BY AARBAKKE INNOVATION

Well Decommissioning Conference – Aberdeen, 10th June 2025

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Operational & Technical Manager

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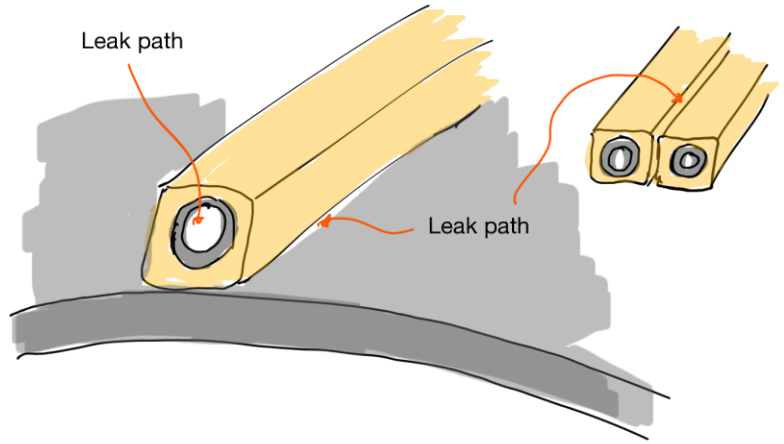
Axter Retrieve

The enabler for permanently leaving the tubing string in the wellbore by removing the cable outside the tubing string to permit cementing the tubing in place.

Moving from Rig to
Well Intervention Vessel.

DHG and FO cables together with Hydr. control lines will create a leak-path through cement over time, both internally and externally through the plastic cover. They have not been designed to last for ‘eternity’.



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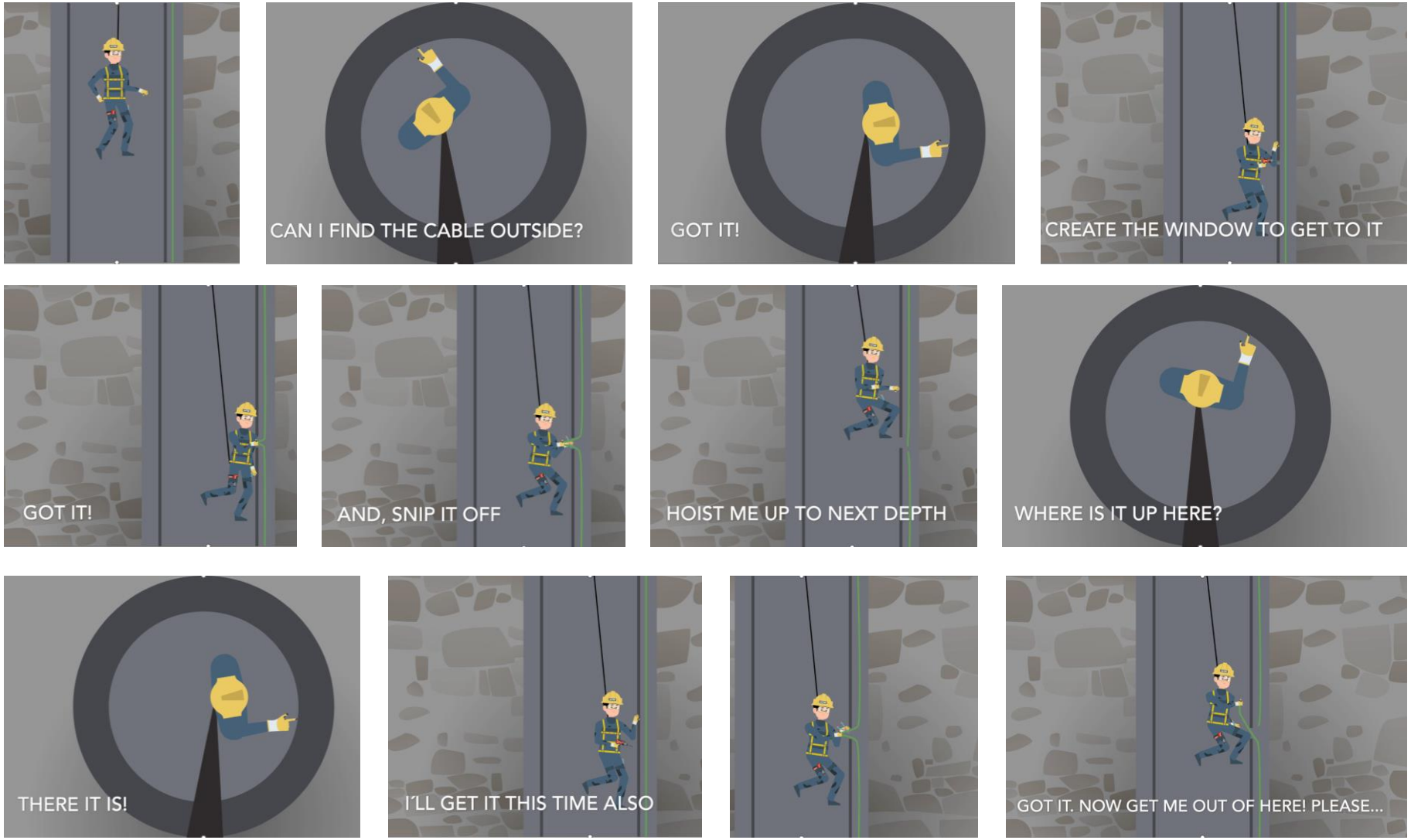
The Axter Retrieve solution



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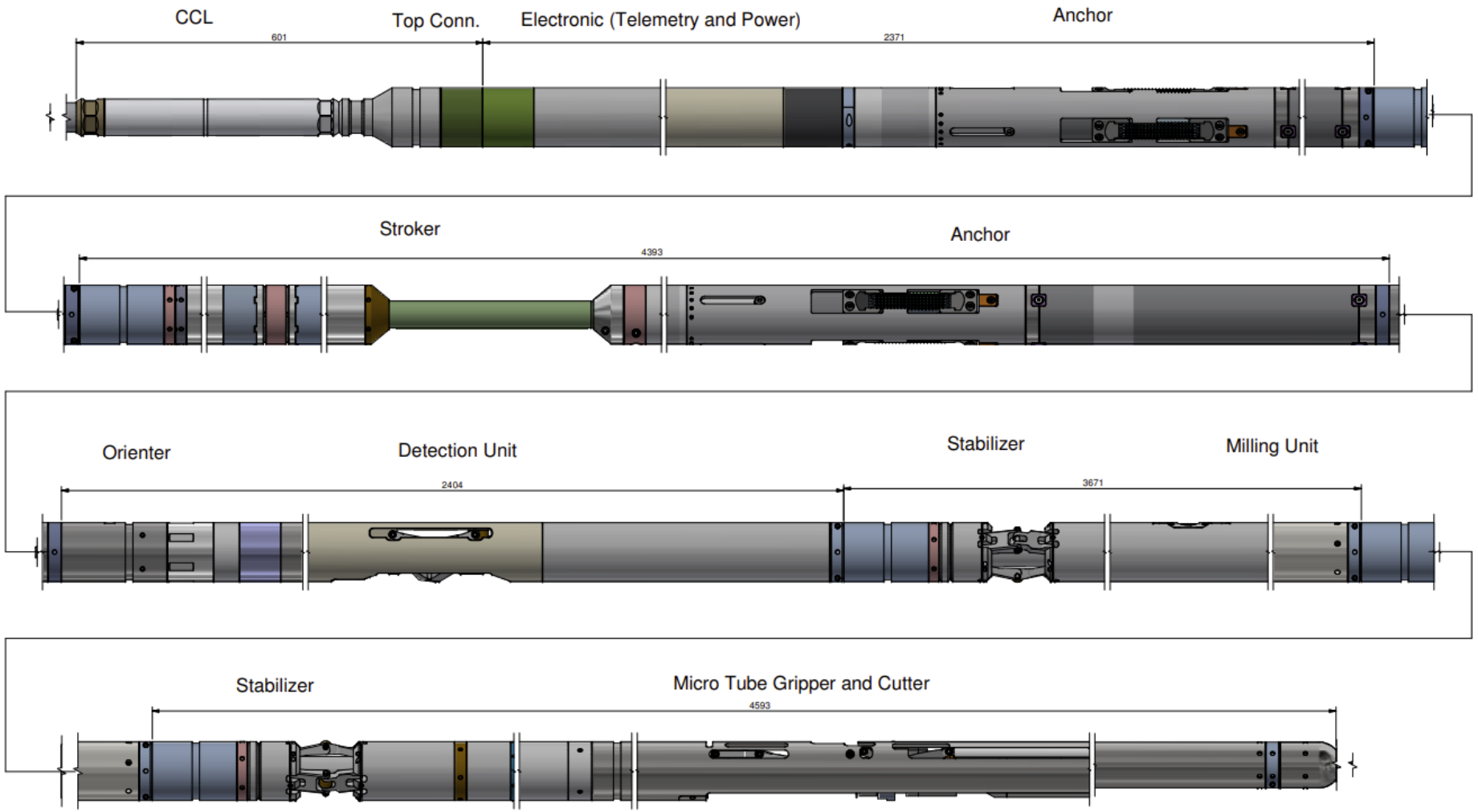
The 4-1/2” Axter Retrieve tool string

To be run on 5/16” Mono-conductor and larger Multi-conductor cables



3 sets of tools for 4-1/2” tubing will be ready for operation this summer

5-1/2” to 7” version with Flatpack capability are coming!

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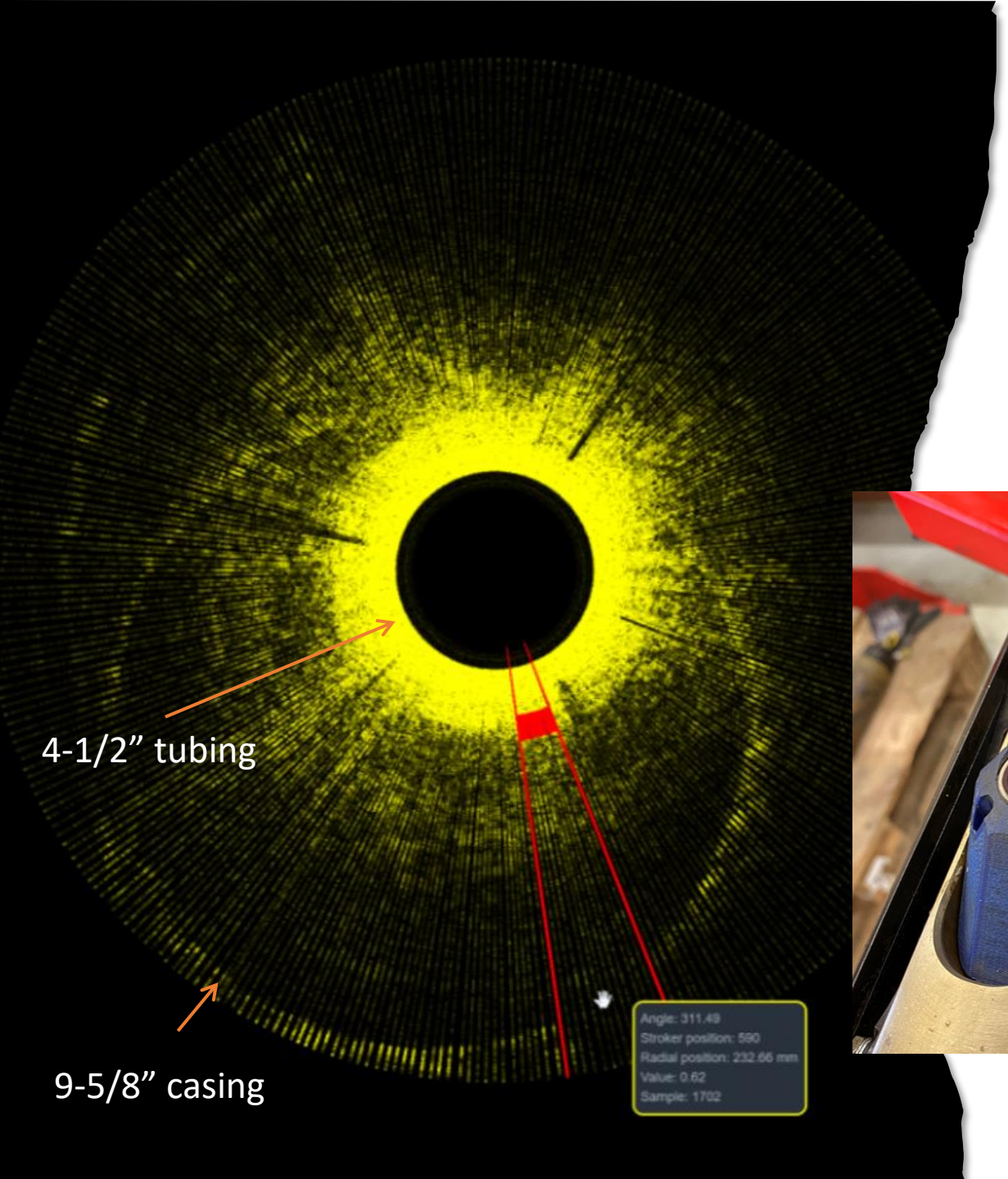
Real Time Through Tubing Imaging Tool



- Capable of detecting external cable position along a tubing string (outside cable clamps).
- Measures Tubing within Casing Eccentricity and detects Casing Deformation.

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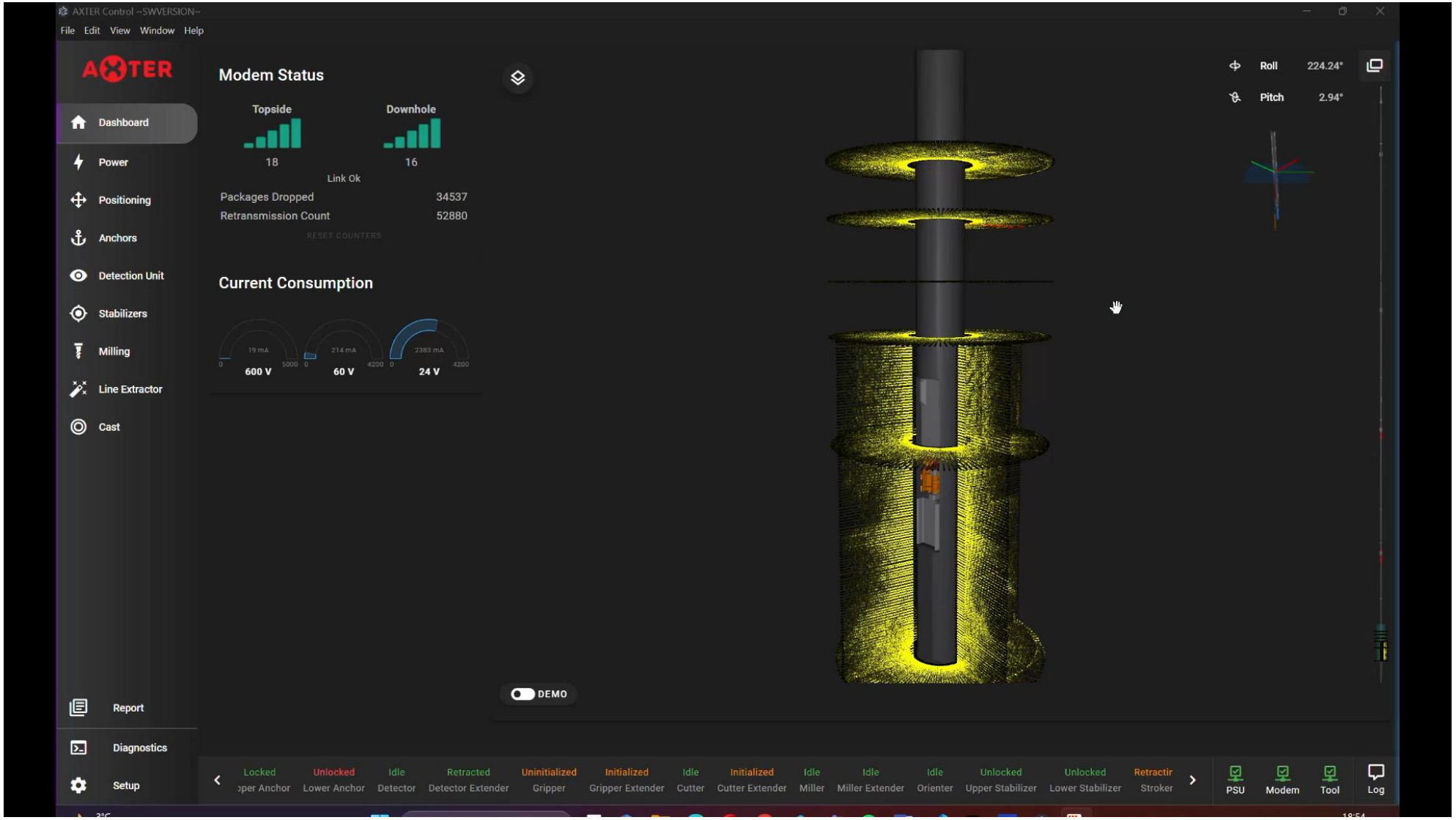
User Interface, Scanning operations



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Lateral Miller

- Powerful and stable milling unit, high cutting rate.
- 3-4 mm Swarf size.
- Special designed mill bits for different applications.
- Mill designed to extend to max. 5mm outside tubing OD (Fully controllable from operator panel).

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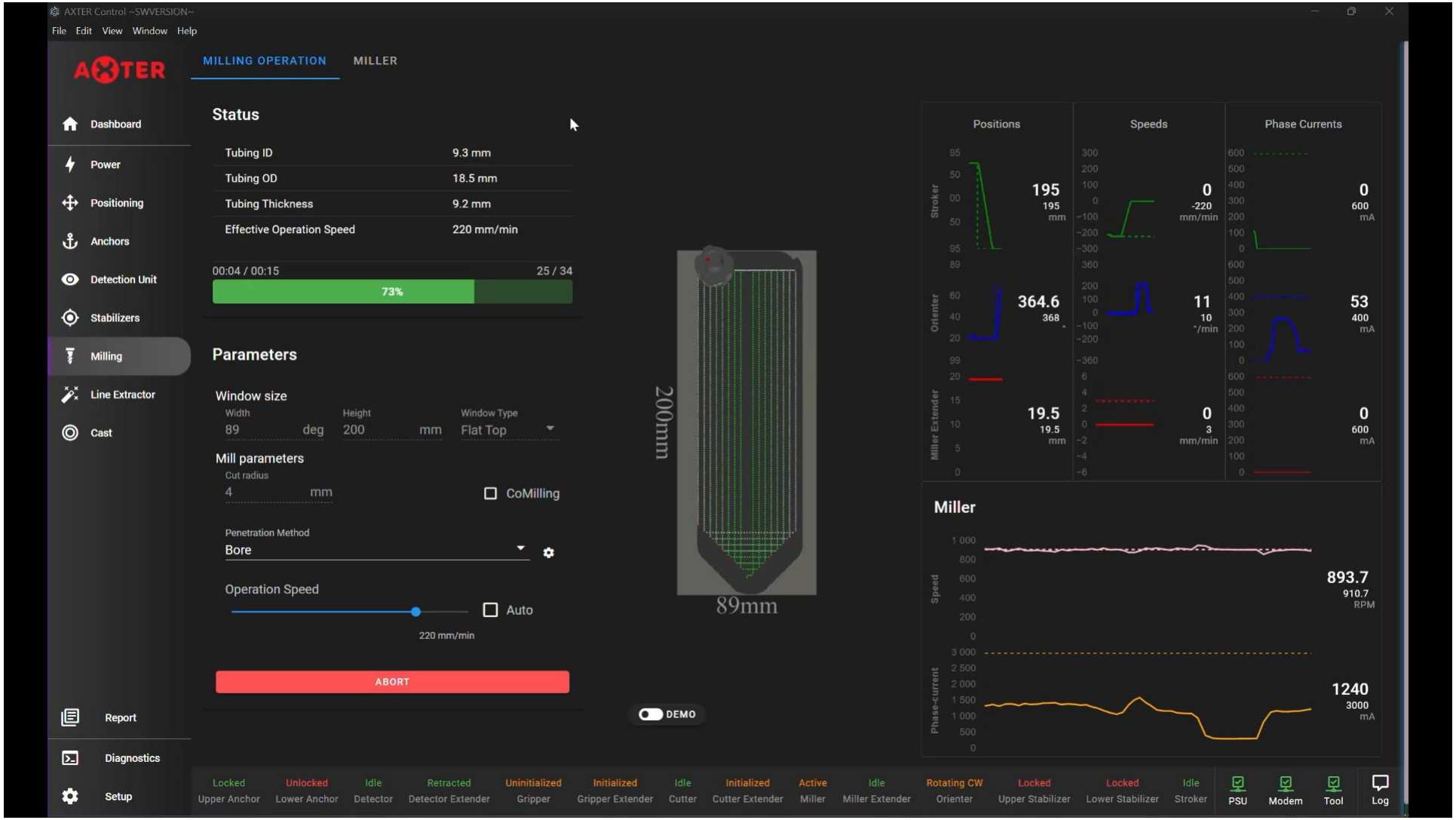
User Interface, milling operations



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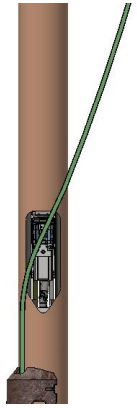
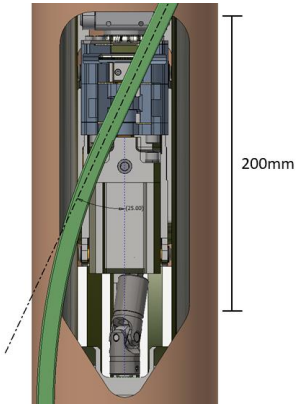
Control line Gripper & Cutter Unit

Gripper locked onto control line

Gripper biting into steel tube

Cut surface





Gripper able to grab control line where line is positioned at an angle of up to 25° in relation to tubing.

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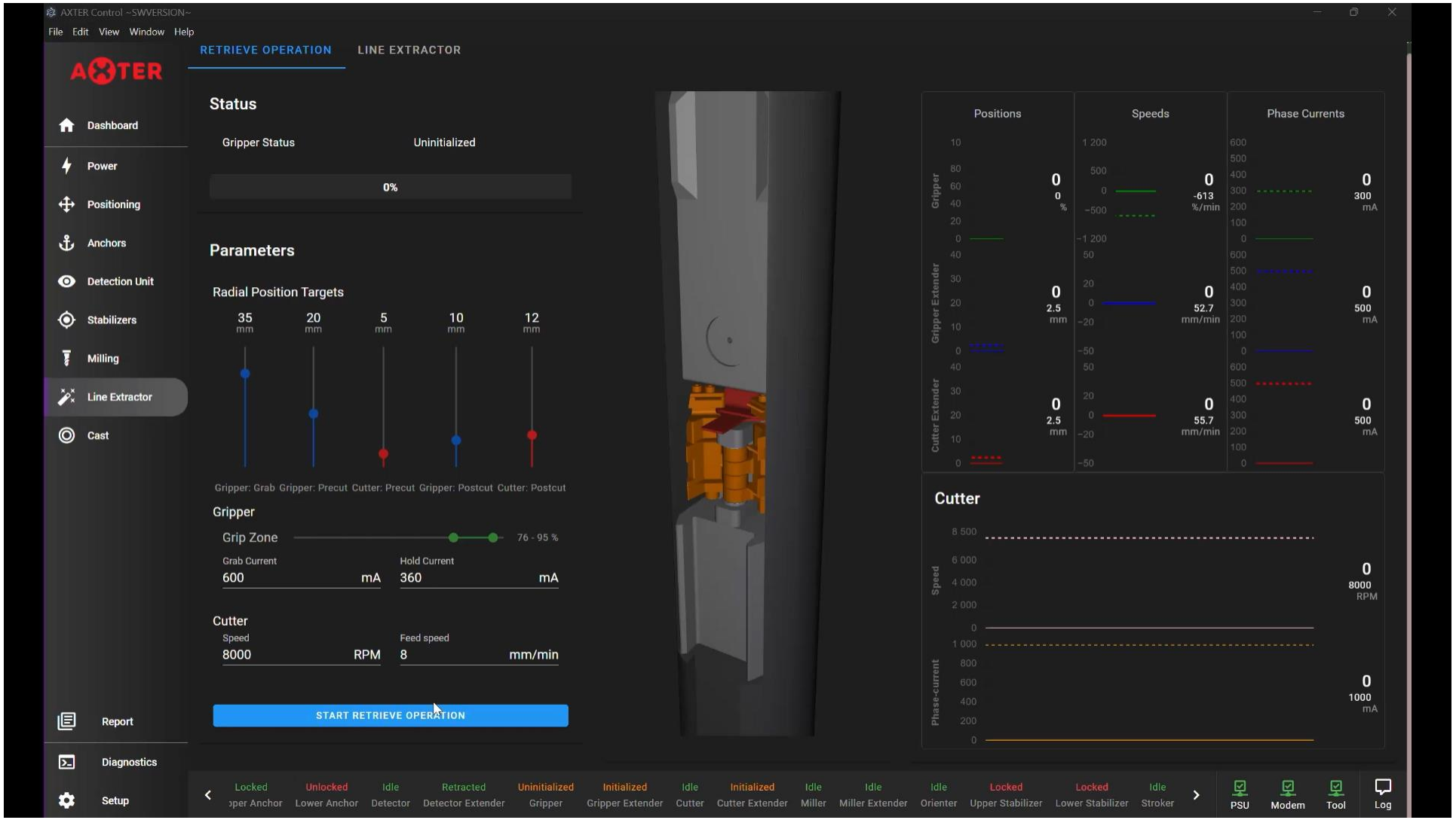
User Interface, Gripper & Cutter operations



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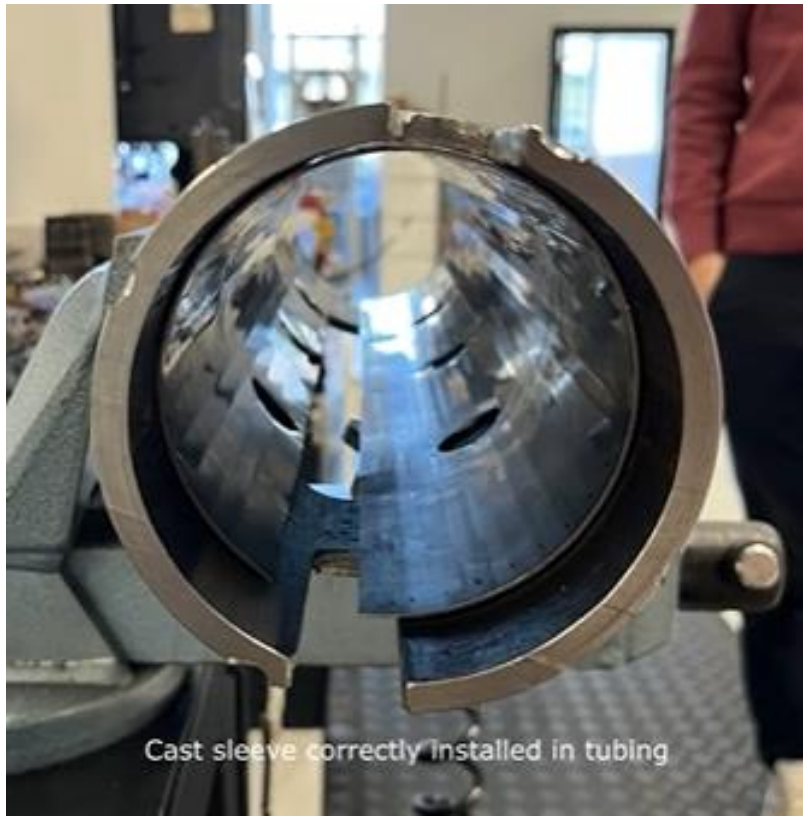
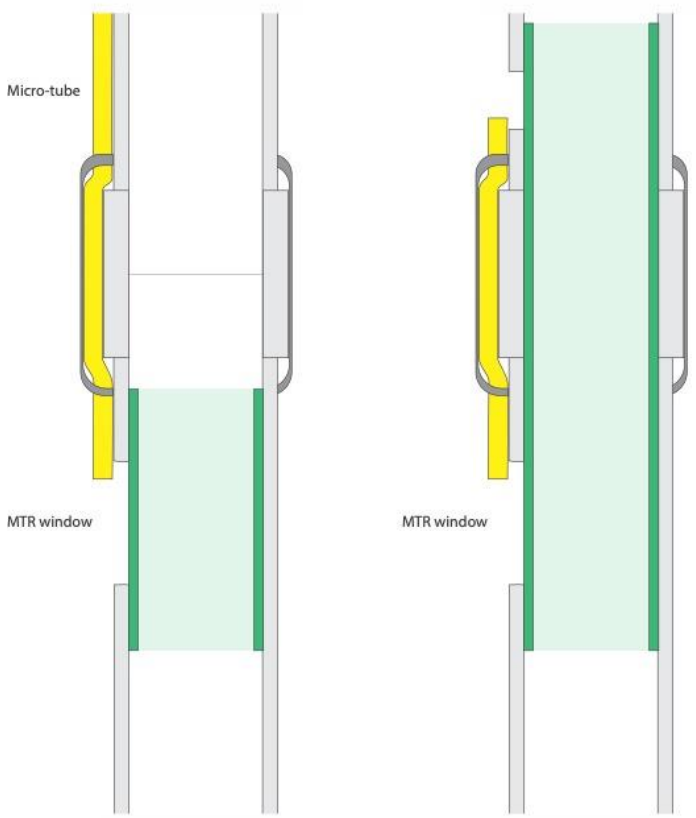
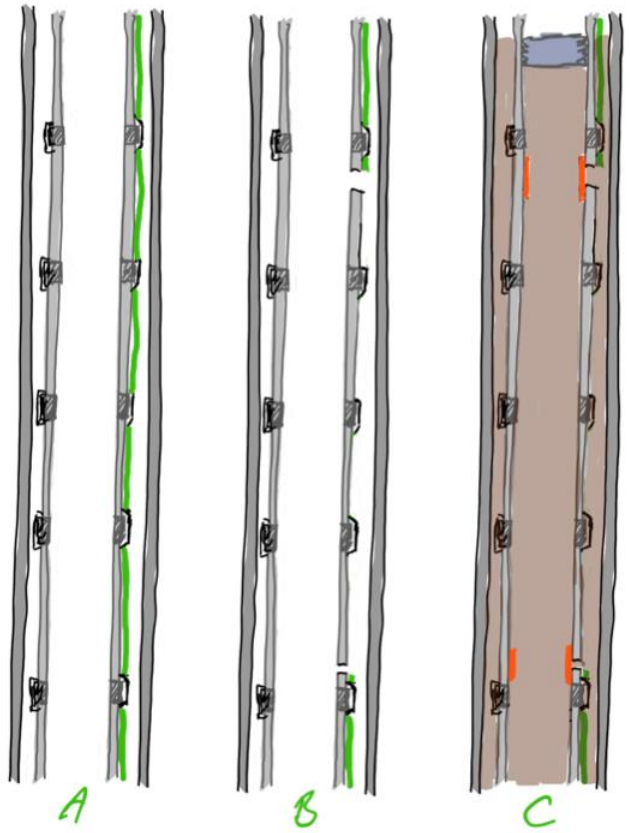
Axter Cast – Low cost and rapid installation of sleeves for cementing purposes

The Axter Cast straddle







- A patch/straddle with minimum ID reduction, can be placed across milled windows
- Allows cement darts to easily pass through

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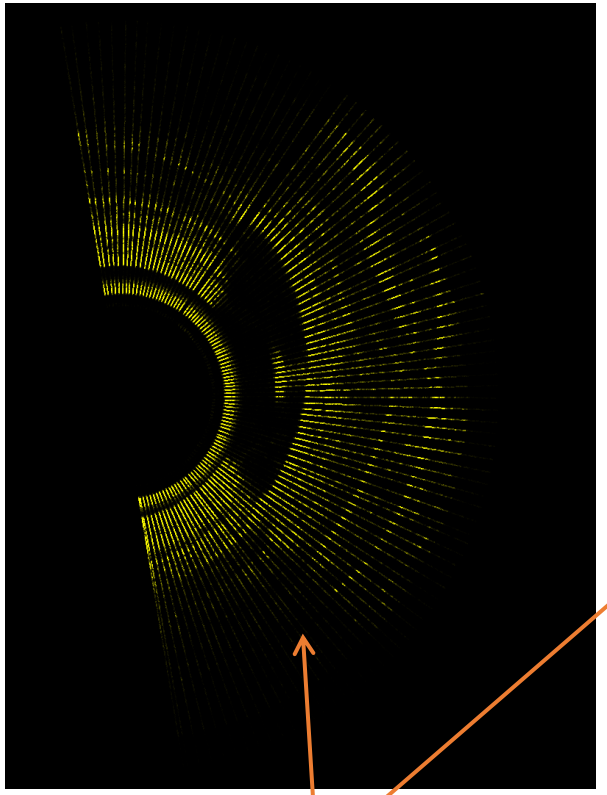
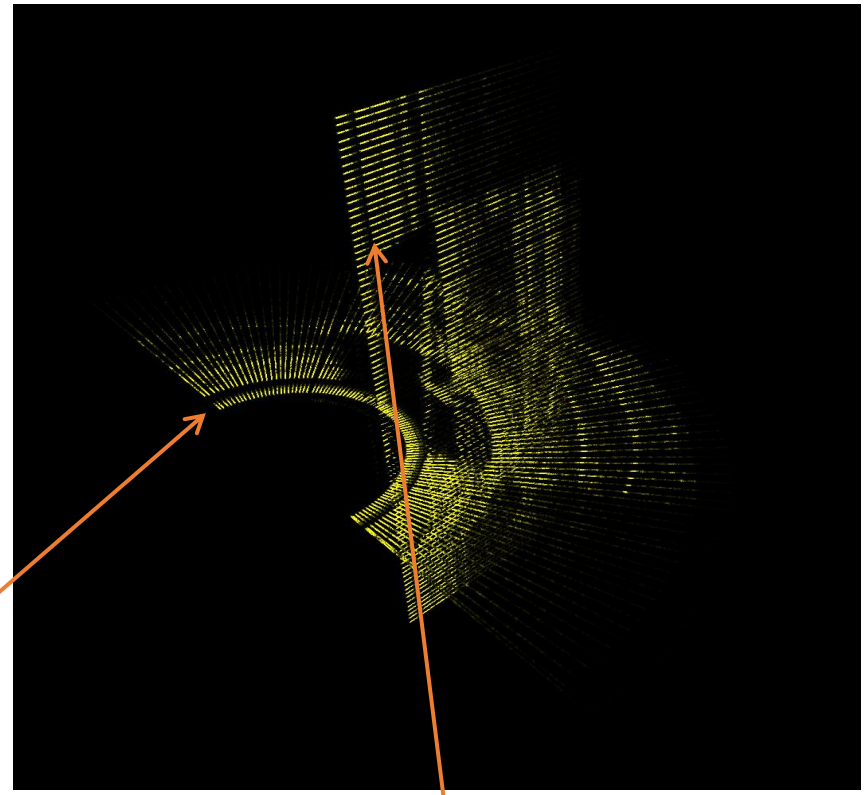
The Axter Cast Patch Straddle

Scanning window position prior to installation of Cast sleeve

The initial Radial scan indicates the window position and width in addition to the control line position

The vertical scan indicates top and bottom of window in addition to top and position of control line





Radial scan

Vertical scan

(Line Cutter in window only for illustration purposes)

AXTER
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The Axter Cast Patch Straddle

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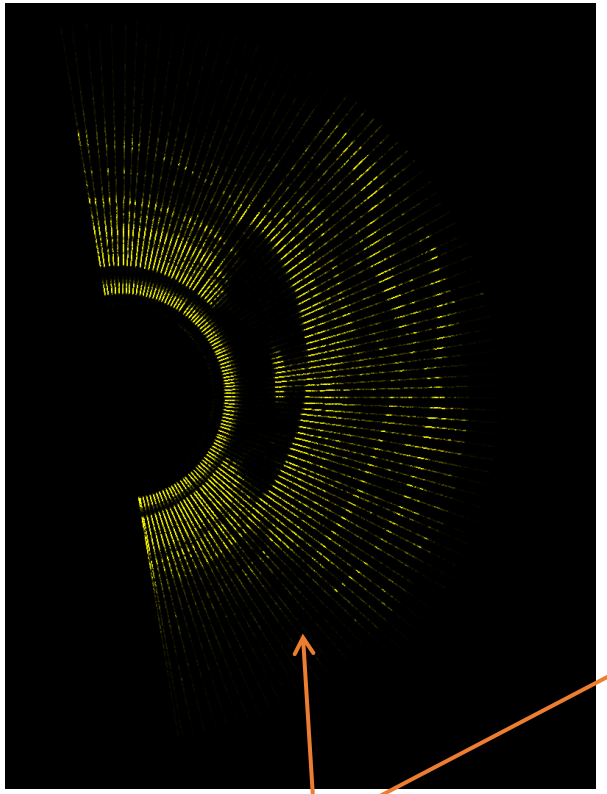
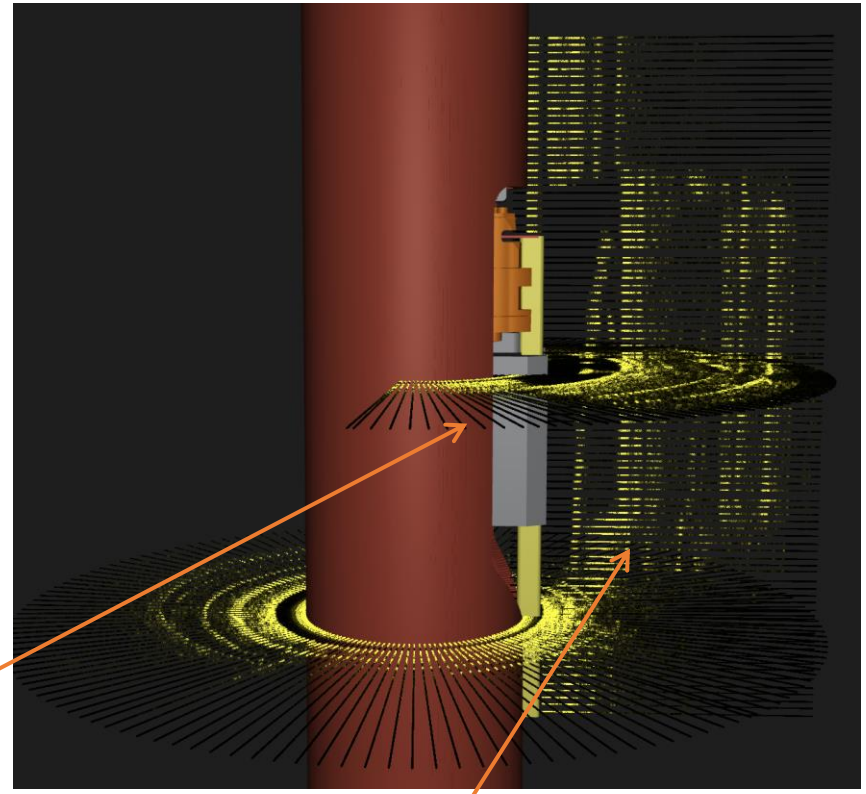


Radial scan



Vertical scan

(Line Cutter in window only for illustration purposes)

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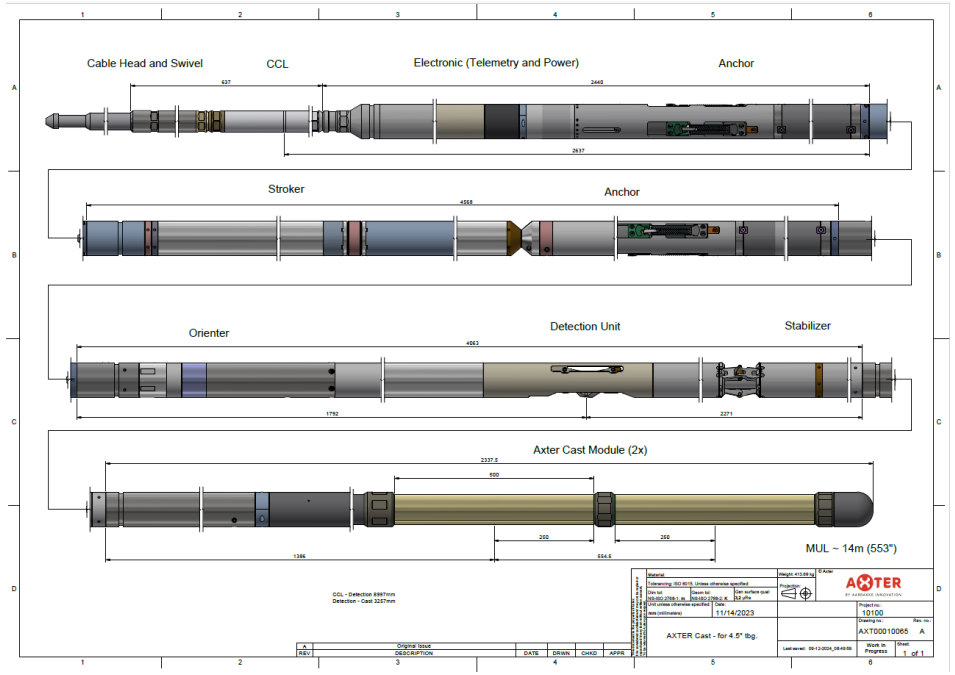
The Axter Cast Patch



Up to 4 ea. Cast sleeves individually positioned in one single run

Axter Cast ready to RIH

Axter Cast set and tubing pulled

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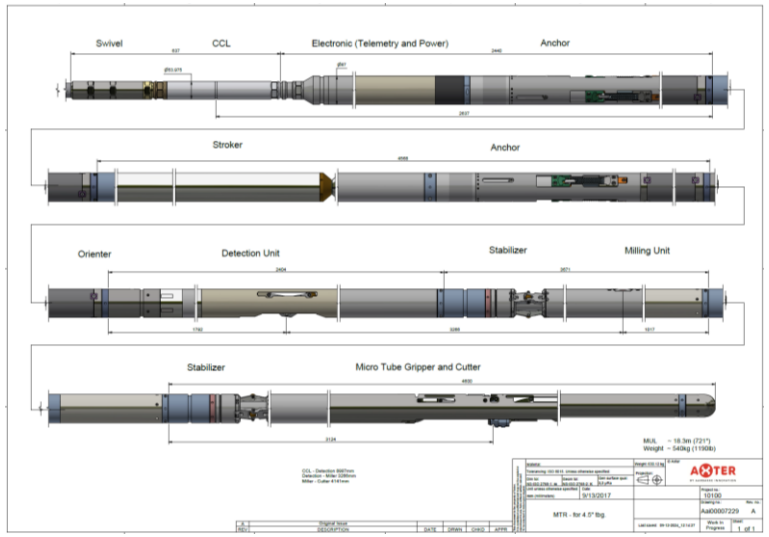
Axter Retrieve & Axter Cast de-risk for TotalEnergies Gryphon P&A

Ullrigg Test Centre – Stavanger. 27.01.2025

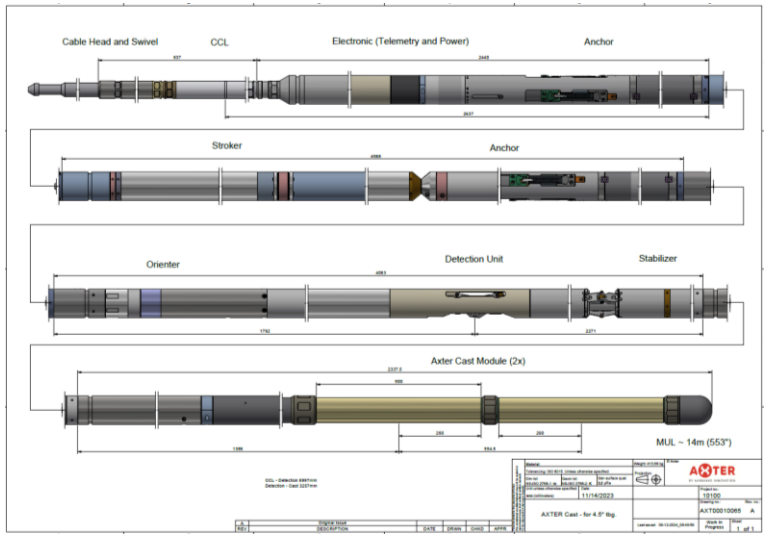
Operations performed in Ullrigg well U-08
Tubing size: 4-1/2” 12.6ppf. L80
Casing size 9-5/8”
Operations depth: 545 - 557mRKB
Well inclination at depth: 27˚

Axter Retrieve Operations - Ullrigg U-08
RIH to position toolstring for lower control line cut (557mRKB)
Identify position of control line, mill window and cut control line. - Total operation time 4 hrs. 10 mins.
Position toolstring for upper control line cut (545mRKB).
Identify position of control line, mill window and cut control line. Retrieve cut control line to surface. - Total operation time 5 hrs. 10 mins.

Axter Cast Operations - Ullrigg U-08
RIH to position toolstring for Lower Cast installation (557mRKB).
Identify position of milled window, position and set Cast sleeve. - Total operation time 1hrs. 10 mins.
Position toolstring for Upper Cast installation (545mRKB).
Identify position of milled window, position and set Cast sleeve. - Total operation time 1hrs. 24 mins.



4-1/2” Axter Retrieve Toolstring



4-1/2” Axter Cast Toolstring

Control line successfully retrieved to surface.

Ben Foreman, TotalEnergies
Johan Kverneland, TotalEnergies
Martin Straume, AkerBP

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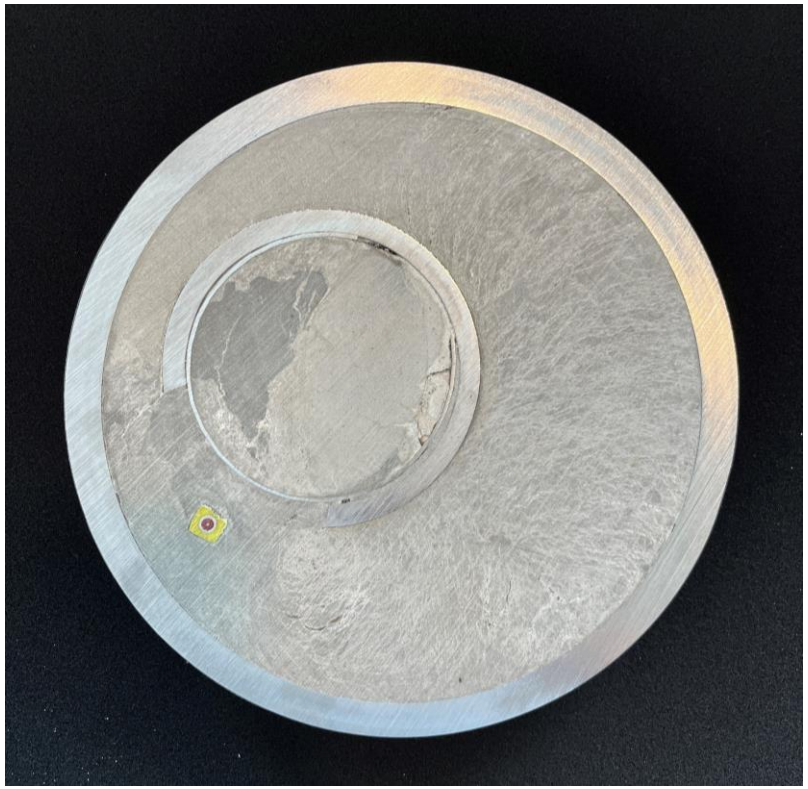
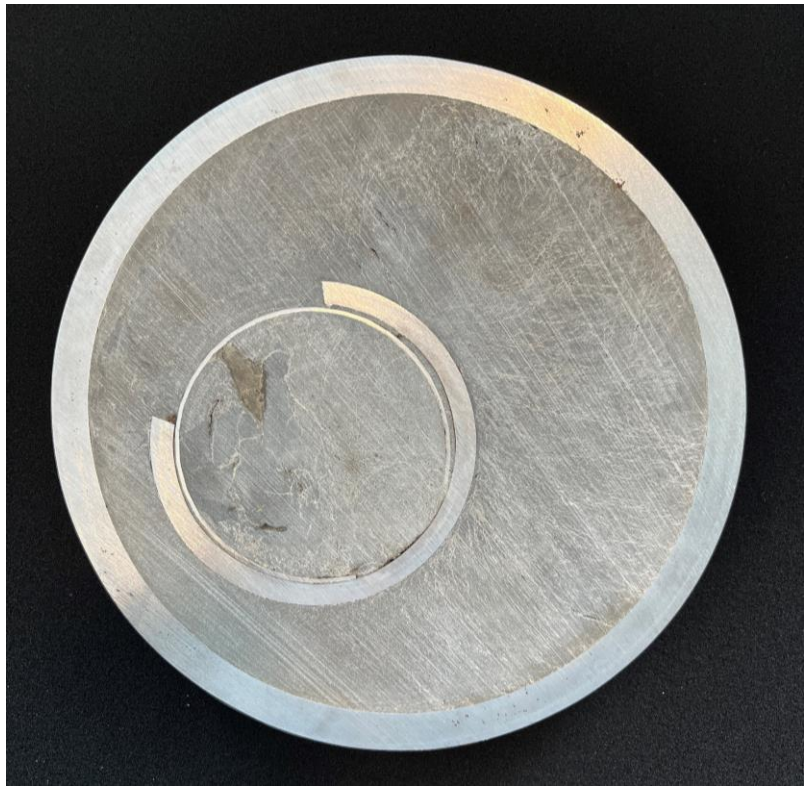
The Axter Cast, Ullrigg U-08.



From above looking downwards



From below looking upwards

Upper window, at 545mRKB

27° Inclination

Cast set in 4-1/2” tubing inside 9-5/8” casing

40mm disc cut-out

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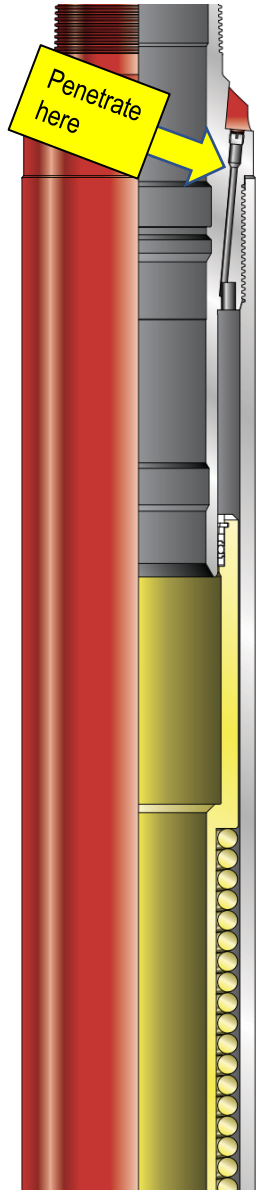
Non-P&A applications

Penetrate the hydraulic inlet of a TRSCSSV to install retrofit Slickline set DHSV

When one of the two hydraulic supply lines down to the valve connection is ok, but the TRSCSSV will not cooperate

Accurately locate hydraulic bore, penetrate and create communication to slickline retrievable DHSV.



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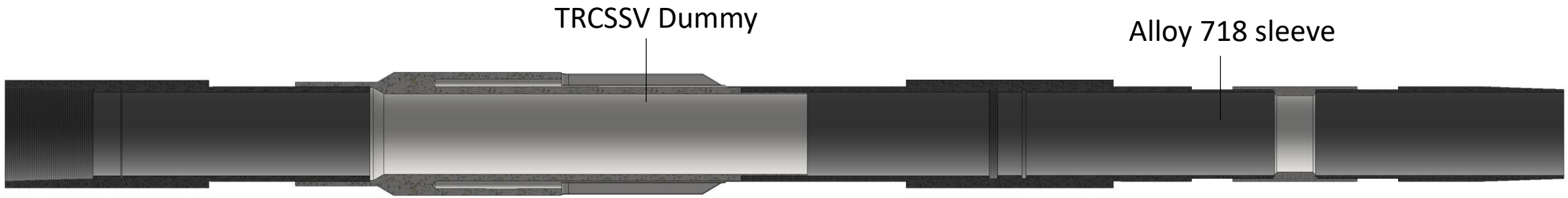
TRSCSSV Port Scanning test stup



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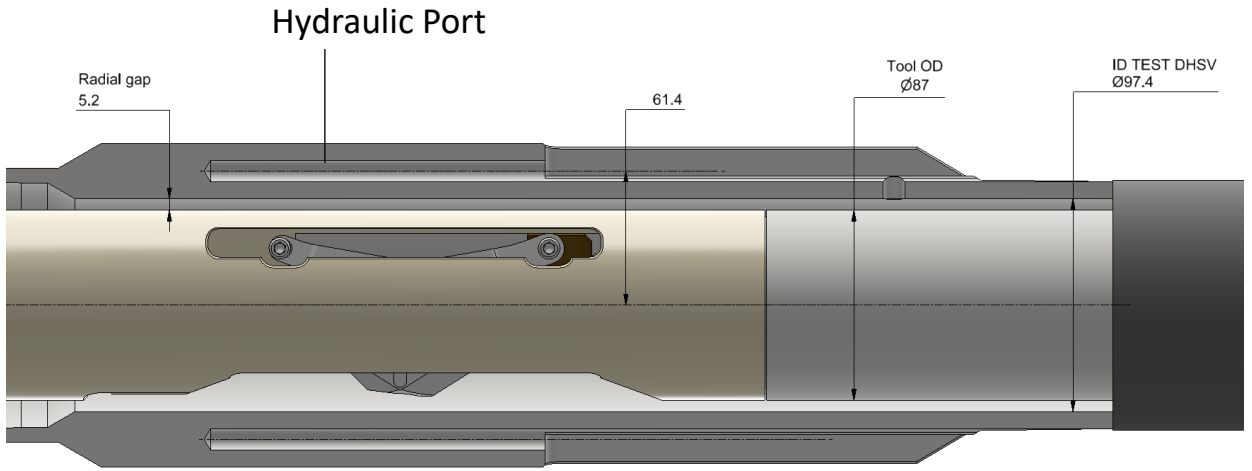
Axter Real Time Scanner (TRSCSSV Port Scanning)



- *Scanning and detect hydraulic ports*

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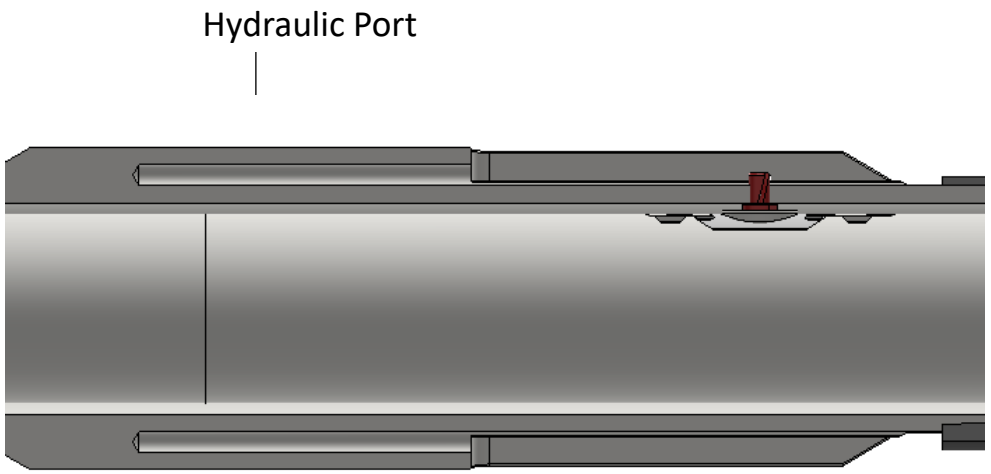
Axter Real Time Scanner (TRSCSSV Port Scanning)



- *Penetrate hydraulic ports 225mm below scanning position (for test only)*

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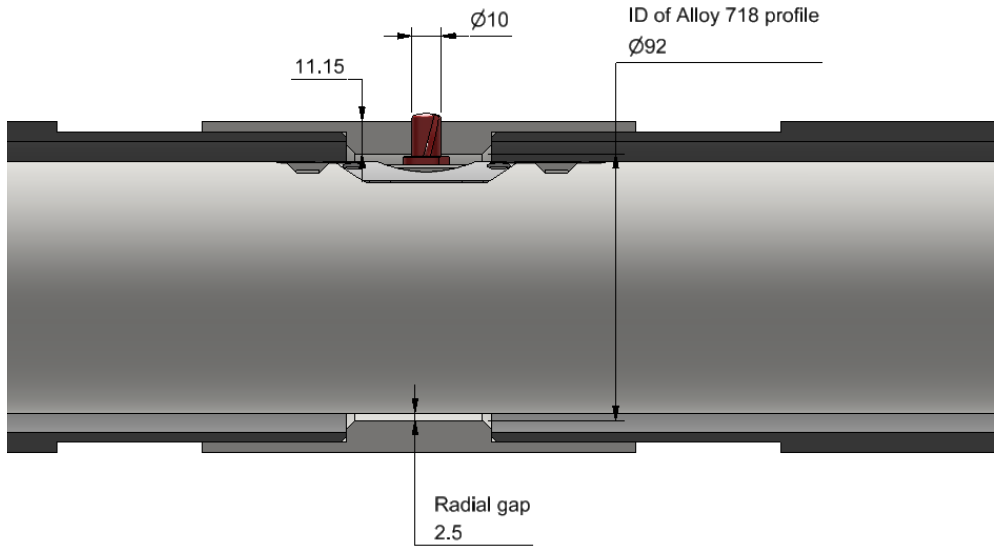
Axter Lateral Miller (Alloy 718 Penetrating)



- *Penetrate Alloy 718 part*

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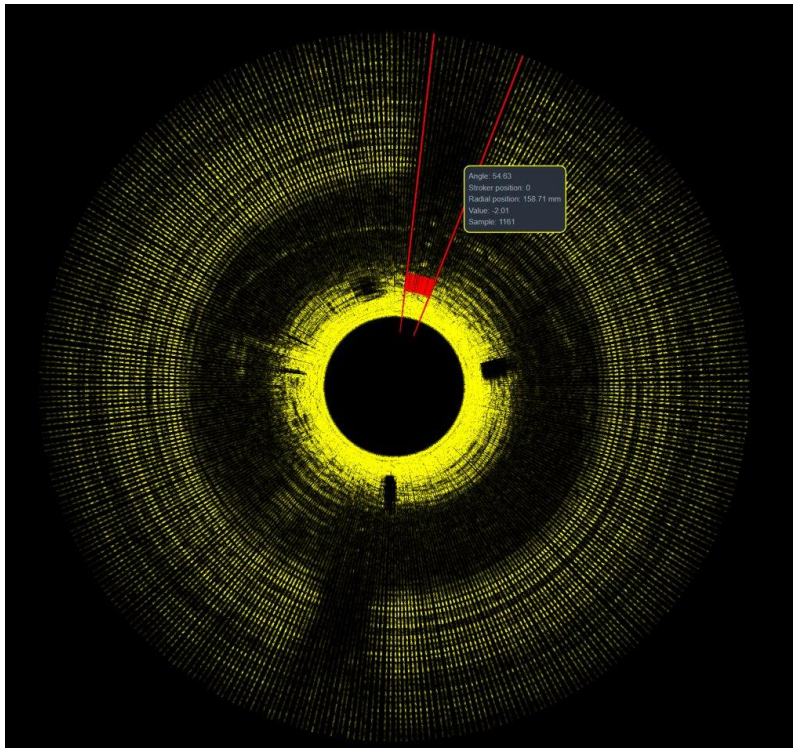
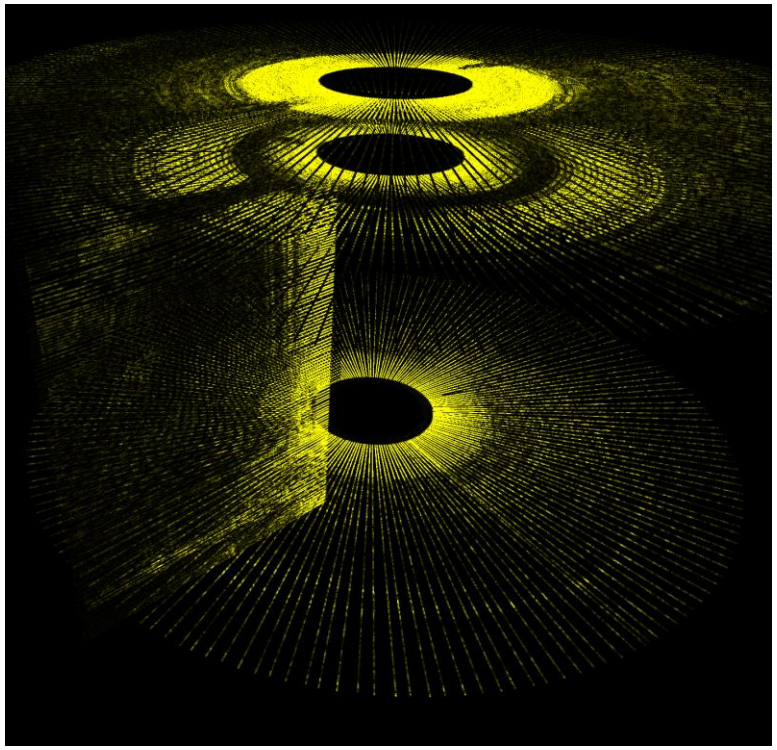
TRSCSSV scanning using the
Axter Detect Ultrasonic Through Tubing Imaging Tool.





Good accuracy length measurement of both borings allows for smarter penetration and improved placement of insert sealing device

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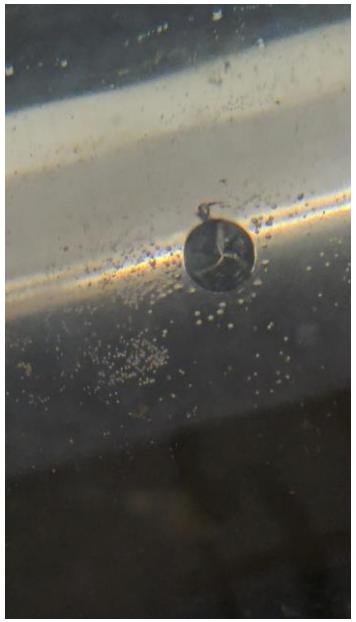
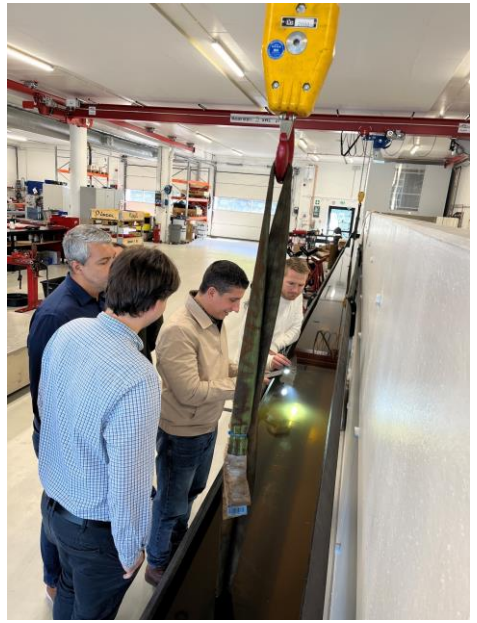
Successful test penetrating the hydraulic bore in the TRSCSSV

Successfully milling
directly into target





Successfully penetrating
Inconel 718 with 10mm millbit

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Optimizing Coiled Tubing Drilling

Machining lateral window for Liner Exit / Sidetrack and installing Whipstock. Offline

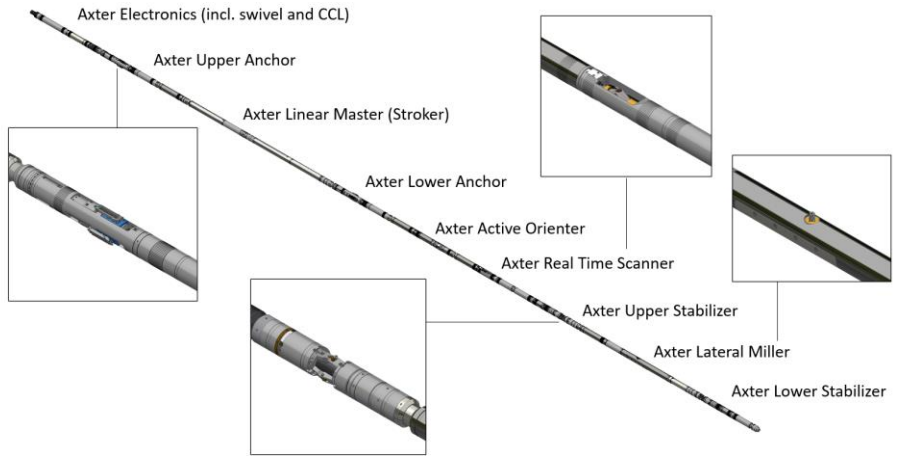
Operation done offline on pipe deck

Mill window 60” tall by 3,8” wide

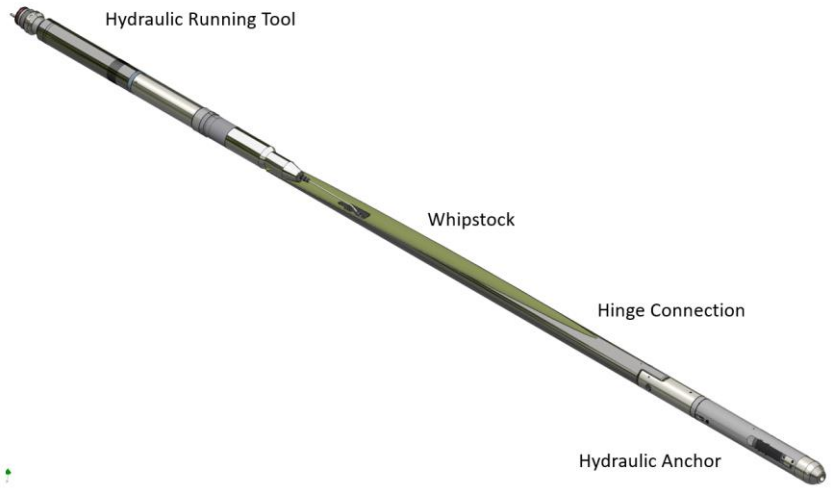
5” Liner #23 ppf, Q-125

Workshop testing scheduled for Q3 2025

Axter Lateral Miller for CTD operations



Hydraulic Guidestock



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Smart Kick Over Tool

A fully Electro-mechanical KOT to allow for GLM placement in the horizontal section.

KOT operations independent of orientation sleeve condition for positioning and operations

Current status:
Feasibility study project.

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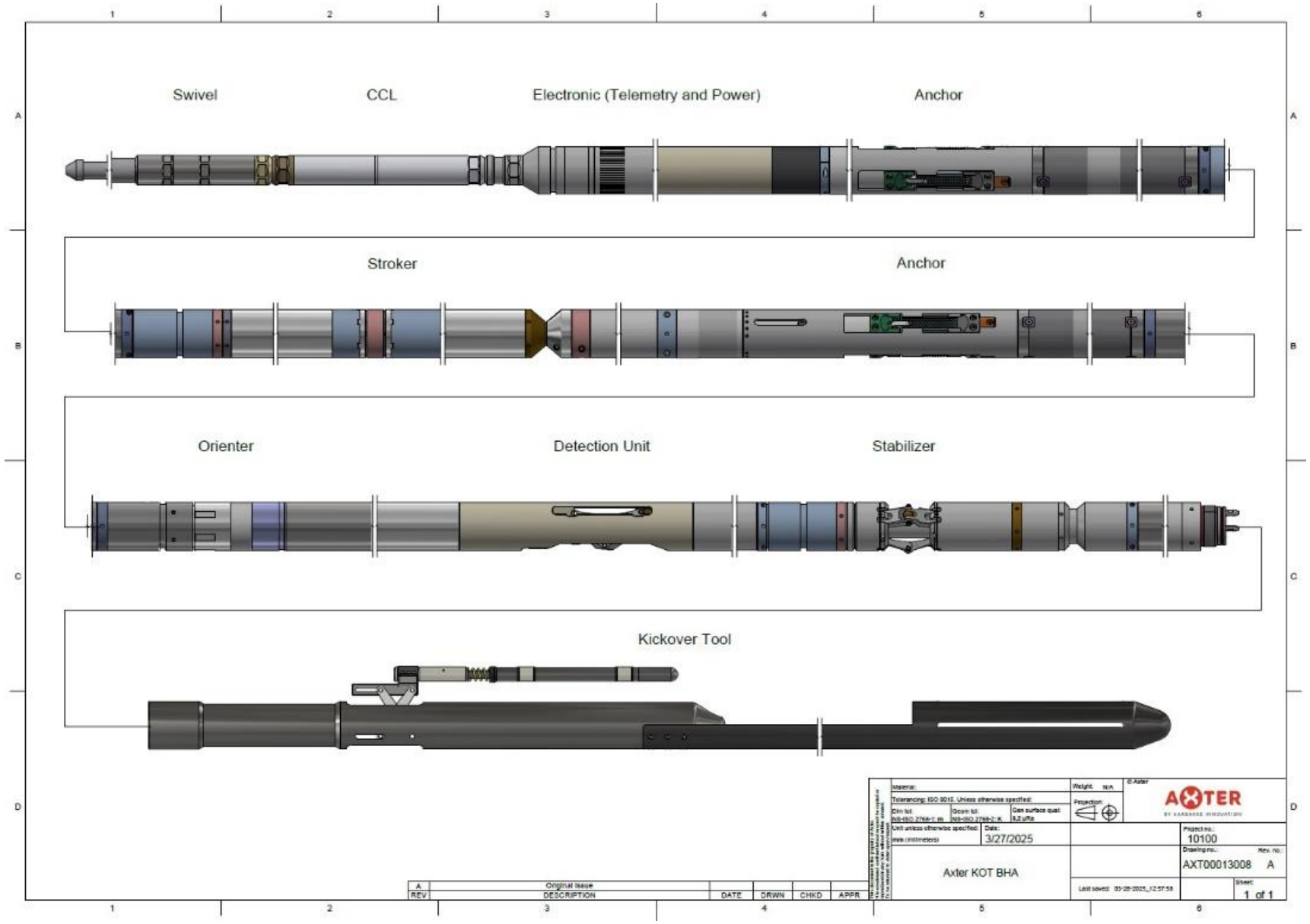
Axter Smart-KOT toolstring



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Axter Smart-KOT

- Fully integrated with the existing Axter Retrieve modules
- Surface-controllable setting and pulling tool for the GLV's
- Built in sensors indicating setting and retrieving of GLV's
- Electrical feed-through enabling to run tools in tandem for retrieval and installation in one single run
- For use with 1" and 1-1/2" GLV's
- Compatible with Welltec tractor for operations in horizontal we

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