

# Drone Inspection Services

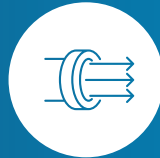
Comprehensive Ultrasonic Data Collection with Drone Technology



Reducing inspection effort by eliminating access costs



Minimizing HSE risks associated with working at height



In-service inspection with no need for operational shutdown



Inspection of assets with complex structures



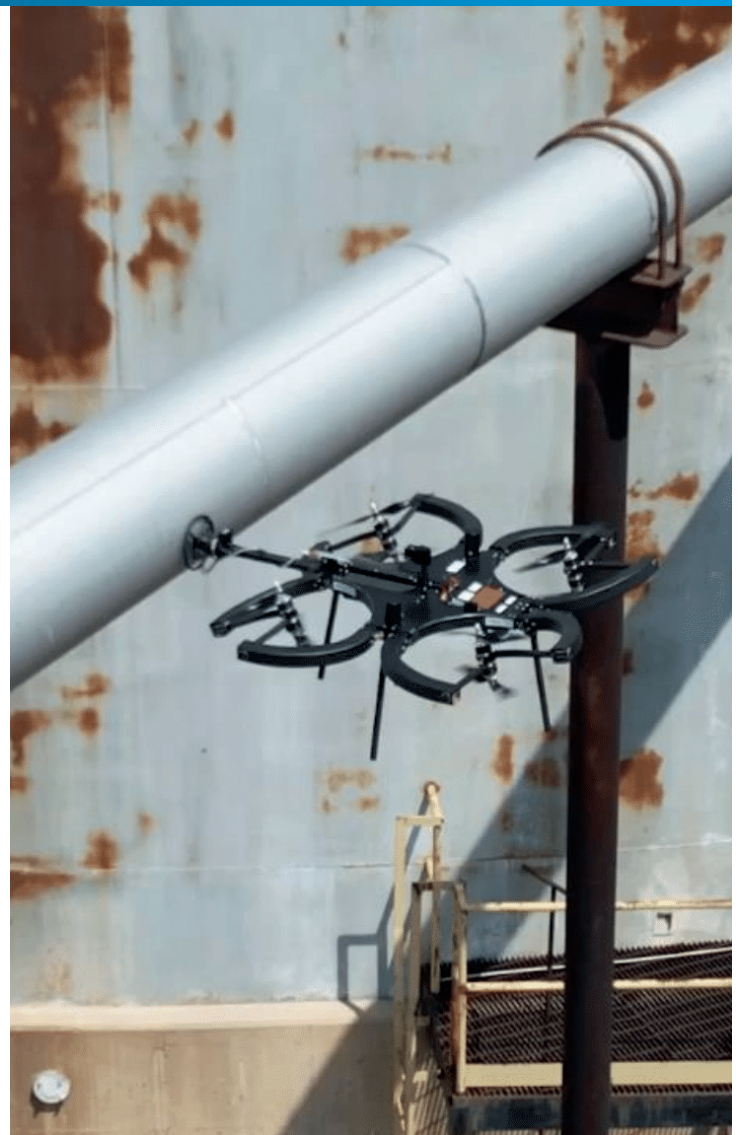
Delivery of UT A-Scan for live data validation

**Drone inspection is a non-destructive testing (NDT) method that utilizes ultrasonic testing (UT) and visual and thermal inspections to evaluate areas in tanks, piping systems, chimneys, and other installations that are challenging or hazardous to access due to obstacles or heights. Drone inspections overcome the technical and physical limitations of conventional methods and significantly reduce health, safety, and environmental (HSE) risks. Beyond inspections, drones are also effective for cleaning and maintenance tasks such as coating repair, rust removal, and painting.**

Collecting ultrasonic data at height can often be challenging and costly due to the necessity of access equipment such as ropes, boom lifts, and scaffolding to position workers for inspections. Traditional methods not only present logistical and safety issues but also significantly increase inspection costs. Ultrasonic technology is complemented by visual and thermal inspection capabilities, providing a thorough assessment of the condition of the structure, leading to more accurate and effective integrity decisions. In addition to data collection, maintaining the integrity of structures by mitigating corrosion growth is crucial to prevent further damage. Drones offer a revolutionary solution by enabling precise cleaning and recoating of these areas without the need for expensive access equipment, ensuring both efficiency and safety.

## Benefits

- Automated or manual UT couplant dispensing
- Measurement validation assistant will help determine the best A-Scan
- Real-time data visualization during flight
- Data collection in line with industry standards, e.g. EN ISO 9712



# Measuring Description

The drone probe houses several different systems and sensors to collect UT thickness data. Once the pilot has navigated the drone to an inspection area, the pilot engages contact mode. With feedback from the forward-facing LiDAR aid, the drone moves forward at a fixed speed. Just prior to contact, the couplant is automatically released. During contact, the drone automatically adjusts its angle with feedback from the force sensor. These adjustments mimic the accuracy of hand-tested measurements. The live waveform is reviewed by the UT inspector, and the pilot flies the drone to the next inspection point.

# Technical Specifications

## Aircraft specifications

<b>Maximum wind speed</b>	10 knots static gusting up to 15 knots (18 – 27 km/h; 11.2 – 16.8 mph)
<b>Operating range</b>	100 m (328.1 ft)
<b>Ambient temperature</b>	-20 °C to +40 °C (-4 °F – 104 °F)
<b>Deployed dimensions</b>	90 x 90 x 48 cm (35.43" x 35.43" x 18.9")
<b>Clearance requirements</b>	1 m (3.28 ft) of clearance in each direction
<b>Measurement performance</b>	50 – 60 readings per hour
<b>Max take-off weight</b>	8 kg (17.64 lb)
<b>GNSS</b>	Dual GPS+, Glonass, Beidou + Galileo
<b>Hovering Precision</b>	Vertical +/- 2.5 cm (0.08 ft), Horizontal +/- 1.0 cm (0.03 ft)
<b>Max hover angle</b>	45 degrees pitch and roll
<b>Video resolution</b>	1920 x 1080 at 60 fps
<b>Streaming resolution</b>	1920 x 1080 at 60 fps

## Ultrasonic specifications

<b>Thickness range</b>	2 mm (0.08") to 50 mm (2")
<b>Material velocity range</b>	0.508 mm/μs (0.002 ft/μs) to 13.998 mm/μs (0.046 ft/μs)
<b>Transducer</b>	D7906 dual element 11 mm (0.43")
<b>Frequency</b>	5 MHz
<b>Coating</b>	Non-metallic
<b>Coating thickness</b>	0.125 mm (0.005") to 5 mm (0.2")
<b>Surface temperature</b>	-20 °C (-4 °F) to 200 °C (392 °F)

ROSEN Swiss AG  
Obere Spicher matt 14 · 6370 Stans · Switzerland

Phone: +41-41-618-0300  
info@rosen-group.com  
www.rosen-group.com

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