

**Hummingbird**  
Technologies

# HBT Drones in Agriculture



# OUR PROCESS

**1.**  
DATA SOURCED  
VIA REMOTE  
SENSING

**2.**  
HUMMINGBIRD  
PLATFORM

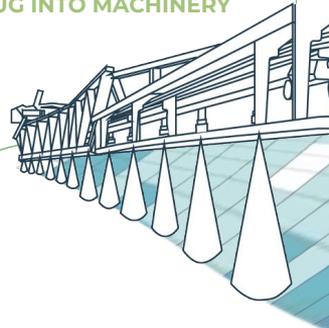
Cloud based artificial intelligence platform where multiple layers of data are ingested and analysed

**3.**  
Analysis and application maps are downloaded and available in multiple ways

**a** VIA AN API INTEGRATION STRAIGHT TO FARM MGMT SOFTWARE OR MACHINERY



**b** VIA SHAPE FILE AND USB TO PLUG INTO MACHINERY



**c** VIEWABLE ON DESKTOP, APP & MOBILE



- AI
- DEEP LEARNING
- SOIL DATA
- WEATHER DATA
- HISTORIC YIELD

“WE ARE DATA SOURCE AGNOSTIC”

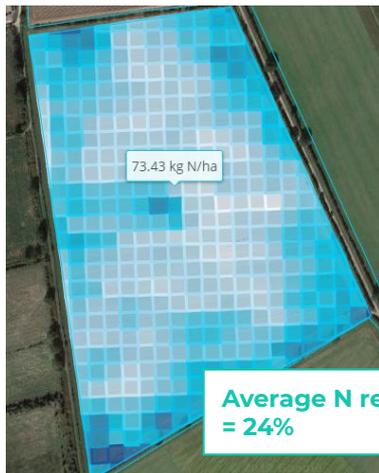
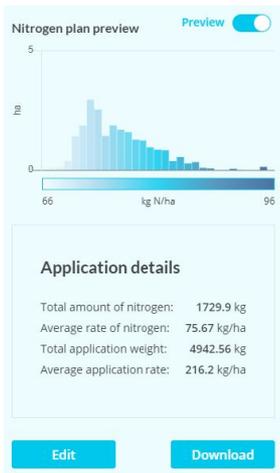
“AVERAGE TURNAROUND TIME IS <12 HOURS”

## Hummingbird's Precision Ag tools drive sustainable outcomes

Facilitate  
optimised  
inputs

Analytical products provide actionable insights to reduce agrochemical applications, thereby mitigating run-off, leaching and selection pressure without affecting yields.

### Variable Rate Nitrogen



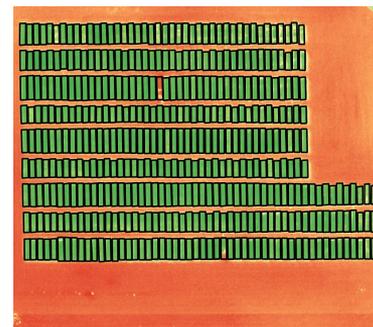
### Variable Rate Herbicide



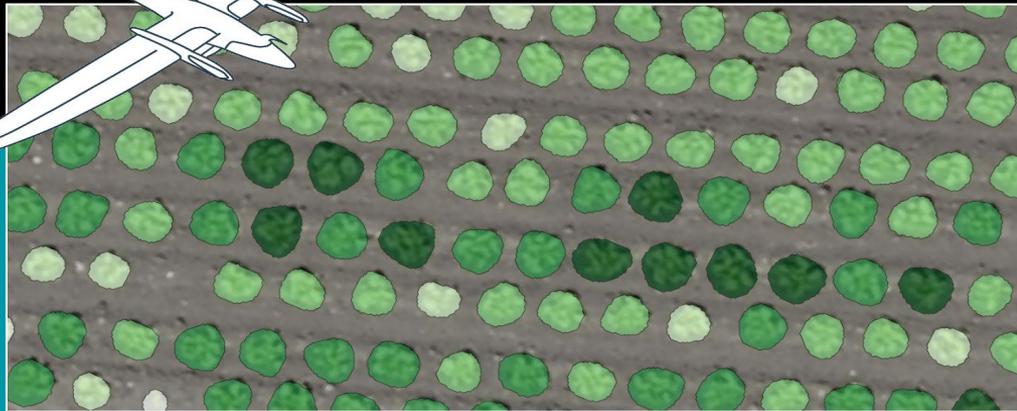
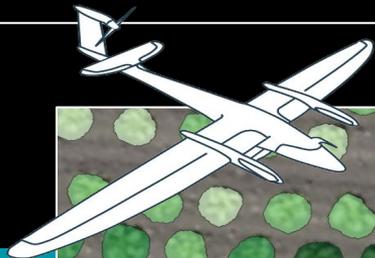
### Variable Rate PGR

Average PGR reduction = 33%

### TaaS



# HUMMINGBIRD AI SOLUTION



## Lettuce crop as seen from UAV

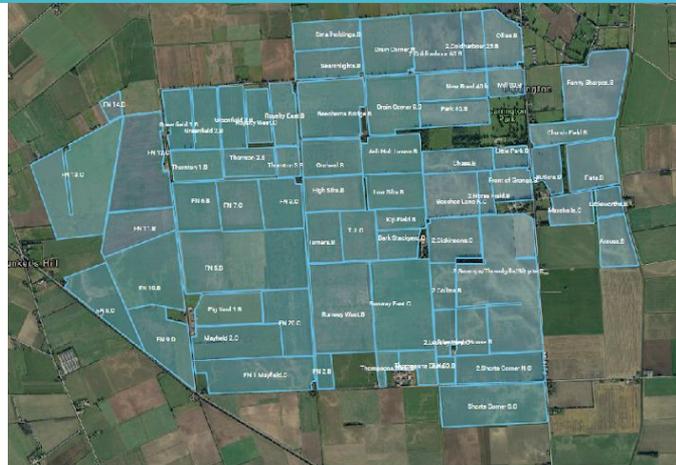


Our cutting-edge AI scans drone imagery for lettuces. It automatically draws the contours of each plant in the field to calculate their size accurately

# Quick and easy approval of BVLOS or autonomous operation

## Limitations of current VLOS regulation:

- The pilot is required to **set-up his operations multiple times in a day** instead of covering the whole area at once, thereby driving up the cost (between £1.5/ha and 15£/ha - max. 300 ha/day)
- Only large estates and agricultural cooperatives have the quantity and density to make current UAV operations worth the cost of the flights
- **Small farms are far too costly** to justify UAV flights (some over £5/ha)



## Regulations lags behind while....

- Current **drone technology is not a limiting factor**
- The performance of drone technology has far exceeded current regulatory limitations
- **Therefore regulatory changes required to reduce operational cost:**
  - **BVLOS**
  - **Flying multiple drones at the same time**
  - **Autonomous flying**
- Operations cost can be reduced by **ca. 80%**



# Expand regulation to be internationally competitive

## Regulations per country

Country	Regulations	Pilot Day Cost, incl Regs & Insurance
UK	Strict	750 GBP
Brazil	Relaxed	200 GBP
Australia	Medium	600 GBP
Ukraine	Relaxed	160 GBP
Russia	Medium	220 GBP

## Regulations drive pilot set-up cost (day rate)

### Example: Ukraine

- **Full BVLOS** on <7kg UAS
- No restriction to operate only one UAV at a time
- **500m height limit**
- Very light air traffic
- Currently **exactly the same equipment** in use as the UK
- **1500ha/day** compared to 300ha/day in the UK.

