



Monitoring Emissions Compliance from Ships

Mini Sniffer System for UAVs



Making monitoring of vessel emissions effective, easy and affordable.



In response to the increased demand for monitoring of SO_x and NO_x emissions from ships, Explicit has developed a unique mini sniffer system to be used as payload on UAVs.

The system enables authorities to perform in harbour or at-sea monitoring of vessel emissions using multi-rotor or fixed-wing UAVs equipped with Mini Sniffer Units to measure exhaust plumes (SO₂, NO₂, NO and CO₂). As such, the system offers an effective tool for screening vessel compliance as part of regulatory enforcement efforts.

Full system for emissions monitoring

The Explicit Mini Sniffer System includes both a Mini Sniffer Unit UAV payload as well as a full software platform to perform analysis of each vessel's emissions and compile detailed emissions reports.

The system also includes real-time features to support the UAV operator's navigation in the exhaust plume as well as automated quality scoring to allow the operator to quickly assess the reliability of each measurement.

Lowest uncertainty of any sniffer system

The Explicit Mini Sniffer System has been validated in scale on more than 300 vessels. It has been verified to have the lowest uncertainty of any sniffer system available.

The Explicit Mini Sniffer System is able to determine non-compliance already at 0.14% sulphur in the bunker fuel for

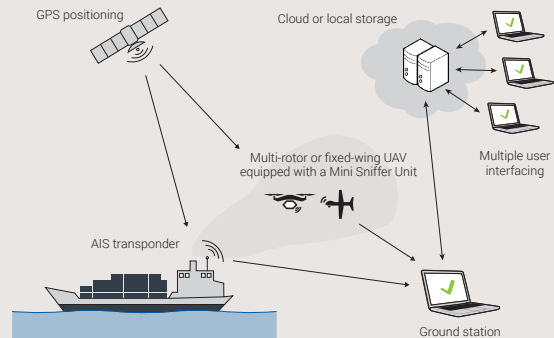
the 0.10% limit, and at 0.61% for the 0.50% limit. No other sniffer system is able to deliver the same accuracy.

Certified calibration and replacement

Each Mini Sniffer Unit comes ready-to-use and carries a unique certificate of calibration from FORCE Technology. No further in-field calibrations or device maintenance is needed.

Explicit is also offering the Mini Sniffer System on attractive product-as-a-service terms as test kits or under operational contracts reducing upfront costs to deploy the system. To learn more, please contact our team.

The Explicit Mini Sniffer System



The Explicit Mini Sniffer System includes both hardware and software components to carry out plume inspections.

Key benefits



Only verified and scale-tested mini sniffer system available for compliance monitoring



Lowest uncertainties of any sniffer system



Simultaneous measurement of SO_x and NO_x emissions



Full system with detailed emissions reports on compliance.



Easy to use. No need for in-field calibration



Patented smart flight features to assist in-plume navigation



Certificates of calibration by FORCE Technology

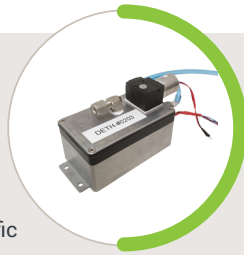


Built-in quality scoring on all measurements.





For Integration



Description

Mini Sniffer Unit for integration on appropriate UAV airframe as scientific payload. The unit comprise all necessary sensors to conduct SO_x and NO_x measurement of ship plumes. The unit relies on access to the UAV flight controller in order to relay position and sensor data to the ground station software for further analysis. This option is intended for cases with payload weight restrictions and/or long-term operations.

Technical specifications

Sensors: SO₂, CO₂, NO, NO₂, temperature, humidity
Payload weight and size: 500g, L145 x H75 x W63 mm
Inlet: Teflon tube, max. length up to 500 mm. Note, the tip (50 mm) must be placed in (turbulence) free air
Outlet: Rubber tube, max. 1000 mm. Placeable anywhere.
Power requirement: 5v, 150 mA (unit); 6v, 300 mA (pump)
Mount: 4 mounting holes
Data interface: Serial TTL
Maintenance: Units are delivered ready for operation with a certificate of calibration. No further calibration is needed. Units must be replaced after 100 hours of operation or at least every 2 years. Used units to be returned to Explicit.
Other considerations: Unit data output must be combined with the UAV GPS track and separately sourced AIS data in order to compile a vessel emissions report. See below.

OR

Standalone



Description

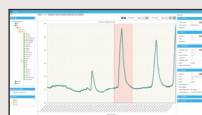
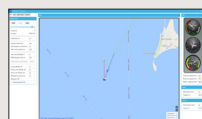
Mini Sniffer Unit as standalone payload for appropriate UAV airframe. The unit comprise all necessary sensors to conduct SO_x and NO_x measurement of ship plumes. It also includes controller, radio link and GPS receiver to allow the unit to communicate directly with the ground station software. This option is intended for cases where no UAV integration is preferred and/or short-term operations such as a scientific projects.

Technical specifications

Sensors: Same as integrated
Payload weight and size: 1000g, L200 x H85 x W100 mm
Inlet: Same as integrated
Outlet: Same as integrated
Power requirement: 4S or 6S, up to 22v
Mount: Subject to UAV airframe. Please request info.
Maintenance: Units are delivered ready for operation with a certificate of calibration. No further calibration is needed. Units must be replaced after 100 hours of operation or at least every 2 years. Used units to be returned to Explicit.
Other considerations: Unit data must be combined with separately sourced AIS data to compile a final vessel emissions report. See below.

Ground Station and Analysis Software

The Explicit Mini Sniffer System for UAVs come with software for identifying vessels, navigating plumes, and analyzing emissions. The software allows the operator to compile detailed emissions reports and conclude on compliance in relation to MARPOL Annex VI with a high degree of certainty. The software consist of two components: A ground station application and an analysis and reporting application.



Smart Flight

Tests have shown that navigating ship plumes can be difficult, since plumes are not easily visible. Explicit's software solution includes a unique option for simulating plume positioning using local weather data as well as a real time sensor feeds to assist the pilot operator when navigating a plume.

About Explicit

Founded in 1998, Explicit is an experienced technology company specializing in data systems for environmental monitoring and mapping.

Our work is focused on data collection in settings that are difficult to access or require a large distributed network of measuring points.

Our systems apply smart UAV and other airborne platforms together with various sensor technologies. Coupled with advanced software we create unique environmental knowledge through smart data collection.

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