

# TerraDrone

Terra Drone Europe  
GNSS and Aerial Drone Surveys







## TerraDrone Europe



**15**

Employees



**14**

Drones



**7500+**

Flights



**24**

Countries



**2400+**

Km<sup>2</sup> Mapped



## TerraDrone



**250+**

Employees



**210+**

Drones



**50K+**

Flights



**69**

Countries



**14K+**

Km<sup>2</sup> Mapped

Harris Carrier



Asctec Falcon V8



DJI M200 & M210



DJI M600



DJI Inspire 1 & 2



Terra Wing



Elios Flyability



Altura Zenith ATX8



C-Astral Bramor





## 250 + onshore oil and Gas Locations in the Netherlands

- Fast and cost effective method for the survey of NAM Locations
- Creation of a 3D models to check terrain height changes
- Updating of as build drawings
- Inspections of flares



### When

- October 2013 – January 2016



### Location

- Mainly North East of the Netherlands
- 250 + Locations



### Objectives

- Deliver data for updating NAM As Build Drawings
- Create Imagery to limit site visits
- Creation of 3D models

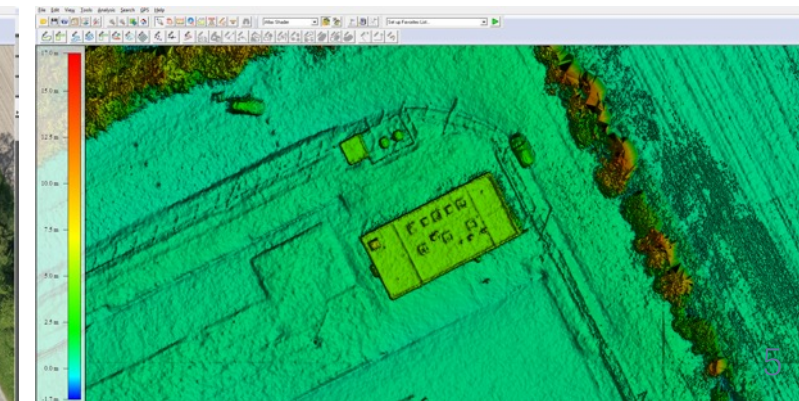
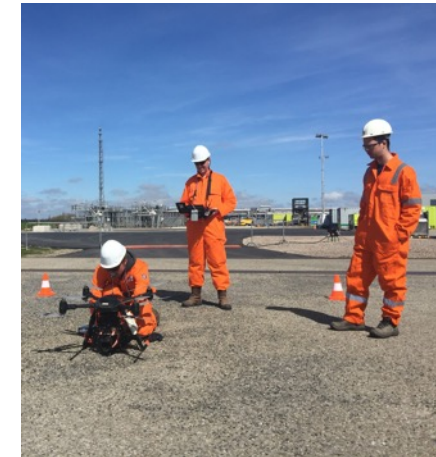
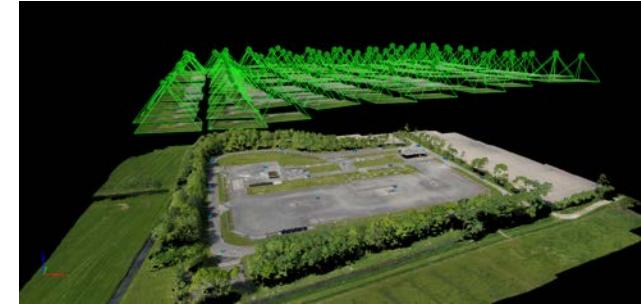


### Deliverables

- 3D Terrain and Surface Models
- Ortho rectified aerial imagery
- 360 aerial panoramas
- Point Clouds



NAM





## 3D As-Build survey of an offshore platform

- Built reliable 3D as-built dataset from scratch.
- Platform top side with photogrammetry using a UAV
- Quick method of creating a 3D model of the outside of the installation
- Photogrammetry was the only highly accurate method available
- Clashes between rig and platform were identified in the clash detection



## When

- August 2017
- 2 working days on the platform



## Location

- Dolphin platform, Trinidad and Tobago
- 2 Days on Installation



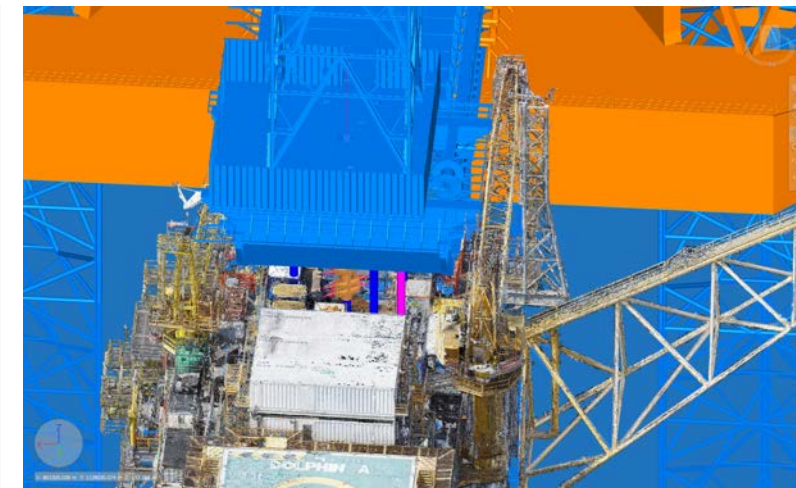
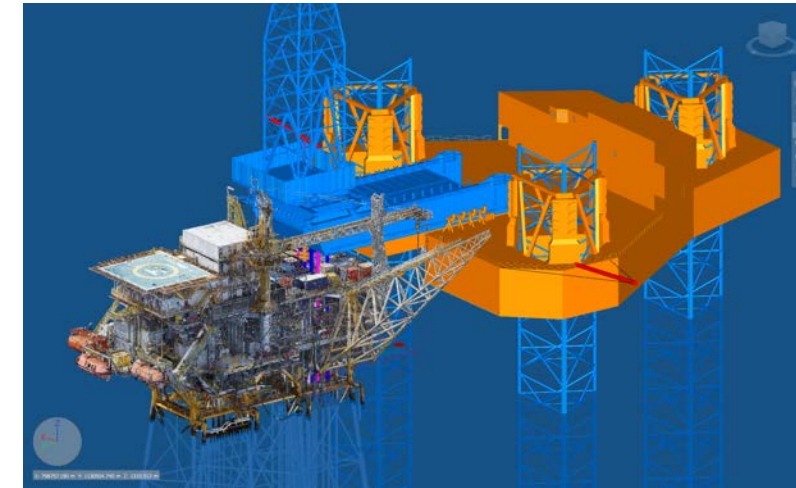
## Objectives

- Accurate as-built point cloud



## Deliverables

- 3D Point Cloud
- Textured Mesh
- Top View aerial orthophoto mosaic
- 5 x 360 degree aerial panorama
- Results of quality control measurements





## Why and where we use GNSS?

- Execution of automated flightpaths
- Measurement of ground control points for photogrammetry
- Measurement of verification points (LiDAR and Photogrammetry)
- Establishing base station position
- Computing exact position of where images are taken
- Replacement of IMU in LiDAR measurements



# Automated Flight Paths (Horizontal – Survey and mapping)

File Import Process View Map Export Help

JOB ID —

SEARCH [Info] [Globe] [Layers] [Print] [LAT/LONG]

**TOTAL RUN LENGTH**  
24.5 km

**LINE BEARING**  
57.5°

**NUMBER TURNS**  
32

**NUMBER FRAMES**  
870

**GROUND SAMPLE**  
0.020m (2.0cm)

**INPUT AREA**  
70.9 hect

**CAPTURE AREA**  
117.9 hect

**CAMERA**  
Canon 5Ds\_50.0...

**ALTITUDE AGL**  
800ft

**FORWARD O'LAP**  
75.0%

**SIDE OVERLAP**  
80.0%

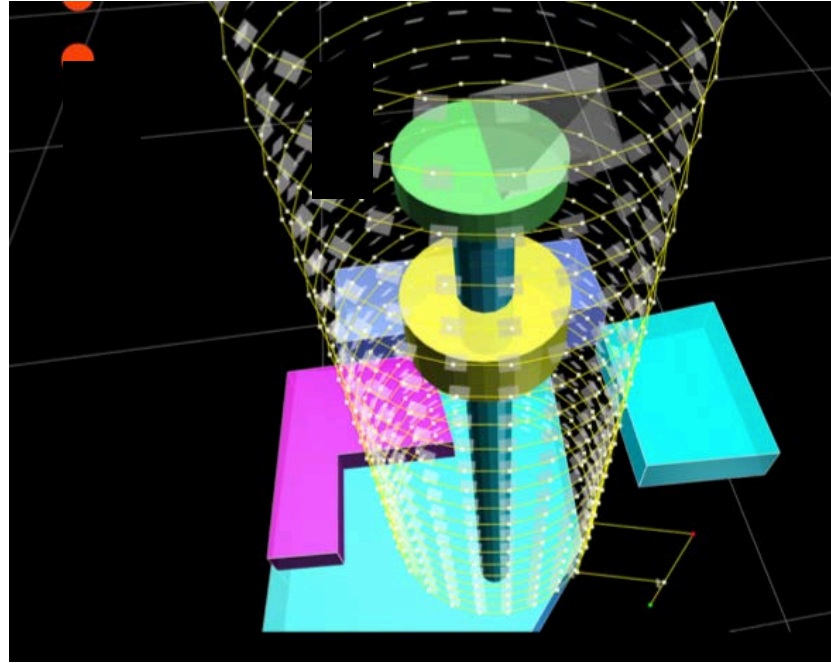
**GROUND SPEED**  
65kts

**FRAME RATE**  
0.38 seconds  
b/n frames

**TERRAIN MODEL: NO**

**INTERNET: AVAILABLE**

# Automated Flight Paths (Vertical – Inspections)



The screenshot displays the TerraDrone software interface for mission planning. The main view shows a 3D aerial perspective of a transmission tower network with a yellow flight path. The interface includes a left sidebar with various tool categories and a right sidebar with mission details.

**Generic tools**

- Actions
  - Select pylons to inspect
  - Select calibration pylon
- Measuring Tools
  - 1 km radius
  - Get structure data
- Structures
  - Distribution Grid
  - Transmission Grid
- Lidars
  - Network 1 X
- Pylons
  - Select...
- IGN Layer
- Fit transmission tower
- Imagery layer
  - Bing with labels
- Imagery layer

**Specific tools**

Mission Name: Mission 1

**Execution**

- Trajectory up-to-date
- Flight distance: 3575 m
- Furthest structure: 919 m
- Inspected network: 919 m

**Structures (3)**

- 00012
- 00013
- 00014

**Parameters**

- Preset: Custom
- Inspection distance: 10.00 m
- Vertical distance to structure: 10.00 m
- Distance to cables: [icon]
- Minimum: 9.00 m







## Introducing AeroPoints

AeroPoints are the world's first **smart Ground Control Points**.

Purpose-built for **drone surveying**, each AeroPoint includes a solar panel, battery, GPS and WiFi inside a fully-sealed, rugged, lightweight shell.

**Large memory**  
Store data from 100+ flights before upload is required.

**In-built GPS**  
Records positioning data every 10 seconds.

**Solar powered**  
Low maintenance. Charges while running. Powerful LiFePO<sub>4</sub> battery for long storage life.

**One button operation**  
Just place-and-press. Indicator light displays current status.

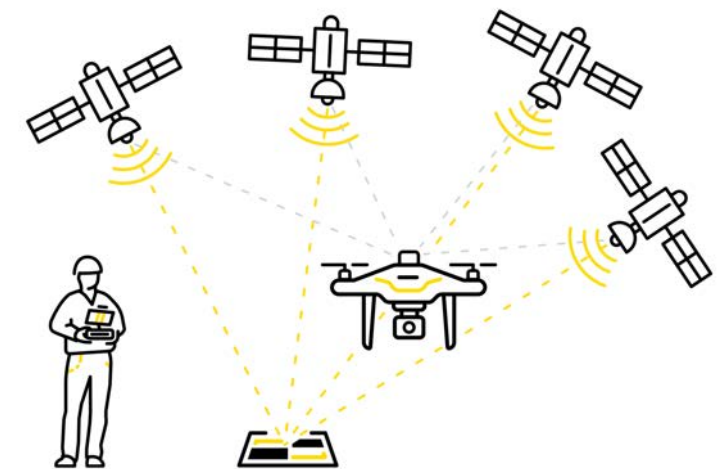
**Lightweight**  
1.5kg (3.3 lb). Each set includes a carry bag for easy transport.

**Strategic design**  
Optimised for recognition by processing software.

**Rugged and durable**  
Water-resistant. Aerodynamic shape prevents shifting and aids water runoff.

**DO NOT MOVE**  
Survey in progress

propeller aeropoints



### Specifications

<b>Dimensions</b>	544mm (W) x 544mm (L) x 32mm (H)
<b>Weight</b>	1.55kg
<b>Power supply:</b>	5000 mAh 3.2 V (16 Wh) LiFePO <sub>4</sub> battery with solar charging (Newly purchased AeroPoints come fully charged)
<b>Storage:</b>	4GB Flash
<b>Wireless connectivity:</b>	2.4GHz WiFi (802.11 b/g/n)
<b>Operating temperature:</b>	0°C/32°F (min); 40°C/104°F (max)



# Verification Points and Quality Control

20180924-Q1002-Brett Aggregates-Cliffe South-QC.pdf - Adobe Acrobat Pro DC

File Edit View Window Help

Home Tools 20180924-Q1002-... x

Sign In Share

Search tools

- Create PDF
- Combine Files
- Edit PDF
- Export PDF
- Organize Pages
- Send for Review
- Comment
- Fill & Sign
- Send for Signature
- Enhance Scans
- Protect
- More Tools

**Coordinate system:** OSGB36 British Grid  
**EPSG code:** 27700  
**Location:** Cliffe South  
**Date:** September 24, 2018

**skeye**  
aerial survey & inspection

Ground control points							Check points						
Label	X	Y	Z	DEM-Z	Difference-Z		Label	X	Y	Z	DEM-Z	Difference-Z	
GCP 01	571991.394	175388.388	3.796	3.791	0.005		CHP 01	571975.661	175352.099	3.722	3.745	-0.023	
GCP 02	571955.378	175329.182	3.442	3.447	-0.005		CHP 02	571889.776	175331.851	4.528	4.502	0.026	
GCP 03	571878.501	175330.775	2.604	2.612	-0.008		CHP 03	571744.645	175406.859	2.861	2.871	-0.010	
GCP 04	571776.099	175399.571	2.401	2.415	-0.014		CHP 04	571690.007	175303.305	2.510	2.549	-0.039	
GCP 05	571717.484	175347.722	2.201	2.196	0.005		CHP 05	571759.045	175530.629	4.544	4.576	-0.032	
GCP 06	571670.905	175306.619	2.551	2.548	0.003		CHP 06	571856.901	175493.285	4.208	4.179	0.029	
GCP 07	571669.159	175348.517	2.978	2.952	0.026		CHP 07	571820.458	175482.417	4.319	4.290	0.029	
GCP 08	571706.952	175423.064	3.171	3.166	0.005		CHP 08	571884.799	175387.864	3.479	3.497	-0.018	
GCP 09	571687.756	175497.069	4.461	4.451	0.010		CHP 09	572007.261	175391.836	3.715	3.760	-0.045	
GCP 10	571785.378	175532.611	4.871	4.878	-0.007		CHP 10	571894.470	175812.018	3.315	3.330	-0.015	
GCP 11	571855.746	175529.342	5.637	5.645	-0.008		CHP 11	571938.043	175851.813	3.135	3.174	-0.039	
GCP 12	571789.880	175448.968	4.050	4.076	-0.026		CHP 12	572067.398	175745.898	4.760	4.762	-0.002	
GCP 13	571850.976	175406.338	5.967	5.951	0.016		CHP 13	572015.283	175646.611	5.201	5.224	-0.023	
GCP 14	571906.453	175403.155	3.522	3.539	-0.017		CHP 14	571946.264	175597.837	4.156	4.155	0.001	
GCP 15	571956.315	175495.141	4.578	4.573	0.005		CHP 15	571892.627	175666.551	3.625	3.653	-0.028	
GCP 16	571922.479	175535.022	4.358	4.357	0.001								
GCP 17	571976.337	175440.413	4.145	4.151	-0.006								
GCP 18	571892.446	175782.042	3.496	3.493	0.003								
GCP 19	571898.227	175862.118	4.210	4.194	0.016								
GCP 20	571987.721	175830.243	4.260	4.268	-0.008								
GCP 21	572070.438	175756.620	4.760	4.768	-0.008								
GCP 22	572035.056	175719.113	4.550	4.532	0.018								
GCP 23	572045.323	175668.079	5.143	5.147	-0.004								
GCP 24	571985.636	175641.230	3.942	3.943	-0.001								
GCP 25	571908.030	175585.271	3.691	3.703	-0.012								
GCP 26	571891.936	175695.366	3.911	3.902	0.009								
GCP 27	571956.175	175697.188	3.677	3.689	-0.012								
					STDEV	0.012						STDEV	0.025

Trial Expired  
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12:01  
 10-10-2018



## FIELD OPERATIONS

### LOGSHEET - BENCHMARK

Skeye BV  
 Johan van Hasseltweg 39D  
 1021 KN Amsterdam  
 T: +31-20-8200955  
 www.skeye.nl  
 aerial survey & inspection

<b>PROJECT No:</b>	Q067	<b>BENCHMARK NAME</b>	Mussulo Base
<b>LOCATION:</b>	Mussulo Pensinsula	<b>SURVEYOR:</b>	PF
<b>DATE:</b>	02/06/2014	<b>REMARKS:</b>	Station established using
<b>PAGE:</b>	1 of 1		Hotel, Luanda as Bas

#### Benchmark description

Nail (Meetpunt) in the centre of the courtyard behind (North) the reception of Roca Das Mangueiros.

#### Situation Sketch



Coordinates projection		Coordinates ellipsoid	
X:	295685.22	Latitude:	08°53'20.01685" S
Y:	9017152.46	Longitude:	13°08'20.92140" E
Z:	1.50	Height:	16.982
Projection:	UTM 33S (15E) on Clarke 1880	Ellipsoid:	WGS'84
Datum:	Camacupa (Clarke 1880 RGS)		

#### Remarks

Vertical reference is Camacupa (MSL), Height transformations from WGS'84 to Camacupa were done via EGM2008 model

Checked (Skeye BV): *(SIGNATURE)* 17/12/2013 Approved (client): *(SIGNATURE)* (Da

VERSION: 121213  
 DOCUMENT: 1 nosheet - Benchmark - Mussulo.xlsx





## Reach UAV RTK kit

\$1242.00

Upgrade GPS in your drone with centimeter-accurate Reach UAV RTK kit. Reach M+ receives corrections from Reach RS+ using LoRa radio and outputs precise coordinates to the autopilot. This kit can also be used in other applications, where moving receiver needs to be compact.

### Kit includes

- Reach RS+
- Reach M+
- Tallysman multi-GNSS antenna
- Reach M+ LoRa radio
- Carry case
- 2x Radio antenna
- Adapter for survey pole
- 2x USB cable
- USB-OTG cable
- JST-GH 6-pin to jumper pin cable
- JST-GH 5-pin to jumper pin cable





Klantenservice

Direct bestellen

Nederland

incl. btw



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## DJI Enterprise Phantom 4 RTK Professionele drone RTF Professional



Artikelnummer: 1932562  
Fabrikantnummer: 168628  
EAN: 6958265168628

Intelligentie die u beleeft. Absolute precisie. Ervaar de volgende generatie moderne cartografieprocessen - met de Phantom 4 RTK, de meest compacte en nauwkeurige cartografie-oplossing voor geringe hoogtes. Cartografie van de volgende generatie DJI heeft...

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Fabrikant: [DJI Enterprise](#)

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**D-RTK GNSS**  
OPTIMIZED ACCURACY | ULTIMATE RELIABILITY

D-RTK is a high precision navigation and positioning system specially designed for DJI A3 series flight controllers. Using dynamic differential technology, it provides ultra-accurate, centimeter level 3D positioning. This enhanced accuracy over typical barometer, compass and GPS systems makes D-RTK essential for commercial, industrial and scientific applications where accuracy is imperative.





Dual

\$10000



One

\$200

Item	X m	Y m	Z m
Box1	0.019	-0.054	0.021
Box2	-0.021	-0.067	0.020
Box3	0.046	-0.043	0.014
Box4	0.030	-0.030	0.017
Box5	0.046	-0.079	-0.008
<b>SD</b>	<b>0.025</b>	<b>0.017</b>	<b>0.011</b>

