



***Every day workers are exposed to risk.
We are all responsible to manage,
control and minimize risk.***

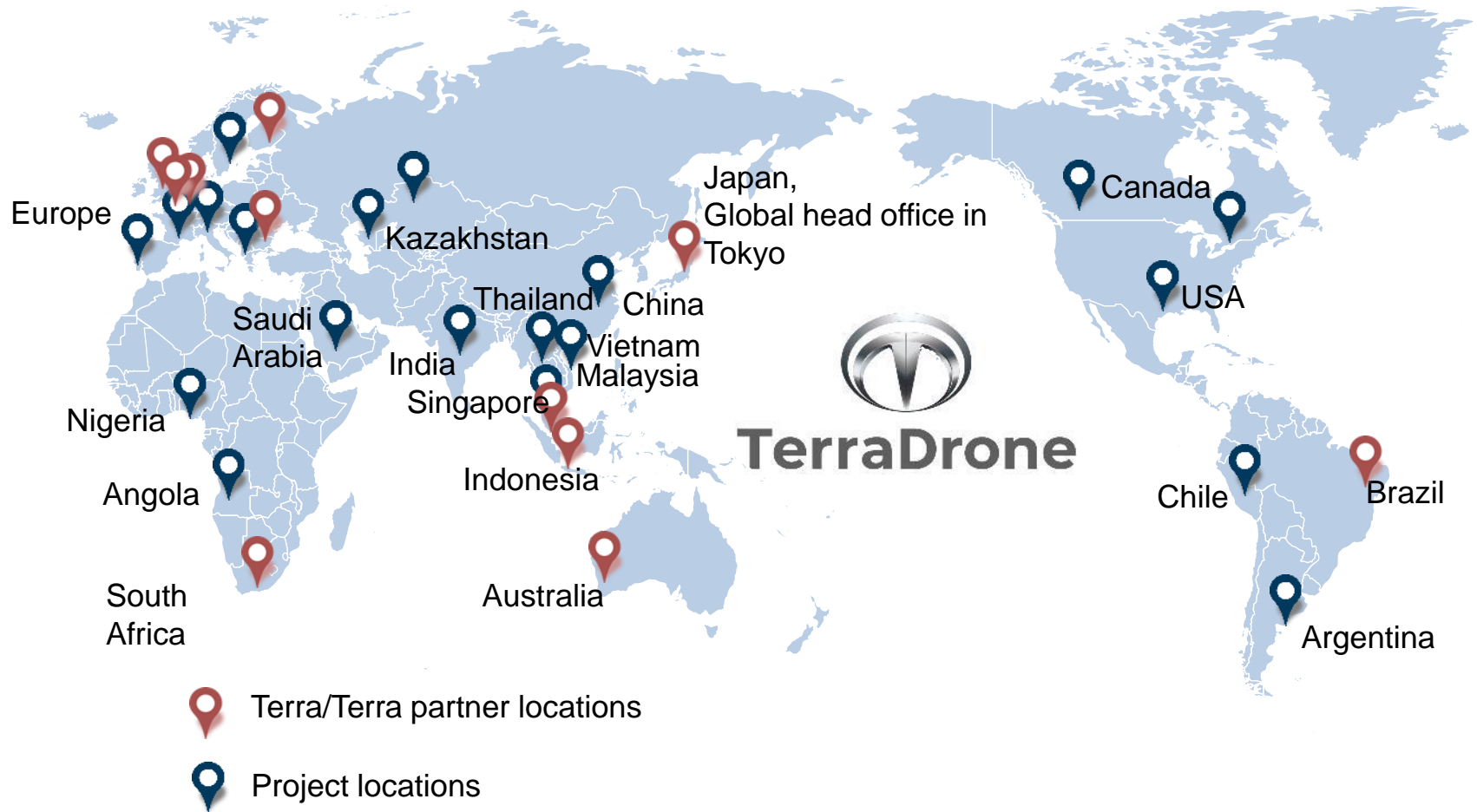
***Robotics can help reducing risks and
be more efficient.***



Terra Inspectioneering

- Robotics Inspection Company
- Head office in Vlissingen, Netherlands
- Founded in 2016
- In house R&D for robot development & manufacturing
- Recently recognized by our state authorities as most innovative co.
- Own training facility
- Member of the Japanese Terra Drone Co.

***Develop and use technology to improve workers' safety
&
More efficient inspection of valuable assets.***



Terra technology users



Terra Inspectioneering



PETRONAS



NESTE OIL

ConocoPhillips

HEXION™
Responsible Chemistry

BASF
We create chemistry



ExxonMobil
Energy lives here™



Vopak

OMV



BUNGE
Loders Croklaan



ODFJELL

æb
amsterdam

ZEELAND REFINERY
A TOTAL AND LUKOIL COMPANY



AkzoNobel

Oiltanking



inter terminals

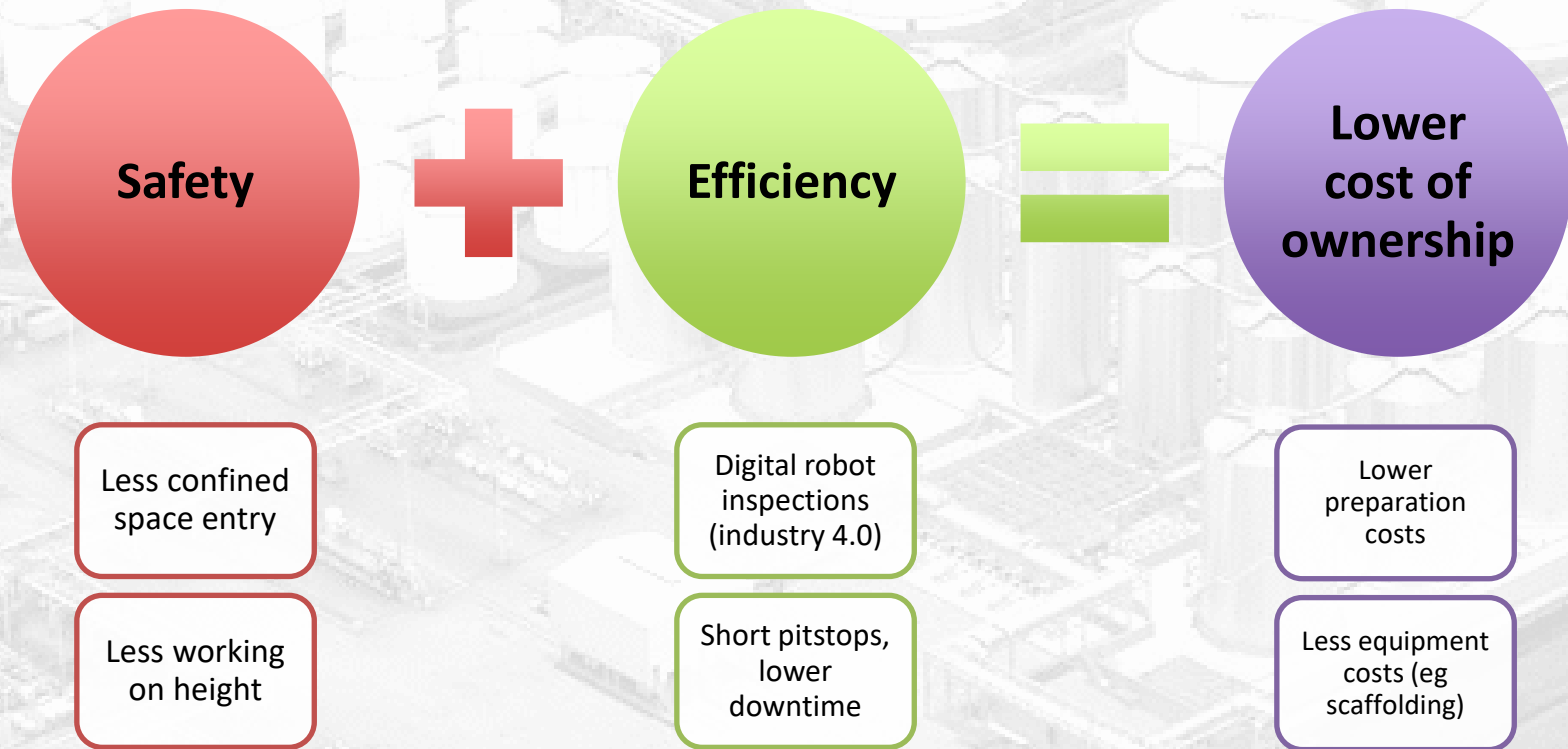


TOTAL

lyondellbasell



essent
RWE
The energy to lead



Inspection drones – robotics. Why?



***Safer
High quality
Less downtime
More efficient***



We use a variety of equipment

Drones



Confined space drones

- Elios 2
- from July: Elios 3
- Mini drone 17cm
- Visual inspections
- Thermal camera



UT drones

- Certified UT measurements
- Worldwide patent
- Confined spaces and outdoor
- + coating thickness



Outdoor inspection drones

- Visual inspections
- 30* zoom
- Thermal inspections
- Gas detection



Robots



Terra UGV

- High res visual
- UT surveys
- Cleaning brush



Magenetic crawlers

- For CS only
- Visual
- UT
- 80m umbilical



Sailing drone

- Visual inspections
- From waterline
- For underside of jetties

Manual equipment



Telescopic equipment

- Non entry
- UT
- Visual
- Weld research



3D Laserscanning

- High precision 3d pointclouds
- Fast
- Often non-entry
- Tank deformation analysis



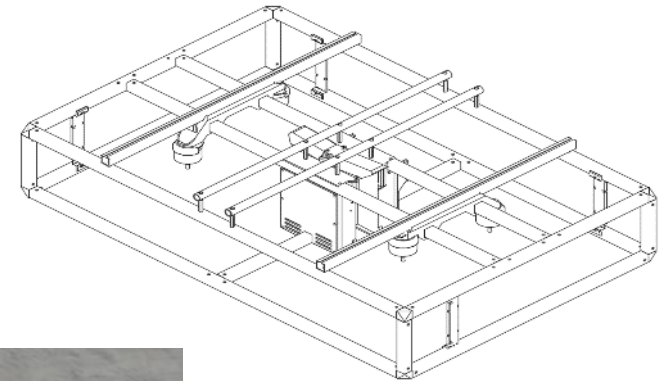
Manual NDT surveys

- UT thickness survey
- MT research
- Pitting measurement
- Dye penetrant
- Cornerweld measurement

Terra modular UT drone platform

Highlights:

- Collision tolerant
- Modular
- Gel pump
- Cleaning brush
- Indoor + Outdoor
- Non-entry
- Cloud-enabled
- Data tracability

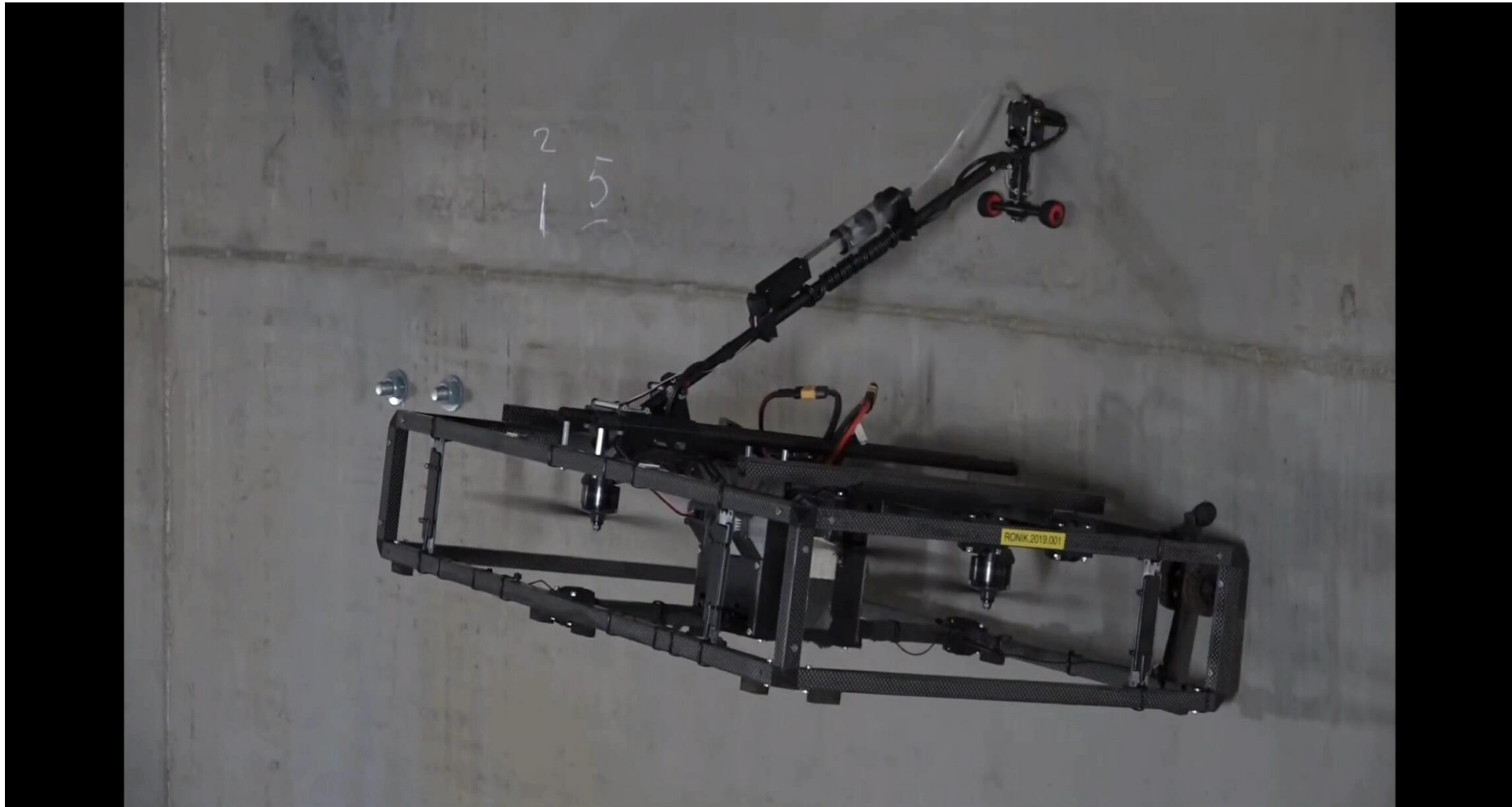


Current modules:

- Vertical walls
- Roof plates
- Tank floors
- Diagonal walls
- IPE\T\U beams
- Floating roofs
- Vertical pipes
- Boiler tubes
- Coating thickness

Proven technology:

- > 1000 projects executed since 2019
- Fully EEMUA-159 and/or API-653 compliant





- **Certified** measurements at 0,1mm accuracy validated by Level 2 NDT engineer (full A-scan).

Pilot and payload operator are VT and/or UT level 2 certified

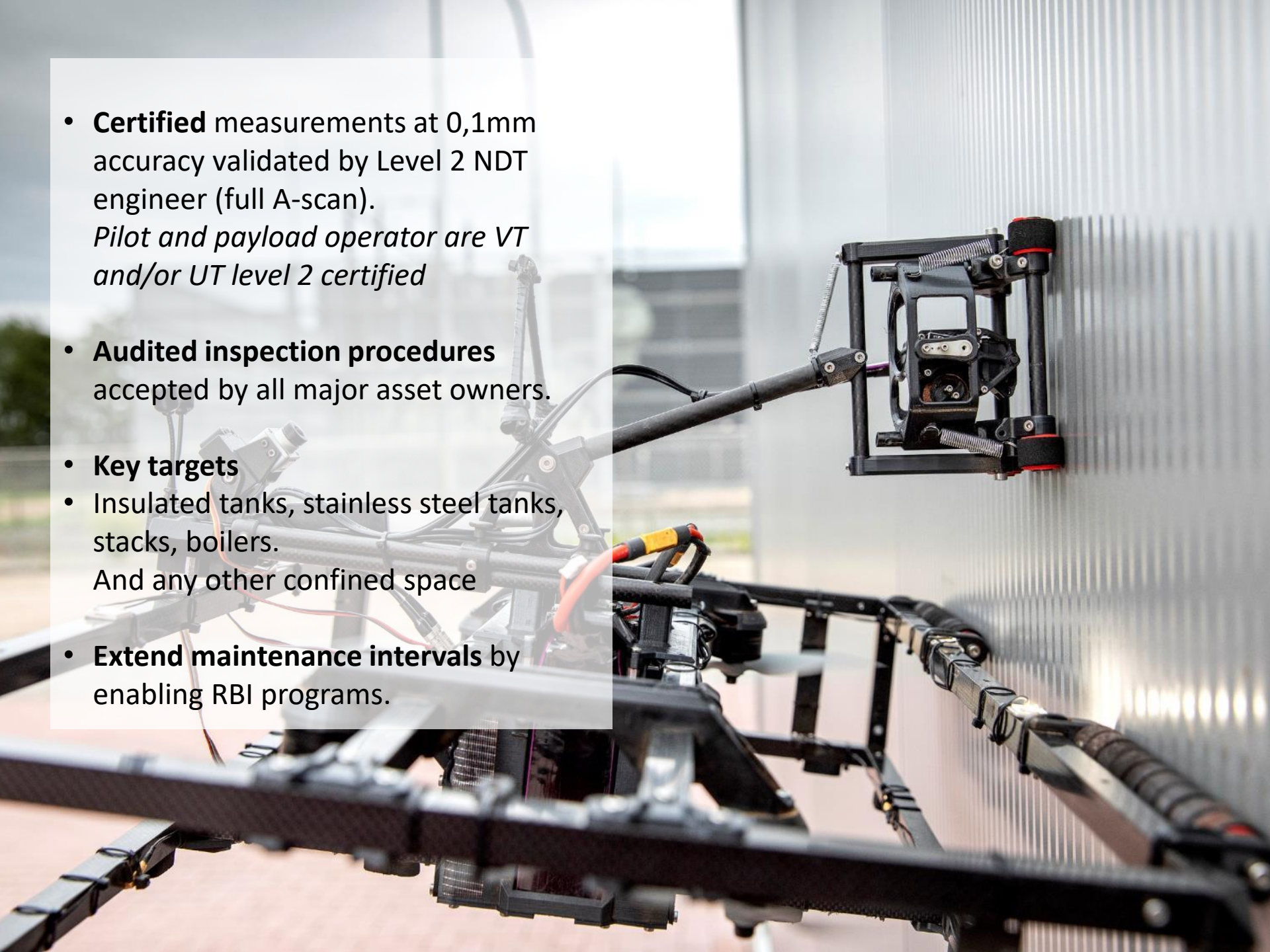
- **Audited inspection procedures** accepted by all major asset owners.

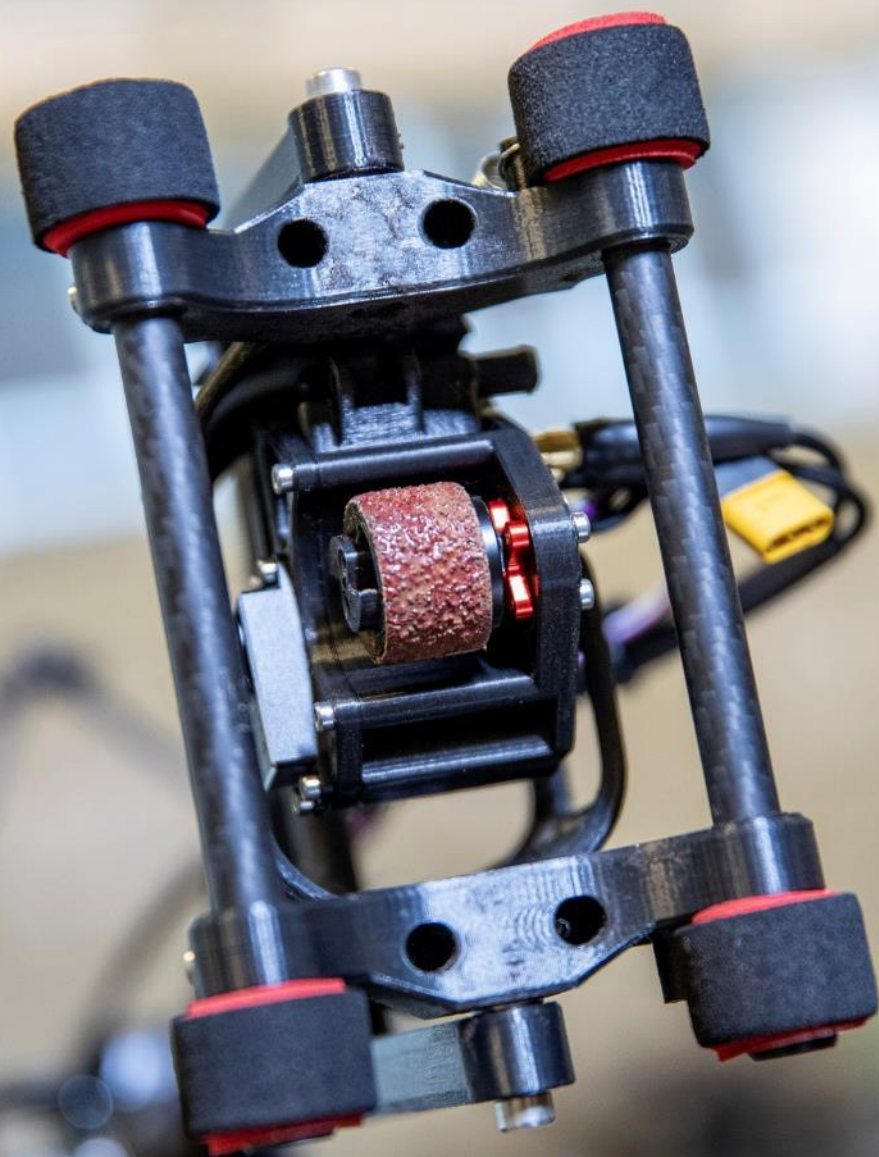
- **Key targets**

- Insulated tanks, stainless steel tanks, stacks, boilers.

And any other confined space

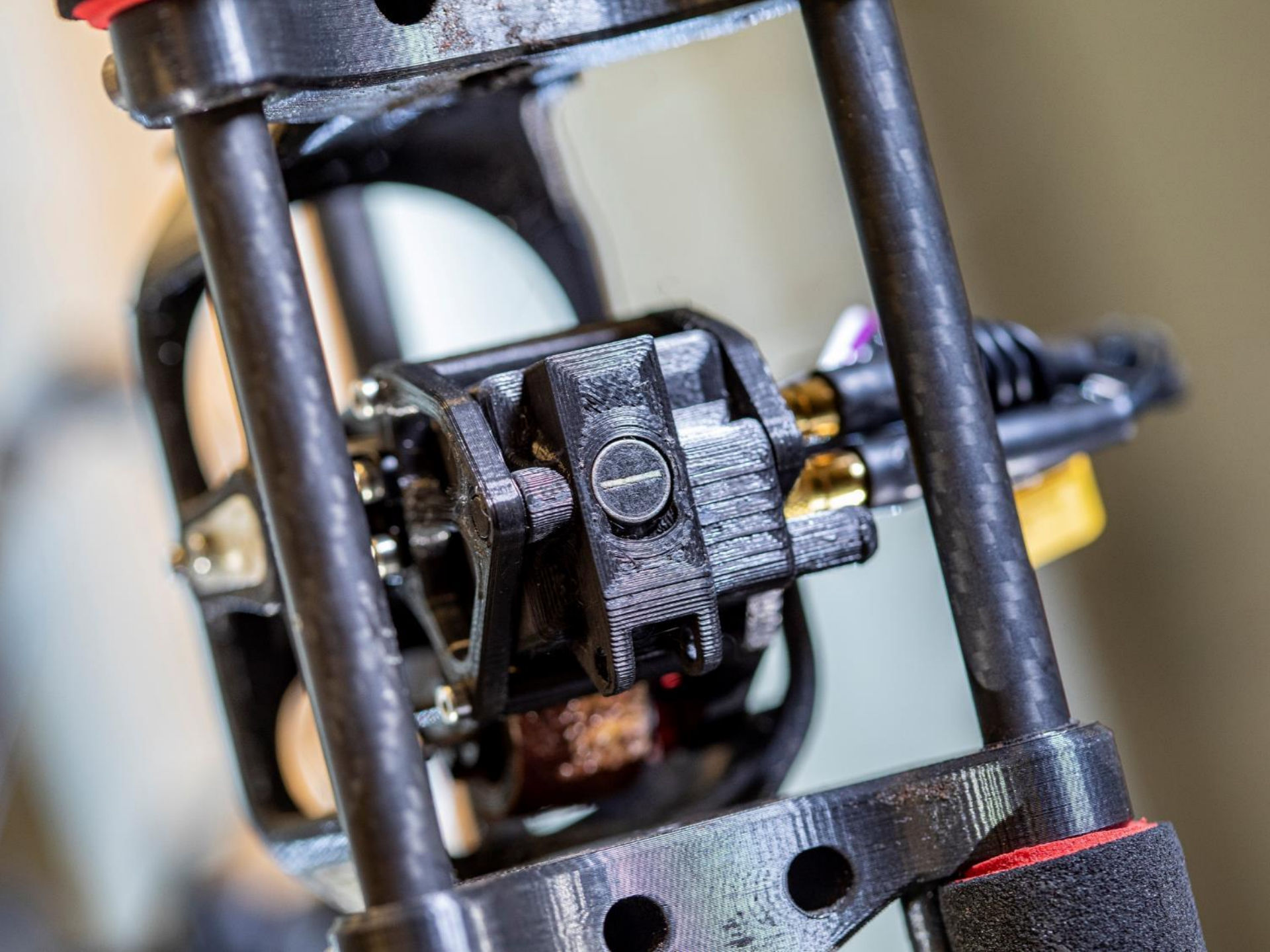
- **Extend maintenance intervals** by enabling RBI programs.





INTEGRATED GEL DISPENSER
TWO ONBOARD CAMERAS





Inside storage tank inspections



UT shell and roof indoor



Roof support structure
IPE / UNP / T rafters



Non-entry VT & UT



UT floor

Storage tank inspections - outside



UT roof



UT shell

Full storage tank inspection package



full inspections according
API – 653 or EEMUA-159

Other use cases



Turnaround confined space inspections



Chimney UT & VT inspections



Flare UT & VT inspections



Boiler tubes UT & VT inspections



Coating thickness measurements

Software solutions



3D scanning & deformation analysis



Terra 3D inspect reporting software

- Accessibility (cloud based)
- Data traceability

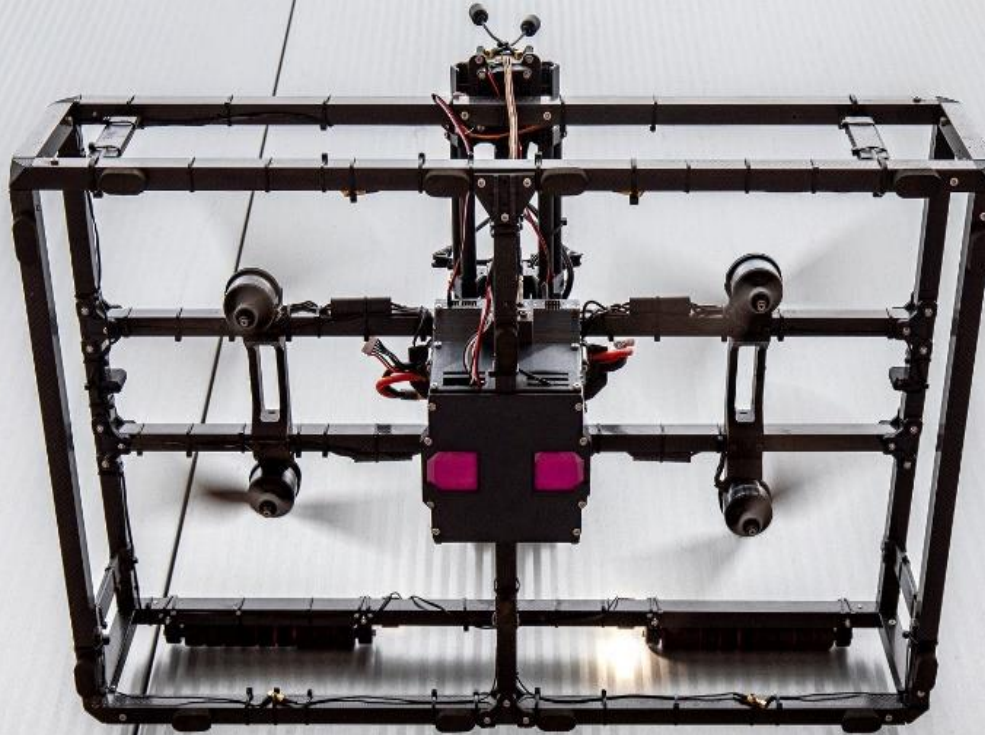


Elcometer 456 coating thickness device



[link](#)

Thank you for your attention!



Terra Inspectioneering



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