CUSTOMER PROFILE

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Why Draganfly

Having been Oil and Gas professionals for over a decade, we understand the importance of using equipment that manufacturers can guarantee in cold climates.

We knew the camera solution required a sensor that mounted securely, had excellent stabilization, and shot clear imagery from safe distances during concurrent operations.

Thermal anomalies are also a very important factor in Oil and Gas operations, so the Draganflyer X4-P system allowed a real-time feed of dual mounted RGB and Thermal, adding immensely to our inspection capabilities.

Project Quotes

“Getting this survey in 3D so that we can draft a plan in AutoCAD Civil 3D is amazing. Compared with how we created contour images before from standard land surveys, we can understand our sites in a whole new way.”
- Company Engineer

“Wow. We can read the 400bbl tanks in the 3D model! This is insane!”- VP during presentation

Oil and Gas Industry

Drill Pad Footprint Analysis

Introduction:

This paper examines the benefits and cost savings of conducting a drill pad footprint analysis by Starscream Aerial Services, using the Draganflyer X4-P drone and photogrammetry Pix4D post-processing software in contrast to traditional methods.

With the Draganflyer system, capturing aerial data with the correct image overlap required and processing the data is very simple. We design the flight using automated flight planning software, then point, click, fly, and process the data.

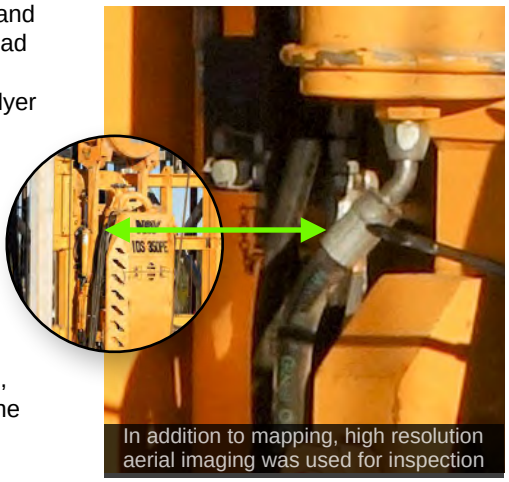
For inspection of equipment, the Draganflyer system was flown to capture high resolution photos of flare stack tips and other tall structure equipment.

The immediate benefits are crew safety and a dramatic savings in time. High resolution aerial photography is used for structure inspection and the resulting highly detailed 3D computer models provide the team with updated site information, topography, and where needed, volume calculations.

Background/Problem:

Our oil and gas client wanted to complete a footprint analysis of their ongoing drill pad in the region. These pads had been previously surveyed and they wanted to test and compare data from the Draganflyer system.

After flying the site and processing the data, the digitally recreated ortho-rectified imagery and point cloud data (.las) files can be imported into their AutoCAD system for potential future



In addition to mapping, high resolution aerial imaging was used for inspection

site planning, logistics, and regulatory compliance monitoring. The customer also requested high resolution aerial photos for rig mast/site inspection.

Potential Solution:

Oil and gas work provides a unique set of circumstances with OH&S regulations and UAV/drone safety. Concurrent operations with safety sensitive workflows require all personnel on location to have an understanding of the operation, and how it may affect their job; this was discussed in an on-site safety meeting where objectives were outlined, safety documentation signed, and fielded questions answered.

After the establishment of a flight plan that gave us our desired 2cm GSD and allowed us to clear the on-site infrastructure, including a 50m drilling rig mast and neighbouring flare stack, we laid down 6 GCPs using a handheld L1/L2 receiver and VRS (Virtual Reference Station) correction.

FRAC SITE LAYOUT

The frac site layout over the orthomosaic drill pad was done with spatial planning software using true-to-scale equipment drawings as an overlay.

The specific type of frac treatment was hydrocarbon based, so the spacing, fluid storage area, and lease sloping requirements were of particular importance.

It's imperative to know which equipment can stay, which equipment is arriving, how it all fits together, and embankment volumes for regulatory site grading in a finalized frac site layout. With these powerful tools, we have the ability to make simple and effective modifications on-the-fly.

Ryan Brown
President, Starscream Aerial Services Inc.

Orthomosaic with scale overlay

After placement of the GCPs, two grids were flown at 90m AGL with a high imagery overlap of 85% front and 70% side at a rate of 6m/sec.

Oblique photos were taken at 45 degree angles in an up/down spiral pattern of the rig mast and a circular outline of the location perimeter to capture the remaining on-site infrastructure.

Lessons Learned:
This type of job is perfect for a quadcopter like the Draganflyer system, because it has failsafe redundancy and comms link stability.

For mapping, the tight grid patterns and flight stability is superior for the required accuracy to model these types of complicated structures and noisy (image noise) environments. The auto-hold GPS stabilization and smooth control from the handheld controller with “stability augmentation” gives confidence when flying around concurrent operations while the gimbal and accompanying sensors gave us the ability to capture high-resolution inspection images without interference.

Future Plans:
It was determined the value in flying the Draganflyer system around fall arrest areas of a worksite provided very clear and distinct safety advantages to traditional manned, visual inspection. The documentation allows for redundancy in oversight and historical cataloguing of worksite conditions, rather than checklists and ‘word of mouth’ only.

The footprint analysis revealed a major issue in the way the lease site drained, and potentially contaminated nearby areas in the event of a blowout. The Southern portion of the site had its embankment cleared to install a flare stack last year, however, it had not been replaced, creating drainage slope (DSM with contours) into a sensitive wetland to the south. The situation was remedied once the data was presented, abetted by the embankment materials volume calculations that were done to understand if there was enough material to have regulatory height and slope to re-establish the lease perimeter.

The lease site package contained drilled hole and producing wellbores confirmations of distance from all key regulatory items. An orthomosaic and colour gradient with contours, was used to zone and plan future completion activities like frac and coil services. The operator saw a clear advantage in enterprising the image document to service companies for core planning, pre-job.

Return on Investment (ROI)
Drill Pad Footprint Analysis

	Traditional Feet on the Ground	Draganflyer Aerial Data Collection
Data collection and processing:	16hrs Collection 40hrs Analysis	4hrs Collection 12hrs Analysis
One time cost:	$3,680 CAD	$2,900 CAD
Number of sites:	20 Sites	20 Sites
Annual cost:	$73,600 CAD	$58,000 CAD
Cost savings per year:	**$15,600 CAD and 4X Faster**	