

# ENVIRONMENTAL OBSERVATIONS



# **OBSCAPE'S PHILOSOPHY**

# Affordable, easy-to-use and robust measurement systems

# Affordable:

- Competitive purchase price
- Low maintenance
- Free data portal

## Easy to use:

- Completely wireless
- Simple and intuitive design

## Robust:

- Designed for long-term autonomous operation
- Theft-proofing options available



# THE WAVE BUOY

Ocean wave measurements are an indispensable part of any MetOcean project. The Obscape Wave Buoy is based on recent advances in sensor and data technology, ensuring a light-weight, flexible, reliable and affordable wave buoy.

### **KEY FEATURES**

- Affordable operational costs
- Compact & light weight
- Easy to deploy & service
- Bulk wave parameters
- Directional wave spectrum
- GPS position & watch circle



# THE PTM

Obscape's Power & Telemetry Module (PTM) is a highly convenient all-in-1 datalogger. Its built-in solar panels and cellular modem (Satellite option available) will turn any 3rd party sensor of your choice into a plug-and-play real-time monitoring solution.

RAIN

GAUGE

WEATHER

**STATION** 

With its wireless nature and rugged housing, the PTM was designed to function in remote environments.

### **KEY FEATURES**

Completely wireless

TIME LAPSE

CAMERA

HQ CAMERA

- Real-time data
- Solar powered
- Various communication protocols
- Rugged design
- Multiple mounting options
- Versatile data portal included

LEVEL

GAUGE

**STATION** 



TIME-LAPSE

**PTM** What do you need to monitor?

CATHER STATION

# DATA PORTAL

Features included Free-of-Charge:





# ENVIRONMENTAL OBSERVATIONS

#### DELIVERING PREMIUM ENVIRONMENTAL TECHNOLOGY AND INSTRUMENTATION

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WATER

6

TIME-LAPSE CAMERA

RAIN

LEVEL

WAVE

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ORIFTER QUALITY BUOY

# Project monitoring

WWW.OBSCAPE.COM





# Project Phases 1234

### Initiation

### Baseline Monitoring

Installation of Obscape PTM devices and Buoys at a proposed Rig site, Harbour or Port Construction, Dredging Works or Offshore Wind Farm Assembly. All deployed Obscape devices onsite report via satellite or cellular telemetry to the Obscape Data Portal and gain a baseline measurement of environmental parameters, which contribute to project: modelling, construction design, EIA, surveillance and compliance.

Planning

### Compliance Monitoring

Kick-off

Automatic or on demand reports sent from the Data Portal, which confirm real time measurements from all PTM and Obscape Buoy Stations stationed onsite. Data is used to confirm measurements of environmental parameters to meet environmental law, SHEQ and contractual standards.

Operation

3

# Surveillance Monitoring

The Obscape Data Portal can automatically send real time Threshold Alerts when measured environment parameters irregularly change from baseline parameters, and enable you to record and react in real time to remedy adverse environmental conditions or unsafe operating conditions.

# Types of Monitoring

### **Baseline Monitoring**

The foundation for monitoring projects is the identification and description of the baseline behaviour in the area of interest. This is typically carried out as part of the project's Initiation, Planning and Design phases.

### Surveillance Monitoring

When designing a surveillance monitoring programme consideration should be given to:

- What receptors exist and what is their level of importance?
- The monitoring project's overall objectives
- Ensure that the strategic objectives are met

### **Compliance Monitoring**

Real-time monitoring results in order to ensure that critical thresholds are not reached at receptor sites.

The practical, site specific limitations and strengths associated with particular types of monitoring in the general area and specific locations of interest, and likely regulatory requirements

#### An example of estuary PTM monitoring



# An example of Wave Buoy monitoring





Sal 21 OS AM

0-O6 PM 06 AM

06 AM 12.85

12 PM 06 PM Dec 22 06 AM Time [Europe/Sofia]

vwv

12 PM

HERMES

Q Map

🗠 Data

**Q** Station data

E Data overview

◀ GPS tracking

A Devicer

C Monito

Log

OC Pr

A Sat

O Support





LIL HILL



Q Map

Log



height (HS), average wave period (Tavg) and mean wave direction



# Environmental Monitoring Factors

- ✓ Objectives: Environmental assessment of an area of interest to meet client's contractual requirements, OSH or SHEQ and environmental law.
- Method: Create a Monitoring Project by deploying appropriate Obscape devices. The Obscape PTM and offshore buoy monitoring devices are ideal for your project because they are easy to deploy, tough, low cost, solar powered, accurate and can report from any remote site via telemetry to the free-to-use and secure Obscape Datal Portal.

This deployment methodology removes the need for frequent site visits and mains power, whilst empowering all project stakeholders with up-to-date information and the capability for fast reaction to changes in the area of interest's environment to mitigate potential disaster.

Because Obscape monitoring devices are economically priced and the Data Portal is free of charge the versatile devices meet most projects' monitoring budgets. Therefore the optimal quantity and variety of Obscape systems and devices can be deployed to provide the best monitoring coverage, and measure a greater variety of environmental parameters, to supply the best solution to the monitoring project's objectives.

- Analysis: The free, easy and secure Obscape Data Portal generates reports and Threshold Alerts, which can be automatically emailed to all decision makers with accurate, real-time measurements and qualified data. This report can be used to evaluate the environmental impacts of the area of interest and confirm safe environmental conditions. The project's decision makers are informed of any changes in the environment and if necessary can avoid, reduce or offset those effects as soon as possible.
- Completion: After the project's contractual period has concluded accumulated reports from the Data Portal confirm measured parameters of Baseline, Surveillance and Compliance monitoring from all PTM and Obscape Buoy Stations throughout the duration of the Monitoring Project. Real-time data is used to confirm environmental parameters have been met, contractual standards adhered to and environmental law standards are met throughout the lifespan of the entire project.

# ENVIRONMENTAL OBSERVATIONS

#### DELIVERING PREMIUM ENVIRONMENTAL TECHNOLOGY AND INSTRUMENTATION

LEVEL

WAVE

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WATER

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TIME-LAPSE CAMERA

RAIN

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WEATHER

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ORIFTER QUALITY BUOY

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# Case Studies

#### WWW.OBSCAPE.COM

# Tidal study

King Island, in the Bass Strait, is 50 miles (80 km) off the north western coast of Tasmania, Australia.

Bass Strait is a relatively narrow and shallow stretch of water jammed between the Australian mainland and Tasmania. The shape of the landmasses involved, the prevailing weather patterns and ocean currents, all combine to make Bass Strait a very challenging place, and therefore has a well deserved reputation as one of the most treacherous bodies of water in the world. A combination of shallow seas, currents and weather systems has brought many a sea voyage to an untimely end, and King Island sits at the western end of this stormy stretch of

water Our customer, EGS a world leader in Geophysical survey for over 45 years, was commissioned by the Australian Hydrographic

Office for a Geotechnical evaluation and shoreline evolution of King Island's north coast.

The benefits of the Level Gauge's rugged, reliable, and versatile monitoring system gave EGS the full confidence to confirm and record real time data of tidal fluctuations as part of the projects remit.

Wireless, maintenance free, rugged design and solar powered features are ideal for this remote location. In addition, real time data sent via cellular telemetry to the Data Portal, can be securely accessed from the EGS offices in WA, the Australian Hydrographic Offices, or securely on any other internet based smart device world wide.

#### COASTAL EROSION: LEVEL TIDE GAUGE CASE STUDY









ECOLOGICAL MONITORING: FLOOD AND METWEATHER CASE STUDY

# eThekwini Municipality

Carther Market Bally De





eThekwini Municipality

# Obscape TimeLapse Camera , WeatherStation & LevelGauge. Real Time Estuary Breach confirmation

FLOOD AND METWEATHER CASE STUDY



eThekwini Municipality

# Obscape Water LevelGauge Real Time Canal Flood

FLOOD AND METWEATHER CASE STUDY





# **Offshore Terminal**

An LNG Plant and export facility is based on the Peruvian coast, which includes a marine terminal, breakwater, and temporary rock quarry.

A 34 inch diameter transportation pipeline will be constructed to bring feed natural gas to the LNG Plant. The pipeline is approximately 408 kilometers (km) in length, stretching from the Chiquintirca community in the Ayacucho Region of the Andes mountains to the LNG Plant at Pampa Melchorita on the coast

Our customer, a Global Maritime Agency monitors the Terminal and the Breakwater with 2 x Obscape Time Lapse Cameras for visual confirmation of Terminal Environmental conditions and LNG loading operations.

The benefits of the Time Lapse Camera's rugged, reliable, and versatile monitoring system give the maritime agency the full confidence to confirm and record real time data of docking and shipping operations.

Wireless, maintenance free, rugged design and solar powered features are ideal for this remote location. In addition, real time data sent via cellular telemetry to the Data Portal, can be securely accessed from the onshore mining offices, the Maritime Agency's offices in the Callao District, or securely on any other internet based smart device world wide.

#### CONSTRUCTION: OFFSHORE CASE STUDY



# The Ocean CleanUp

The Great Pacific Garbage Patch (GPGP) is the greatest known accumulation of ocean plastic.

The Ocean Cleanup Foundation has developed floating barrier systems to concentrate and extract buoyant plastic from accumulation zones. To analyze and improve the efficiency of such cleanup systems, access to accurate Metocean conditions was critical.

Between September 2018 and December 2019, TOC completed the first campaign in the Pacific, comprising of Pacific Ocean Systems POS001 and POS001b nicknamed "Wilson"

During the deployment of the first two systems in the Pacific, an experimental campaign was carried out, which included an intercomparison of wave measurements from an unmanned surface vessel (USV) with those from Obscape wave buoys and a vessel based Xband radar.

TOC reported that preliminary comparison suggests that the USV and Obscape wave buoy data compare rather well. Small differences between the GFS and CFSR forced model were observed, and both compared well with the field measurements.

TOC used a total of four customized Obscape Wave Buoys to measure heave, pitch and roll accelerations. TOC deployed the buoys temporarily inside and in the vicinity of the cleanup system. The buoys were free floating without an anchor chain attached and typically recovered after one hour.

The Obscape WaveDroid obtained very good results in cross comparison to other equipment, with a seemingly good agreement of the MOTUS wave sensor and the Obscape Wave Buoy.





# The Ocean CleanUp

#### **Supporting Action on Rivers**

Did you know the <u>Obscape B.V.</u> HQ Time-Lapse Camera was developed particularly for monitoring debris/litter on water surfaces?

<u>Obscape B.V.</u> are proud to be a part of <u>The Ocean</u> <u>Cleanup</u>'s <u>#1000riverscleanup</u>, targeting 1000 rivers around the world for clean-up!

Obscape's HQ Time-Lapse Camera is ideally suited for long-term visual monitoring of gradually evolving processes, such as beach and river morphology, littering of surface waters or construction works.

The superior image quality of the HQ Camera is preferred when used as input for operational computer vision algorithms. The ability of the device to collect image bursts at a known framerate yields a whole range of unique applications, such as litter detection.

By pairing the HQ Camera with the <u>The Ocean Cleanup</u>'s automatic litter detection software, the camera will keep a close watch on debris pollution rates of the river surface over time.

Click here to find out more about the HQ Camera, <u>#1000riverscleanup</u> and monitoring of other plastic pollution projects: <u>https://lnkd.in/dazWctth</u>

#### ECOLOGICAL MONITORING: RIVER LITTER CASE STUDY



#### 80% OF RIVER PLASTIC STEMS FROM 1000 RIVERS

Rivers are the main source of ocean plastic pollution. They are the arteries that carry waste from land to the ocean. Our research found that <u>1000 rivers</u> are responsible for roughly 80% of the pollution.

# S.T.S Ingeniería y Construcción Marítima

Mined copper concentrate is transported from a copper mine in the Coquimbo region of Chile; via a pipeline through the Punta Chungo port in Los Vilos. From there the pipeline runs along the mine's offshore Marine Terminal and is loaded on to ships destined for the Asian and European markets.

An Obscape Wave Buoy deployed a short distance from the Maritime Terminal, measures the full wave spectrum of this offshore area, which is displayed on their Data Portal in easy to read and accurate graphs.

The Data Portal can automatically send Threshold Alerts when real time swell parameters change from pre-set baseline levels to high energy swell conditions. This empowers the mine operator to act and avoid unsafe docking conditions, reduce possible offshore pipeline damage, and minimise the potential of concentrate entering the water.

The benefits of this rugged, reliable, and versatile monitoring system give the mining company the full confidence to automatically confirm, and record parameters required to meet environmental law, SHEQ and contractual standards.

The Wave Buoy's maintenance free, rugged design and solar powered features are ideal for this remote location. In addition, real time data sent via cellular telemetry to the Data Portal, can be securely accessed from the onshore mining offices, regional Santiago offices, London based head offices, or any other internet based smart device.

#### CONSTRUCTION: OFFSHORE CASE STUDY



#### ECOLOGICAL MONITORING: RIVER LITTER CASE STUDY

# The Living Lab

Plastic Interception, Detection and Identification in Cape Town

A series of floating plastic litter booms, which collect waste, can be found on Cape Town's Liesbeek river, Black river, and other waterways in Cape Town.

The <u>University of Cape Town</u>, <u>IHE Delft Institute for Water Education</u>, OKP and <u>NWP (Netherlands Water Partnership)</u> in collaboration with <u>Pristine Earth Collective NPC</u>, <u>The Litterboom Project NPC</u>, and <u>Obscape B.V.</u> are monitoring, collecting, identifying and removing plastic floating in Cape Town's rivers.

As part of this project, Solar powered Obscape Time Lapse Cameras remotely monitor the Liesbeek River's litter boom in real time, and report images via cellular telemetry, to the Free to use Data Portal. <u>Max Radermacher</u> at <u>Obscape B.V.</u> has field tested A.I recognition software, to qualify, quantify, and identify plastic pollution caught up in the boom.

<u>Cameron Service</u>, Kevin Winter (UCT), Mariska Heijs (RUAS), the Orange Knowledge Programme and UCT students work together to assess the time lapse images and other data to research the pollution problem and develop successful solutions to not just improve water quality in the Liesbeek river, but also where other litter booms are deployed in Cape Town waterways too.

#### https://lnkd.in/gzTx8QS6



#### CONSTRUCTION: SITE CASE STUDY

# Specifire

A Time Lapse camera was mounted on a construction site pillar by our customer, Specifire.

The Time Lapse Camera enabled the project managers to monitor the construction site for visual confirmation of HSE conditions and correctly installed civil operations.

The benefits of the Time Lapse Camera's rugged, reliable, and versatile monitoring system gave Specifire the full confidence to remotely confirm correct the mounting and record real time installation of 6 000 fire suppression sprinkler systems and 20,000m of pipe. This empowered Specifire to ensure HSE assembly operations, on time project progress and protection against possible liability claims.

Wireless, maintenance free, rugged design and solar powered features are ideal for this remote location. In addition, real time data sent via cellular telemetry to the Data Portal, can be securely accessed from Specifire's offices back in Durban or securely on any other internet based smart device world wide.

To view the onsite images that Specifire's Time Lapse camera captured click here: Specifire construction site

To view the Specifire onsite installation, at height on a pillar, please click here: Specifire onsite installation



#### ECOLOGICAL MONITORING: RIVER LITTER CASE STUDY

# **The Litterboom Project**

- Focusing on the interception of marine plastic pollution in South African Rivers since 2017
- Currently operating in Cape
  Town and Durban
- We work into 7 major River systems
- We have employed overs 76 team members over the last 3 years
- We have collected over 320 000 kilograms of plastic over the past 3 years
- We are part of South Africas Civil Society Organisation, involved with implementing EPR regulations and waste management innovations

- Work with students to select specific areas best applicable to marine debris research within the Cape Town region
- Developing plastic detection algorithms for the camera images
- Data analysis will be used to determine efficacy of Litterbooms, as well as plastic load trends within the River system/s
- Extrapolating this data will develop a framework for how frequently we need to install Litterbooms and what other interception mechanisms can support the existing solutions that are in place to prevent plastic leakage into the Oceans

# OBSCAPE TimeLapse Camera and Data Portal monitoring











# Marsaxlokk Port

The protection of Marsaxlokk fishing port in Malta is now possible with the construction of the Qrejten Breakwater and the deployment of coastal monitoring systems.

For many years, Marsaxlokk fishers have been calling for a new breakwater and offshore wave monitoring solution to protect and observe the inner harbour area including rough seas and storm events to prevent damages to their anchored vessels and shore-based equipment.

The solution was to construct a breakwater to prevent high waves entering the harbour, monitoring offshore conditions, and reducing the impact on Marsaxlokk port operations, buildings and business operations in addition to the promenade, one of Malta's principal tourism zones.

The project was completed within 18 months. This included the installation of lighting, power systems and environmental monitoring systems like that of Obscape's Wave Buoy.

Obscape had the great privilege of supplying two Wave Buoys for monitoring the new Breakwater. The Obscape Wave Buoy uses real-time wave measurement and directional data to make better informed decisions for our clients' coastlines and coastal infrastructure.



#### CONSTRUCTION: DREDGING WORKS CASE STUDY

# Jan De Nul

The coast of Benin is highly susceptible to erosion due to its geographical situation along the Atlantic Ocean. The erosion of the beaches is further enhanced by the construction of paved dikes on land. Consequently, coastal tourism can not develop in this area. For that reason, the Government makes an extra effort in its Government Action Program to protect the Beninese coast.

An international dredging company is active in Benin for the coastal protection works near the coastal villages Avlékété and Djégbadji, part of the town of Ouidah. Our client is building a submerged dike at about 150 meters off the coast and performing beach reclamation works. The works started in February 2018 and will be completed in 2021.

The government's objective is to contain the advance of the sea on the west coast of Benin by 2021, by definitively solving the problem of coastal erosion and the damaging effects of climate change such as floods.

The submerged dike is situated at about 150 meters off the coast. The dike has a wave damping effect, which means that the waves of the Atlantic Ocean are broken before they reach the coast. A wave-free climate develops between the submerged dike and the coast. This will significantly reduce the impact on the beaches, as a result of which the sand will move less, and the erosion will decrease.

Obscape has the great privilege of supplying a network of Wave Buoys for monitoring the building works and the effectiveness of the new Dike. The Obcape Wave Buoy delivers real-time wave measurements to make better informed decisions for our clients' coastal construction works.



# Van Oord

Our client, an international offshore construction company, has commenced work on the Taranto Offshore Wind Farm in Italy. Their scope of work includes installation of the monopiles, secondary steel and the wind turbines.

An Obscape Wave Buoy has been deployed onsite at the Taranto Harbour to monitor wave heights and direction, which are vital environmental parameters the client needs to monitor throughout the entire construction process.

Building a historical record of accurate real time wave height and direction reporting is very critical to the entire operation. Data Portal graphs and reports are consistently analysed by the Project Engineers during the Initiation, Planning and Assembly Phases, to confirm conditions prior to the installation vessel's jacking operations (up and down), anchor trials and assessing conditions at shallow water construction locations.

Client feedback (sic) "Because the Wave Buoy is versatile and light-weight it has been easy to redeploy several times onsite using the safety craft or similar small boat. In addition, wave data measurements, which report to the Obscape Data Portal have been accurate and consistent throughout the duration of the project".

## Click here



# **\\\\**

# Measuring high speed ferry wake wash



Wake wash from a high speed RO-PAX arriving at a beach. The ferry route is 4 NM offshore from the beach.

WSP Denmark has successfully completed a study of wake wash for an operator of large high speed ferries (RO-PAX) with a cruising speed of more than 35 kn. The study involved continuously and on-line measurement of wave height and period at the 3 m depth contour in front of three popular bathing beaches.

Wakes wash generated by high speed ferries cruising several kilometers away from a shore, can be a real danger to swimmers and beach visitors, especially on calm days, due to their stealthy approach and violent breaking. The long wave length of these swell like waves are producing a powerful undertow which can pull people out into the sea.

The maritime authorities has set a wave height/period based limit because of the known hazard to swimmers and beach visitors. Operators of the fast RO-PAX must document that wake wash stays below the limit. In dialog with the operator WSP has developed a set of operational standards including a depth depending speed management guideline which keeps the generated wake wash below the limit.

#### COASTAL EROSION: WAKE WASH CASE STUDY



Left: "WaveDroid" block III measurement data hub. Right: Sketch showing equipment deployment.

WSP Denmark measured wave parameters with three new developed light weight accelerometer based Wave Droids from OBSCAPE. These small and light weight buoys performed brilliantly even though they were moored dangerously close to the surf zone.



Measured wave heights and periods (dots) compared with the limit (solid line)

For more information contact: anders.a.jensen@wsp.com or joachim.bach@wsp.com

ECOLOGICAL MONITORING: AEROSPACE CASE STUDY



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Proposed retrieval and communication process

EASY TO USE

EASY TO DEPLOY & RETRIEVE

RELIABLE & RUGGED

A simple seamless switching between primary and backup buoys

SPACEX

#### CONSTRUCTION: WIND FARM ASSEMBLY CASE STUDY

# Floating Solar Farm

Floating solar farm has been demonstrated as technically and commercially viable in man-made lakes, ponds and in coal-mining subsidence areas. Studies on its environmental impacts are limited and some are still being conducted globally. The use of natural lakes form this kind of renewable energy generation is being explored in the Philippines, particularly in Laguna de Bay. It is considered as a potential development project, but there were concerns on the environmental and social impacts on a multiple-use lake

As an initial step to deal with uncertainties, the Laguna Lake Development Authority allowed the operation of floating solar farms on a pilot scale for one year subject to certain requirements including the monitoring of essential water quality parameters in the pilot sites to determine the impacts.

Laguna Lake is a challenging location for a floating PV solar because of its, winds and waves.

Our customer's floating Solar platform had to withstand wind speeds of up to 275km/h, in typhoon seasons with strong winds and high precipitation without damage or other negative impacts.

The client, utilized advanced sensors to record weather movements, track wind speed, tag wave fluctuations, and monitor water quality changes. One such monitoring device utilized was the Obscape Wave Buoy

The data together with the inputs from the operators of the pilot projects were used in the assessment of the environmental, technical and commercial viability of floating solar farm and was used by the Laguna Lake Development Authority in formulating a policy on this emerging use of the lake and in crafting the implementing rules and regulations.

Click here to view the Wave Action!



# Offshore Wind Power

Obscape Wave Buoys have been deployed on a Wind Farm off the Baltic Sea since 2017. The Wind Farm has an Operation and Maintenance agreement in place with the Wind Farm operator.

This O&M Agreement requires our client to provide a Weather report for the operation phase of the wind turbines.

Three Obscape Wave Buoys (Wave Droid version) were deployed in the area to gather wave data. This data is then used to calibrate and validate the wave model as part of the Weather forecast report.



#### ECOLOGICAL MONITORING: OFFSHORE WINDFARM CASE STUDY



# ENVIRONMENTAL OBSERVATIONS

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WATER

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TIME-LAPSE CAMERA

RAIN

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WEATHER

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ORIFTER QUALITY BUOY

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# References

#### WWW.OBSCAPE.COM





To: PAUL GROVES PAUL@OBSCAPE.COM +27 83 2156265 WWW.OBSCAPE.COM

12 March 2022

Dear Paul Groves,

#### Re: Recommendation Letter

EGS purchased and operated an Obscape Tide Gauge for tidal data acquisition during the survey period for Australian Hydrographic Office project: SI 1013 – King Island (North) Bass Strait. Tidal data was successfully recorded for the project over a period of 3.5 months. Since this date, the sensor has been used successful on several other projects.

The equipment provided was fit for purpose and provided additional cost/time saving features not available on previous equipment i.e. online web app, internal solar power etc.

Technical support was effective and available in a good time.

EGS are currently in discussion with Obscape regarding the purchase of additional equipment.

Kind Regards,

Charles Collins Chief Surveyor | CPHS1 | Msc.

#### EGS Survey Pty Ltd

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The Ocean Cleanup Projects B.V. Batavierenstraat 15 3014 JH ROTTERDAM

Rotterdam, March 2022

#### Letter of Recommendation

For the purpose of river plastic debris transport research, The Ocean Cleanup is relying on Obscape's technology and services since 2021. Deployed technology includes HQ cameras, time lapse cameras, rain gauges, water level gauges and other devices. The technology and services have currently become the selection of choice for many of our river investigations at The Ocean Cleanup. The technology as well as the support and services, ranging from consulting to trouble shooting and installation and maintenance support have been to our full satisfaction. In my observation Obscape applies highest technical expertise with a dedication to scientifically oriented and sound performance. I fully recommend the services of Obscape.

Thomas Mani, Ph.D. Lead River Field Scientist The Ocean Cleanup

Date: 25/03/2022

#### VISITING ADDRESS

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COMMERCIAL REGISTER

# THE OCEAN<sup>™</sup> CLEANUP





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#### Letter of Recommendation

Van Oord was the Transport and Installation Contractor for the installation of Foundations and Turbines at Taranto Offshore Wind Farm. The peculiarity of this project is to be in very shallow waters (<4m) and near shore (within the Harbour jurisdiction).

Generally, companies such as Van Oord, would engage two independent companies to perform Site-Specific Weather Forecasts. However, the results of the forecasts in such shallow water and influenced by near-shore concrete structures (such as quays and breakwaters) was not accurate and reliable enough to plan the marine operations. Therefore, Van Oord decided to deploy two Wave Buoy system to better understanding of the environment.

Obscape delivered in record-time two full wave buoy system along with a good customer support. The advantage of this system are:

- The price is low compared to fancier solution in the market (e.i. wave rider buoy).
- The system is simple to set-up and does not require specialist surveyors.
- The weight and size of the Buoy makes it simple to deploy and flexible to move in a field.
- The data are reliable so it become a good tool for decision-making.

Van Oord is looking into expanding the use of such buoys for future projects (even when offshore and not impact by any structures)

Your sincerely,

Cesare Meinardi Project Engineer

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TO WHOM IT MAY CONCERN

Our réf. : (Tél. M. Ch. Timmermans : +229 69 08 03 60) Cotonou, June 20th 2021

#### **RECOMMENDATION LETTER**

Over the course of 3 years from 2018 until 2021, Jan De Nul Benin SA has successfully used multiple Wave Buoys supplied by Obscape.

These devices were deployed in ocean conditions at very remote locations and have performed as per expectations and specifications. The lightweight installation system in combination with the online monitoring/follow up platform, has allowed an efficient management of deployment and intervention, as well as data analysis. The performant telemetry, both through satellite and 3G communication has allowed close follow up of sea conditions through continuous data streams.

Overall, the devices have outperformed previously used systems in both efficiency and cost, which would make the Wave Buoys the choice of preference for future needs.

Respectfully yours



JAN DE NUL BÉNIN SA I Membre de Jan De Nut Group Prière d'adressier la correspondance à la sociáté avec indication de nos références.

an De Nul OFFSHORE

G.

OFFSHORE DREI ١G **ENVIRON** 

### Little Environments PLLC

PO Box 6388 Raleigh, NC 27628 www.littleenvironments.com

LETTER OF RECOMMENDATION

This is to confirm that I am writing to recommend the services of Obscape B.V.

Our firm has been using Obscape for the past few years and have always been satisfied with both the performance and quality of their devices and systems.

We have purchased their devices a few times and have found them to reasonably priced and of dependable quality. Any issues we have encountered, the Obscape team has rectified them amicably and provided a good level of backup service and warranty cover on all devices supplied.

I'm happy to recommend the services of Obscape. If you have any questions, please feel free to contact me directly.

Sincerely,

Merdett Thai

Meredith McLaurin, M.B.A Business Manager meredith@littleenvironments.com +1 919.757.2175



# **BVS Case referral: Obscape Level Gauge**

Boyan Savov, B.V.S. Consult Ltd. Varna, Bulgaria

Our relationship with the founders of Obscape dates back over 15 years. During this time we have appreciated the innovative design and reliability, and at the same time the low operation costs for monitoring marine and coastal environments.

We are proud we were able to test and deploy their devices.

We learned a lot in the course of this collaboration, we feel dedicated to share our opinion and experience this with others.

# Obscape Tide Droid & Water Level Gauge:

The Obscape Tide Droid, was installed at the Varna Oceanographic station, as shown on figure below ( left side).

It worked well. Occasionally we had to replace the battery pack, but this was mainly due to the short sampling interval. When a longer interval of around 2 hours was selected, the battery life span was much longer.

This unit has been replaced at Varna Oceanographic station and we have now installed the new Obscape Water Level Gauge (on the right side of figure 18 and the newest version of the Obscape Tide Droid) in its place. We really enjoy working with the new Obscape Water Level Gauge because it is a very compact device, with no external parts or wires, & all electronics & sensors parts placed in a single strong acetal housing. In addition because The device is using much less power, Three solar panels easily re-charge the battery. It is also very easy to install and operate the Obscape Water Level. Our first Obscape Tide Droid (left) and the latest generation Obscape Water Level(right)





# OBSCAPE

### ENVIRONMENTAL OBSERVATIONS

#### DELIVERING PREMIUM ENVIRONMENTAL TECHNOLOGY AND INSTRUMENTATION

LEVEL

WAVE

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WATER

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TIME-LAPSE CAMERA

RAIN

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WEATHER

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ORIFTER QUALITY BUOY

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# Validations

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# Level Gauge validation

In September 2020, a radar-based Obscape Level Gauge was deployed inside the Simon's Town harbour in South Africa. It was installed next to a validation instrument, being an OTT radar-based water level sensor. Over November 2020, water levels returned by the two devices were compared.

After inspection of the raw data comparison (Figure 1), it was found that water levels reported by the Obscape Level Gauge have a bias of 1.6 cm compared to the validation instrument. As this is most likely the result of inaccuracy in the vertical reference level of the devices rather than inaccuracy in the distances measured by the devices, it was decided to subtract the bias from the raw Obscape Level Gauge data in order to arrive at a cleaner comparison of the two datasets.

Both datasets contain short-term fluctuations as a result of wind-driven surface waves entering the harbour. Therefore, the two datasets were low-pass filtered with a Butterworth filter that had a cut-off period of 30 minutes. Finally, the OTT dataset was interpolated to the timestamps of the Obscape dataset to allow for calculation of error statistics (Table 1).

Error statistics of the shifted and filtered datasets reveal a root-mean-squared error of 1.4 cm between the two devices. It is thought that the largest portion of this remaining difference can be explained by the limited averaging period of both devices, which might be insufficient to average out the effect of wind-driver surface waves completely. The Obscape Level Gauge has a sampling rate of 5 Hz and uses an averaging period of 40 seconds to determine the water level. The averaging period of the OTT radar sensor amounts 20 seconds.





#### Table 1: Error statistics

	Raw	Shifted & filtered
Bias	1.6 cm	0.0 cm
Root-mean-squared error	3.1 cm	1.8 cm
Mean absolute error	2.4 cm	1.4 cm



#### VALIDATION STUDY

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# Validation of the Obscape Wave Buoy

In August 2018, the predecessor of the Obscape Wave Buoy (WaveDroid Block III) was deployed at the northern North Sea at 120 m of water depth. A Datawell Waverider mark 4 buoy was co-located with the WaveDroid to provide a validation dataset. In this report, a comparison of the directional wave data measured by both instruments is made. During the 12-day measurement period, a moderate storm occurred.

The bulk wave parameters obtained from both instruments are presented in Figure 1, while the associated root-mean-squared error (RMSE) values and correlation coefficients are given in Table 1. Generally, good correlation between the WaveDroid and Datawell data is found.

The peak wave period and peak wave direction reveal the presence of a double-peaked wave spectrum during the first half and last days of the measurement campaign, as the peak values jump back and forth between two spectral components. Furthermore, the peak wave direction wraps around the 0 / 360 degree mark regularly. This volatile behaviour, which is inherent to peak-related parameters like T<sub>p</sub> and Dir<sub>p</sub>, has a slightly negative influence on the presented RMSE values and correlations. Nonetheless, the small error and high correlation of the mean wave period T<sub>m01</sub>, which has a more continuous character, shows the good ability of the Obscape buoy to measure wave periods.



Figure 1: Bulk wave parameters. WaveDroid observations are shown in orange, observations from the reference buoy are shown in black.

Table 1: Root-mean-squared errors and correlation coefficients of observed parameters

Parameter	RMSE	Correlation
Hmo	0.10 m	0.99
Tp	1.08 s	0.85
Tmo1	0.21 s	0.98
Dirp	19°	0.94





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