

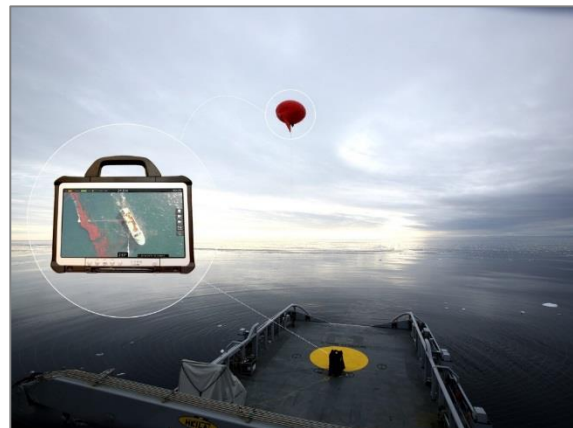
SEAFLOOR AND SEEP SAMPLING PROGRAM – LABRADOR OFFSHORE TO JEANNE D’ARC BASIN (2014 TO 2019) – PROGRAM DESCRIPTION

Program Description addition
August 7, 2014

2.2.5.1 OceanEye® Aerial Surveillance System

In addition to interpreted results from satellite data, TGS proposes to implement the OceanEye® Aerial Surveillance System to assist in locating active natural seafloor seeps on the ocean's surface. Prior to collecting seep samples using the AGI sampling kits, a weather-proof, helium-filled balloon carrying a triple-sensor unit will be deployed from a base unit off the stern of the survey vessel to an approximate height of 100 to 150 metres above the ocean surface. Tethered by a heavy duty cable, the system will operate while the vessel is transiting to and within the identified potential seep areas, collecting and producing high resolution day and night (EO/IR) imagery and geo-location coordinates. The balloon's sensor unit locates the petroleum seep and transmits data wirelessly to the base unit on the vessel. With customized OverView software, the hand-held, touch-screen terminal displays daylight and infrared information for real-time identification and reconnaissance of active seafloor seeps.

During program operations, there will be a dedicated operator on board the vessel, who will be qualified and trained on the system prior to commencement of activities. The system will not be used continually during all operations, it will only be implemented and deployed to identify and detect active seeps in specific areas. Once seeps are visually identified for sampling using OceanEye®, the system will then be retrieved and stored in a dedicated area on the work deck of the vessel. Deployment and retrieval of the balloon can take from 15-30 minutes for each activity.



The system components include:

- **Sensor Unit**

Triple sensor unit (EO/IR/AIS) with real-time day & night video and imagery. The sensor unit, is equipped with a video camera, sensor and wireless datalink. The compact camera is attached to the balloon, which makes the high quality footage from the OceanEye® Sensor unit stable. The product is built out of solid and robust material that can handle harsh weather.

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- **Base Unit**

The base unit serves as a docking station, winch control panel, helium-filling and storage unit. The compact system with base unit, balloon and sensor unit is compact for air freight & small vehicle transport. Completely self-contained and rapidly deployable with footprint of a standard ISO pallet.

- **Viewer Terminal**

Rugged Viewer terminal with touch a based OverView software, controls the OceanEye® Sensor unit and displays sensor data and position of video-view cross-hair.

- **Balloon**

Helium-filled balloon carries the airborne sensor unit for persistent aerial surveillance.

OceanEye® is manufactured and provided by Maritime Robotics, based out Trondheim, Norway. Maritime Robotics is a leading provider of innovative unmanned solutions for maritime operations in harsh environments (www.maritimerobotics.com/systems/ocean-eye). See attached brochure for more information.