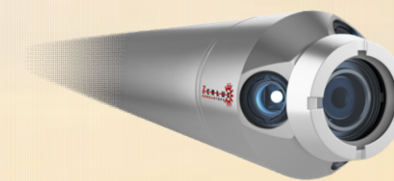


# ZERLUX HUNGARY TECHNOLOGY PRESENTATION



## *DOWNHOLE CAMERA TECHNOLOGIES*

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B D Manager Global  
[ftoth@zerluxhungary.com](mailto:ftoth@zerluxhungary.com)  
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## INTRODUCTION OF ZERLUX HUNGARY LTD.

### ➤ General Information

- ✓ ISO 9001 certified
- ✓ Founded: 2013
- ✓ Location: *Hungary*
- ✓ CEO/CTO – *Mr. Tamas Bozso* (20+ years of laser experience)
- ✓ Owned by Private Individuals



### ➤ Main Scope of Activities

- ✓ Developing & **Selling** Downhole **Camera**
  - ✓ 400+ RIH, 30+ sold camera tools
- ✓ Developing Downhole **Laser** Technology
- ✓ Developing & Smart Downhole Tools (s-Xover)

#### Track Record



# DOWNHOLE CAMERA TECHNOLOGY



Fishing Operation  
Scale & Corrosion Monitoring  
Leak Detection  
Perforation Monitoring



## DOWNHOLE CAMERA TECHNOLOGY



### Camera Family

- ✓ **400+** commercial Downhole Camera Run In Hole (RIH) from 2018
- ✓ **Oil, Gas & Geothermal** wells,
- ✓ **20** pcs. Downhole Camera RIH at **North Sea**,
- ✓ **38** pcs. Downhole Camera RIH in **Malaysia** by Slickline Memory
  - Up to **171°C (340°F)**;  
400 bar (5,800 psi)

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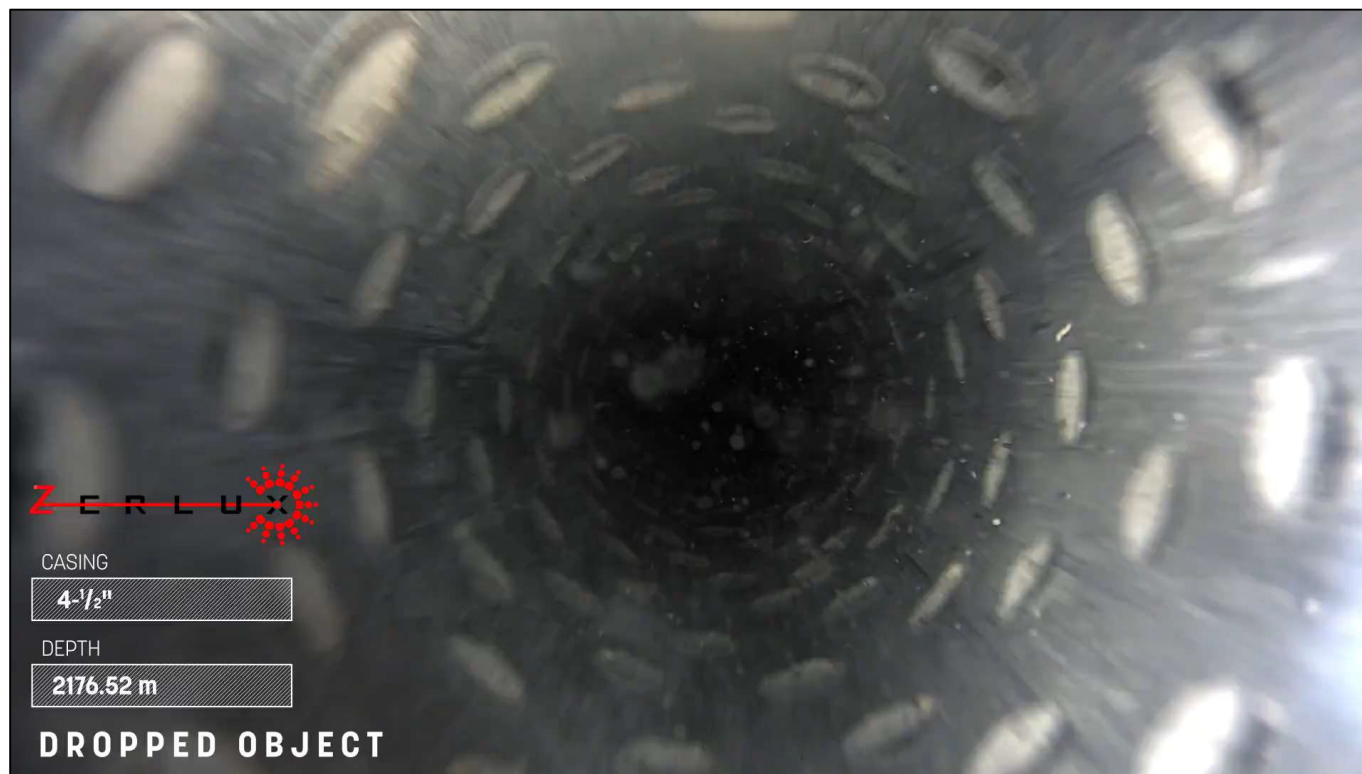


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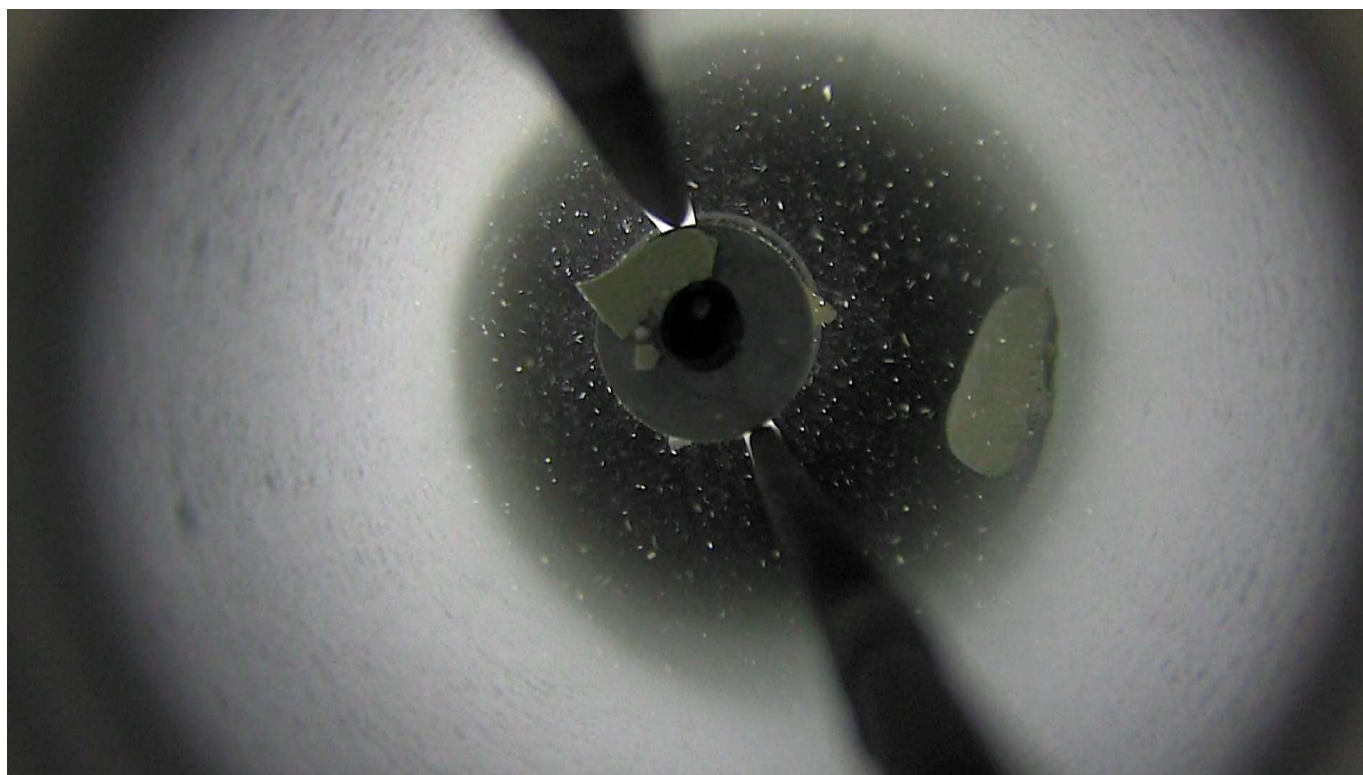
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# OPTEYE DOWNHOLE CAMERA FAMILY

## ➤ HT Slickline full HD Memory Tool

SPECIFICATIONS HT Slickline full HD MEMORY Camera	
Temperature Rating	High Temp.
Outer Diameter	54 mm (2.125")
Length	3148 mm (10.32 feet)
Weight	43 kg (95 lbs)
Resolution	1920x1080 Memory Mode FULL HD
Max. Frame Rate	60 frame/sec
View	Downview
Depth, Temp. & Incl. Meas.	YES
Connection Type	Standard API 15/16"-10UN (Sucker Rod)
Max. Temperature	177°C (350°F)
Max. Pressure	690 bar (10k psi)
Max. Operational Time	Up to 1.5 hours at 177°C Up to 5 hours at 125°C Delayed Multiple Turn ON/OFF Recoding
Battery Lifetime	Up to 18 hours
Battery Type	LIRDD-165/180HTS
Deployment	Slickline Cable



# DOWNHOLE CAMERA IN GEOTHEMAL INDUSTRY

## ➤ Actual Status

- ✓ High demand but low activities (price sensitive market),
- ✓ Well issues are similar to Oil&Gas,
- ✓ Typical bottom hole temperature range is 180°C to 280°C,

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- ✓ No available or commercial solution above 200°C
- ✓ Increasing needs vs. Lack of vendors



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### ➤ Zerlux Gaia Project

- ✓ Extreme High Temperature Camera Tool Development (up to **300°C**)
- ✓ Completed preliminary timeline and budget,
- ✓ Conceptual design,
- ✓ Downhole Memory Camera to record full HD videos,
- ✓ min. 2 hours operational time at 300°C
- ✓ Looking for Industrial partners

# OPTEYE DOWNHOLE CAMERA FAMILY

## ➤ Hybrid Camera Tools

- ✓ Tool works in **Dual Mode**: memory and real-time (SRO)
- ✓ 1.732", 690 bar, full HD recording, deploying on **Slickline, E-line & CTU** Deployment

1. **Standard Downview**
2. **HD Downview**
3. **HD 360 Down & Sideview**

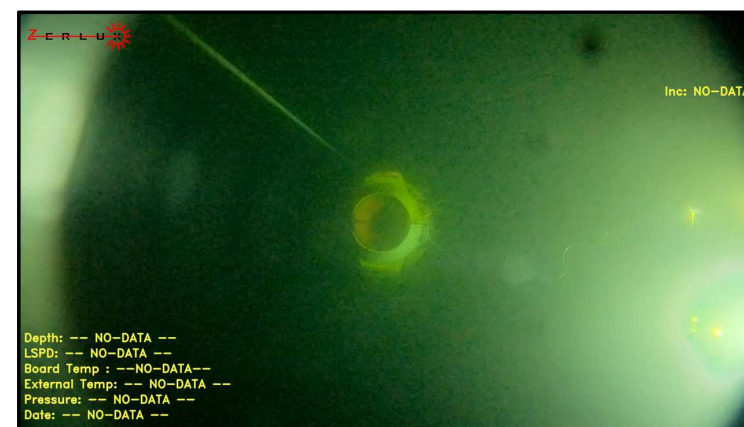


# STANDARD DOWNVIEW HYBRID SPECIFICATION

SPECIFICATIONS STANDARD DOWNVIEW Hybrid Camera		
Camera Mode	Real-time	Memory
Outer Diameter	44 mm (1.732")	
Length	3 237 mm (10.62 feet)	2 629 mm (8.62 feet)
Weight	45 kg (99 lbs)	37 kg (82 lbs)
Max. Video Quality	B&W	FULL HD
Video Frame Rate	1 frame/4 sec	60 frame/sec
Camera Viewing	Downview	
Temp. & Incl. Meas.	YES	
Connection Type	1-3/16"-12UN	15/16"-10UN
Max. Temperature	125°C (257°F)	
Max. Pressure	690 bar (10k psi)	
Operational Time	Continuous	10 hours – 30 fps Delayed Multiple Turn ON/OFF Recording Option
Battery Lifetime	40 hours at 80°C 32 hours at 100°C 15 hours at 125°C	
Battery Type	LIRDD-165HTS	
Deployment	Monoconductor E-Line	Slickline



Real Time



Memory



## HD DOWNVIEW HYBRID SPECIFICATION

SPECIFICATIONS HD DOWNVIEW Hybrid Camera		
Camera Mode	Real-time	Memory
Outer Diameter	44 mm (1.732")	
Downview Video Quality	PAL	FULL HD
Downview Video Frame Rate	15 frame/sec	60 frame/sec
Camera Viewing	Downview	
Temp. & Incl. Meas.	YES	
Connection Type	1-3/16"-12UN	15/16"-10UN
Max. Temperature	125°C (257°F)	
Max. Pressure	690 bar (10k psi)	
Power Supply	160W/24V	LIRDD-165HTS (battery)
Battery Lifetime	N/A	40 hours at 80°C 32 hours at 100°C 15 hours at 125°C
Operational Time	Continuous	10 hours – 30 fps Delayed Multiple Turn ON/OFF Recording Option
Deployment	E-Line	Slickline



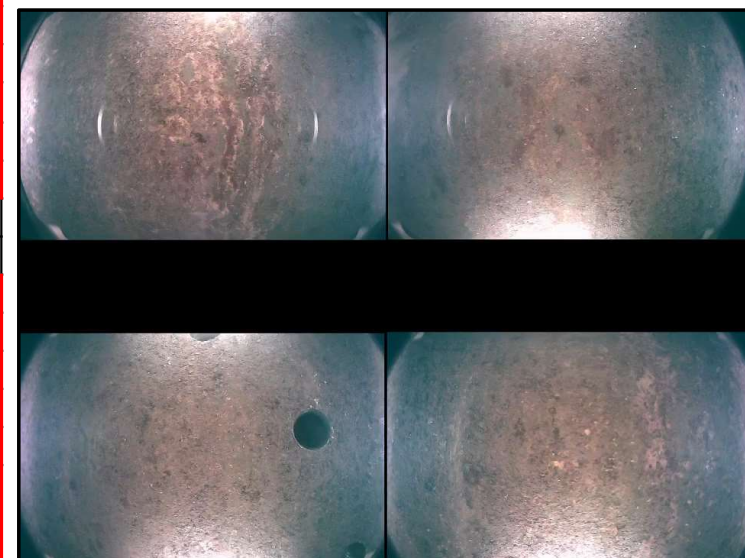
Real Time



Memory

# HD 360° SIDE & DOWNVIEW HYBRID SPECIFICATION

SPECIFICATIONS HD 360 SIDE & DOWNVIEW Hybrid Camera		
Camera Mode	Real-time	Memory
Outer Diameter	46.5 mm (1.830")	
Downview Video Quality	PAL	FULL HD
Downview Video Frame Rate	15 frame/sec	60 frame/sec
Camera Viewing	Downview & Sideview	Downview
Sideview Real Time Quality	PAL	N/A
Sideview Real Time Frame Rate	15 frame/sec	N/A
Sideview Memory Quality	FULL HD	N/A
Sideview Memory Frame Rate	30 frame/sec	N/A
Temp. & Incl. Meas.	YES	
Connection Type	1-3/16"-12UN, GO	15/16"-10UN
Max. Temperature	125°C (257°F)	
Max. Pressure	690 bar (10k psi)	
Power Supply	160W/24V	LIRDD-165HTS (battery)
Battery Lifetime	N/A	40 hours at 80°C 32 hours at 100°C 15 hours at 125°C
Operational Time	Continuous	10 hours – 30 fps Delayed Multiple Turn ON/OFF Recording Option
Deployment	E-Line	Slickline



Memory

# CTU LENS CLEANING STANDARD DOWNVIEW HYBRID SPECIFICATION

## ➤ Advantages

- ✓ Ability to deploy Hybrid Camera families on Coiled Tubing,
- ✓ Only a housing/sleeve that could be placed on/off the camera tool (NOT A CAMERA),
- ✓ Clean Camera Windows and LED Lenses with fluid,
- ✓ Tolerate up to 4 tons per cm2 on sapphire window maximum

SPECIFICATIONS		CTU – Coiled Tubing Lens Cleaning Adapter
Compatible With	Standard HD HD 360 Side & Downview Hybrid	
Outer Diameter	54 mm (2.125")	
Connection Type	1-1/2" AMMT or per request	
Max. Temperature	125°C (257°F)	
Max. Pressure	690 bar (10k psi)	
Deployment	Coiled Tubing	

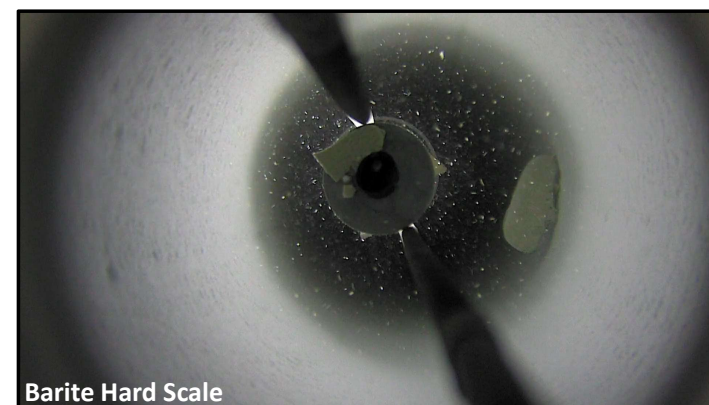




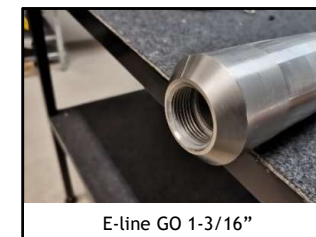
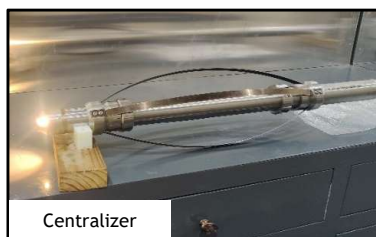
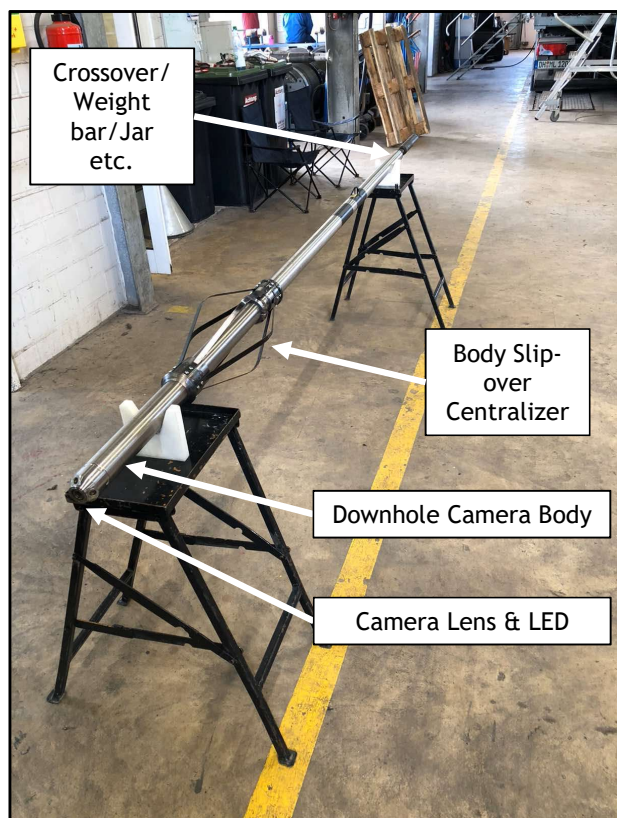
# OPTEYE DOWNHOLE CAMERA FAMILY

## ➤ HT Fiber Optic FULL HD Real-time Camera

SPECIFICATIONS		HT Fiber Optic REAL-TIME Camera
Temperature Rating		High Temp.
Outer Diameter		54 mm (2.125")
Length		3520 mm (11.54 feet)
Weight		40 kg (88 lbs)
Resolution		1920x1080 FULL HD Real Time
Max. Frame Rate		60 frame/sec
View		Downview
Depth, Temp. & Incl. Meas.		YES
Max. Temperature		177°C (350°F)
Max. Pressure		690 bar (10k psi)
Max. Operational Time		Up to 1.5 hours at 177°C Up to 5 hours at 125°C Delayed Multiple Turn ON/OFF Recoding
Battery Lifetime		Up to 18 hours
Battery Type		LIRDD-165/180HTS
Deployment		Fiber Optic (SM) / Hybrid Cabel

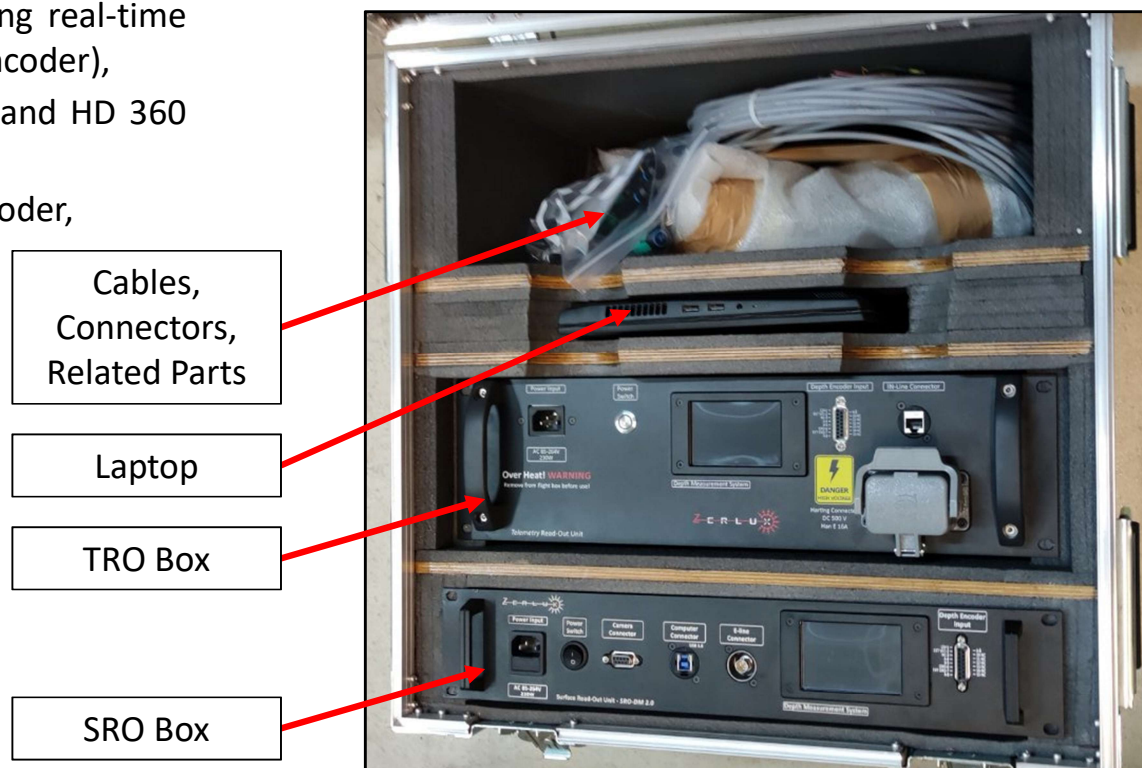
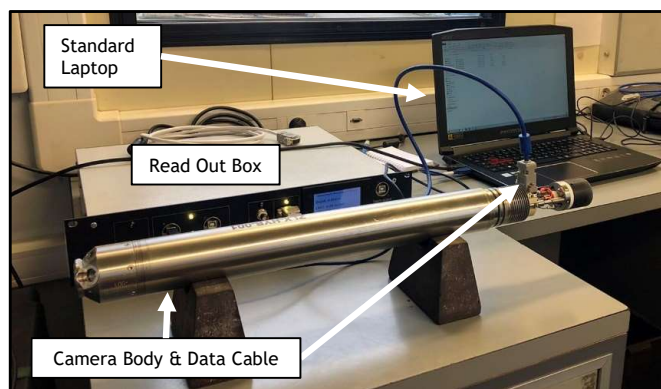


## TYPICAL DOWNHOLE CAMERA BHA



## DOWNHOLE CAMERA SURFACE READ OUT SYSTEM

- ✓ **SRO** - Surface read out technology for receiving real-time video & downloading recorded videos (depth encoder),
- ✓ **TRO** – Telemetry & Power Supply Unit for HD and HD 360 Side & Downview Hybrid Cameras
- ✓ Very **Easy** and **Quick** connection to Wireline Encoder,
- ✓ Merging **All** logging **Data** to the video
- ✓ **Standard** video format (.avi/mp4)
- ✓ **< 15mins** data downloading



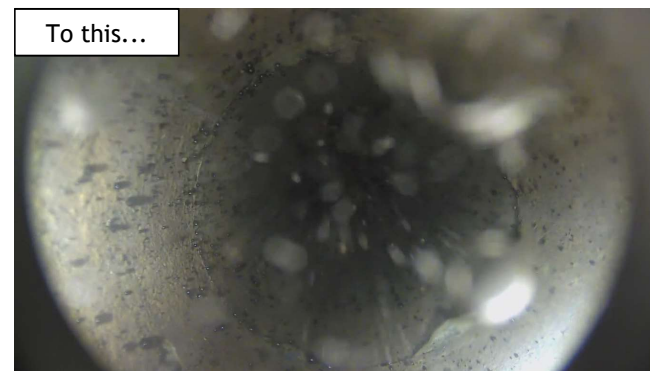


## RUNNING AND WELL PREPARATION PROCEDURE

- ✓ Procedure for well preparation and camera deployment might vary depending on well-to-well basis,
- ✓ Procedure Discussion and Communication is key to success

### ➤ Generic Considerations

- ✓ Shot Down the well 24-48 hours before Camera Run,
- ✓ Continuously or Periodically Pump Inert Gas/Nitrogen,
- ✓ Apply proper overpressure,
- ✓ Prepare and open the lubricator correctly,
- ✓ Circulate clear fluid etc.







*Thank you for your kind attention!*

**Ferenc Toth**

Business Development & Sales Manager

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