Opportunities for Marine Inspection Innovation

Smarter, Faster, Cheaper, Safe
Mission Statement

C4D Intel is focused on providing meaningful outputs to positively impact operational decision making via cost effective data acquisition, advanced data processing and analysis.

We do this through the acquisition of enterprise grade remote sensed data from airborne (unmanned and manned), satellite and terrestrial sensors and stringent technical workflows.

Ultimately we reduce risk and improve efficiency.
Resources to deliver complex projects

- CASA licenced
- Science/engineering focus
- Experienced operators
- PhD qualified remote sensing analysts
- Class leading equipment
- Local and AWS distributed processing network
- High end data processing and coding skillset
- International Experience.
Class leading RPAS for enterprise data

- C-Astral Bramor PTK
- SRP Lynx M PPK
- DJI M600
- DJI Inspire 2
- AscTec Falcon 8
- Elios Inspection Robot
Clients and Spatial Case Studies

Ship Hull Survey

Client: BHPB

Technology: Fixed Wing/Multirotor Unmanned, Photogrammetry, HD Stills/Video

Description:
High resolution unmanned aerial survey using multiple platforms to undertake Survey of the Hull of Merchant Ships.

Data stitched into HD Orthomosaics with further development being explored on Change Detection and Segmentation on temporal captures for condition assessment and predictive analytics.
Ship Hold Survey

Client: Wilhemsen

Technology: Fixed Wing/Multirotor Unmanned, Photogrammetry, HD Stills/Video

Description:
High resolution unmanned aerial survey to undertake Survey of both the Hold of Merchant Ships.

Australian Ladder structural integrity, Hold floor stitched into HD Orthomosaics and output of Digital surface Model.
Clients and Case Studies – Internal Inspection

ELIOS IN ACTION | MARITIME INDUSTRY
INSPECTING THE BALLAST TANK OF A CONTAINER SHIP

MISSION PICTURES TAKEN BY ELIOS

General Visual Inspection
General Visual Inspection
Exhaust Funnel Inspection
Anode Integrity checking

SOLUTION AND PROCESS

Three flights of 10 minutes each with a single pilot were carried out for the inspection of one tank. All the flights were performed entirely from above the ballasts with the pilot controlling Elios beyond line of sight (BLOS). The robot’s collision-tolerance allowed it to navigate safely in contact with the structures, rolling on the walls when required. The onboard LEDs allowed performing the inspection without any external lighting.

RESULTS

The two ballast tanks, as well as their corrosion monitoring anodes, were inspected in less than 2 hours from deployment. The general integrity of the tank, as well as the states of the anodes, were assessed to be satisfactory. With over 25 similar ballast tanks per vessel and a fleet of several hundred vessels, a substantial increase in workers’ safety and efficiency of inspection are achievable with Elios.
Pressure Vessel Inspection

Client  JKC – INPEX LNG Refinery

Technology  Elios Platform

Description

JKC required internal inspection of Pressure Equipment with minimal operational impacts and to avoid manned confined space entry.

C4D Intel utilised the Elios Drone to undertake the inspection that was completed within 3 hours.

*Nb: File images only*
Infrastructure Inspection

Client	TW Power Services - Pilbara

Technology	Fixed Wing/Multirotor Unmanned, Photogrammetry, HD Stills/Video

Description

High resolution unmanned aerial inspection using multi-rotor platform and high end micro 4/3 Sensor. The inspection included Silencers, Pressure Safety Valves and internal exhaust baffle duct. The resulting data was an ultra high resolution image incorporated into the Asset Inspection Report.

Video fly-throughs were also undertaken with a multirotor system for planning and promotional purposes.
Client: TW Power Services

Technology: Terrestrial Scanner, Photogrammetry

Description:
TWPS have done over 20 Scans of their Asset and are utilising the scans for Inductions and Training Purposes. They are the first to now utilise the ability to embed documentation and video within the model.

This particular scan is the largest outdoor scan completed to date.

TW Power Services Collie PS WTP
Infrastructure Scan

Client: Western Power

Technology: Terrestrial Scanner, Photogrammetry

Description:
Western Power’s Perenjori BESS System was required to be As-Built on completion prior to delivery to Site so the Reality Scan tech. was utilised to capture the completed Units.

It was received and reviewed by senior management whom have now also used the scans for marketing and media.

Western Power Perenjori BESS System
LIDAR Bridge Inspection

Client: MainRoads WA – South West

Technology: Multirotor Unmanned, HoverMap, Photogrammetry, HD Stills/Video

Description:
The Hover Map Payload (DATA61) was used with our partners InSitu Pacific to conduct a full LIDAR Capture of the Bridge to enable a high Cloud Point Density Scan of a key Bridge Infrastructure.

This was the first time airborne LIDAR via HoverMap had been applied in Western Australia and is a paradigm shift in Laser scanning of Assets.

HD Stills were also undertaken with a multirotor system for crack identification and mapping.
LIDAR Conveyor Inspection

Client: Confidential
Technology: Multirotor Unmanned, HoverMap, Photogrammetry, HD Stills/Video

Description:
The Hover Map Payload (DATA61) was used with our partners InSitu Pacific to conduct a full LIDAR Capture of a Conveyor at a Gold Mine.

HD Stills were also undertaken with a multirotor system for crack identification and mapping.
Clients and Spatial Case Studies

Bucket Wheel Excavator

Client: Confidential

Technology: Multirotor Unmanned, Thermographic Camera, HD Stills/Video

Description:

A MultiRotor system with FLIR Thermographic Camera was utilised to produce a thermographic map of the Equipment Motor and Drive system.

HD Stills were also undertaken with a multirotor system for additional analysis.
3D Model Bucket Wheel Excavator

Client  Confidential

Technology  Multirotor Unmanned, Terrestrial SLR

Description

A MultiRotor system was used to take over head and oblique images whilst a handheld SLR was used for underside image capture.

These images were then post processed with photogrammetric techniques to produce a high resolution 3D Model for Engineering Planning use.
Clients and Spatial Case Studies

Landform Assessment

Client: Metals X Pty Ltd
Technology: Fixed Wing Unmanned, Photogrammetry
Description:
As part of their mine closure process, the client manages a large range of legacy mine pits, waste rock dumps and tailings facilities in the Goldfields region of WA. A large number of fixed wing unmanned missions have been undertaken to capture these features using both RGB and Near Infrared (NIR) sensors. The resulting data has been used to identify a range of attributes such as erosion, sedimentation, vegetation (cover, class, height and health) and other geometric features such as bunds, berms, sinks etc. Temporal captures will be used to automatically detect and classify change over time.
Clients and Spatial Case Studies

Stockpile Volumetric Survey

Client
Confidential

Technology
Multi Rotor Unmanned, Photogrammetry

Description
As part of their regulatory compliance our Client is required to conduct a Bi-Annual Volumetric Survey of their Port Stockpile. The traditional survey approach used to take 1 full day at site and produce a 2D Toe Outline with Volume Calc.

By using a UAV and post processing, we capture the data in 1 hour (less downtime) and produce a far more accurate high fidelity 3D Image of the Stockpile status.
Tyre Statutory Volumetric Survey

Client Confidential

Technology Multi Rotor Unmanned, Photogrammetry

Description

As part of a regulatory compliance check our client required a volumetric survey of a waste tyre facility to determine the contractors compliance to their Waste License.

By using a UAV and post processing, we captured the data in 1 hour and produced a far Survey Report that is presentable in Court if necessary.

Tyre Compliance Check
Safe operations to protect people and assets

- Operations in accordance with CASA.UOC.0562
- Adherence to UAV Operations Manual
- All controllers are CASA Certified
- Compliance with CASR 1998, Part 101
- Pre-operations Planning and Risk Assessment
- Job Hazard Analysis
- HSE Policies including D&A, Fitness for Work
Next Steps

C4D Intel are providing Asset Owners with the ability to employ the latest technology in GIS Data Acquisition and Analytics.

We are keen to discuss with Aus-Shil the opportunities for us to work together, enabling a paradigm shift in efficiency gains and temporal determination of the way Aus-Shil manage their extensive Asset Inspection portfolio.

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