PRECISION AERIAL AGRITEK

A COMPANY PROFILE

SUSTAINABLE, EFFECTIVE & ECONOMICAL
CROP PRODUCTION & PROTECTION

Precision Drones was founded in 2020 with a focus on the technical applications of drones in various sectors – land survey, mapping and industrial inspections.

Precision Drones is still in existence, however the Directors soon came to realize the massive benefits drone technology could bring to Botswana's growing but challenging agricultural sector.

Precision Aerial Agritek (PAA) was launched in 2021 to investigate, test and introduce drone agricultural technology in Botswana. We currently employ 8 personnel at two bases in Botswana.

With our roots in commercial aircraft operations, Precision Aerial Agritek brings over 20 years of aviation experience and operational standards to our commercial drone business. Led by an experienced aviation manager, aircraft and drone pilot who understands the industry from the ground up.

PAA is passionate about drones and how they will revolutionize farming in Botswana.

OUR SERVICES

AGRICULTURAL (PAA)

- Agricultural land mapping for farm planning and land use management

- NDVI & thermal field surveys for crop health analysis

- Drone crop spraying

- Invasive species control and debushing

- Large area pest control

- Aerial wildlife & livestock counts

- Anti Poaching

INDUSTRIAL (Precision Drones)

- Thermal solar panel inspections

- Thermal infrastructure inspections

- Topographical surveys

- 2D & 3D digital surface modelling

DRONES IN AGRICULTURE

The United Nations Food and Agricultural Organization (FAO) projects that food and feed production will need to increase by 70 percent by 2050 to meet the world's food needs.

This will only happen with the adoption of new technologies that make farming more efficient and cost effective with increased outputs on available land.

Drone technology is rapidly being adopted world wide with agricultural drone sales surpassing $1bn in 2021 with forecast sales of $6bn by 2030. Drones inspect, monitor and assess crop health and are now used to apply chemicals at greatly reduced volumes.

PAA researches and introduces the latest drone technology to help farmers save time, save money, save resources and improve their yields.

PAA's agricultural drones currently service the Tuli Block, Palapye, Serowe, Francistown, Pandamatenga and Kasane areas.

EXPOSURE AND ADOPTION OF AFFORDABLE DIGITAL AND PRECISION FARMING TECHNIQUES

The exposure and adoption of affordable digital and precision farming techniques can have a significant impact on agricultural practices. By utilizing digital tools and precision farming techniques, farmers can improve crop yield, reduce waste, optimize resource utilization, and ultimately increase profitability. Some examples of these techniques include precision irrigation, drone technology for monitoring crops, crop spraying, soil sensors for better fertilization, and data analytics for informed decision-making. As the adoption of these technologies grows, it is important to ensure that they are accessible and affordable to farmers of all scales to promote sustainable agriculture and food security.

 Precision agriculture, integrating technology to enhance crop yields and efficiency, offers several advantages and disadvantages:

These may amplify or slow down the adoption of precision farming

Advantages:

1. Increased Efficiency: Precision agriculture allows for more accurate application of resources such as water, pesticides, and fertilizers, leading to improved efficiency. (There is shortage of water in most parts in Botswana so with technologies such drone crop spraying farmers are able to save 80% of water used on crop spraying

2. Cost Savings: By utilizing technology to target specific areas that need attention, farmers can reduce input costs and maximize profits. e.g farmers can use data acquired from multi spectrum image to analyses crop health and target specific areas hence saving the costs

3. Environmental Benefits: Precise applications methods help minimize the environmental impact of farming practices by reducing overall inputs and minimizing runoff.

4. Data-Driven Decisions: Advanced analytics and data collection enable farmers to make informed decisions based on real-time data, improving overall productivity.

5. Enhanced Crop Quality: By tailoring inputs to each specific area of a field, precision agriculture can help optimize crop health and quality.

Disadvantages:

1. High Initial Investment: Implementing precision agriculture technologies can be costly, requiring an initial investment in equipment and training. As the first company to offer drone crop spraying services PAA has been tasked with educating and exposing crop spraying drones to many Botswana across the country in Central(Palapye, Serowe and surrounding areas)Northeast (Masunga , Moroka,) CHOBE (Kasane , Pandamatenga)Kanye

We have discovered that there are various issues that can hinder and promote drone technology

Some are cultural practices, language barriers. Another factor that we have toiled to bring to knowledge is the difference in expectations vs reality especially with agrochemicals and crop spraying , to close this gap we had to have demonstration on fields.

Most small scale farmers in Botswana need to be equipped with practice good farm management skills, PAA has worked with various crop production offices across Towns and villages to bring about this knowledge. We worked together with Crop production officers to understand the people we are approaching and how much knowledge they have when it comes these technologies. These approaches have aided us and guided our presentations, leading to promising adoption of precision farming

The cost of marketing and promoting the use of digital technology to farmers has been something we look forward to reap fruits from as our customer's yield increases

2. **Technological Complexity:** Some farmers may struggle with the complexity of using new technologies, requiring additional education and support. Most of the farmers are elderly people and most of them are not up to date with the modern technology making it difficult for them to get the concept of the drone technology, good crop spray program,

3. **Data Security Concerns:** With the collection of large amounts of data on farming practices, concerns about data privacy and security may arise.

4. **Dependence on Technology:** Relying heavily on technology and data-driven practices can leave farmers vulnerable to disruptions in connectivity or technology malfunctions.(Farmers have to regularly monitor and scout their fields) this new technology is not meant to erase human inputs in farms and production

5. Unequal Access: Not all farmers may have equal access to advanced precision agriculture technologies, potentially widening the digital divide in agriculture, as of now there are very few drone crop spraying service providers our resources are stretched and limited even with our attempts to educate farmers across the country.

Overall, while precision agriculture offers numerous benefits in terms of efficiency, environmental sustainability, and data-driven decision-making, it also presents challenges related to cost, complexity, and access to technology.

TOPGRAPHICAL FIELD SURVEYS

- ▸ Initial farm planning mistakes can be very costly causing loss of entire crops

- ▸ Drone surveys rapidly and accurately determine surface contours & elevations

- ▸ Enables farmers to efficiently plan farm and field layouts, irrigation installations & develop drainage systems

- ▸ Digital information & records
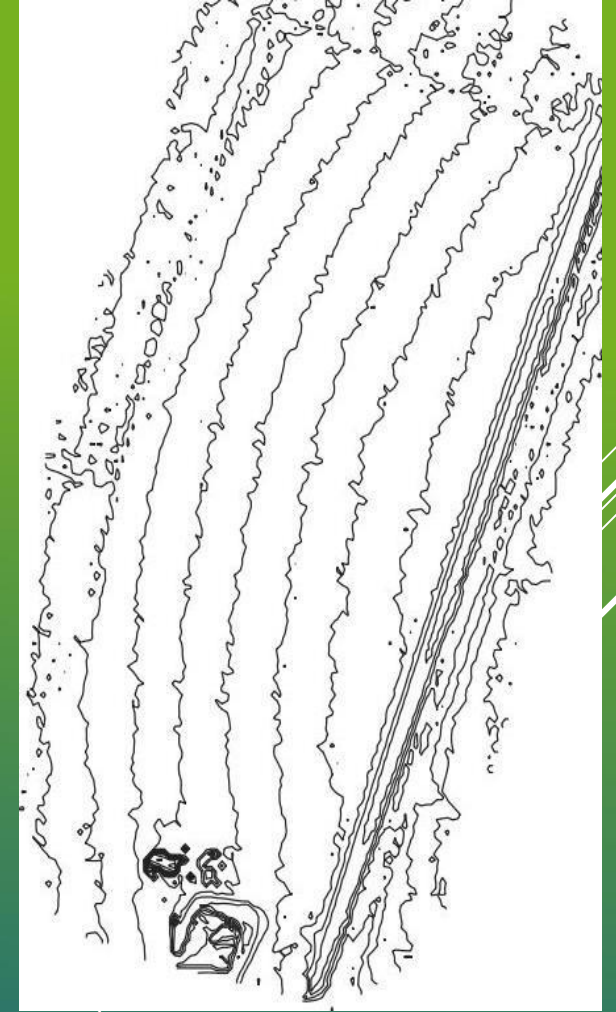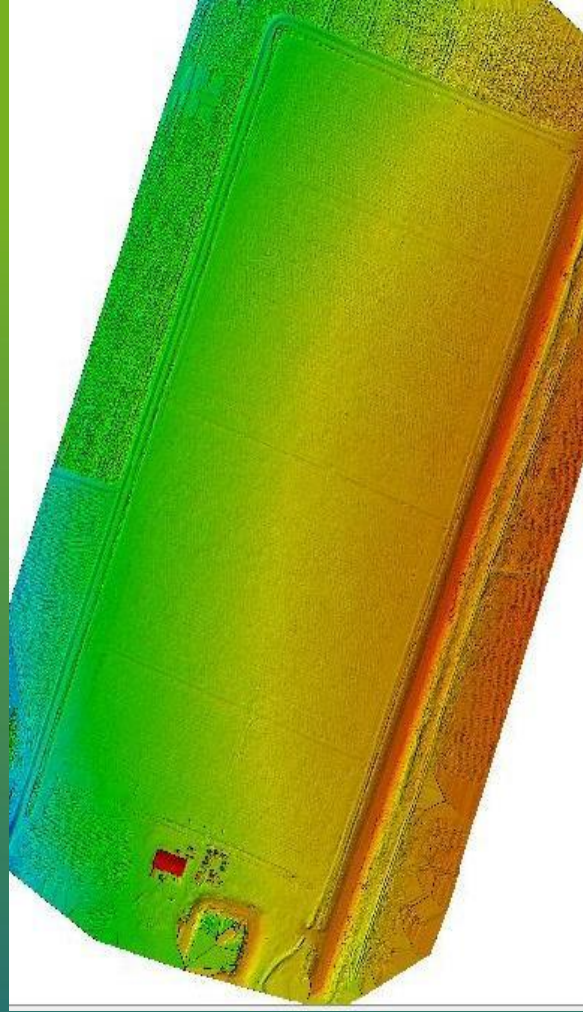
Drone survey and processing of digital surface models to map contours and identify drainage issues
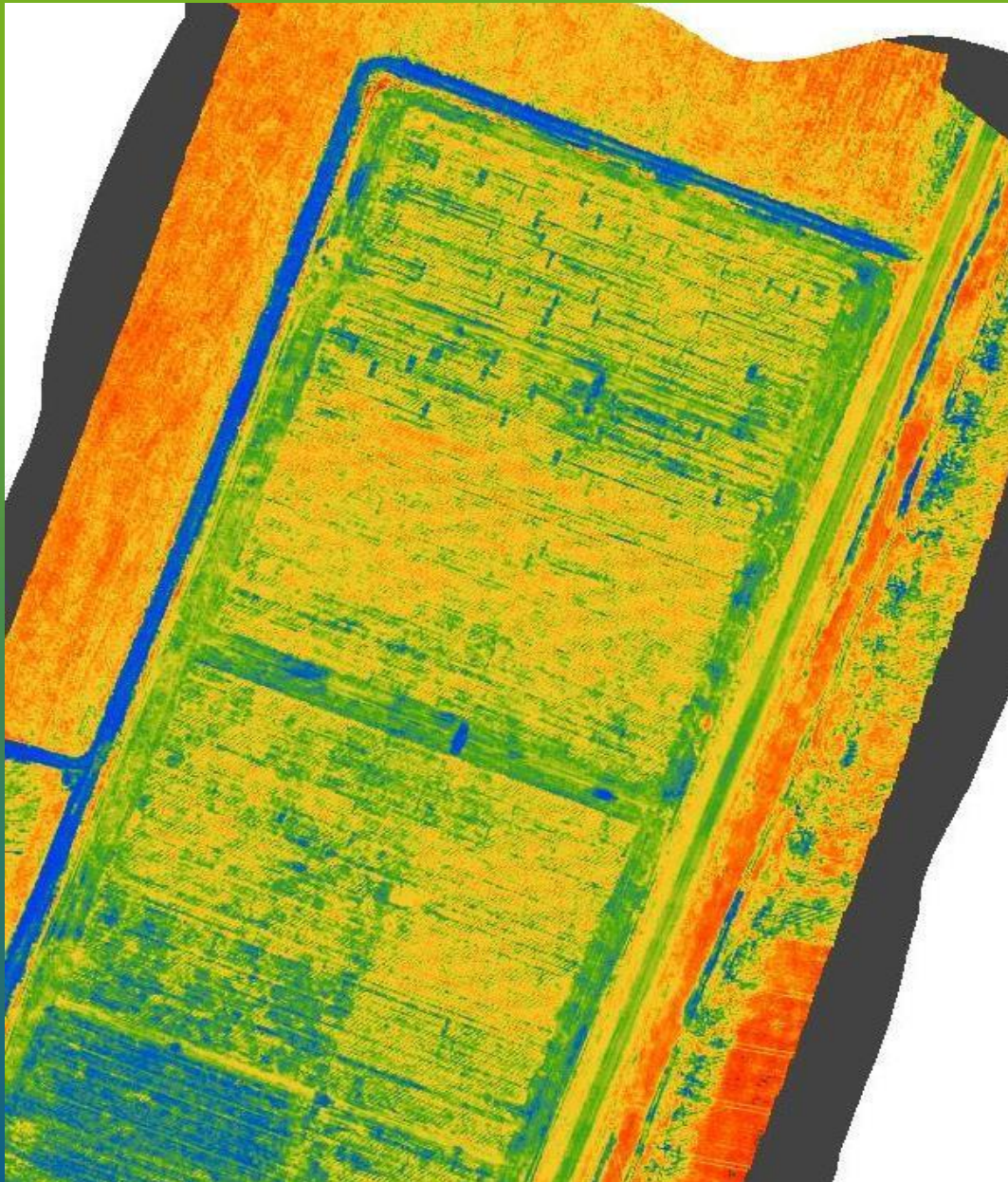
NDVI & THERMAL CROP ASSESSMENTS

NDVI is a Normalized Difference Vegetation Index. It is a measurement of crop health based on how the plant structures reflect light at certain wavelengths

Drones with specialized multi-spectrum cameras survey fields during the growing season. Thermal cameras are used to accurately asses heat stress in crops,

Data is then used to accurately monitor plant health, identify irrigation & drainage issues, assess fertilizer requirements, spray program effectiveness and provide early warning of disease outbreaks and pest infestations.

These surveys enable the adoption of Precision Agriculture and targeted irrigation, fertilizer, pesticide and herbicide applications saving farmers large amounts of money on inputs.

CROP PROTECTION

- PAA operates fully equipped mobile crop spraying units for contracted spraying services
- First drone company to be issued with a Commercial use of Agrochemicals Permit
- Trained and qualified pilots and ground crews
- Spray pesticides, herbicides and fungicides
- Granular application of fertilizers & seeds
- Mosquito, fly, Locusts, FAW, quelea & rodent control
- De-bushing & invasive species control
- Sustainable - Save 80-90% water over tractor spray applications
- Economical - Save 40-50% on chemical costs
- Efficient - save diesel, pumps, labour and time
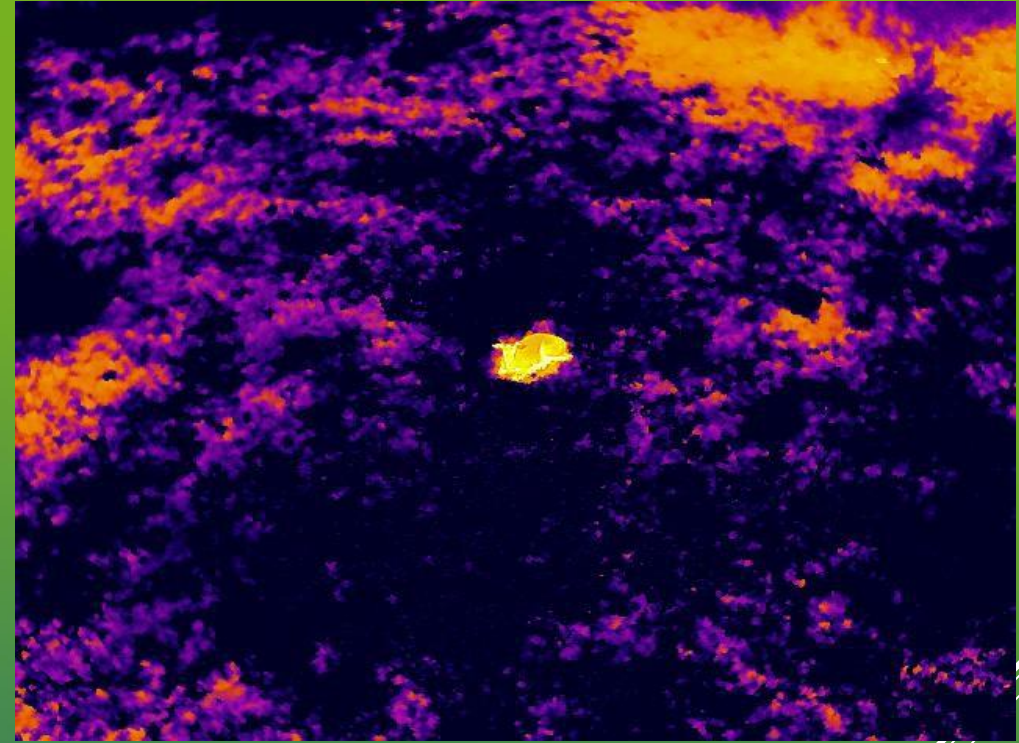- Units based in Tuli & Pandamatenga

OTHER AGRICULTURAL SERVICES

WILDLIFE & LIVESTOCK COUNTS

- Modified survey methodology
- High accuracy of counts
- Low cost compared to aircraft
- Digital records of all counts

ANTI POACHING

- Game farm patrols with high resolution thermal camera drones
- Deter poachers
- Locate, intercept, track and apprehend
- Reduce stock and wildlife losses

LAND SURVEYING & DIGITAL MAPPING

Traditional survey methods are expensive, time consuming and labour intensive with very limited resultant outputs.

Drones have completely revolutionized this sector enabling the survey of vast areas in a matter of minutes – our state of the art survey drones survey up to 300ha in just 20 minutes taking thousands of high resolution, geo referenced ortho photos.

These photos are processed on high performance computers using sophisticated photogrammetry software to output high resolution orthomosaics, google earth image overlays, digital surface and digital terrain models, contour lines, 2D and 3D models with an accuracy of sub 2cm.
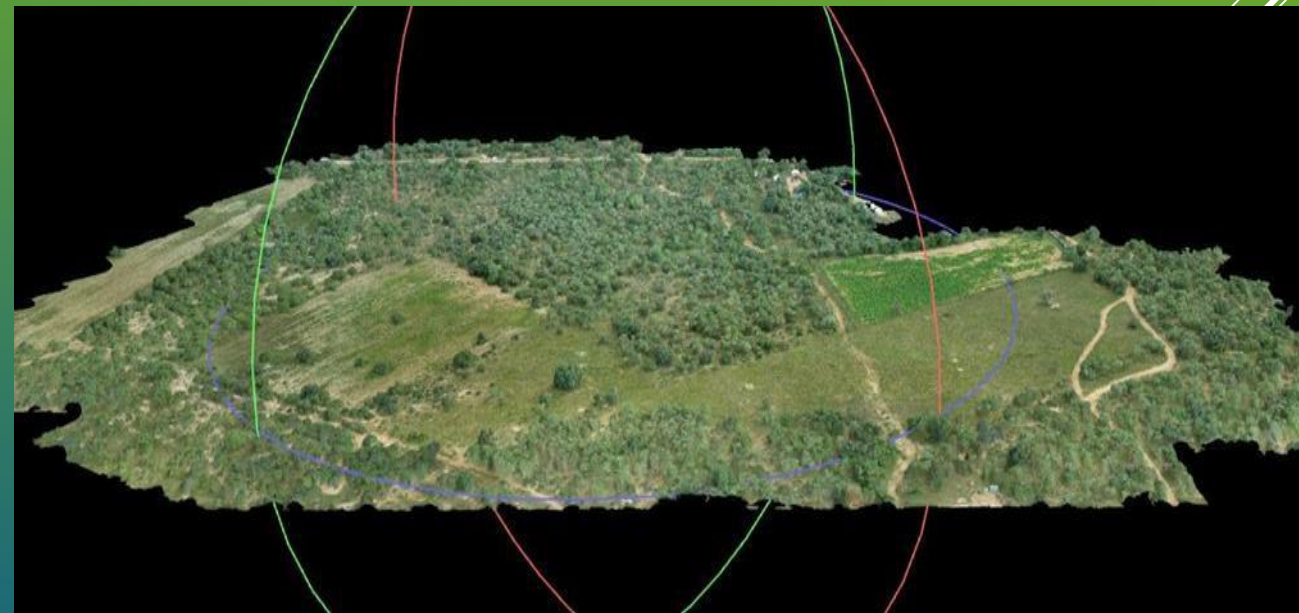
DRONE THERMAL INSPECTIONS

Adoption of thermal drone technology makes inspecting solar, rooftops, buildings, pipelines and electricity infrastructure safer, simpler, faster and more accurate than ever before.

Equipped with high resolution thermal cameras, drones scan large arrays of online solar panels in minutes accurately identifying defective cells and panels.

Thermal camera drones effortlessly scan hundreds of kilometres of water and gas pipeline, using heat signatures and geotagged thermal photos to accurately identify and evidence costly leaks, pipe damage and corrosion.

Similarly, thermal drones scan electricity infrastructure (powerlines, pylons, transformers) rapidly identifying hotspots and structural anomalies.

Drones are far more cost effective than traditional helicopter surveys and the amount of data captured makes them a far superior inspection tool.
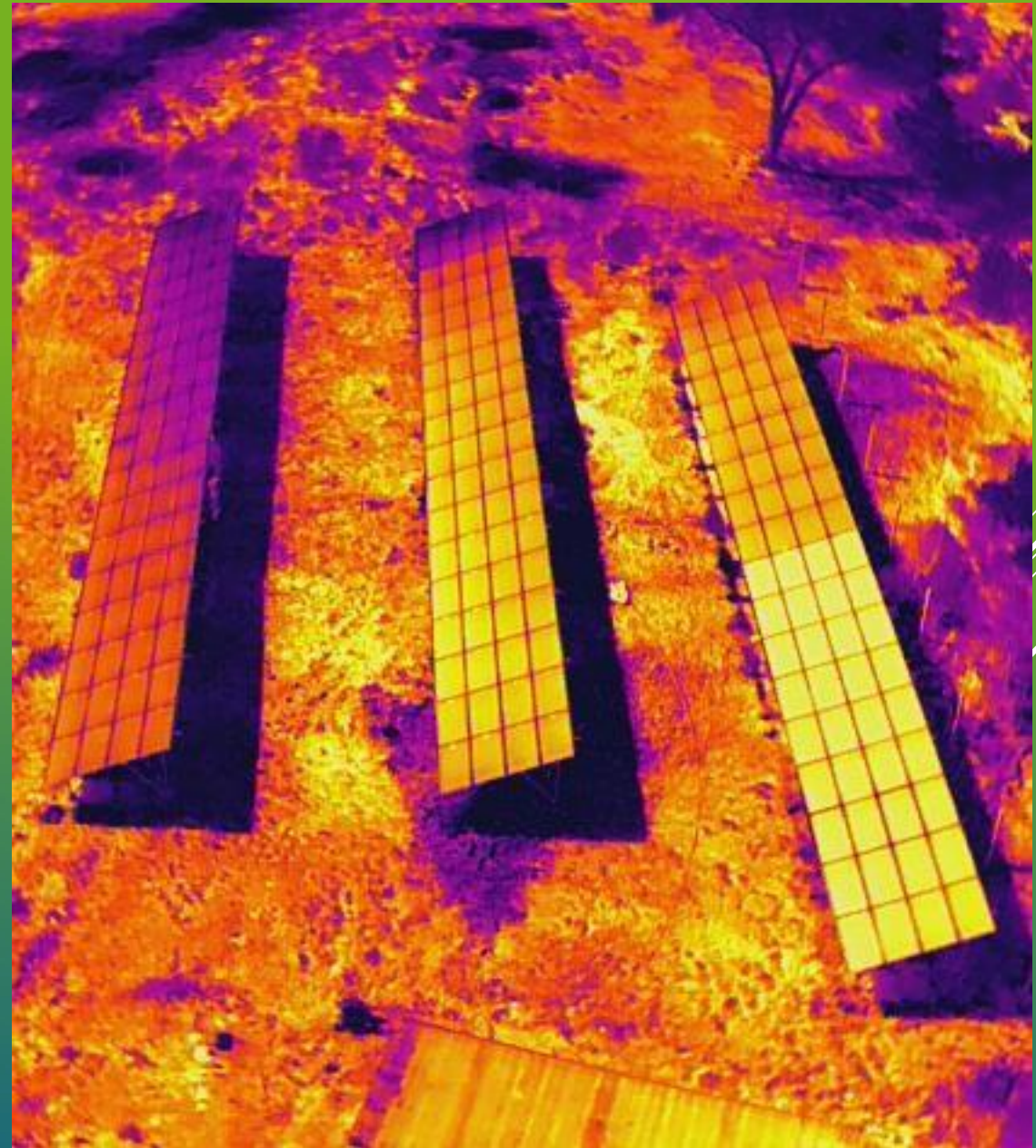
SOME OF OUR BIGGER CUSTOMERS INCLUDE:

- Pandamatenga Commercial Farmers Association
- JP Roos Vegetables
- Vegi Block
- Seleka Farms
- Bots Veg
- Botswana Ministry of Agriculture
- Hills Agrochemicals, Botswana
- PJL Rich Vegetables
- Eastfort Holdings
- Winfort Investments
- Classic Ventures
- Anbo Farms
- Chandia Farms
- Mabina Farming
- Jaro Farms
- 3M Ranching

FOUNDER & CEO

DWAYNE ELDERKIN

Originally from Eswatini, Dwayne has been in the aviation industry since 1998 holding various management roles including Flight Operations, Safety Manager, Quality Manager and Maintenance Manager for commercial air transport operations in Botswana, Papua New Guinea, Swaziland, Mozambique and South Africa.

Dwayne is also a licensed commercial aircraft pilot in Botswana and holds a commercial RPL (Drone) license from the RSA CAA.

THE SKY IS NOT THE LIMIT!

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