

Fact sheet

Drone services for confined spaces

For safe and cost-effective inspections in confined spaces

New technologies such as Unmanned Aerial Systems (UAS) are being adopted to mitigate significant risks associated with inspection in confined spaces, hazardous locations and those with limited access.



Confined spaces

Hazardous environments historically required time-consuming and costly human inspections with extensive safety protocols and equipment like scaffolding and rope access.

Drones are revolutionizing this process by eliminating the need for human entry.

Advanced technology such as LiDAR for 3D mapping and high-resolution cameras for visual and thermal inspection, can capture detailed, actionable data from a safe distance.

This approach drastically improves worker safety and boosts operational efficiency by cutting down on inspection time and minimizing asset downtime.

Benefits include:

- Enhanced safety
- Operational efficiency
- Detailed and actionable data
- Collision-resilient design

Inspection reports

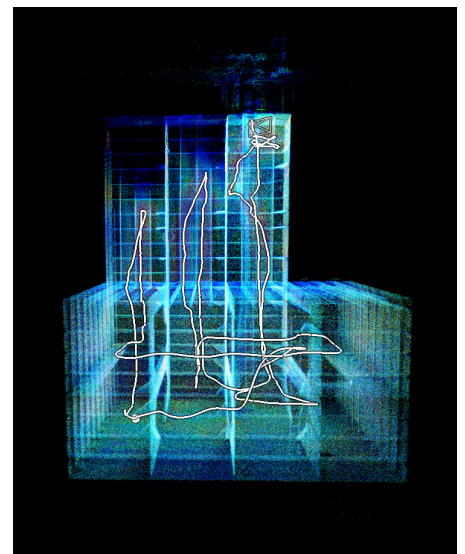
With each inspection, we provide a detailed report with thermal images, high-definition videos, photos, and measurements..

Our inspection software processes this data to create accurate 3D point cloud models and comprehensive reports.

Drone features

Our capabilities include high-resolution visual, thermal and non-destructive testing (NDT) inspection as our drones are equipped with a dedicated payload for close-up inspections through:

- **4K camera:** captures high-definition 4K video and 12MP photos with a wide 180° field of view, optimized for low-light conditions
- **Thermal camera:** a Forward-Looking Infrared (FLIR) thermal sensor detects thermal anomalies and heat signatures, crucial for predictive maintenance and identifying potential failures
- **Powerful lighting system:** an adaptive, dust-proof lighting system with up to 16,000 lumens ensures clear imagery even in complete darkness or dusty environments
- **Ultrasonic thickness measurement payload:** this payload turns the drone into a flying UTM drone allowing for accurate thickness measurements in hard-to-reach areas, reducing the need for scaffolding or rope access
- **3D volume measurement:** LiDAR can be used to capture a 3D scan and measure the volumes of many different types of assets



3D volume measurement for a tank

For more information

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 intertek.com/uas

UAS for confined spaces



Inspection applications

- Coker drums
- Tanks / ballast tanks
- Vessel hulls
- Reactors / cooling towers
- Boilers, furnaces, and pipelines
- Underground utilities
- Chemical tanks
- Mines

Use cases

Drones can be used in a wide range of inspections from in-service inspection plan (ISIP) inspections in offshore environments to turnaround inspections. All can include confined spaces.

ISIP inspections are performed on floating vessels such as FPSOs and semi-submersible platforms.

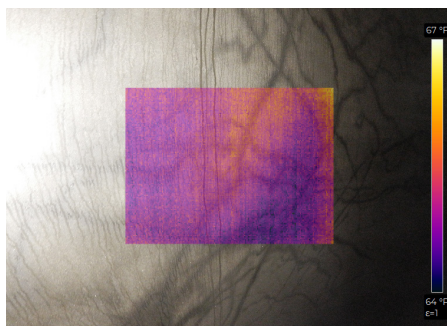
These include confined space inspections of the ballast and void tanks, and any location where critical infrastructure is located.

Thermal infrared camera

When inspecting boilers, furnaces, and pipelines, using the drone's thermal infrared camera is key as it can be used to inspect cracks or leaks, or detect.

The thermal camera is ideal for detecting hot spots in machinery, electrical components, or industrial equipment.

This can be an early indicator of a developing failure, overheating, or a faulty connection, allowing for preventative maintenance before a critical failure occurs.



Thermal camera overlay during live inspection

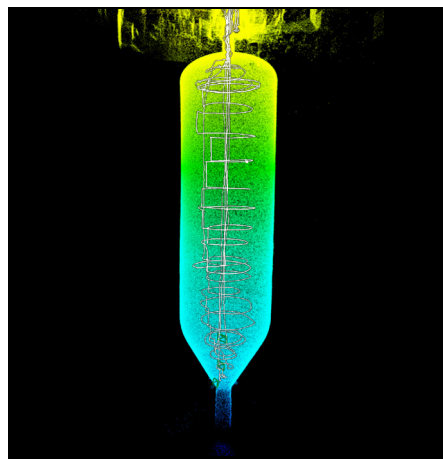


Coker drum

For coker drum inspections, we can use our drone to conduct a visual and ultrasonic thickness (UT) inspection.

By deploying the drone, the inspection team eliminates the need for costly and time-consuming scaffolding and avoids placing personnel at risk in a confined space.

The drone's LiDAR system creates a real-time 3D map of the drum's interior, allowing the pilot to navigate precisely while the inspectors localize any defects they find.



3D map of the coker drum's interior

The drone's visual and UT payloads collect high-quality data on the condition of the drum's walls including accurate measurements and detailed images of any cracks, corrosion, or other damage.

With this comprehensive analysis, we enable the refinery personnel to plan maintenance with greater accuracy.

We're reducing risks, delivering quick turnarounds and providing cost savings by using innovative UAS solutions in challenging spaces.



User interface on remote control

Remote control user interface

When flying the caged drone, the pilot is able to see a real-time 3D model that is located on the controller. When combined with the camera view, the pilot can see where the drone has already flown.

When the pilots see something of interest, they are able to mark a point of interest (POI) in that specific location so the POI can be referenced in the post inspection report.

3D live mapping

The cutting-edge UAS we use has software built in which uses LiDAR to create a real-time, 3D high-density point cloud map of the environment.

This provides capturing a 3D scan area of confined spaces previously not possible in a practical or efficient manner.

For more information

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