
- Non-explosive initiation
  - Plug setting
  - Tubing punching
  - Dump bailing





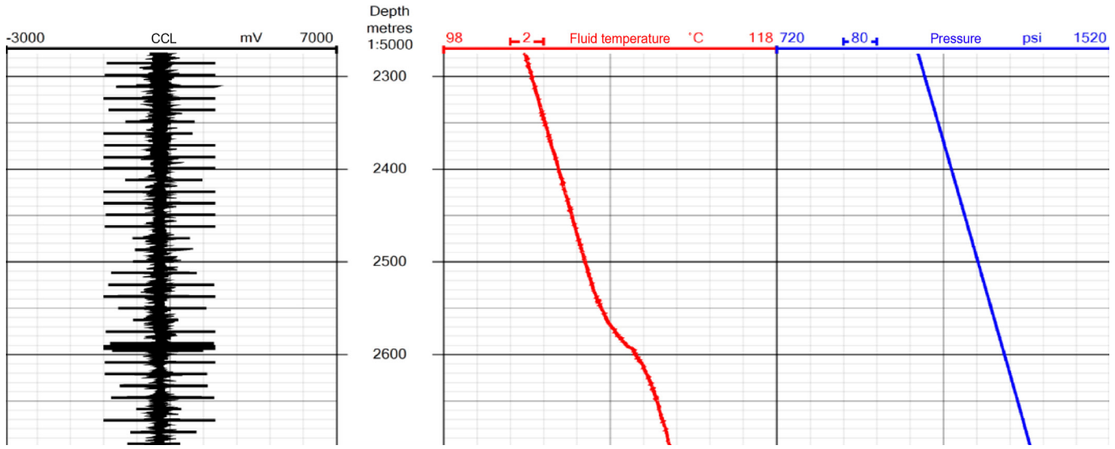


# Slick-E-Line® System Operational Examples

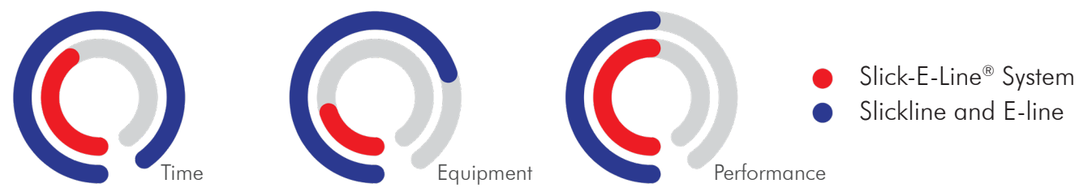
The **Slick-E-Line® System** presents significant advantages in terms of overall operation time, equipment footprint requirements, and operational performance. A few examples are presented below.

## Intelligent Drift

Quite often a drift run needs to be performed. With the **Slick-E-Line® System**, correlation can be performed directly and simultaneously during the drift run. Inclination, pressure, temperature, CCL are all available in real time, saving at least one run.




### Relative System Performance for Intelligent Drift

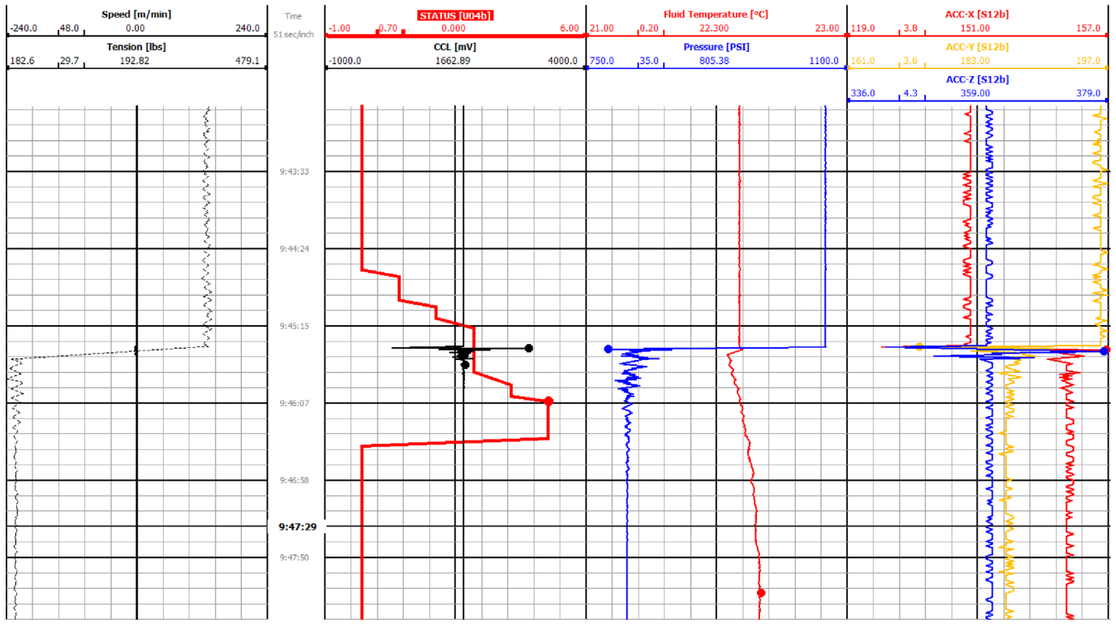





Slick-e-Line

## Real Time Perforating

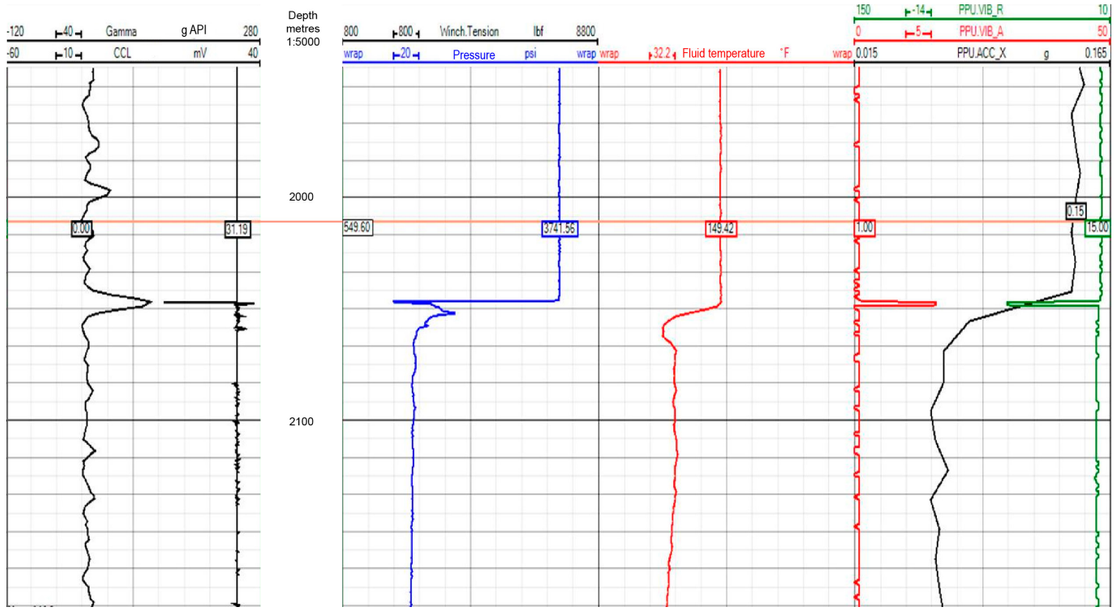
Running explosives on slickline is quite common. Running on the **Slick-E-Line® System** gives the possibility to activate the trigger from the surface in real time, and observe the perforating event live in real time from surface. For example, as a direct result of a succesful perforating event, a change in pressure and temperature due to fluid communication can be observed in ParaOffice™.




### Relative System Performance for Real Time Perforating


## Tubing Punch Operations

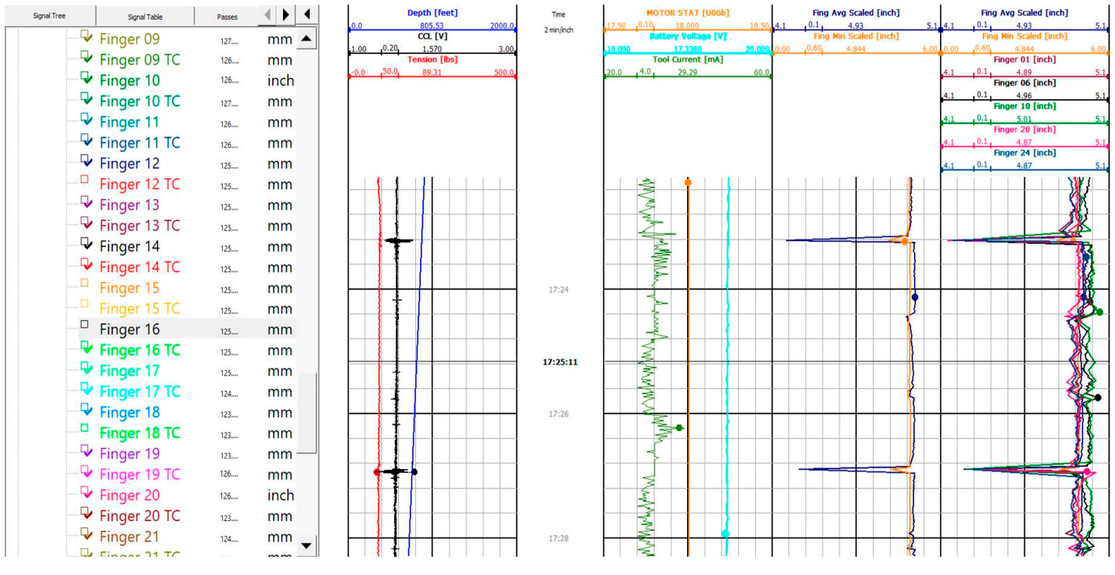
During a tubing punch operation, it important to locate the punch correctly, at a known, specified depth. Using the **Slick-E-Line® System** and the inherent live data from a variety of sensors, indicators of a punch event can be seen in real time at surface. These indicators are matched in the time domain with depth and thus allow for accurate, real time positioning of the punch. Live CCL data can further lend confidence to the measured punch depth data; all displayed and recorded in the same unified data plot in ParaOffice™.




### Relative System Performance for Tubing Punch Operations

# Well Integrity Assessment with Multifinger Caliper Tools

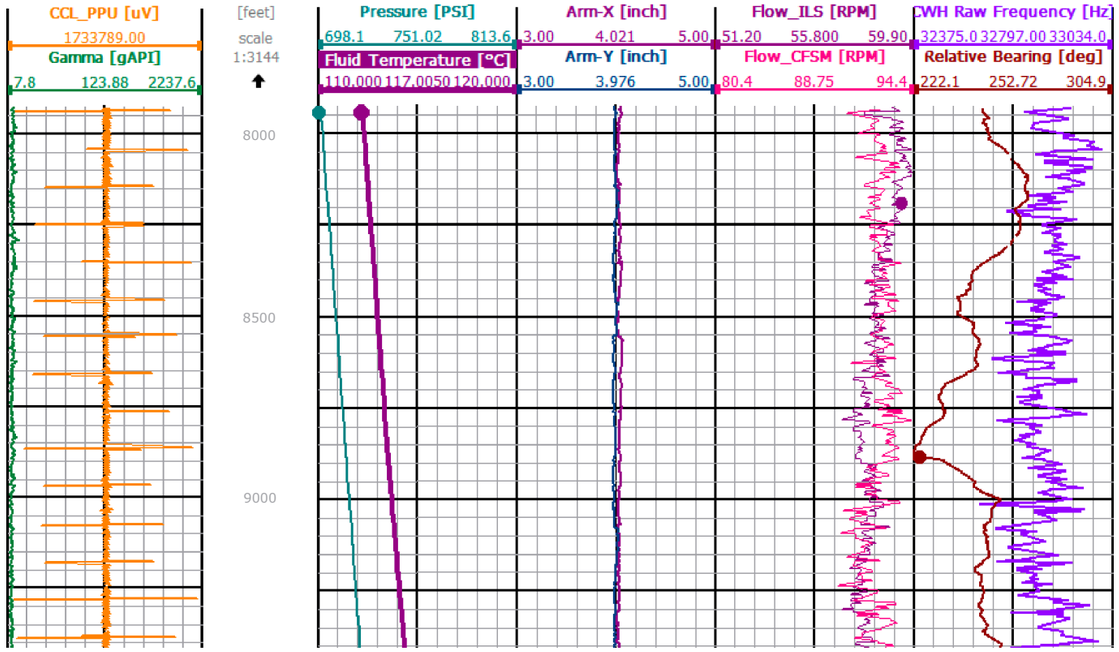
With a slickline rigup, even a complete well integrity assessment operation can be performed. With ParaOffice™, the caliper fingers are controlled from surface, and depth can be correlated with CCL simultaneously. All relevant data, including all of the PPU's onboard sensors, is available live at surface in ParaOffice™.



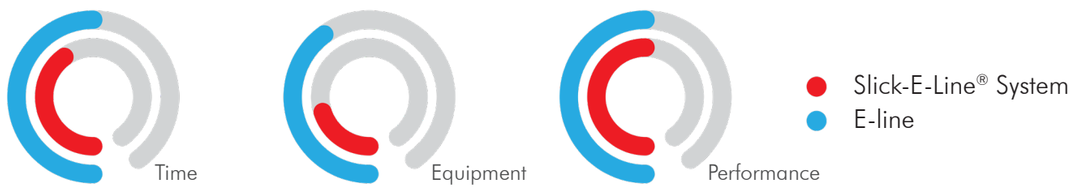

## Relative System Performance for Well Integrity Operations


# PLT Correlation with GR and CCL

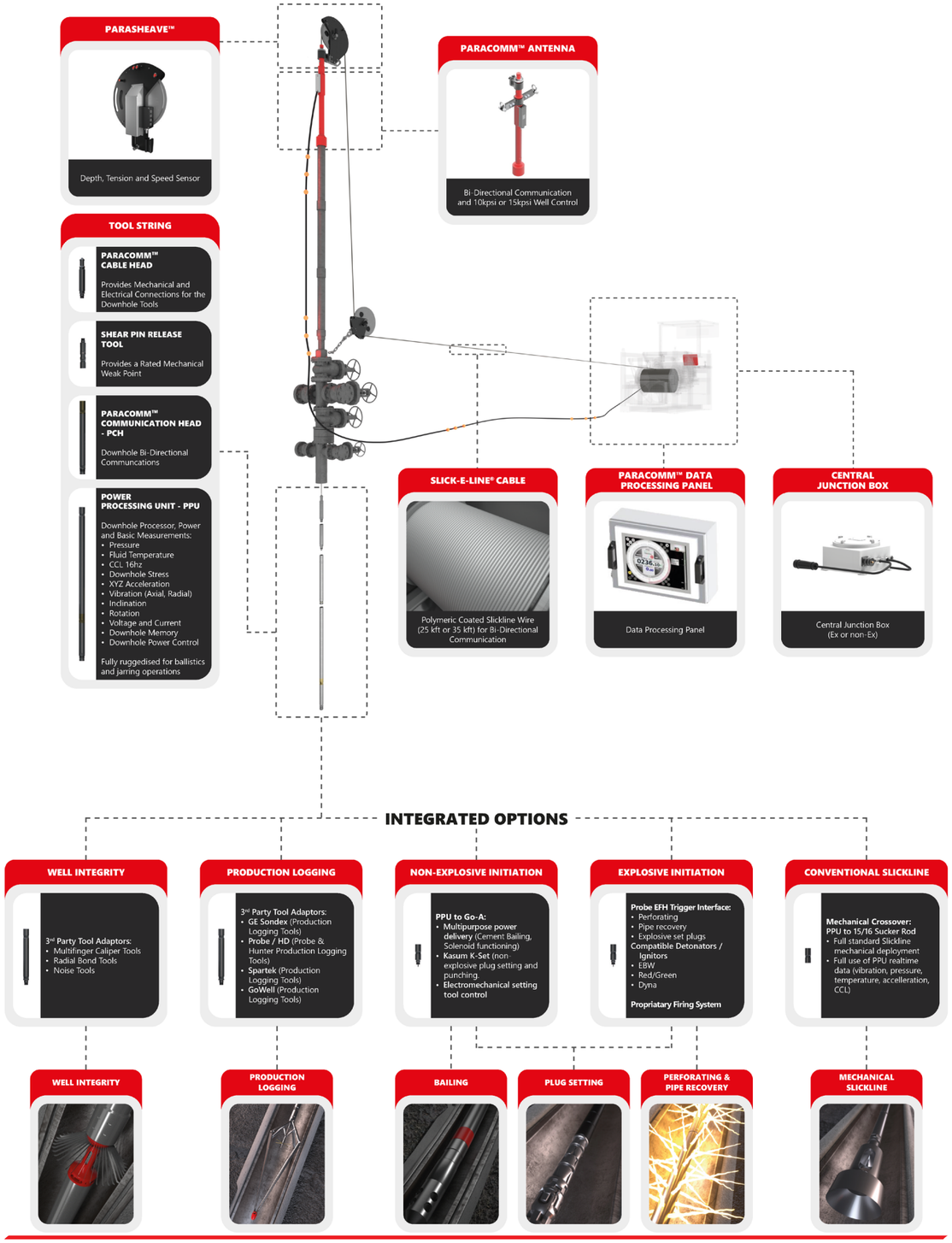
A complete PLT operation with the **Slick-E-Line® System** is possible, only requiring slickline pressure control equipment. Logging of pressure (via Quartz sensor), temperature, density and actual water hold-up, flow, and X-Y caliper measurements is all possible. Further live data monitoring and capture is possible for inclination, vibration and relative bearing.




## Relative System Performance for Production Logging



# Slick-E-Line® System Components







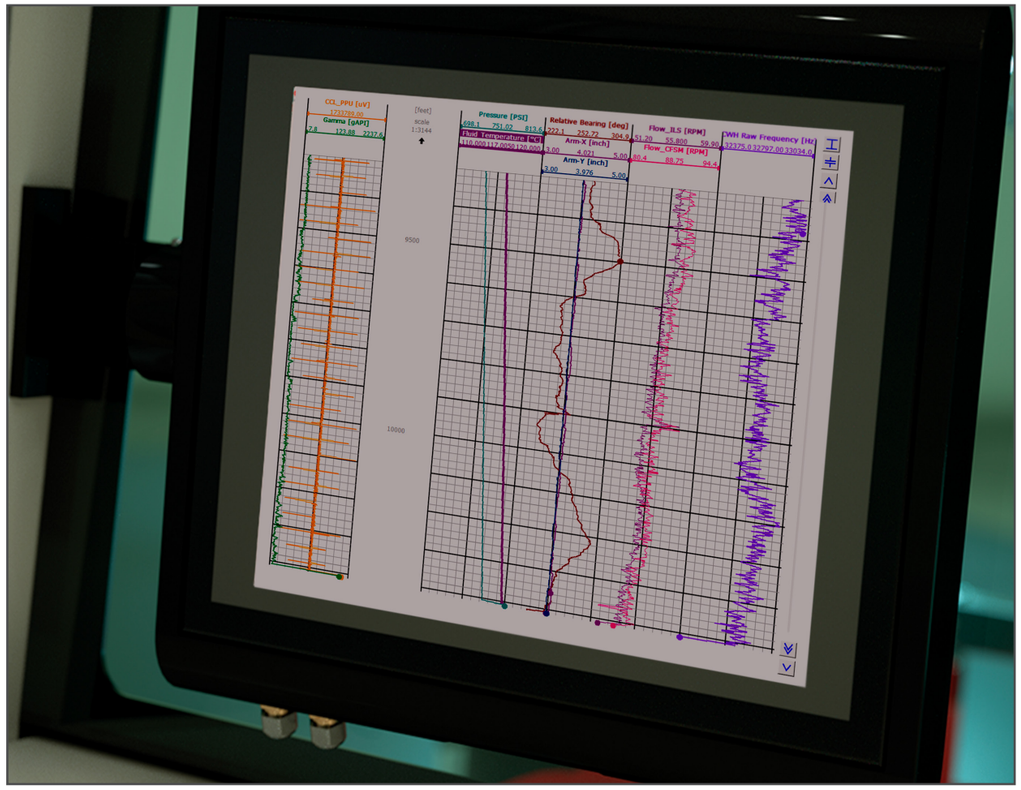

# ParaOffice™

ParaOffice™ is Paradigm's proprietary data acquisition software specifically desinged to be used in conjunction with the Slick-E-Line® and ParaComm® Systems. Aquiring data simultaneously in the time domain as well as the depth domain, ParaOffice™ offers an intuitve and easy-to-use interface that allows full control of the ongoing operations.

Plotting data in real time, performing click-and-drag correlations, and controlling an extensive suite of downhole tools can all be handled by ParaOffice™. Examples of acutated tools that can all be controlled at surface via ParaOffice™ are:

- Multi-finger Caliper Tools
- Bailers
- Casing Punch
- Explosive Perforation and Setting
- Electromechanical Setting

All functions and commands have been designed with the user in mind, resulting in intuitive and simple control.



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