

LFS-P

Ultra-compact airborne laser fluorosensor for day & night oil spill classification



- Detection of laser-induced fluorescence of crude oils, petroleum products and water constituents
- Day & night classification of crude oils, petroleum products and chemicals spilled at sea
- Detection of submerged contaminants
- Measurements of oil film thickness over very thin (optically thin) oil layers
- Hydrographic measurements (CDOM, turbidity, chlorophyll-a)
- Ultra-compact and ruggedized set-up, no internal cooling water

Product Evolution

The ultra-compact LFS-P is OPTIMARE's fourth generation laser fluorosensor (LFS) for airborne oil type classification. Two decades of expertise as well as progress in opto-electronics and laser technology enabled OPTIMARE to develop a laser fluorosensor with roughly one-third in size, weight, and power consumption compared to its predecessor, the LFS Light. The new LFS-P makes airborne pollution detection and classification possible from a huge variety of airborne platforms. The LFS-P has a

built-in interface to OPTIMARE's airborne maritime surveillance system MEDUSA.

Application

Laser fluorosensors are the only airborne Instruments for a day & night remote classification of crude oil, petroleum products and fluorescing chemicals spilled at sea. The airborne identification of the type of marine pollution can support both the coordination of response actions and the prosecution of polluters.



Technique

The LFS-P is an ultra-compact nadir-looking (non-scanning) airborne laser fluorosensor for oil type classification. Besides its oil detection capability the device is suitable for airborne monitoring of (harmful) algal blooms due to its capability to measure the laser-induced fluorescence signal of chlorophyll a. The LFS-P has been designed to meet the requirements to be operated routinely as a part of modern airborne surveillance systems. The instrument is low-maintenance due to its ruggedized set-up and its liquid-free cooling system.

Technical Data

LFS-P

MECHANICAL PROPERTIES

Dimensions	560 mm x 554 mm x 292 mm
Mass	45 kg
Stand-alone/Module	Controlled by separate mission computer

OPTICAL DETECTORS

Type	Range-gated multi-channel PMT
Number of channels	15
Spectral and/or temporal resolution	~ 20 nm for each channel
Spectral range	355 nm ... 705 nm, 25 nm pitch
Measurement capabilities	Classification of crude and refined oil as well as water based on a catalogue of spectra of 11 substance types
Altitude of operation	Ideally 1,000 ft

LASER

Laser type	Air-cooled diode-pumped Nd:YAG laser
Laser class	4
Excitation wavelength	355 nm (third harmonic generation)
Repetition rate	10 Hz
Pulse energy	60 mJ
Pulse duration	<10 ns

POWER/FUEL SUPPLY

Current	20 A (typical) @ 28 VDC
Voltage	28 VDC (nominal); 20 VDC - 31.5 VDC

COMMUNICATION/INTERFACE

Network Connection	Copper or fiber-optic ethernet
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OPERATING/STORAGE CONDITIONS

Ground survival temperature	-55 °C ... +60 °C
Operating temperature	-40 °C ... +55 °C
Altitude/Pressure	41,000 ft
Vibration	RTCA/DO-160G, Section 8, Category S, Curve L
Humidity	RTCA/DO-160G, Section 6, Category B

STANDARDS

Environmental qualification	In accordance with RTCA/DO-160G
Electromagnetic compatibility	In accordance with RTCA/DO-160G

