

ELIOS IN ACTION | OIL & GAS

# PRESSURE VESSEL INSPECTION



A prevalent tool in energy production and storage are pressure vessels, which hold gases and liquids at high pressures. Vessels are subject to regular inspections, as a ruptured unit can give rise to more fatal risks. Current inspection methods are time consuming and prone to risks; our all-in-one UAV solution Elios can inspect vessels without the risk of injury.

Operating and maintaining pressure vessels presents considerable health and safety concerns for the Energy industry. Consequently, the regularity of maintenance inspections is to avoid leaks or explosions, this requires extensive preparation and caution by human workers.

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WHILE DOWNTIME IS  
REDUCED, INSPECTION  
PERSONNEL ARE ABLE  
TO CONTROL THE  
DRONE REMOTELY  
OUTSIDE THE  
STRUCTURE, AVOIDING  
THE RISK OF INJURY

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Current approaches to evaluating pressure vessel integrity are through Non-Destructive Testing methods such as observing deterioration indicators and visual inspection. Preliminary visual inspection is a fundamental aspect of the process, other NDT methods such as ultrasonic thickness measurement are compliments to an overall assessment. The larger issue at hand is the extensive training and preparation needed for accessing and inspecting these confined areas, specialized permits, presence of multiple trained personnel, rescue teams and ventilation are a few aspects that add to the costly nature of pressure vessel inspection. Shell states that “98% of the costs are related to EHS and preparation, only 2% to the inspection itself”, which emphasizes the need for a solution that is able to perform the inspection and reduce costs related to preparation and risk.

### CONVENTIONAL INSPECTION METHODS

- Robotic Arm
- Visual inspection
- Magnetic-wheeled robots

### UNMET NEEDS

- Avoid confined space access
- Rapid inspection in emergency cases
- Minimize downtime during inspection
- Complete coverage, even in hard to access areas

Practical robotic solutions exist for pressure vessel inspection; this includes a controllable robotic arm or magnetic-wheeled robots. However, most are limited by their locomotive capabilities when faced with obstacles or different environments. Flyability’s collision-tolerant UAV Elios is designed to reflect off obstacles with an external rotating cage, the same mechanism protects any human operators from harm.

A pilot test was organized in collaboration with Chevron’s energy sector, whose objective is to prevent all human entry into confined areas by



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2020. Flyability performed vertical and horizontal pressure vessel inspections. While one of our pilots was controlling the drone itself, another adjusted the live video transmission to ensure the best quality material, even in difficult lighting situations. When in contact with structures, it transmits visuals at 0.2mm/px resolution, in being able to adjust the ISO+, exposure time and LED intensity, assuring the most accurate close-proximity visuals.

To ensure downtime is reduced during our inspections, Elios can be deployed in under a minute and the batteries exchanged in under 30 seconds. inspection personnel are able to control the drone remotely outside the structure, avoiding the risk of injury, reducing overall asset downtime.

### MISSION ACHIEVEMENTS

- Complete inspection of vertical and horizontal pressure vessels
- High image quality in difficult lighting conditions.

### ELIOS BENEFITS

- No confined access required
- Review mission data on provided SD card.
- Inspector can become trained operator after 2 days training.
- Little preparation required
- No risk of crashing
- No regulatory burden as operations are indoor and not in public airspace

### MISSION PICTURES TAKEN BY ELIOS



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### TIME – COSTS – SAFETY

Flyability builds **safe drones for the inspection of inaccessible, confined, and complex places**. Focusing on the Energy, Oil & Gas, Chemicals & Maritime industries, Flyability enables end-users to save time, costs and reduce risks during visual inspections.