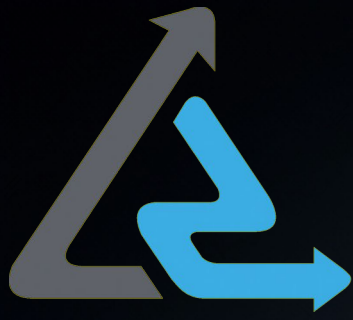


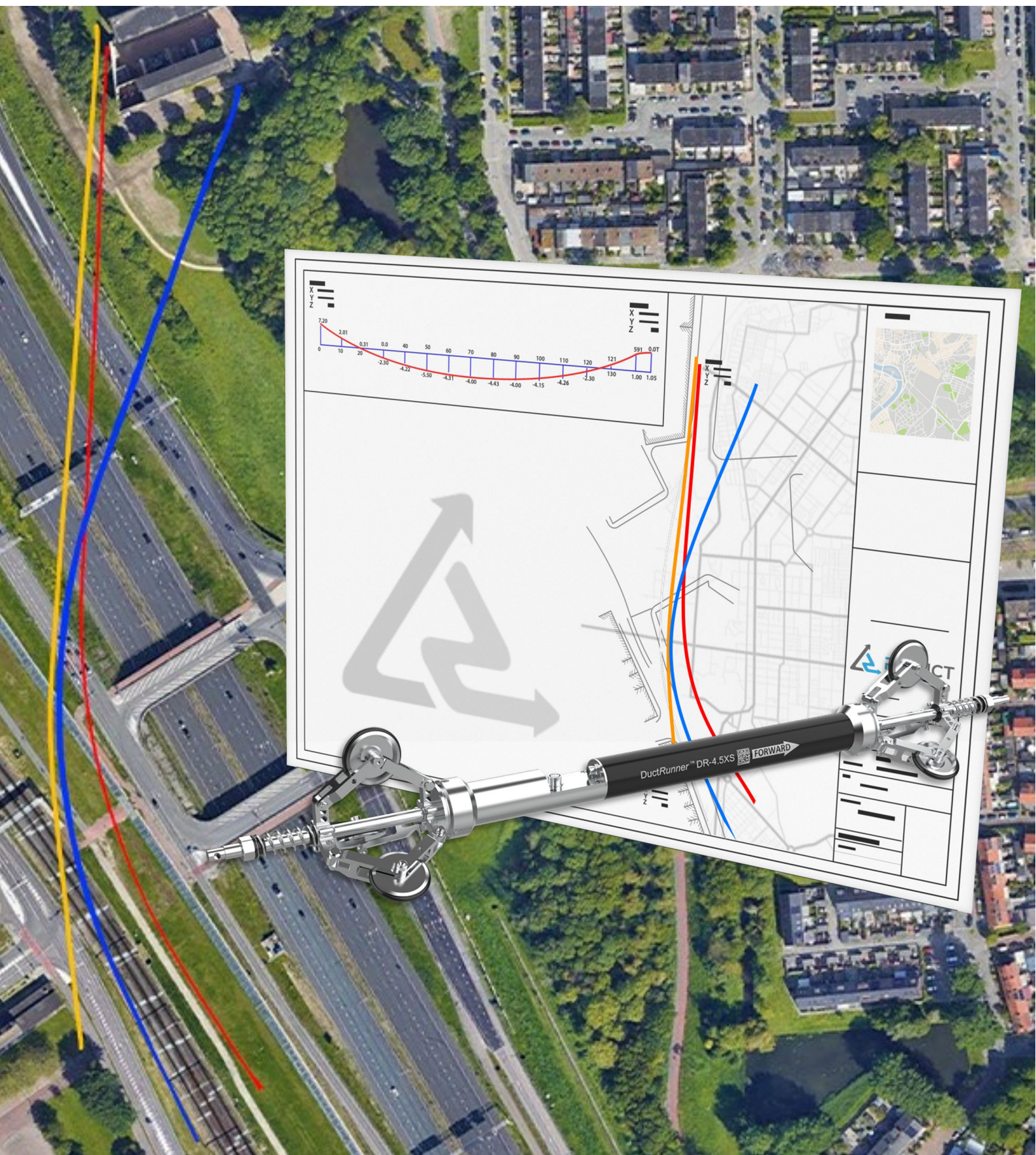


REDUCT

Gyroscopic Utility Mapping Solutions

Turns Liabilities into **Assets**





Turns Liabilities into Assets

Your **trusted partner** for turning your underground network from a **Liability into an Asset**

Accurate as-built data of underground utility pipes and ducts is essential for the safe operation of your network during its 30 years or more lifetime. Reduct offers high-end Gyroscopic Utility Mapping solutions and services to not only obtain highly accurate XYZ data, but also other valuable information such as bend radius, high-definition inclination assessment and video feed.

Founded in 2001, Reduct is an ISO 9001 certified company with a vision to create a world-wide highly accurate digital twin of sub-surface utility infrastructure. We believe that the time of buyers and suppliers is over. Instead, manufacturers, contractors, engineers, surveyors and utility owners are partners in the flow of utility network installation and operation. Only in partnership the ultimate objective of safe, consistent, and high-quality delivery of utility services to end-users can be achieved, and Reduct is committed to be a proactive partner in this process flow.

Regardless of where and how you contribute in the chain of installing and maintaining underground utility networks, we look forward to exploring how we can partner in your project!



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7 ABM-40 / DR-2



11 ABM-90 / DR-4



15 ABM-5 / DR-5



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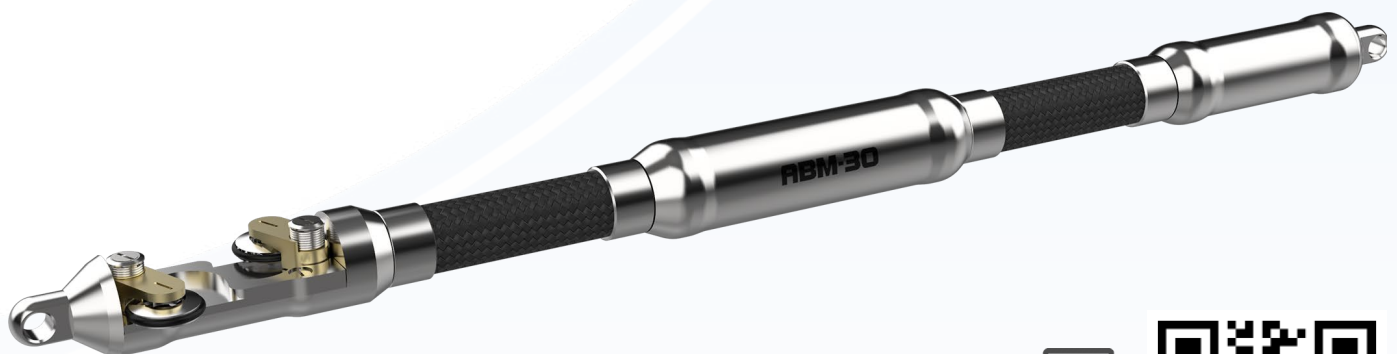
25 Contact

The **world's smallest** gyro-mapping solution is the smartest solution for data ducts

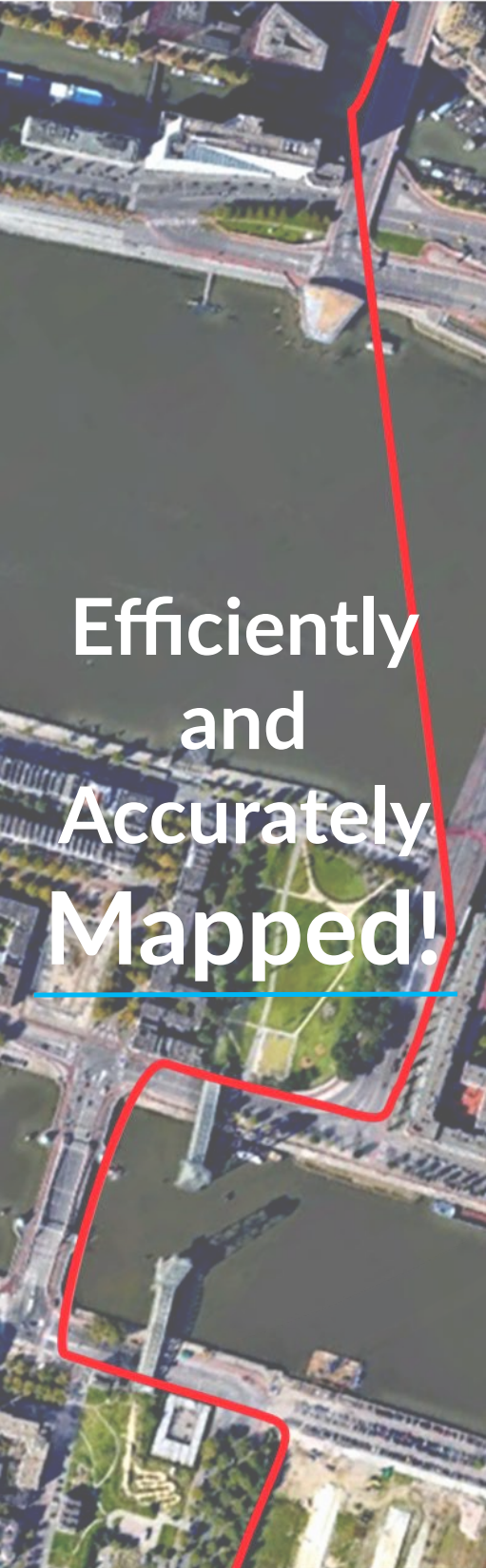


The ABM-30 Gyro Mapping System is designed for small data cable ducts with trade size DN40 / 1.25".

Despite its size, the ABM-30 performs just like its bigger brothers, mapping the location and shape of the duct accurately.



The **articulated design** and **smart foam spacers** ensure optimal measurement results.



Efficiently
and
Accurately
Mapped!



Highly accurate



Easy to operate



Robust design



Waterproof



No electromagnetic interference



No tracing required



High frequency data logging



Open platform output



Technical and Operational Specifications



Probe type	ABM-30
Core technology	MEMS Gyro
Maximum segment length	300m / 1,000ft
Data logging rate	100 Hz
Operational temperature	0°C to 50°C / 32°F to 120°F
Inclination range	+45° to -45°
Probe length (ex. spacers)	± 420mm / 17" (articulated)
Probe outer diameter	27mm / 1.1"
Probe weight	0.6kg / 1.2lb
Mean traveling speed	1 m/s—3 ft/s
Max pulling force	40kg / 80lb
Maximum acceleration	5g
Battery type / Autonomy	Rechargeable Li-ion / 4 hours

Standard output compatibility (selection)



Recommended winches for optimal mapping accuracy



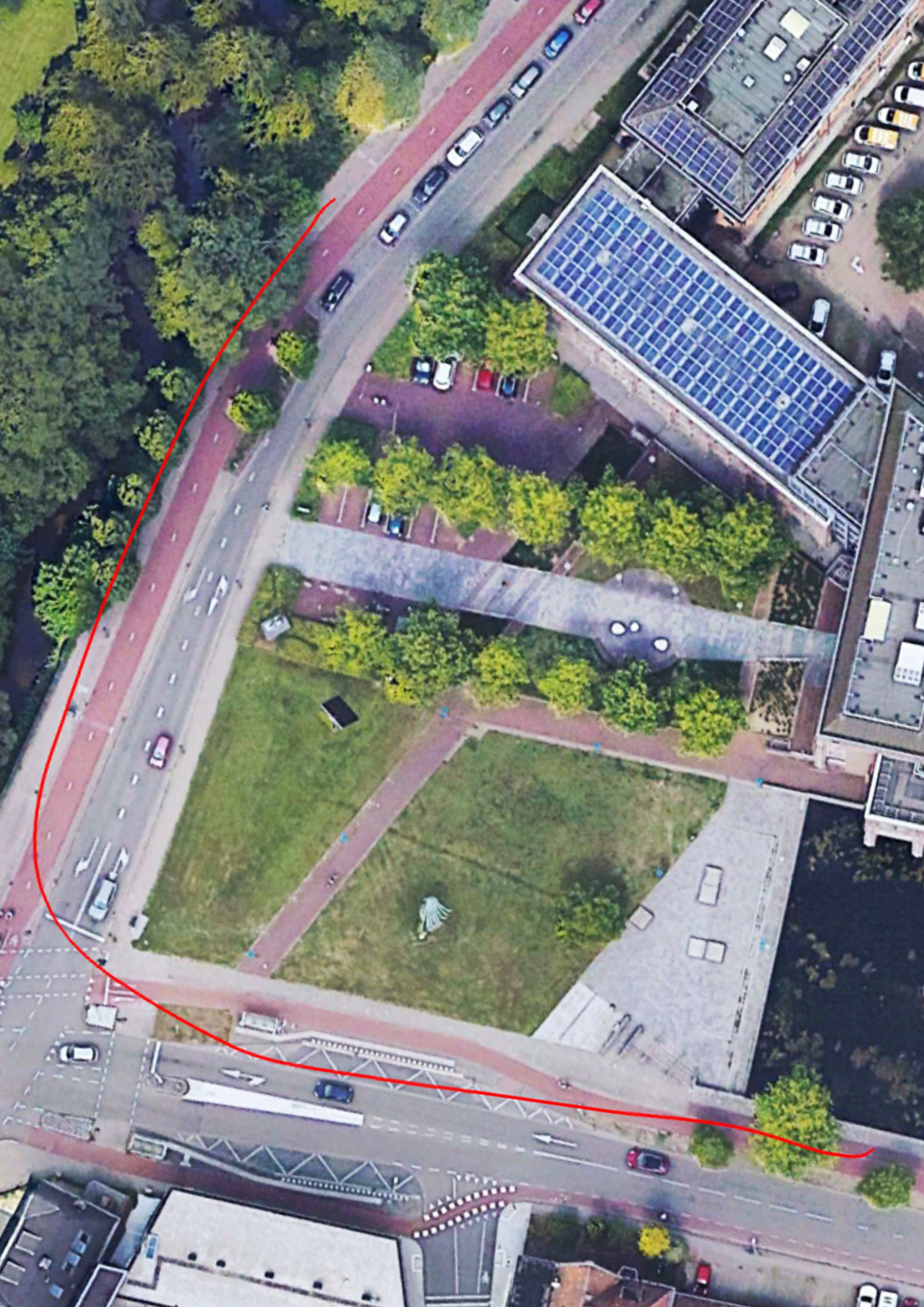
DRW-312m
Manual winch
Capacity 300m/1000'



DRW-250e
Electric winch
Capacity 300m/1000'



DRW-560s
Electric winch
Capacity 1750m/5750'



Not every duct can be located from above, but all ducts can be **accurately mapped** from within



The ABM-40 and DR-2 Gyroscopic Mapping Systems are unique solutions for obtaining accurate location and shape information for data cable ducts with trade size DN50 to DN90 / 1.5" to 3".



Not every duct can be located from above, but all ducts can be **accurately mapped** from within

The ABM-40 and DR-2 mapping systems are designed to map ducts with trade sizes DN50 to DN90, or 1.5" - 3", regardless of its wall thickness (SDR).

 No electromagnetic interference

 No tracing required

 High frequency data logging

 Open platform output

ABM-40 MEMS-based technology for mapping segments up to 300m/1000' distance between waypoints.



DR-2 FOG-based technology for mapping unlimited segment lengths (1500m/5000' waypoint distance is recommended).



Both systems are highly accurate and easy to operate. They share the same robust, waterproof and articulating housing.

Four exchangeable odometer wheel sizes and a range of spacers ensure the best fit, regardless of the pipe material or type of utility.



Technical and Operational Specifications



Probe type	ABM-40	DR-2
Core technology	MEMS Gyro	Fiber Optic Gyro
Maximum segment length	300m / 1,000ft	1,500m / 5,000ft
Data logging rate	100 Hz	
Operational temperature	0°C to 50°C / 32°F to 120°F	
Inclination range	+45° to -45°	
Probe length (ex. spacers)	± 800mm / 31.5" (articulated)	
Probe outer diameter	36mm / 1.4"	
Probe weight	2.0kg / 4.4lb.	
Mean traveling speed	1 m/s—3 ft/s	
Max pulling force	75kg / 150lb	
Maximum acceleration	5g	
Battery type / Autonomy	Rechargeable Li-ion / 10h ABM / 5h DR	

Standard output compatibility (selection)



Recommended winches for optimal mapping accuracy



DRW-312m
Manual winch
Capacity 300m/1000'



DRW-250e
Electric winch
Capacity 300m/1000'



DRW-560s
Electric winch
Capacity 1750m/5750'



The best way to **minimize the risk of damage** to your underground asset is **knowing where it is located**



The ABM-90 and DR-4 are designed with maximum versatility in mind.

A range of exchangeable invert or centralizing wheel sets provide a solution for most common utility pipes starting from 90mm/3.5" ID.



The **solution of choice** for sub-surface utility owners, operators, surveyors and contractors

The ABM-90 and DR-4 mapping systems are the most versatile probes in the range. Exchangeable wheel sets enable the probe to map pipes and conduits starting from an ID range of 90mm / 3.5" regardless of the pipe material or utility.

ABM-90 MEMS-based technology for mapping segments up to 300m/1000' between waypoints.



DR-4 FOG-based technology for mapping unlimited segment lengths (1500m/5000' waypoints spacing recommended).

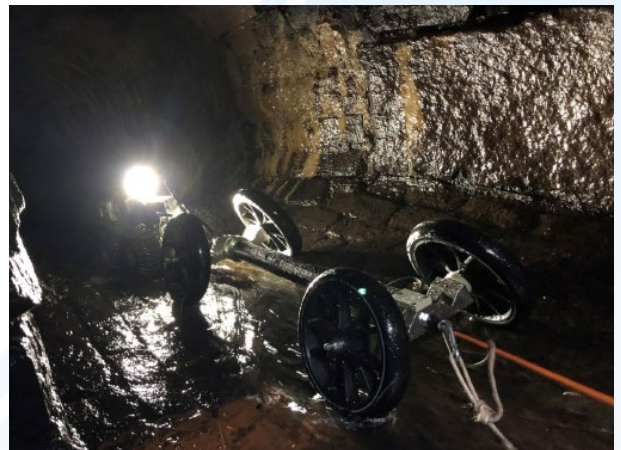


 Highly accurate

 Easy to operate

 Robust design

 Waterproof



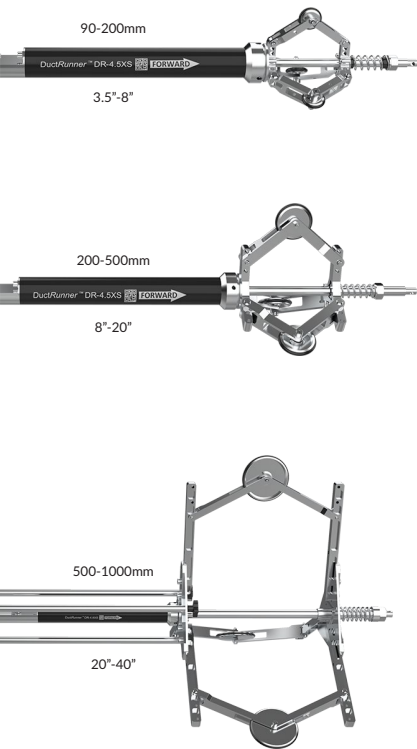
 No electromagnetic interference

 No tracing required

 High frequency data logging

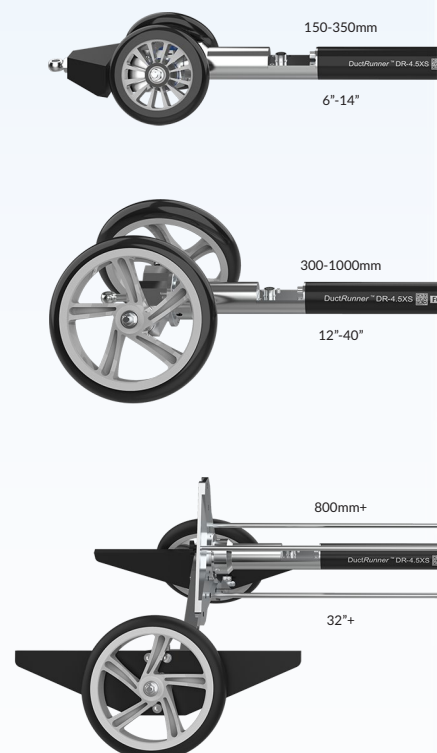
 Open platform output

Exchangeable **centralizing** and **invert wheel sets** enable mapping a wide diameter range of utilities



An adjustable spring ensures that the centralizers exert optimal outward pressure while still having enough flexibility to pass internal welds and other small deformations. Three solutions together cover a pipe ID range of 90-1000mm, or 3.5"-40".

For pipes with lateral connections, significant deformations or other obstacles that dismiss the use of centralizers, a range of Invert wheel sets are available to still get a successful measurement. Invert wheel sets are available from pipe ID 150mm-6" and up.



Technical and Operational Specifications



Probe type	ABM-90	DR-4
Core technology	MEMS Gyro	Fiber Optic Gyro
Maximum segment length	300m / 1,000ft	1,500m / 5,000ft
Data logging rate	100 Hz	
Operational temperature	0°C to 50°C / 32°F to 120°F	
Inclination range	+45° to -45°	
Probe length (ex. spacers)	± 490mm / 19.3"	
Probe outer diameter	42mm / 1.7"	
Probe weight	2.0kg / 4.4lb.	
Mean traveling speed	1 m/s—3 ft/s	
Max pulling force	150kg / 330lb	
Maximum acceleration	5g	
Battery type / Autonomy	Rechargeable Li-ion / 10h ABM / 5h DR	

Standard output compatibility (selection)



Recommended winches for optimal mapping accuracy



DRW-312m
Manual winch
Capacity 300m/1000'



DRW-250e
Electric winch
Capacity 300m/1000'



DRW-560s
Electric winch
Capacity 1750m/5750'

With accurate bend radius and depth profile data, you will **minimize** the **risk** of damage to expensive data cable



The DR-5 and ABM-5 are specifically designed for challenging pipes with an internal diameter range of 65mm or 2.6" to 500mm or 20".



SCAN ME



The **solution of choice** for bend radius analysis

The ABM-5 and DR-5 mapping systems are designed with accuracy and user experience in mind.

Its shorter length enables it to negotiate sharper bends and deliver accurate bend radius data of underground utilities.

Exchangeable wheel sets enable mapping pipes and conduits from ID 65mm / 2.6" to 500mm / 20" regardless of the pipe material or utility.

ABM-5 MEMS-based technology for mapping segments up to 300m/1000' between waypoints.



DR-5 FOG-based technology for mapping unlimited segment lengths (1500m/5000' waypoints spacing recommended).

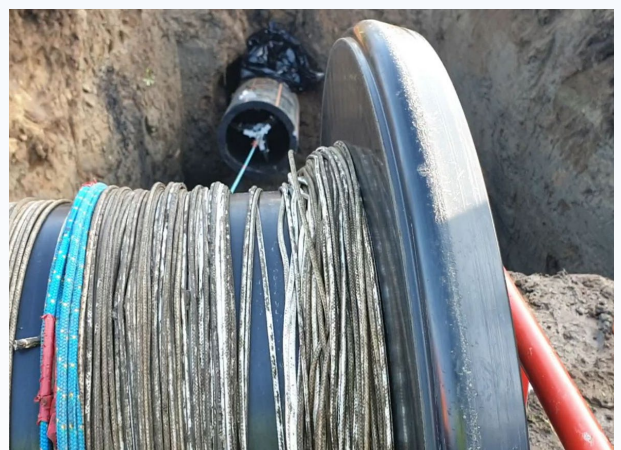


 Highly accurate

 Easy to operate

 Robust design

 Waterproof



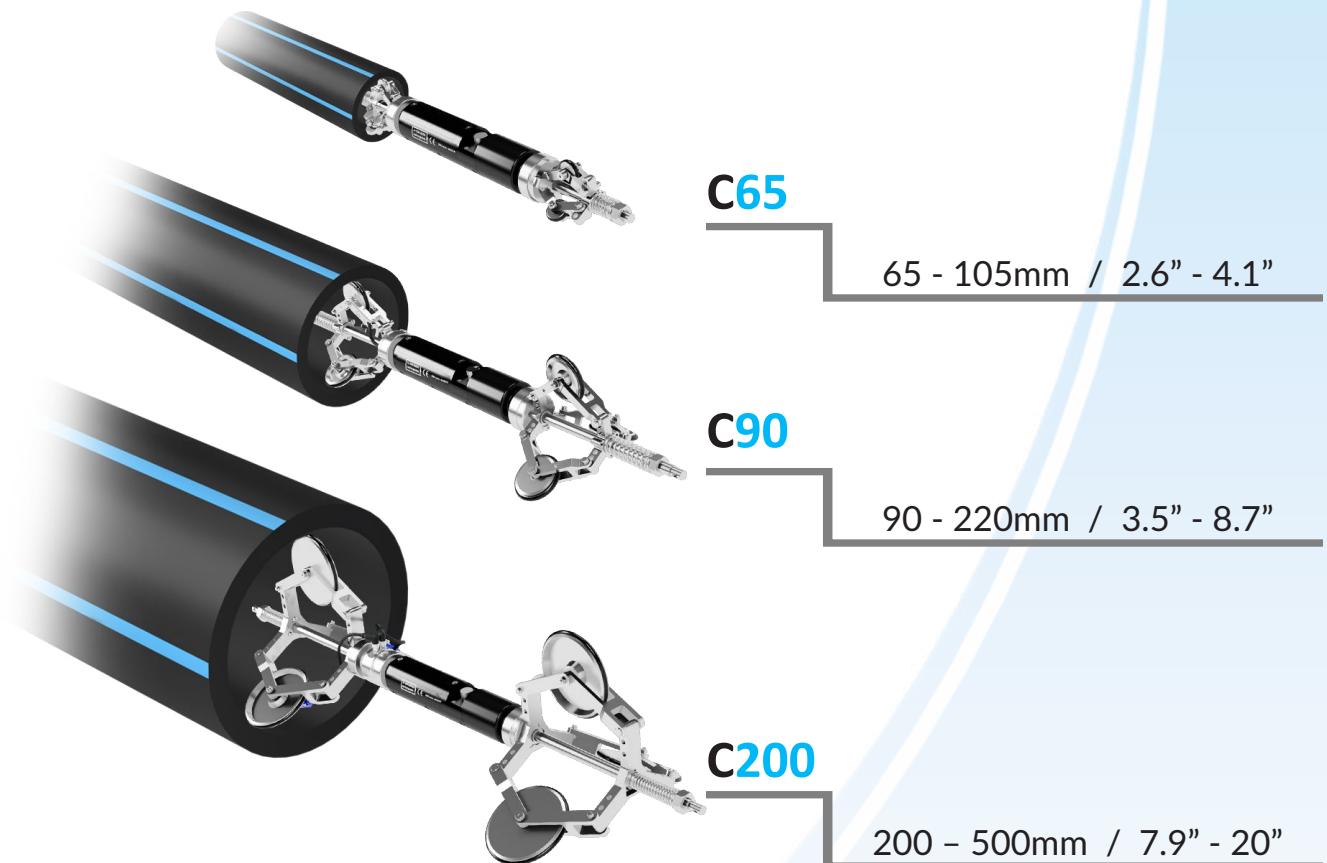
 No electromagnetic interference

 No tracing required

 High frequency data logging

 Open platform output

The **solution of choice** for sub-surface utility owners, operators, surveyors and contractors



An adjustable spring mechanism ensures that the centralizers exert **optimal** outward pressure while still having enough flexibility to **pass internal welds** and other small deformations.



Technical and Operational Specifications



Probe type	ABM-5	DR-5
Core technology	MEMS Gyro	Fiber Optic Gyro
Maximum segment length	300m / 1,000ft	1,500m / 5,000ft
Data logging rate	100 Hz	
Operational temperature	0°C to 50°C / 32°F to 120°F	
Inclination range	+45° to -45°	
Probe length (ex. spacers)	± 263mm / 10.3"	
Probe outer diameter	52mm / 2"	
Probe weight	1,3kg / 2.8lb.	
Mean traveling speed	1 m/s—3 ft/s	
Max pulling force	150kg / 330lb	
Maximum acceleration	5g	
Battery type / Autonomy	Rechargeable Li-ion / 10h ABM / 5h DR	

Standard output compatibility (selection)



Recommended winches for optimal mapping accuracy



DRW-312m
Manual winch
Capacity 300m/1000'



DRW-250e
Electric winch
Capacity 300m/1000'



DRW-560s
Electric winch
Capacity 1750m/5750'

The **View-2-Map** module synchronizes the XYZ result of a measurement with a video feed captured during that same measurement.

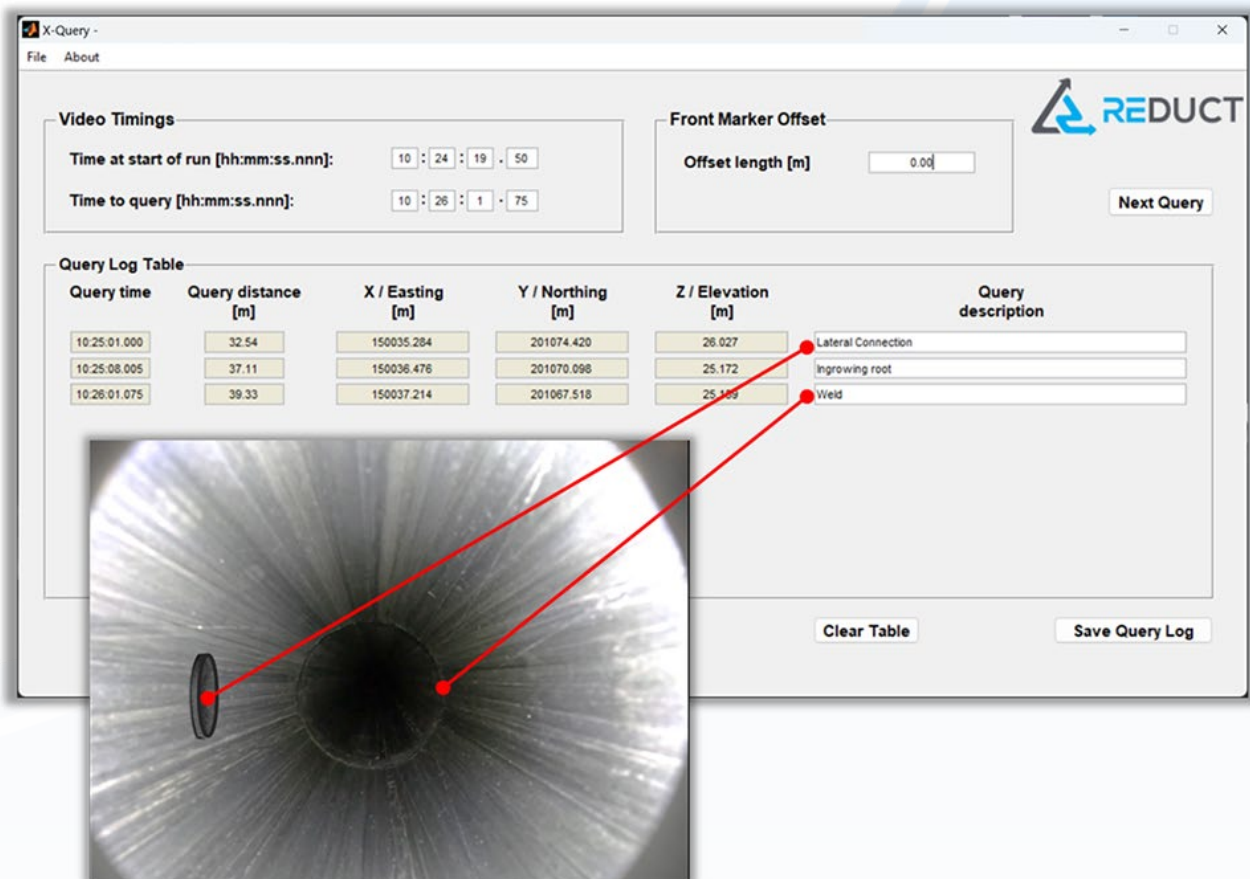
Software

The **View-2-Map** module includes a non-transferable X-Query™ (XQ) software licence. XQ is an intuitive software application that synchronizes the XYZ data with a video feed recorded while mapping.

How does XQ work?

- The XYZ measurement result is opened in XQ.
- The user opens the video feed in any viewer.
- After entering the movement start time, the user watches the video and pauses it at a point of interest.
- XQ displays the distance from the start and the XYZ coordinate.
- The user adds a free-form description for reference. This may also be a sector-specific code.

As simple as that!



Hardware

The **View-2-Map** module includes a mounting frame for the GoPro Hero 11 Mini camera with Max Lens Mod (recommended). The frame is compatible with the ABM-90, ABM-5, DR-4, and DR-5 Mapping Systems.

Hardware Components



Mounting for
Centralized Wheel Set



Mounting for
Invert Wheel Set



GoPro Frame with dual LEDs
and replaceable battery



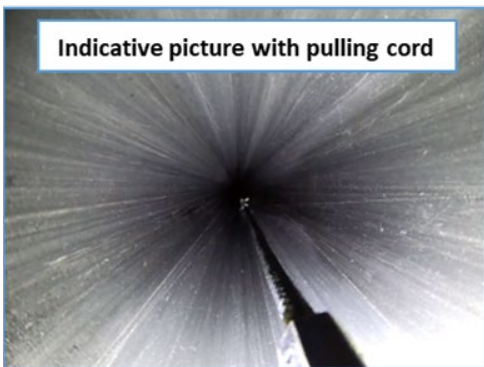
GoPro Hero 11 Mini
with Max Lens Mod
(not included)



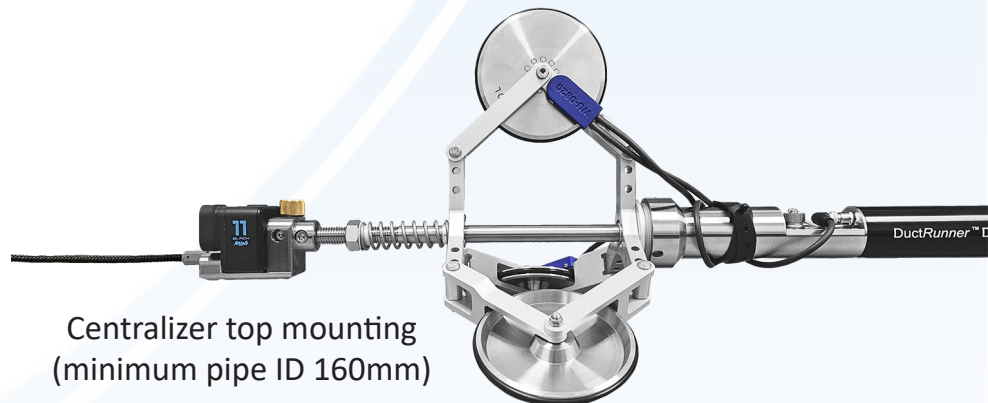
LED specifications (per LED)
Colour Temp (Degrees Kelvin): 5700K
Luminous Flux: 130lm



Invert mounting
(minimum pipe ID 150mm)



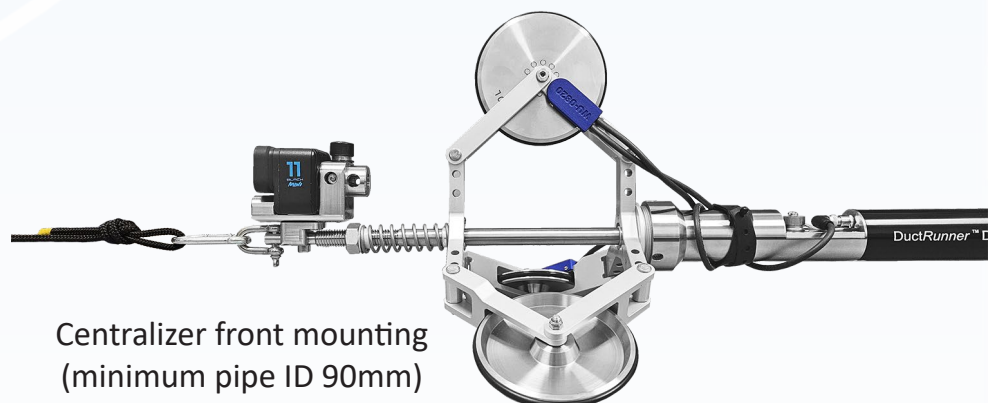
Indicative picture with pulling cord



Centralizer top mounting
(minimum pipe ID 160mm)



Indicative picture without pulling cord

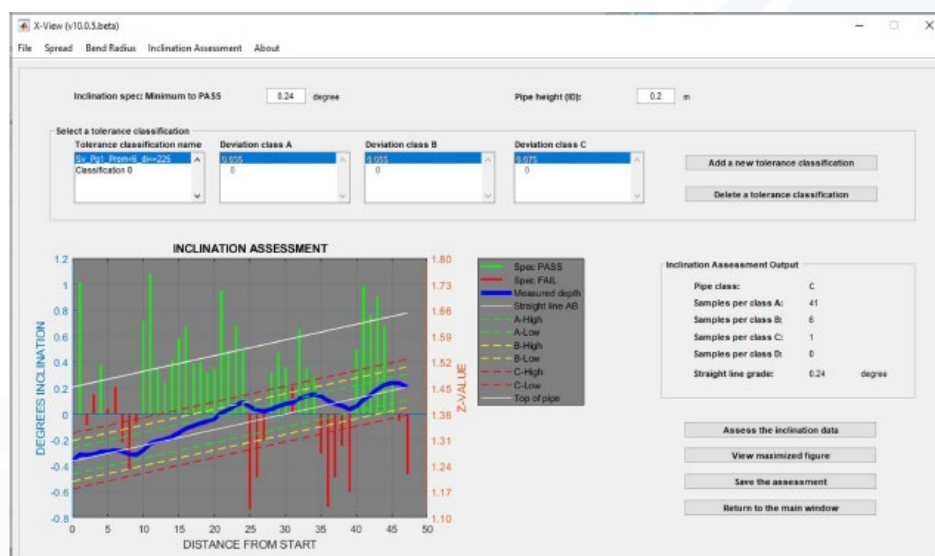


Centralizer front mounting
(minimum pipe ID 90mm)

Highly detailed grade assessment is only possible with **High Frequency data**



Up to date positional and inclination data of gravity wastewater pipes is often missing. Gyro-mapping solutions provide highly accurate, high frequency XYZ and inclination data, which is essential for managing flow and maintenance .



One dashboard
Two tests

1

Instant grade assessment for newly installed or relined wastewater pipes

2

Current inclination data for flow assessment and maintenance purposes

Instant **grade assessment** for newly installed wastewater pipes

The conventional way of obtaining the inclination of newly trenched gravity wastewater pipes is use a GPS device to map the top of the joints of the visible pipes immediately after lowering them in the trench. However, after those points are taken, the trench is backfilled, compacted, and heavy machinery drives over the trench many times. Who can assure that the inclination has is unchanged? Exactly, no-one can!

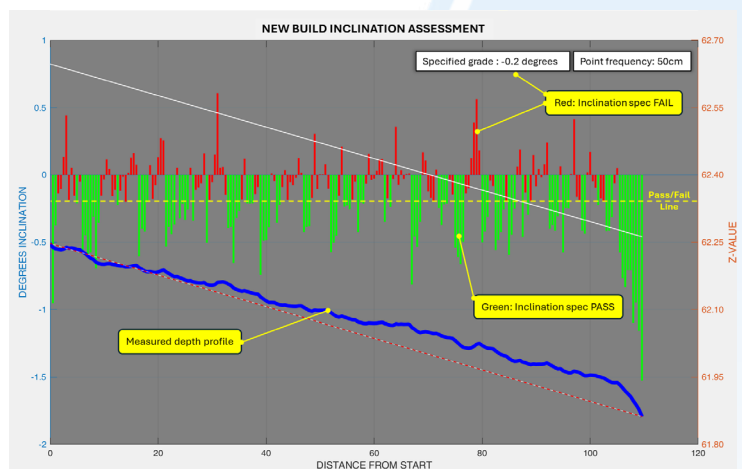
Using a gyro-based system in combination with the inclination assessment module has two significant benefits: The inclination **data is measured after the trench is backfilled**, and gyro systems provided **much richer data**, with a point every centimeter if desired.

Within several minutes after completing the measurement the user can assess the inclination pass/fail against the specified minimum inclination at high point frequency. It is also immediately clear where the fails occur and their severity.

Combining the inclination assessment with the View-2-Map video module may further enhance the understanding of the internal condition of the pipe.

Within several minutes after completing the measurement the user can assess the inclination pass/fail against the specified minimum inclination at high point frequency. It is also immediately clear where the fails occur and their severity.

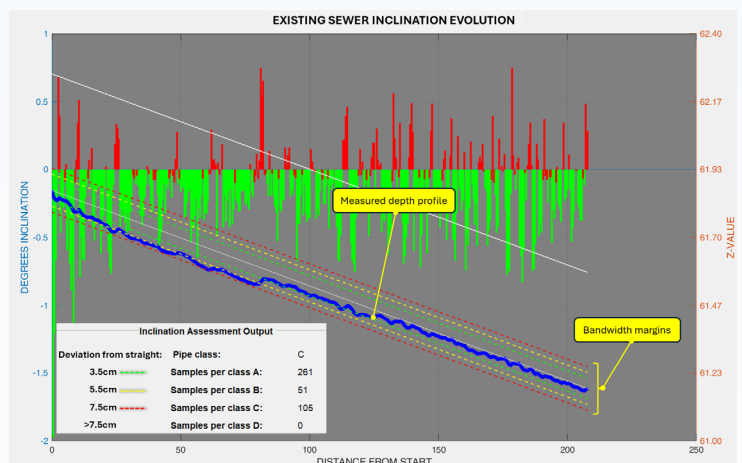
Combining the inclination assessment with the View-2-Map video module may further enhance the understanding of the internal condition of the pipe.



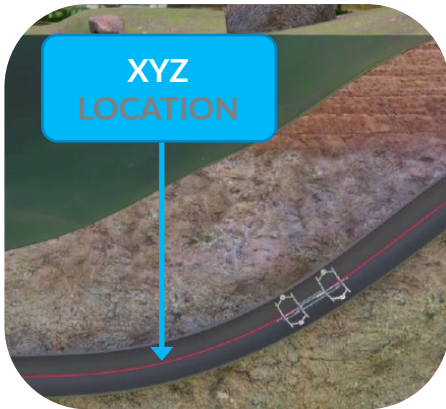
Current inclination data for flow and maintenance purposes

Monitoring the vertical movement of a gravity sewer is important for its continued functioning. However, in order to optimize maintenance funds it is essential that accurate data is available.

The inclination module enables the Utility to define 4 escalation classes, A, B, C, and D. Again, within minutes following a measurement data points per class are calculated and their location is shown.

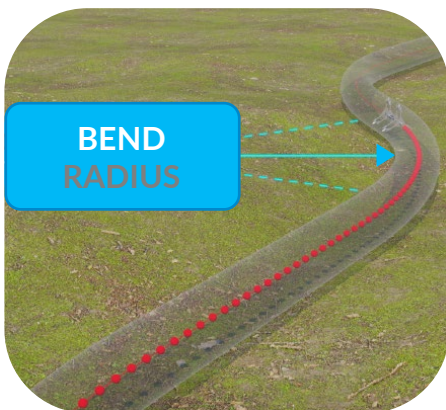


Standard **data output** serves a wide range of purposes adding specific value to each type of utility



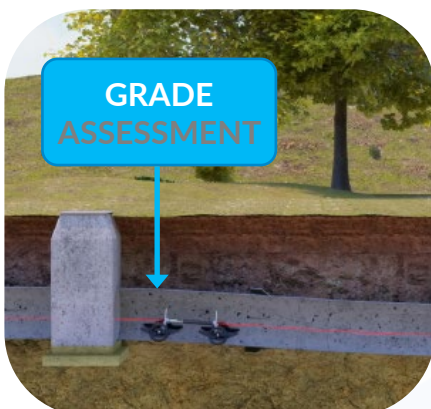
As-built data

-  Accurate as-built data
-  High frequency points
-  User defined sampling distance
-  Objective data for contractor handover
-  Open platform output format



Bend radius analysis

-  Verifying new-built specifications
-  User defined sampling distance and calculation interval
-  Essential for pipe stress calculation
-  Essential for estimating cable pull tension



Grade assessment

-  High frequency grade samples
-  New-built grade verification
-  Check results against international tolerance classifications

 Google Earth

Standard output compatibility (selection)



Reduct Academy

Learning how to operate Gyro-mapping solutions

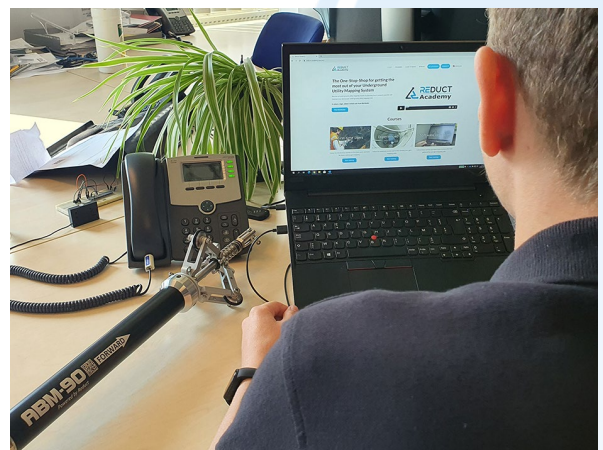
Gyro-mapping, like many other sophisticated in-pipe inspection technologies and devices, yields the best results if the operator understands the do's and don'ts of operating the tools. basic operational activities may not seem complex, but the sensitive sensors inside the Reduct devices pick up all movements, both good and bad.

One thing we have learned over several decades is that no two measurements are alike. Learning how to set a system up correctly for a certain type of pipe, or how to perform the recommended operational procedure is vital to obtaining the high definition as-built maps. Starting from a solid base is essential, experience over time will gradually raise you to expert level.

Online Training

Get access to our virtual academy and learn how to assemble and operate the various systems, and how to process the logged data before you hit the field.

Advanced courses such as single entry method and bend radius calculation become available once you have completed the basic system courses.



On Site Training

In addition to the online academy, Reduct operates three training facilities in Belgium, Malaysia, and the USA. Qualified trainers at these centers delve deeper into potential operational hazards, troubleshooting, case studies, and tips and tricks. In addition, all Reduct distributors are trained and qualified to provide additional training as well.



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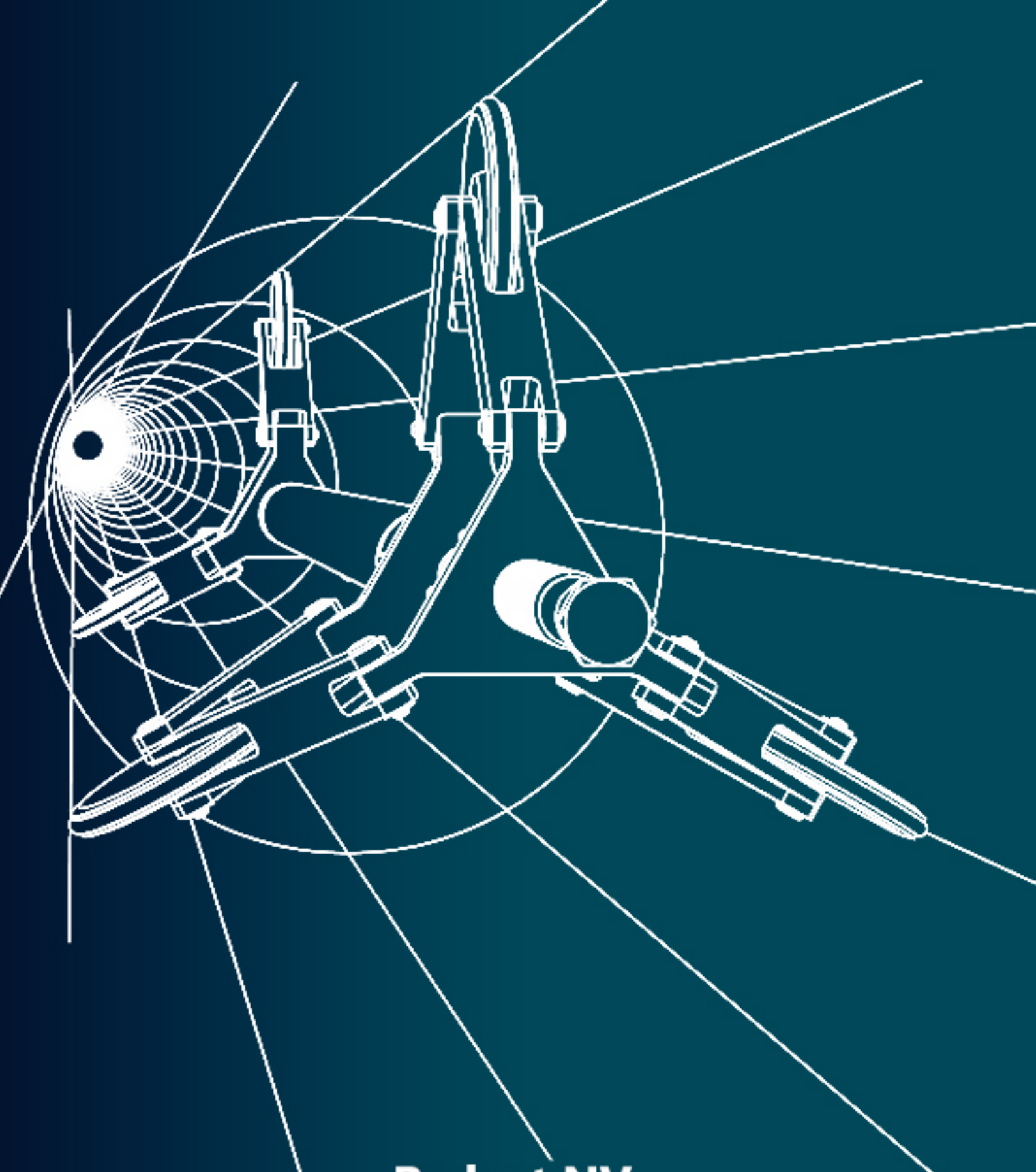
Our global distributors

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