

**slick
sleuth™**

Automated 24/7 Oil Spill Monitoring & Leak Detection





*Monitoring & Early-Warning
Detection of Oil & Fuel for:*
**Fuel Depots & Airports
Storage Terminals
Refineries & Midstream
Power Plants / Industrial
Marine Terminal Piers
Sumps, Sewers, Separators
Drains, Discharges, Outfalls
Offshore & Loading Buoys**

Who Uses Slick Sleuth?

Power Generators

*Power Plants (Coal, Fuel, Nat. Gas)
Hydro-Electric & Nuclear Power
Compressor Stations
Remote Substations*

Heavy Industry

*Steel & Aluminum
Pulp & Paper
Food Oils & Ethanol
Manufacturing Factories*

Offshore Industry

*Offshore Platforms
Manned & Unmanned Rigs
Marine Terminals
Loading/Transfer Buoys*



Environmental

*Stormwater Monitoring
Inland Waterways
Aquaculture & Fish Farms
Sensitive Habitats*

Transportation

*Ports & Harbors
Fuel Docks & Shipyards
Airports
Railways*

Oil & Petrochem

*Refineries
Terminals
Oil Production Sites
Mid-Stream – Pipelines & Storage*

Water Quality

*Desalination
Intake Protection
Wastewater Treatment
Municipalities*

Key Drivers

- Reduced Risk of Oil Discharge = Cost Benefits
- Minimize Clean-Up Expense & Inventory Loss
- Protect Corporate Image (stay out of the news!)
- Improve CSR & Environmental Stewardship
- Compliance w/ Pollution Regs & Best Practices



Strategic Early Warning & Containment

***Vessels and Offshore Rigs Are NOT
the Largest Source of Oil Released to the Environment***

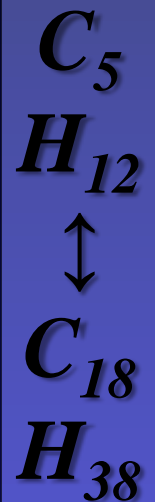
Approximately:

- 12,000 – 15,000 Oil Spills are Reported Annually in USA
- Over 50% of Reported Spills Occur at Inland Facilities



What Constitutes an Oil Spill ?

“...any quantity of discharged oil that violates state water quality standards, causes a film or sheen on the water’s surface, or leaves sludge or emulsion beneath the surface. For this reason, the Discharge of Oil regulation is commonly known as **the ‘sheen’ rule**... Under this regulation, reporting oil discharges does not depend on the specific amount of oil discharged, but instead can be triggered by the presence of a visible sheen created by the discharged oil...and prevent oil discharges from reaching navigable waterways or adjoining shorelines” (US EPA)



Slick Sleuth Product Line

- Proven, Optical (Non-Contact) Detection
- Install Base of over 1,000 Sensors
- Highly Sensitive Detection to Sheens & Slicks
- Early Detection = Early Response & Containment

SS100 / SS100-Exd

1m range



SS300 / 320

5m -10m range



SS300-EXd / SS320-EXd

4m - 8m range



Slick Sleuth • Model Designations

| | MODEL | RANGE* | APPLICATION |
|--|--------|-----------|---------------------------------|
|  | SS 100 | 1 Meter | AST Facilities |
|  | SS 300 | 5 Meters | Industrial Facilities |
|  | SS 320 | 10 Meters | Terminal Piers Offshore Rigs |

** Range = Vertical Distance from Sensor to Surface*

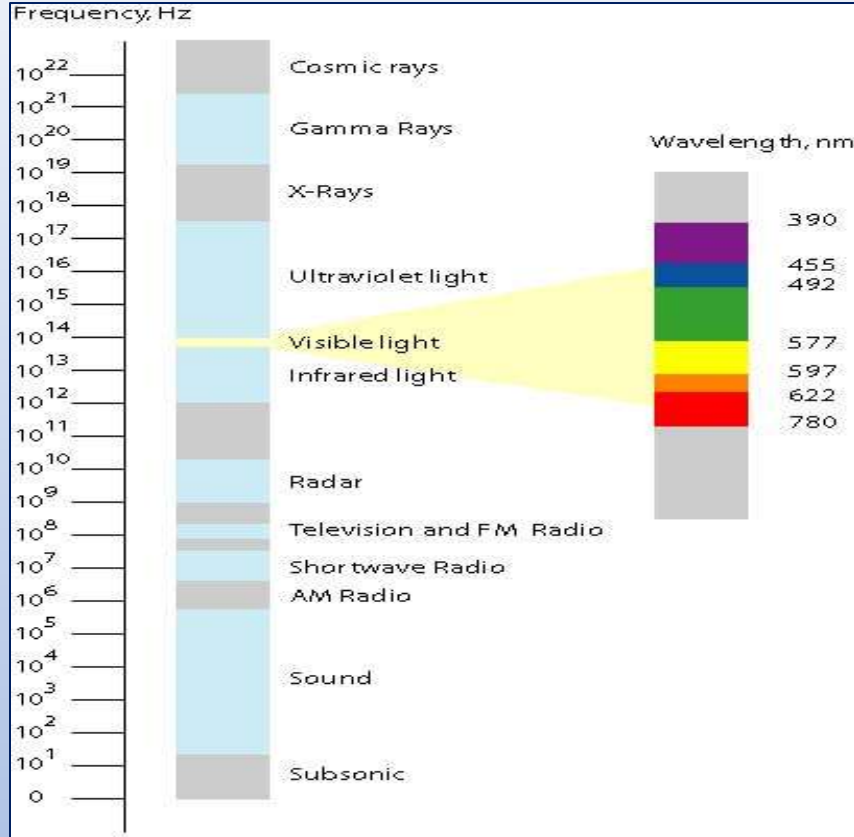
UV-Based Sensor • Theory of Operation



Patented Slick Sleuth Remote Oil Spill Detection & Alert System

- **24/7** Real Time Monitoring for Leaks & Spills
- Proven, Optical, **Non-Contact** Method of Detection

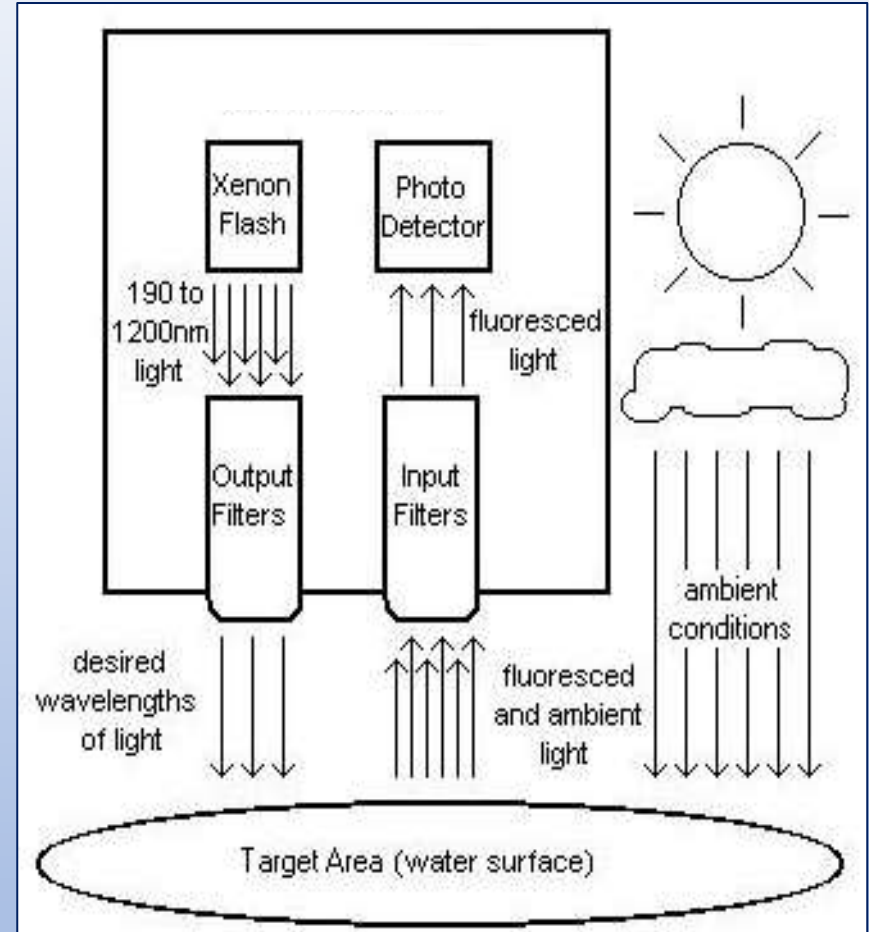
UV-Based Sensor • Theory of Operation



Remote Non-Contact Sheen Detection

Monitors for hydrocarbons using Ultraviolet (UV) source for excitation & detection of fluorescence

Oils typically absorb light between 300 - 400nm, then emit light in the longer 450 to 650nm range



- **Extremely Sensitive**
- **No Probe, No Fouling**
- **Immune to Ambient Conditions**

Strategic Early Warning & Containment



Tank Farm Storage



Cooling & Process Water



Turbines & Storm Water

Point-Sources:



Failsafe:



Strategic Deployment of Sensors

Point-Source Monitoring

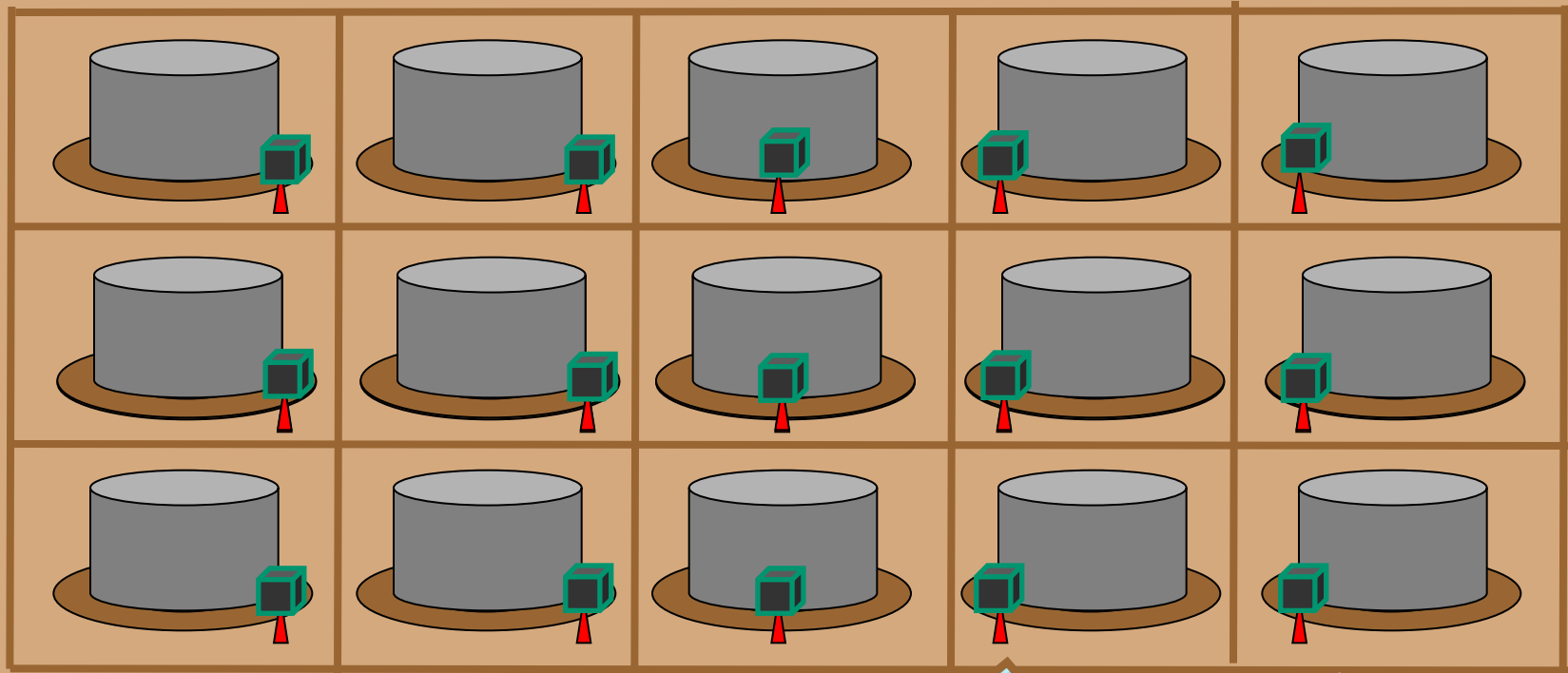
Upstream: *Detection Near to Potential Source(s)
for Earliest-Possible Detection & Containment*

Failsafe Monitoring

Downstream: *Detection Near to Discharge Point
for Failsafe Containment before Discharge*



Strategic Monitoring is Key



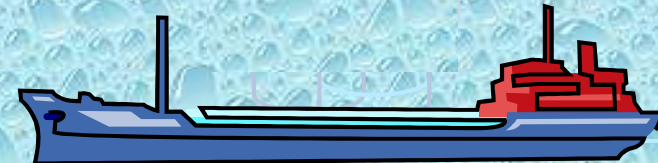
Tank Dike Alarms
( Model SS 100 x15)



Outfall/Failsafe Alarm
(Model SS300)



Drainage from
Tank Farm



Risk Management • Heat Mapping Strategy

Medium

High

Critical

Low

Medium

High

Low

Low

Medium

Installation Example • Plants & Equipment Areas



- Turbine / Cooling Water – Sumps & Sewers
- Monitor Discharge for Turbine Oil, Fuel Oil, Diesel, Etc.

Installation Example • Power Plant Discharge



- Cooling Water, Storm Water – Sumps & Sewers
- Monitor Discharge for Turbine Oil, Fuel Oil, Diesel, Etc.

Installation Example • Sumps & Sewers



- Deep Sump Application with Float Switches
- Diversion Valve Actuated Upon Detection of Oil (or ability to Shut Off Pump, Activate Skimmer, etc.)

Installation Example • Sumps & Sewers



- Around the Clock Monitoring & Alarm on Industrial Sewers
- Automated Containment of Oil (Actuate Valve, Pump, Skimmer)

Installation Example • Hazardous Gas Areas



- Sensors Packaged for Class 1 Div 1 / Zone 1 Areas

Installation Example • Sub-Stations



- Remote Spill Alert plus AUTOMATED CONTAINMENT of Transformer Oil
- This Remote/Unmanned Location discharges to a National Park!

Installation Example • Interceptors



- Remote Spill Alert plus Automated Containment
- This Remote/Un-Manned Compressor Station Discharges to a Local Stream

Installation Example • Automated Containment



- Remote Spill Alert
plus Automated Containment
- Interceptors Monitored
Optically Through the Grating
- Local Alert and Remote Output to DCS

Installation Example • Sumps & Sewers



Installation Example • Sumps & Sewers (Airport)



Installation Example • Sumps & Sewers (Airport)



- Remote Spill Alert
plus Automated Containment
- Subterranean Catchment



Installation Example • Sumps & Catchments (Airport)



- Remote Spill Alert
& Automated Containment
....Prior to Discharge!



Installation Example • Sumps & Catchments



- Remote Detection of Leaks & Spills
- Sensitive to Sheens & Slicks, Leaks & Events

Installation Example • Drainages



- Remote Detection of Leaks & Spills
- Sensitive to Sheens, Slicks & Events

Installation Example • O/W Separators



- Retention Ponds & Oily Water Separators
- Install on 'Dirty' or Clean Water Side of O/W Separator

Installation Example • Retention Ponds



- Remote Monitoring of Containment Pond
- Cold Weather Location, with Local A/V Alarm and Wireless Signal

Installation Example • Lift Stations



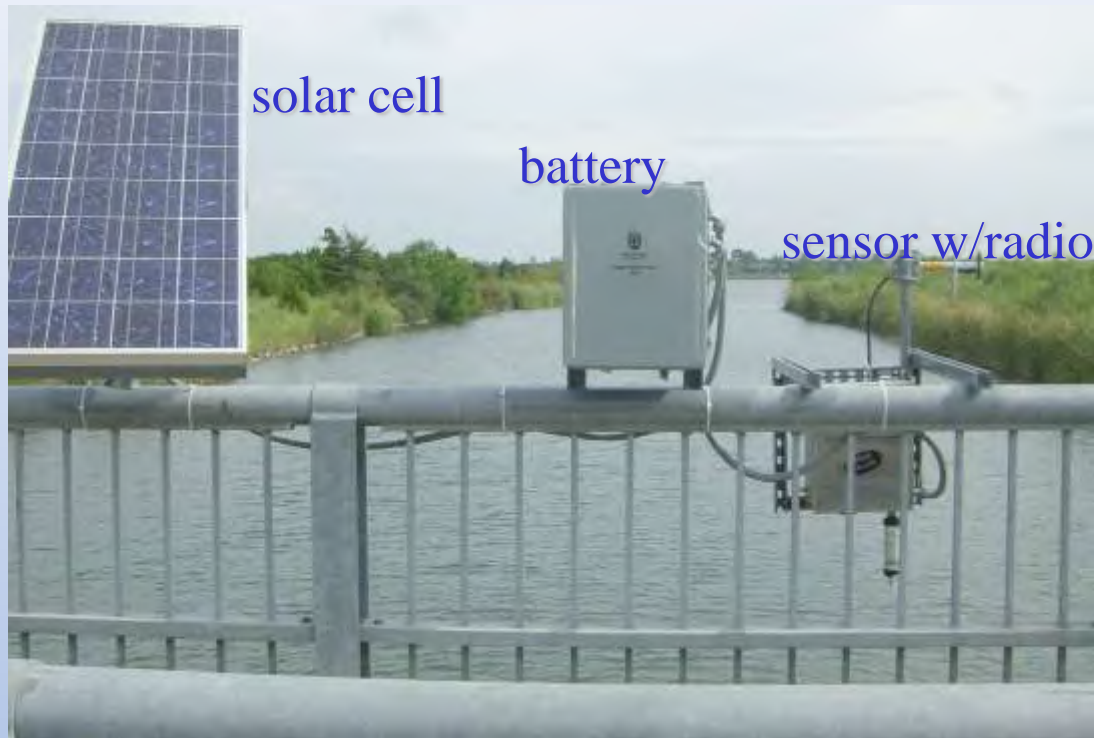
- Discharge Monitoring at Lifts Stations (ACOE)
- Used to PREVENT Oil from Reaching Salmon-laden Rivers

Installation Example • Failsafe Points



- Wireless Remote Monitoring of Sump
- Plus Camera and Web-based Interface (at US Navy Base)

Installation Example • Discharges & Outfalls



- Remote Monitoring
- Upstream from a Municipal Reservoir
- Cooling Water & Stormwater
- Solar & Wireless
- Pre-positioned Boom (for use if oil is detected)



Installation Example • Discharges & Outfalls



- Fixed Boom acts as O/W Separator
- Detector can be Positioned on the 'Dirty' or Clean Water Side of the Boom (normally zero tolerance!)



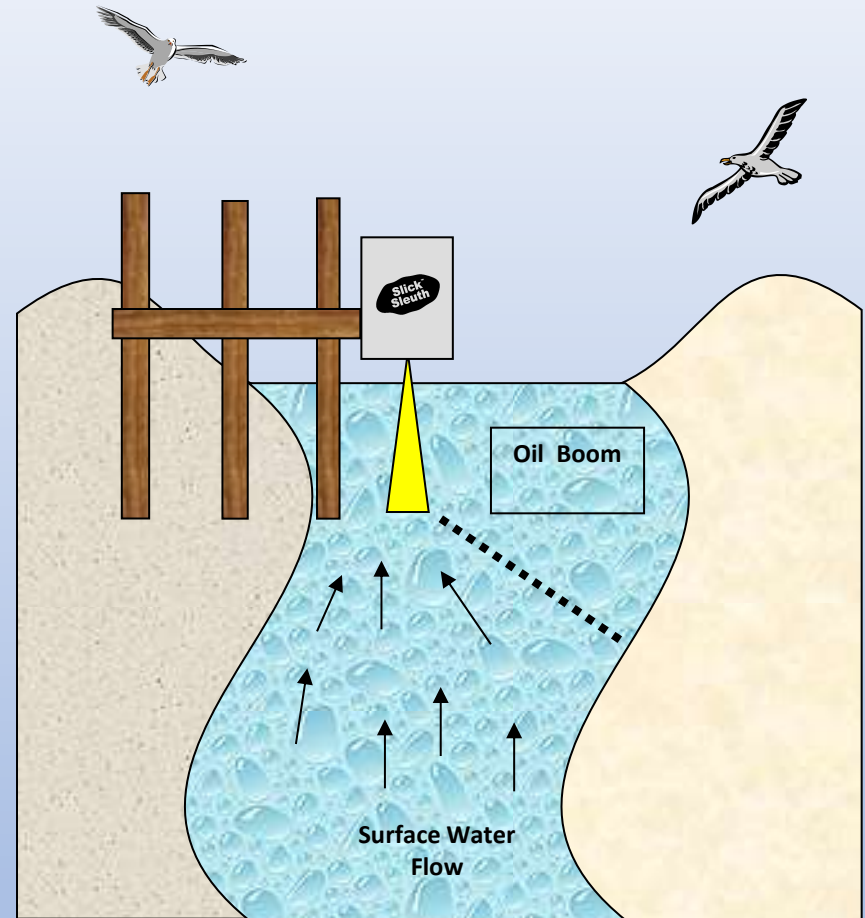
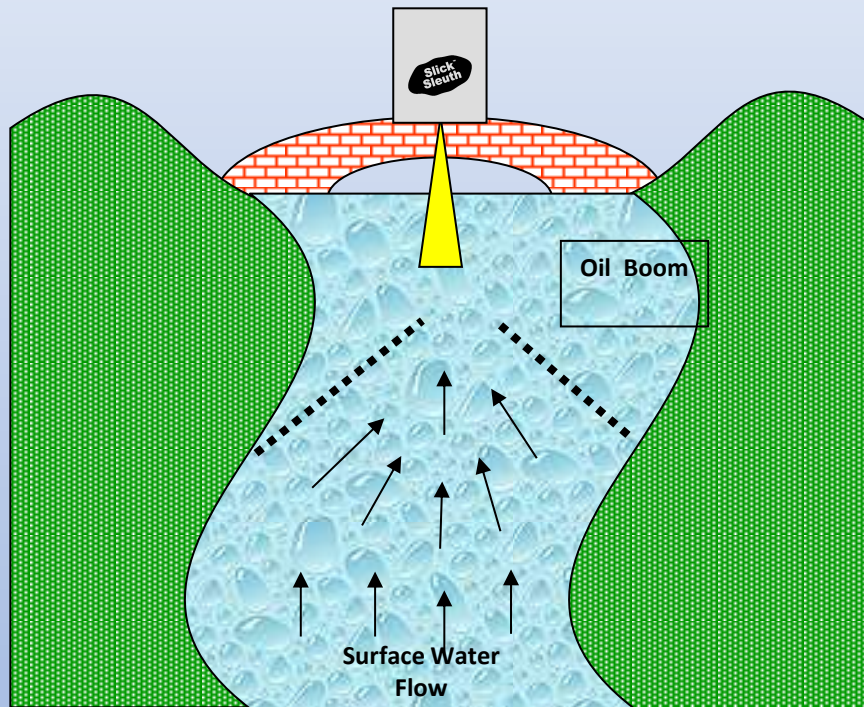
Installation Example • Discharges & Outfalls



- Remote Monitoring
- Discharge to Local River
- Cooling Water & Stormwater
- Solar & Wireless
- Fixed (Semi-Permanent) Boom



Installation Example • Discharges & Outfalls



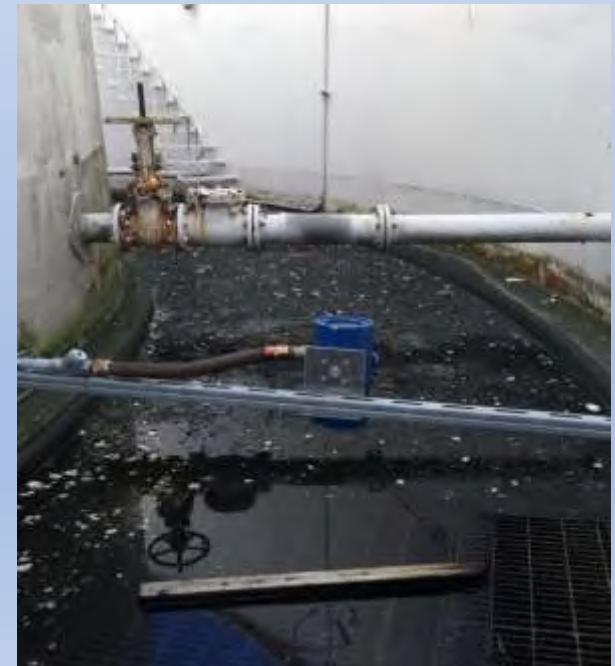
- Boom(s) Used to 'Funnel' Water to Monitoring Point(s)
- Simple Low-Cost Method of Directing Surface Effluents
- Useful Approach for Covering 'Wide Area' Applications

Installation Examples • Secondary Containments



- Model SS100s
- Drains near Truck (Bulk Tanker) Loading/Unloading Areas
- & Diked Areas around Storage Tanks

Installation Examples • Secondary Containments



- Model SS100s
- Tank Dikes & Drains
- Leak/Spill Alarm *Plus*
Automated Shut-off of Valves

Typical Monitoring Points • Storage Terminals



Inside (Interstitial)
& Under Tanks



Inside Tank Dikes &
Secondary Containment



Floating Roof
Drains / Valves



Outflows From
Tank Dikes

Typical Monitoring Points • Storage Terminals

Equipment & Mixing Pads



Sumps, Drainages, & Outfalls



Install Example • Tanks & Terminals

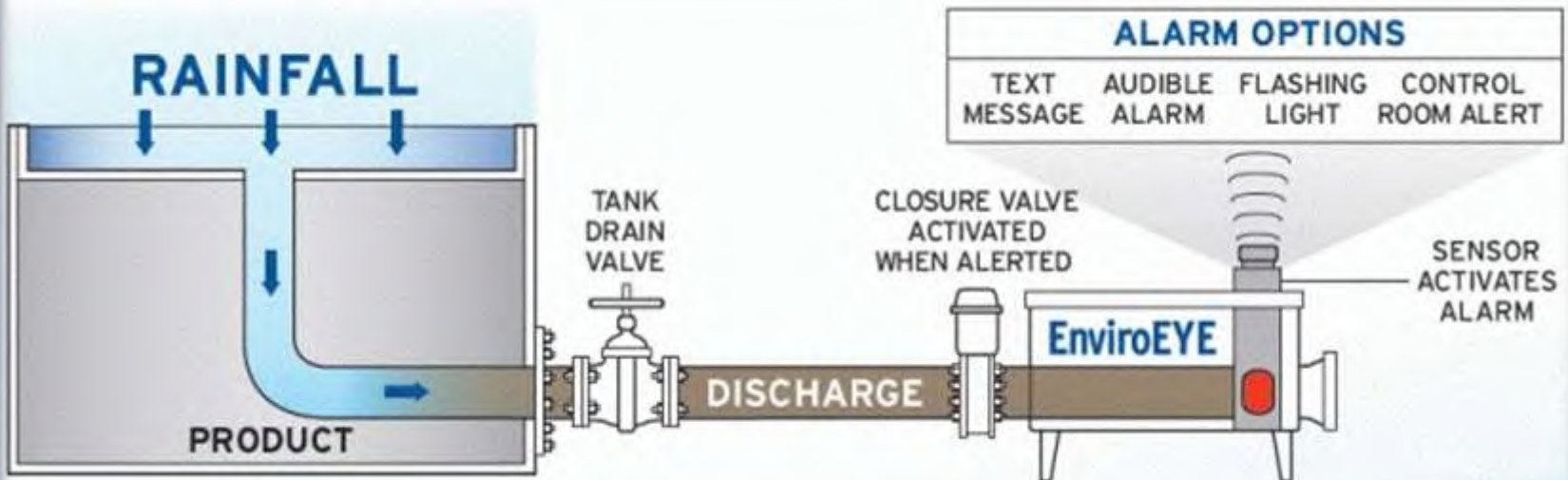


Monitoring & Automated Containment System for Aboveground Floating-Roof Tanks

Install Example • Tanks & Terminals



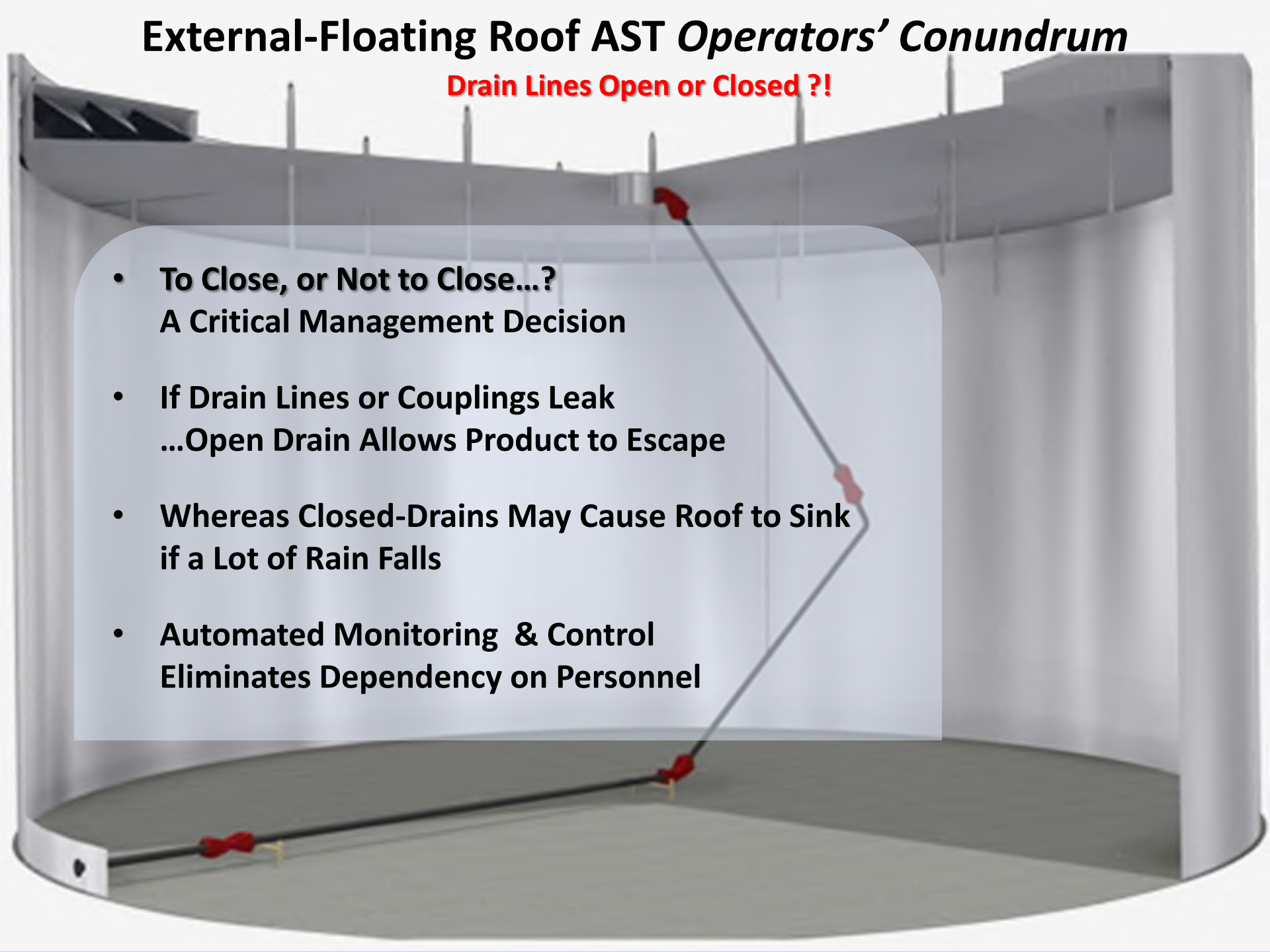
“EnviroEye” Automated Detection & Containment for External Floating-Roof Tanks



External-Floating Roof AST *Operators' Conundrum*

Drain Lines Open or Closed ?!

- **To Close, or Not to Close...?
A Critical Management Decision**
- **If Drain Lines or Couplings Leak
...Open Drain Allows Product to Escape**
- **Whereas Closed-Drains May Cause Roof to Sink
if a Lot of Rain Falls**
- **Automated Monitoring & Control
Eliminates Dependency on Personnel**



Install Example • Tanks & Terminals

A Long-Overdue Solution



Installation Example • Pipeline / “Look Boxes”



- SS100s Used to Monitor Pipelines on Fuel Piers at Marine Terminals

Installation Example • Marine Terminals



Installation Example • Marine Terminals



● *Oil Sheen Monitors*

Installation Example • Fuel Piers



Installation Example • Loading Piers



Installation Example • Loading Piers



- Sensors Near Loading Arms / Fuel Transfer for 24/7 Sheen Monitoring & Detection

Installation Example • Marine Terminals



Installation Example • Marine Terminals

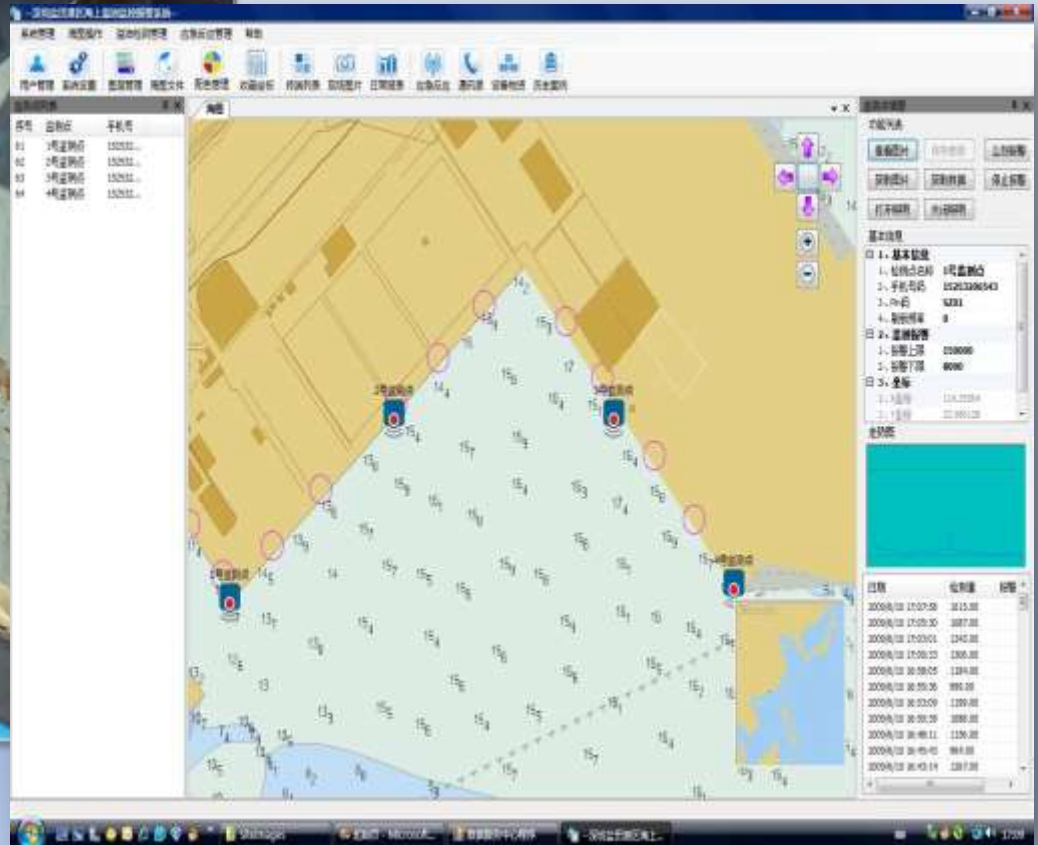


Installation Example • Marine Terminals



- Remote Monitoring and Alarms to Vessel Traffic Center / Central Control Room

Installation Example • Marine Terminals



- Remote Monitoring and Alarms to Central Control Room of Marine Safety Office

Installation Example • Marine Terminals



- Remote Monitoring and Alarms to Central Control Room of Service Provider
- Sensor Stations are Mounted Under Terminal-Piers, with Local Audio/Visual Alert

Installation Example • Remote Monitoring



Slick Sleuth Base Station Software - Monitoring & Control for System Arrays

- Dedicated Software for Remote Monitoring & Alerts
- Typically Used with Point to Point (PTP) Radios
- Communicate with Network of Sensors (up to 99 stations)
- Full Duplex System with Remote Alerts via Text/Email
- Used for Offshore, Coastal, and Inshore Applications

Installation Example • Remote Monitoring

**Slick Sleuth
UpLinker Modem**
(cellular / cloud-based)



WEB BASED ALERTS & SYSTEM CONTROL

- Secure, Password Protected Web Portal
- Dashboard & Web Based User Interface (WUI)
- Authorized Access Using Any Web-enabled Device
- Multiplex Up to Four Slick Sleuths Using One Modem
(and Host an Unlimited Number of Stations on a single Dashboard)
- Full Duplex System with Remote Alerts via Text/Email
- Used for Offshore, Coastal, and Inshore Applications

Installation Example • Offshore Platforms

Crowne Plaza Houston River slick-sleuth

https://slicksleuth. 67% Search

Slick Sleuth

Dashboard

Chris Chase

Map Satellite

Google

Map data ©2017 Imagery ©2017 Terms of Use

Stations

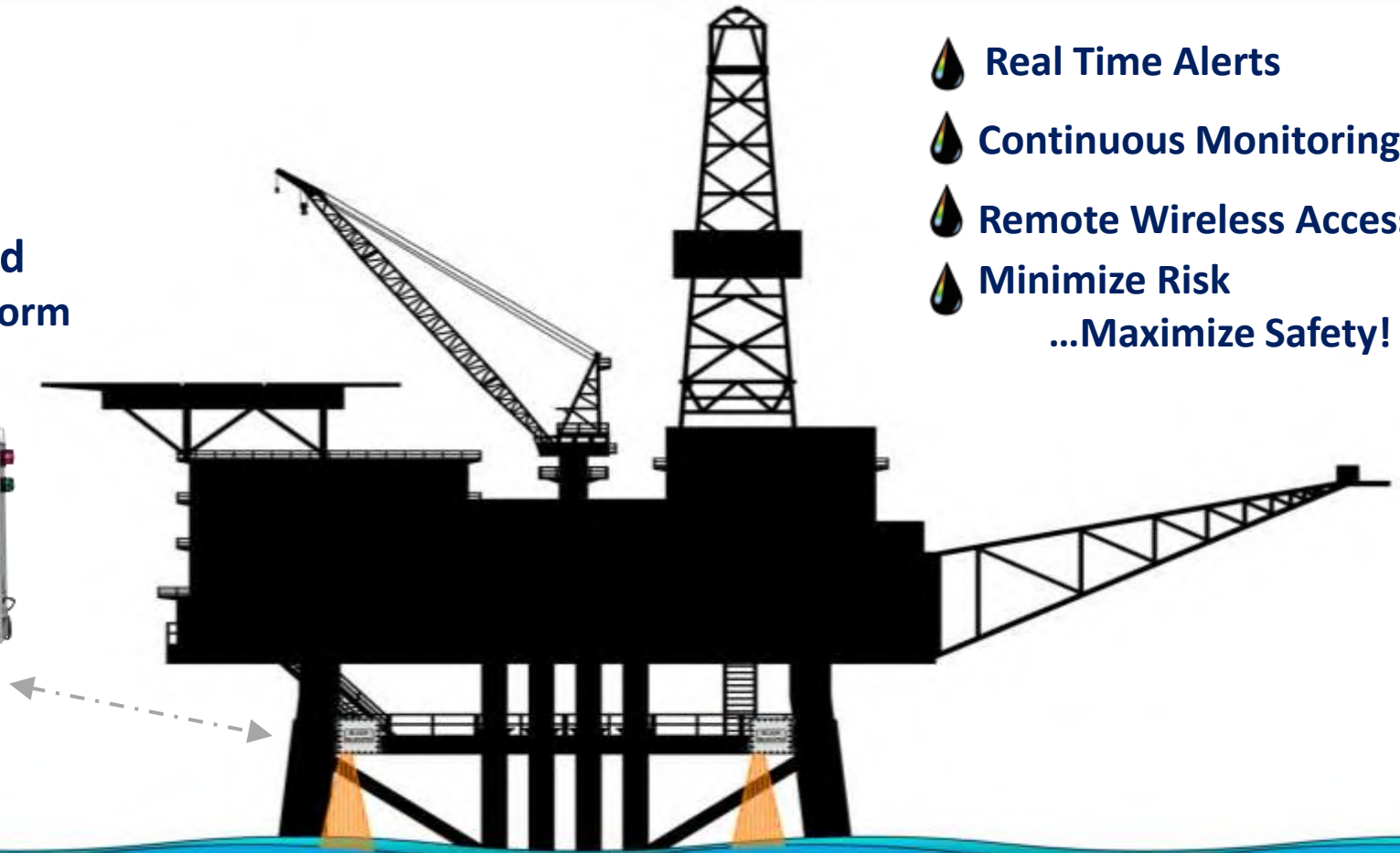
| OTC Remote (09) | Platform 01 North (02) | Platform 01 West (03) |
|--|--|--|
| Spill <input checked="" type="checkbox"/> | Spill <input checked="" type="checkbox"/> | Spill <input checked="" type="checkbox"/> |
| Station <input checked="" type="checkbox"/> | Station <input checked="" type="checkbox"/> | Station <input checked="" type="checkbox"/> |
| Connection <input checked="" type="checkbox"/> | Connection <input checked="" type="checkbox"/> | Connection <input checked="" type="checkbox"/> |
| 05/01/17, 5:07:37 am | 05/01/17, 5:07:39 am | 05/01/17, 5:07:08 am |

| Platform 01 South (04) | Platform 01 East (01) |
|--|--|
| Spill <input checked="" type="checkbox"/> | Spill <input checked="" type="checkbox"/> |
| Station <input checked="" type="checkbox"/> | Station <input checked="" type="checkbox"/> |
| Connection <input checked="" type="checkbox"/> | Connection <input checked="" type="checkbox"/> |
| 05/01/17, 5:03:04 am | 05/01/17, 5:07:45 am |

Dashboard Display WUI

Installation Example • Offshore “Rig Guard”


SS320-EXd
4ea per platform



- Real Time Alerts
 - Continuous Monitoring
 - Remote Wireless Access
 - Minimize Risk
- ...Maximize Safety!

- System Supplied as Capital Goods (CAPEX) or *As-A-Service* (OPEX)

Installation Example • Offshore “Rig Guard”

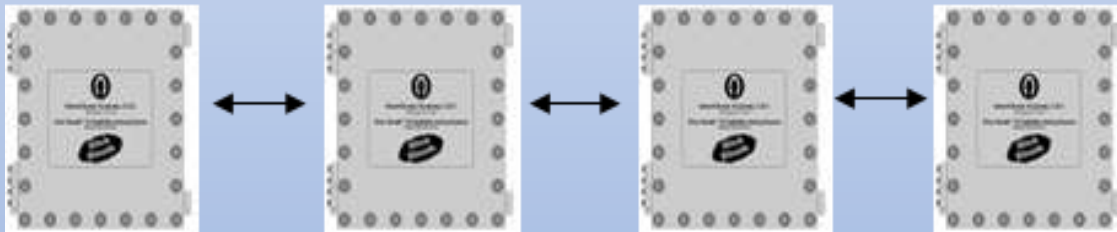
- SS320-Exd Rig Guard Oil Detector
- Designed Specifically for Installation on Offshore Platforms for Detection of Crude Oil, Diesel, Slops on Sea Surface
- IP68 – Weatherproof & Submergible
-  Certified Zone 1 / Class 1 Div 1
- Systems Available for Purchase...
or Oil Spill Monitoring *As a Service*



Installation Example • Offshore “Rig Guard”



Standard Rig Guard System Consists of:
4x SS320-EXds, Cellular Modem(s), Web-Based Interface
Installation Support, and Annual Field Servicing



**Base Station PC
(included)**



**A/V Alarm
(optional)**



**DCS/SCADA
Interface Module
(DSIM)
(optional)**

Central Control Room

**Solar Power
& Cameras
(optional)**



Installation Example • Buoy-based Systems



- Integrated Buoy System, inclusive Oil-On-Water Detection, Wireless Alerts, Solar Power

Installation Example • Offshore Seawater Intakes



- Integrated Spill Monitoring Buoy used for Protection of Intake at Desalination Plants

Installation Example • Marine Terminals (SPMs)

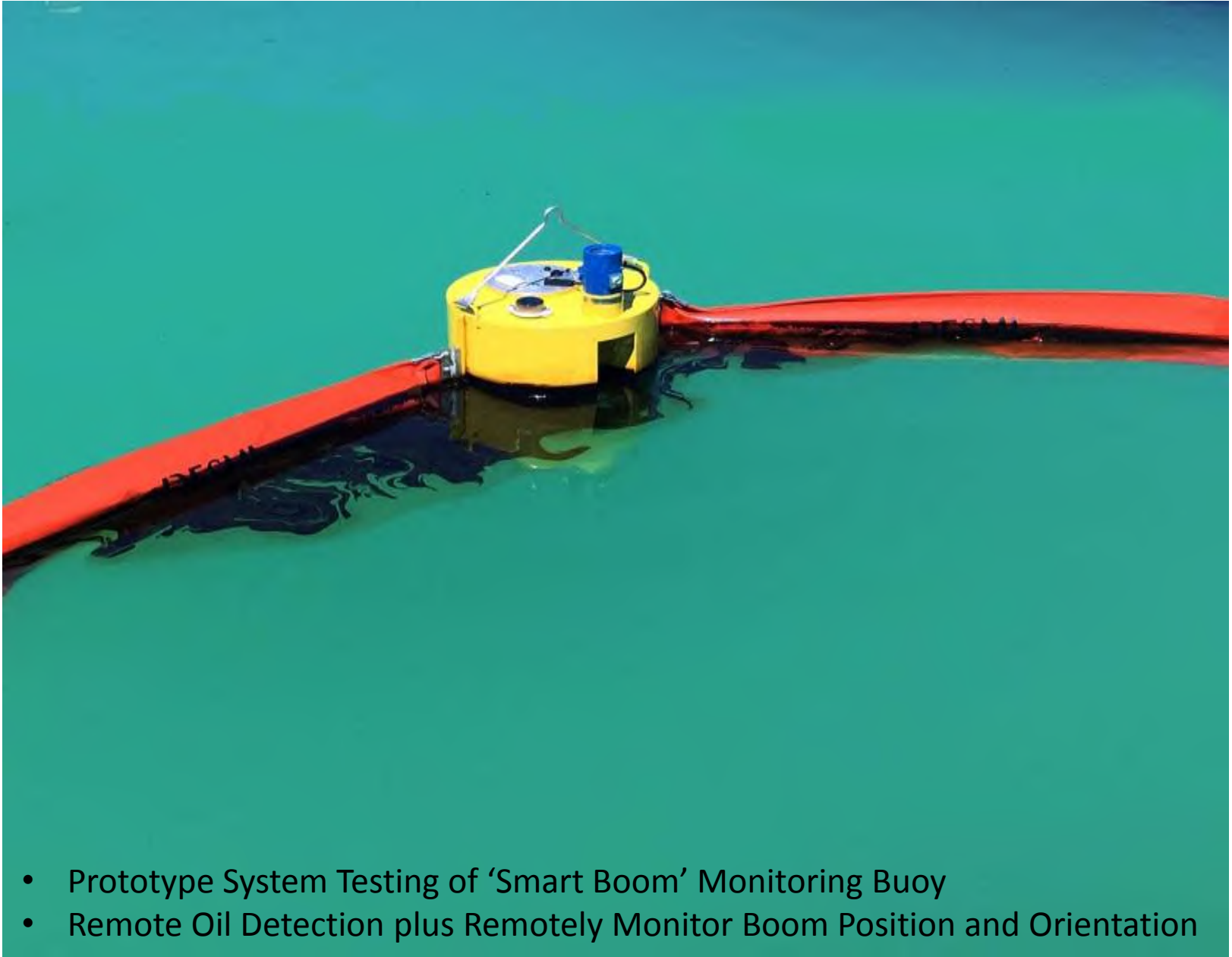


- Integrated System used to Monitor Offshore Loading Buoy

Installation Example • Marine Terminals (SPMs)



Installation Example • Spill Containment Booms



- Prototype System Testing of 'Smart Boom' Monitoring Buoy
- Remote Oil Detection plus Remotely Monitor Boom Position and Orientation

Installation Example • Prototype Testing -“Smart Boom”



Questions?

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Product Manager

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ChrisC@SlickSleuth.com

**Slick[™]
Sleuth**

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are approximately 20 lines visible. The paper has a slight shadow on the right side, suggesting it's part of a bound notebook. There is no handwriting or other markings on the page.