Distant Imagery Solutions

Understanding Through Imagery

Distant Imagery Solutions

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Who is Distant Imagery?

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ABOUT US

Distant Imagery is registered under the UAE Sharjah Free zone.

We are a team of dedicated professionals who are passionate about creating 4th generation communication and data collection and analysis tools for enhanced engagement in interactive means.

The team on this proposal comprises of regionally based experts with a combined experience of over 30 years of photography, videography, 360, engineering, analysis and UAV experience.

We are passionate about utilizing imagery as key mechanism towards data collection enhancement, analysis, mapping and as a key measure in supporting 4th generation communications and education.

Our virtual learning experiences and 4K 360 videos are a truly immersive way to experience places that are inaccessible to most.

We believe that understanding our environment is key towards its conservation. Through our innovation arm, we work on developing UAV and underwater ROV technologies and tools to better assess and collect data in the field. We also believe in the power of community engagement, thus creating replicable solutions which are low cost and easily operated.

For more information on the company please visit: http://distantimagery.com/

YouTube

Instagram

Twitter

Facebook

Who Have We Worked With?

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TEAM WORK

We have been very lucky to work with several clients from around the world from various sectors including supporting Intergovernmental Agencies, Government Departments such as the Ministry of Climate Change and Environment, Special Initiatives such as the GEF Blue Forests Project, Private sector such as 5Oceans and Academia such as the Aquila School.

We work in all conditions, in natural habitats, deep in the mangroves and under the sea or on a beach of a hotel. We would say that working away from our desks and showcasing beautiful environments is the best part of our jobs. We specialize in three complimentary specialisation areas through our team, as well as bringing in from our global connections expertise as needed.

Why Use Our Tools?

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WHAT MAKES US DIFFERENT

We specialize in providing complimentary specialisation areas throughout our team, making us unique. Expertise includes experts with over 17 years of environmental programme management and expertise gained from running highly technical environmental projects in the region, professional photographers and videographers as well as ex-military aviation experts and engineers.

From our understanding, we are globally a rare company which has specialization in gigapixel imagery, kite and drone custom built solutions and analysis such as NDVI, SAVI etc., aerial beautific imagery, underwater mapping, underwater beautific imagery, 360 imagery above and below water, video editing and customizable virtual tour creation.

All under one roof –
making working with us a one stop shop.

WHY INCLUDE 4TH GENERATION COMMUNICATION AND IMAGERY ANALYSIS TOOLS?

Making the Complex, Not So Complex

Distant Imagery is always looking towards new solutions in how we communicate and how to best bridge and enhance the science to policy interface. It's one of the largest challenges that we see not only in the developing world, but also in the global community. Being innovative, and coming up with solutions to provide decision makers, and those advising them, the ability to interact with and feel integrated into the solutions which we are advocating for often need a visceral connection with the natural environment. By utilizing solutions such as providing Google virtual glasses, 360 imagery and aerial images as well as different mechanisms and means to collect the data in a more resourceful way, such as using community built UAVs and ROVs, provides the ability to connect intuitively.

Making technical information understandable and creating imagery that you can relate to on an individual basis, thus creating personal connections to the issue, allows you to bridge the science to policy interface.

Additionally, creative and community led solutions towards data gathering, such as community built and maintained UAVs, KAPs, ROVs, 3D mapping, virtual tours not only showcase the ability to find new solutions for challenges that we all face, but doing so in a more resourceful and easier way can make a great change with believe in the future.

360 AERIAL/GROUND & FLAT AERIAL/GROUND VIDEOGRAPHY & EDITING

360 and flat videography and photography projects stem from conversations that we have regarding the potential of utilizing ground-breaking use of technologies to best demonstrate the wealth of information and research that the site or country is undertaking, the true expertise of its scientists as well as the beauty and wealth of local ecosystems.

Our 360-imagery capture is different as we work in all conditions, in natural habitats, deep in the mangroves and under the sea or on a beach of a hotel and from aerial to ground views.

We work with world class videography editors to bring you bespoke videos catered to your needs.

360 VIRTUAL EDUCATIONAL TOURS

Studies by Magnifyre have found that 29% more people viewed a 360-degree video than the same video in traditional format. If the goal is engagement and the method is storytelling, the next step up from flat frame video is taking that video 360 degrees, to the cutting-edge educational media. 360-degree videos use a special set of cameras to record all 360 degrees of a scene simultaneously, which means that while a video is playing you can choose which angle you want to view it from.

With comprehensive integration into Virtual Tours, tilting your phone or scrolling your screen allows you to spin around, look up and down, as if you're actually there in person—a truly immersive experience… trumped only by putting on a VR headset such as readably accessible Google Cardboard or higher tech solutions such as the Vive, Oculus or others.

Projects might involve the following components as part of our virtual tours:

- Working with the project leads and its scientists to identify possible story areas for the tour to highlight specific endemic species, information pieces, area of uniqueness to film etc.
- Visit to site to create Panotour.
- Utilization of 360 rigs to create high res photo and videos.
- Utilization of 360 underwater rigs for underwater high res photos and videos as/if needed.
- Utilization of videos with rangers and experts.
- Utilization of UAV to create aerial panorama and 360 degree fly over.
- Utilization of 3D mapping to provide fly through orthomosaics of areas of importance within the site as well as NDVI analysis.
- Creation of Gigapixel panoramas.
- Utilization of available identified text, photos, videos, soft collateral provide within each spherical image.
- Final completed interactive Panotour with Panotourlive sections.
- Walk through Virtual Tours with bespoke movement through the environment.

POTENTIAL USES

There are multiple benefits in showcasing not only the incredible environments that we live and thrive in, but also in highlighting the true innovativeness in communicating how one can utilize different mediums to enhance capacity and better inform decision makers.

Some examples of how the project outputs can enhance dialogue on the importance of these habitats include:

- Utilization of the imagery on social media platforms.
- Utilization within reporting mechanisms and targets related to community engagement, technology, data accessibility and communications such as the SDGs, MDGs and the Aichi targets.
- Utilization in potential education centres.
- Utilization both in country and abroad which showcase innovation and conservation in the site area.
- Utilization to support extra-curricula education tools within education systems.
- Utilsation within online toolkits and web platforms.
- To further build stakeholder and community engagement.
- To build capacity of communities use of innovative tools for enhanced communications.

Tell Us About Mapping!

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LET'S TALK BENEFITS

The aim of Distant Imagery is to provide:

- Community participatory approach to habitat mapping utilizing low cost, self-customized and easy to maintain tools including UAVs, Kite Aerial Photography (KAP), underwater mapping rigs and 360 housings.
- Community participatory approach to developing 4th generation communication stories on key issues to the community.
- In field and software training, capacity building and cross experience exchange towards the mapping tools in parallel to product development.
- Tools remain with the community for continued community led habitat mapping.

Through working in multiple developing regions in the world, we understand that a large barrier to project success is the lack of community engagement in the truest sense of the word. Without real engagement, from project guidance to project implementation the longevity of the project and final buy-in is at risk.

We act as incubators of the technologies that we bring to the table, but the outcome stories are of the community itself.

Communities play a lead role within this type of work as it is their in-depth knowledge on the environment, what matters to them, and their cultural identity tied to these coastal and marine habitats that will make the outputs successful. It is these communities who know, who live, who thrive in these areas who also know best what works and what doesn't. We therefore believe in training communities within our mapping, our information analysis, our understanding in how the information relates to their cultures and their environment, as well as understanding and highlighting the key role of women as influencers of the environment. Communities are the essence and key importance about how we move forward with these projects and we can see enough, their input, their feedback and their passion are incredibly important and critical to everything that we do.

It is by facilitating community participatory mapping projects alongside stakeholders that exciting, fresh and innovative ideas are realized and sharing of experiences are held in a real way. By engaging and training within their sites and understanding what is most valuable to them, we can come together to find common solutions around mapping, communications, use of technologies and how to overcome obstacles that each of us face.

KITE AERIAL PHOTOGRAPHY (KAP)

KAP has been around since the late 1800's and is a lower cost alternative to using drones. This can be very useful for regions that do not have the income or infrastructure to purchase and maintain drones or where regulations are too restrictive. KAP mapping has been used from the Peruvian Andes to the Nile river valley. All aspects of a KAP rig can be built from commonly available materials. A KAP setup can cost anywhere from $200 to $1000 dollars depending on the size of the camera you want to lift and the camera mount system.

Compared to the $1000 minimum price for a basic drone, this can be a much more attractive option. The equipment is much easier to maintain, there are currently no regulations governing KAP, no batteries required for basic setup and much smaller batteries for the more advanced rigs than drones.

KAP also does not suffer from the same wind restrictions as drones. Certain delta style kites are rated to 50 + knots of wind. Consumer drones generally can only handle about half of that (much less for small quadcopters such as the DJI Mavic).

The same principles for mapping with a drone apply to a kite, multiple georeferenced images are stitched into a larger orthomosaic. The kite is simple towed behind something (boat, truck, you) and the camera shoots photos straight down.

Marine mammal location can benefit from KAP as the kite can be towed behind the boat for long periods of time. Lifting kites can also be used to deploy sensors or antennas.

NORMALIZED DIFFERENCE VEGETATION INDEX (NDVI)

NDVI is a simple metric which indicates the health of vegetation. When near infrared hits the leaf of a healthy plant it is reflected back into the atmosphere. As the amount of chlorophyll produced in a plant decreases less near infrared is reflected.

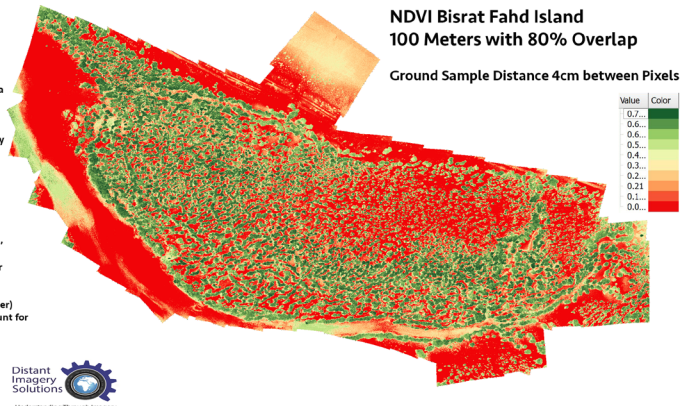
This can be used to see the overall health of a crop. The NDVI algorithm compares the reflected intensities of near infrared (NIR) and visible light. The values are calculated for each pixel of your map, giving them an index in the range -1 to 1.

$$\mathrm{NDVI} = \frac{(\mathrm{NIR} - \mathrm{Red})}{(\mathrm{NIR} + \mathrm{Red})}$$

The original image is black and white, with white being a high NIR reflectance value and Black a low value.

A colorized LUT (look up table) is applied to more clearly show the difference.The LUT is single band pseudocolor Red-Yellow-Green, with dark green being a high NIR reflectance and dark red being a low/ zero reflectance.

Vegetation canopy will tend to values above 0.3, while most soils and water stay below. Certain types of soils can have a slightly higher reflectance value than normal, the moisture content of the soil can also have an effect (soil darkens when wet). NIR is absorbed faster by water than regular light, so very shallow clear areas will show differently than deeper areas. Anything with a high reflectance value in clear shallow water (less than 1 meter) could possibly show using this technique. This can account for areas of water that are yellow and areas that are red.



AGEDI
مبادرة أبوظبي العالمية للبيانات البيئية
Abu Dhabi Global Environmental Data Initiative

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UAV MAPPING

Quad copter: Best used for smaller mapping areas as flight time is limited.

Fixed wing: X-UAV Talon. Best used for larger areas and difficult to reach areas.

Having both types of UAV's available increases the efficiency of operations. It is also much easier to launch a copter style drone from a boat if doing marine mapping or species tracking. A copter is much quicker to setup, launch, and recover. It is also much easier to backpack in to an area inaccessible by automobile.

The downside is that if you have a very large area to map it will take much longer to do with a copter and require many more batteries (20 Km sq. at 150 m altitude would take 19 batteries and 300 minutes). This is where a fixed wing shines (the same area could be done in 2-3 batteries). A fixed wing can stay in the air for up to 5 hours (airframe and loadout dependent) and can map huge areas in one battery. With longer endurance comes longer range, a properly configured fixed wing can travel up to 200 miles round trip. This is an extreme use case with a very well-tuned and lightened airframe, a more reasonable round trip would be about 100 miles. This is very useful for species tracking or surveilling areas for illegal activity (poaching or illegal fishing). One limitation to long distance flight is that if you are required to maintain flight control and video streaming, you must maintain an altitude sufficient that the controller and airframe have line of sight

ORTHOMOSAIC MAPS

An orthomosaic is what is represented in Google Earth. It's a combination of a multitude (up to thousands) of individual, overlapping nadir (pointed straight down) photos. From these images, post-processing software can produce a single very large image, geometrically corrected for topographic relief, lens distortion and camera tilt. Where Google Earth uses satellite images where 1 pixel on your screen could translate to meters on the ground, 1 pixel on maps acquired by UAV translates to centimeters on the ground.

An orthomosaic map which is the end result of UAV mapping also has multiple uses. Along with the orthomosaic, a 3D model can be produced, which will generate a point cloud. From this model, distances, volumes, area and perimeter calculations can be generated with drone mapping. The 3D model can also be used to create a "fly through" video. This is a video that "fly's" along the 3D image to show the entire area in a more interactive way.

The orthomosaic itself is georeferenced and can be used in GIS software to measure distance, area, etc. **It can also be used to identify change over time (if done at set intervals) as well as above ground carbon storage.**

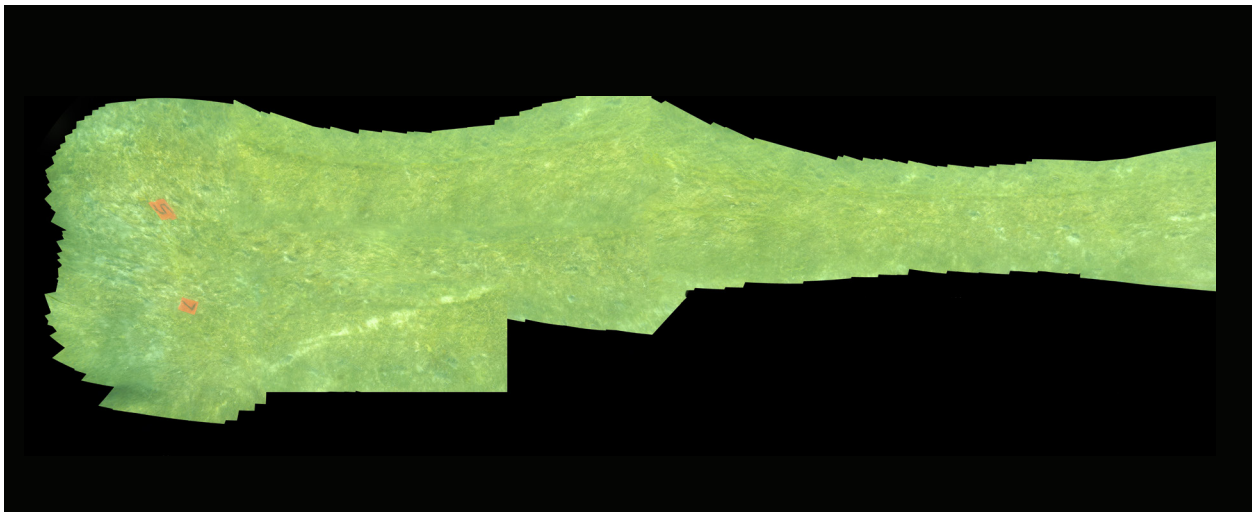
MARINE MAPPING

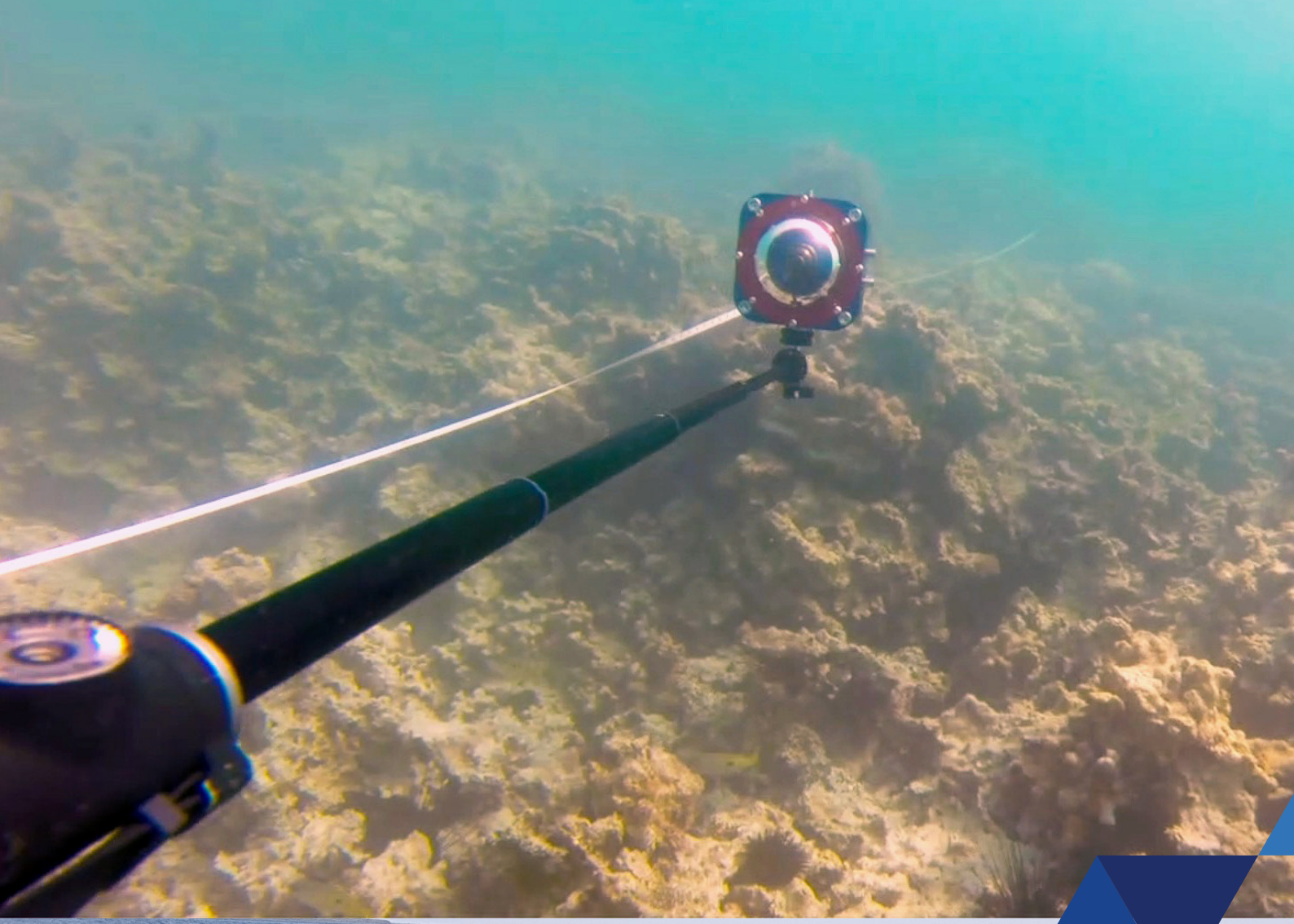
Marine mapping using photogrammetry is currently used mostly for archeology and for wreck surveying, although it can easily be used for mapping coral or seagrass. Underwater mapping is much more time consuming and significantly more difficult that aerial. Water clarity, depth, current, scale issues from lens distortion, light variations, and cloud cover must all be taken into consideration when using this technique. Shallow, clear water where the rig can stay on the surface is the easiest, while deeper water that requires divers for the camera array and snorkelers for the GPS to be located on the surface is more difficult.

The orthomosaic map that will be the end result of the marine mapping section also has multiple uses (nearly identical to aerial). Along with the orthomosaic, a 3D model can be produced, which will generate a point cloud. From this model, distances, volumes, area and perimeter calculations can be generated with drone mapping. The 3D model can also be used to create a "fly through" video. This is a video that "fly's" along the 3D image to show the entire area in a more interactive way.

The orthomosaic itself is georeferenced and can be used in GIS software to measure distance, area, etc. As it is also a large photo, it can be used to identify marine species (with a high enough resolution or ground sampling distance, GSD). It can also be used to identify change over time (if done at set intervals), this will show the area before drilling, during, and after remediation (if applicable). With this information you can show if the drilling is having an unforeseen effect on the local area or adjoining areas.

It is also possible to create a topographic map of the area. The topographic map enables you to see elevation relief.





Need Training?

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WHAT'S AVAILABLE?

UAV Training

Training consists of 5 modules (approximately 5 days, class size and weather dependent).

1. Ground school: Classroom training to gain familiarization with the types of UAV's, their components, basic concepts of flight, local regulations governing UAV flight.

2. Building and maintenance of UAV's: covering how to design, assemble, and maintain a basic UAV (copter and fixed wing). Areas covered include how to choose and airframe, propulsion system, electronic speed controller (ESC), propeller, autopilot system, imaging system, integration of systems into the airframe, and pre/post flight maintenance.

3. Basic flight training: Conducted using more durable training drones. This training will cover basic flight control, emergency procedures, and usage of the autopilot system. Flights will be conducted without first person view cameras initially to show pilots how to identify what position the aircraft is in from a distance.

4. Advanced flight training: conducted using first person view video systems and a ground control station. Training will cover concepts of first person flight, using the ground control station for flight planning and types of automated flight patterns, manual flight for species monitoring.

5. Mapping flight: Covering how to effectively plan and execute mapping flights. Concepts covered include basics of photogrammetry and processing and types of software.

After the training is completed trainees will have all the skills required to continue using UAV systems for a variety of uses (mapping, monitoring, etc.). Using UAV's is a never-ending learning process though!

Marine Mapping Training

Building a mapping rig: This training goes over the basic design and construction of a simple underwater mapping rigs.

1. Building the rig: covering how to design, assemble, and maintain a basic kite rig.

2. Using the rig: how to use the rig for mapping small areas, how to use ground control points, and the importance of using objects for scale.

3. Image processing: how to us the image processing software to produce an orthomosaic image of the areas covered and how to import it into GIS software (QGIS).

http://distantimagery.com/