



RIG CONTROL • TELEMETRY • INTEGRATION

OPERATING SYSTEM • THIRD GENERATION

Xenon

One operating system for the whole site — the PLC that runs the machine, the console that commands it, and the telemetry that streams off it.

SIL 2

WHERE REQUIRED

175

BLACK BOX DATA POINTS

12 months

OF OPERATION STORED

One console

RIG, CATWALK, MAGAZINES, MUD

EXPLORATION DRILL RIGS PTY LTD
REDBANK, QUEENSLAND, AUSTRALIA

OPERATING SYSTEM
XDR.COM.AU

THE SYSTEM

The machine, the console, *and everything above it.*

Xenon is the operating system at the heart of every piece of XDR third-generation oilfield equipment — the safety-rated PLC that runs the machine, the driller's console that commands it, the telemetry that streams off it, and the integration that lets one operator run the whole site from the rig.

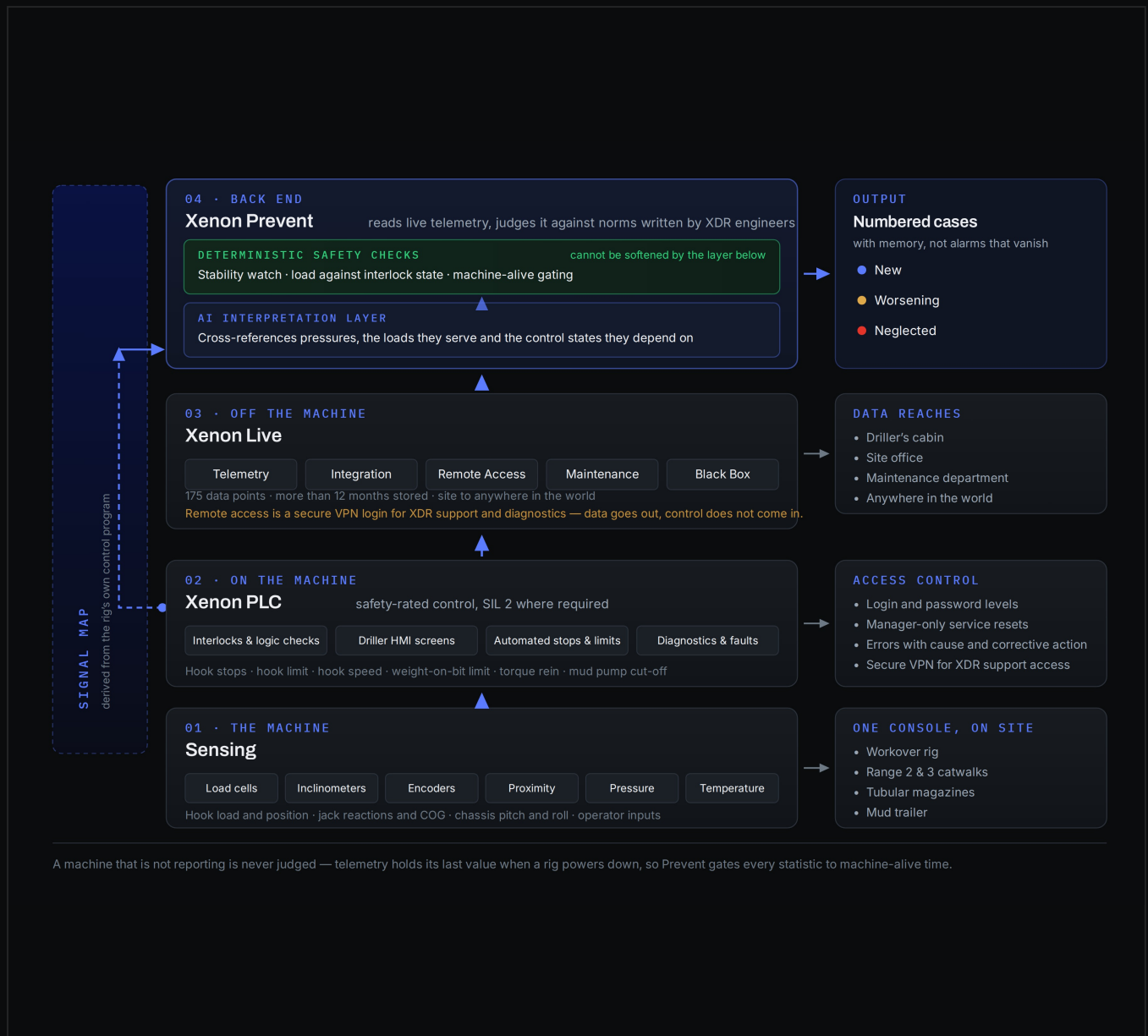
It is designed to increase productivity, cut non-productive time, add layers of safety and simplify troubleshooting — and it is fully customisable to the client's needs.

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Four layers, from the sensor to the case.

Sensing on the machine, a safety-rated PLC running it, telemetry streaming off it, and Prevent watching. Remote access is a secure VPN for XDR support — data goes out, control does not come in.



THE SIGNAL MAP RUNS UP THE LEFT — THE NORMS PREVENT JUDGES AGAINST ARE DERIVED FROM THE RIG'S OWN CONTROL PROGRAM

02 / ON THE MACHINE

ELEMENT	DESCRIPTION	NOTES
01 Control system	— Safety-rated PLC with interlocks, logic checks and automated protections — Typically achieving a level equivalent to SIL 2 where required, using safety relays and a safety PLC — All automatic functions require a man-present button held down, or positive operation of a control — Integrated IP67 rated levers and joysticks	
02 Sensing	— Inclinometers for chassis pitch and roll — Absolute encoders on the drawworks for hook position — Proximity sensors on mast lock pins, wedge and anti-two-block — Pressure sensors on brake, boost, drawworks, pilot, power swivel, power tong and test pump circuits — Temperature sensors on hydraulic oil — Load cells beneath the rear jack legs, where IntelliBeam is fitted	
03 Automated functions	— Set-up stop, set-down stop and clear stop — user-defined hook stop positions — Hook limit and hook speed control — Weight-on-bit limit and Auto-WOB drilling — Torque rein engagement from the console — Mud pump pressure cut-off and flow control — Turtle mode and permanent turtle mode for fine, slow movement	
04 Fail-safe behaviour	— Emergency stops at all control positions and close to where personnel work — Redundant solenoid valving on drawworks and mud pump closed-loop circuits — Counterbalance valves on every cylinder, actuator and motor, so loads lock in position if hydraulic power is lost — Low hydraulic oil level and high oil temperature both shut the power pack down — The machine does not restart automatically when power returns	

Two joysticks, five levers, and one screen that changes job.

IP67 rated levers and joysticks, an emergency stop within reach, and a screen that becomes the tripping, drilling or mud station depending on what the rig is doing. The deadman must be held before anything moves.



TRIPPING – HOOK LOAD, HOOK POSITION, DEADMAN PROMPT



MUD – FLOW RATE, PRESSURE, PRESSURE CUT-OFF

Selectable colour sets

The HMI ships with alternative colour sets for operators with impaired colour vision — the same screens, the same data, read reliably by more of the crew.

Errors that say what to do

On-screen messages state the described cause and the corrective action, not a fault code to look up.

Dedicated screens per task

Setup, tripping, drilling, mud pump and engine management each get their own screen, rather than one screen trying to serve every job.

Login and permission levels

Password levels with manager-only access for restricted service resets, so the machine's protections cannot be cleared casually.

03.1 / THE SCREENS

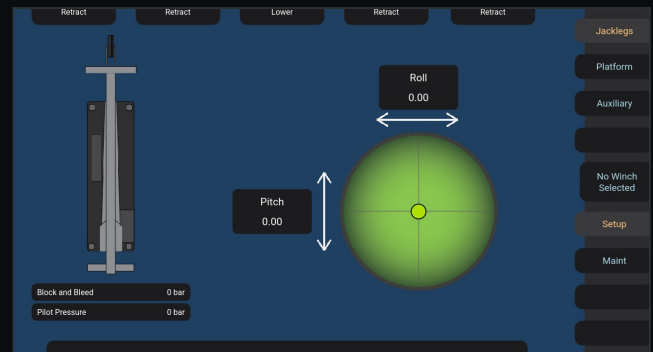
A screen for each job.

Rather than one screen serving every operation, the HMI presents a dedicated screen per task, each carrying only what that task needs.



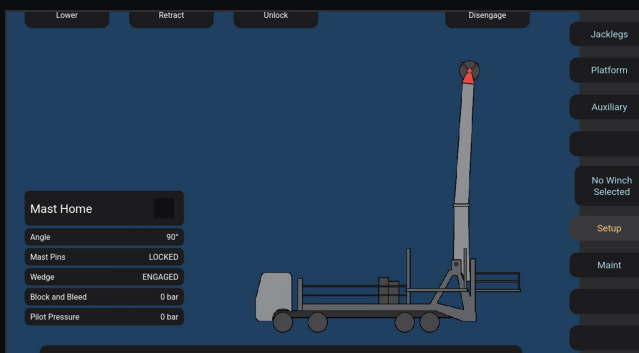
Home

Hydraulic and engine status at a glance, with oil temperatures, pressures, fuel and RPM.



Levelling

Jack leg control with the pitch and roll bubble — the rig levelled before anything is loaded.



Mast

Mast angle, mast pins, wedge and block-and-bleed state during raising and lowering.



Tripping

Hook speed, hook load, tong pressure, hook position and the next hook stop.



Drilling

Weight on bit, torque, rotary speed and swivel, with auto-drill and torque rein.



Mud pump

Flow rate, pressure, barrels pumped and the pressure cut-off, run from the driller's console.

03.2 / DIAGNOSTICS

Down to the *individual node*.

The diagnostic screen shows live status for every PLC and CAN node on the bus, with the I/O and voltage state of each module. When something stops working, the driller can see which module it is before anyone calls for support — and if support is needed, the same picture is available over the VPN.



EVERY NODE ON THE BUS, WITH ITS I/O AND VOLTAGE STATE

WHO MAY CHANGE WHAT

Login and password levels, with manager-only access for restricted service resets. Protections cannot be cleared casually, and the system records who cleared them.

The standard system, *scaled up.*

Xenon ships as a complete operating system. The Live packages extend it off the machine — to the site office, to the maintenance department, and to XDR support.

- | | |
|--|--|
| 01
Xenon Live Telemetry | Transmits selected parameters from any piece of XDR plant on site to anywhere in the world — equipment activity, hydraulic fluid levels, mud flows, pit volume totalisation and trending graphs. |
| 02
Xenon Live Integration | Gives the rig operator control of the plant on site from the rig control cabin. |
| 03
Xenon Live Remote Access | A secure VPN login for XDR support and diagnostics. Data goes out; control does not come in. |
| 04
Xenon Live Maintenance | Monitors the mechanical movement of moving parts and alerts the maintenance department to prepare spares — hydraulic, engine and gearbox oils, drawworks rope change and triplex pump lubrication. |
| 05
Xenon Live Black Box | Tracks up to 175 data points and stores more than 12 months of operation. After an incident the CSV files graph directly, showing joystick positions, hydraulic pressures, hook loads and other parameters that contributed to it. |

REMOTE ACCESS IS NOT REMOTE CONTROL

Remote access is a secure VPN login that lets XDR support see the machine and diagnose it. Data goes out; control does not come in. Operation of the plant stays with the operator on site, on the console, behind the deadman.

The rig operator runs *the plant*.

Xenon Live Integration gives the rig operator control of the plant on site from the rig control cabin — catwalks, magazines and the mud system on the same console that runs the rig.

Workover rig

The console is the rig. Hoisting, mast, platform, power swivel, tongs and slips, with the automated stops and limits above.

Catwalks

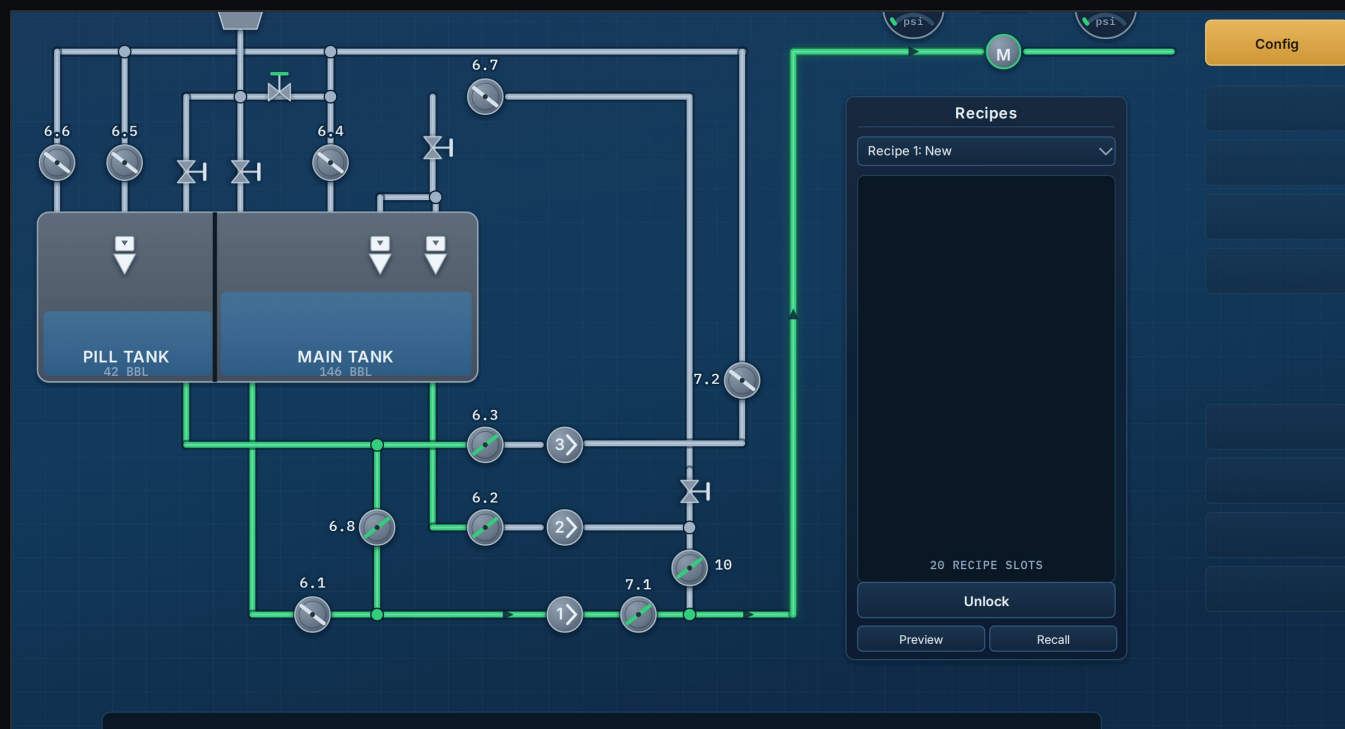
Range 2 and Range 3 catwalks run on Xenon, with semi-automated tubular processing, user defined stop points and IECEx rated remote control.

Tubular magazines

Magazine to catwalk and catwalk to rig floor, processing up to 100 joints per hour without hands on the pipe.

Mud trailer

Complete control of the mud system from the driller's console over a wireless link, with safety interlocks preventing dual control, twenty stored recipes and pneumatic valves that report their position back to the screen.



THE MUD SYSTEM AS THE DRILLER SEES IT – EVERY VALVE REPORTING ITS ACTUAL POSITION, WITH TWENTY STORED RECIPES

Xenon is one brand, several layers.

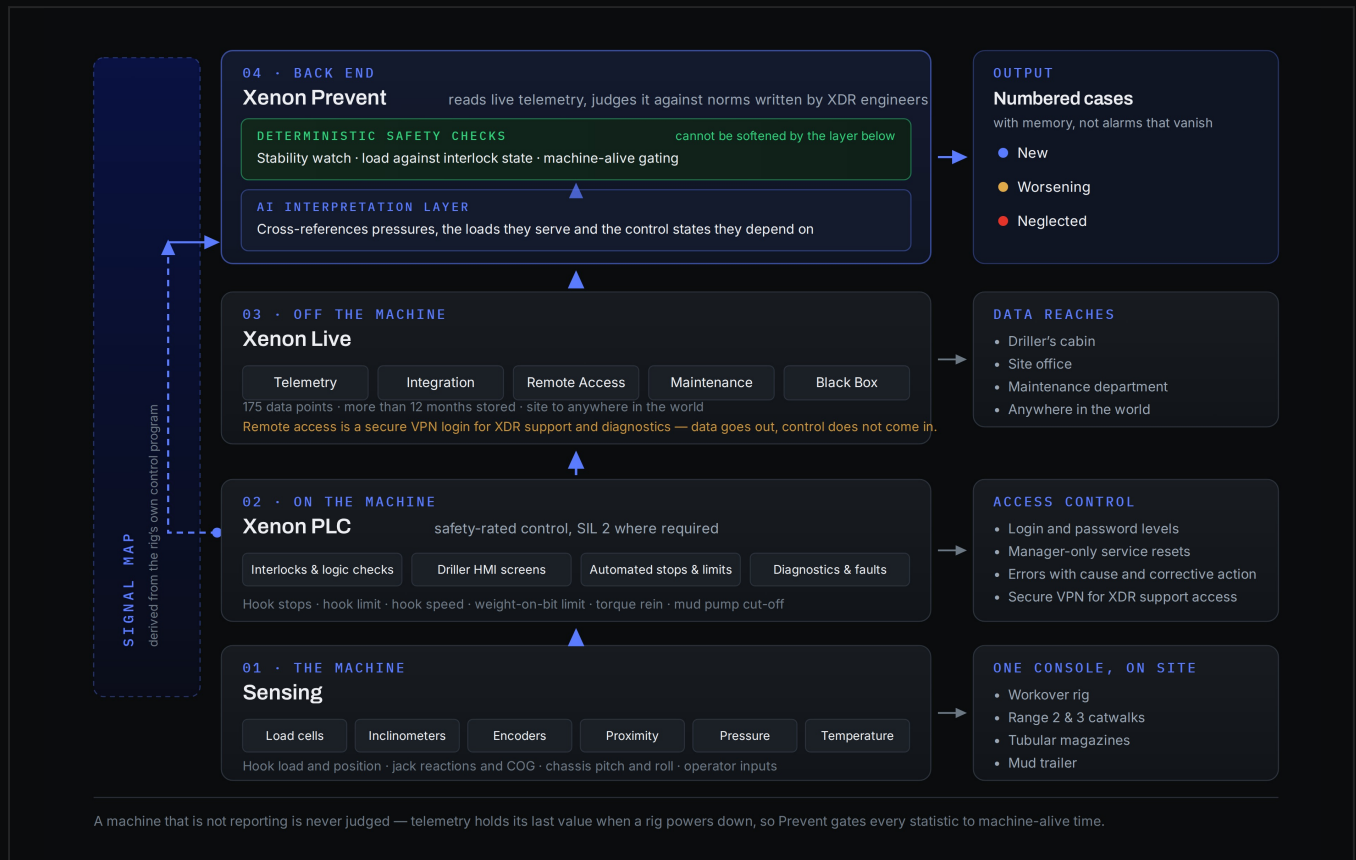
The PLC, the telemetry and everything built on top of them are the same system, not separate products bolted together. Two layers sit above the telemetry, and each has its own document.

IntelliBeam®

Load sensing pads beneath the rear jack legs feed the PLC, which calculates the lateral centre of gravity and displays it live on the HMI. Separate document available.

Xenon Prevent

The back end that reads the telemetry and judges it against norms written by XDR's engineers, raising numbered cases rather than alarms. Separate document available.



PREVENT SITS AT THE TOP; THE DETERMINISTIC SAFETY CHECKS SIT ABOVE THE AI LAYER WITHIN IT

WHY IT MATTERS

Fewer people at the rig site, *and better placed.*

One system, whole site

Rig, catwalks, magazines and mud trailer under one console — fewer people at the rig site, and they work out of harm's way.

The machine explains itself

Diagnostic screens down to individual CAN nodes, and error messages that state the cause and the corrective action.

Twelve months of black box

175 data points stored for more than a year, graphable directly after an event.

Safety built into the control, not bolted on

SIL 2 where required, man-present on every automatic function, counterbalance valves throughout and redundant valving on the critical circuits.

Readable by more of the crew

Selectable colour sets for operators with impaired colour vision.

A platform, not a dead end

IntelliBeam and Xenon Prevent are layers on the same system, not separate products bolted onto it.

SUPPLIED BY

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SCOPE

Xenon is fully customisable to client requirements. Any equipment not clearly specified in this document is not included in XDR's scope of supply.

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