



ABZ SMART FARM CONCEPT FOR AGRAVIS

Introduction:

Precision agriculture continues to evolve, and aerial drone technology presents new possibilities. This document outlines a concept for integrating ABZ Innovation's drone technology into Agravis's 250-hectare smart farm operation. Our drone solutions are designed to offer efficiency gains, potential cost savings, and support sustainable practices. This proposal details the required equipment, estimated investment strategy, operational workflow, potential return on investment (ROI) factors, and examples of real-world applications to consider when evaluating drone-based precision farming.

1. The ABZ Innovation Drone Fleet: Features and Capabilities

Our drones are designed and manufactured in the EU, CE certified, and built for agricultural applications. Key features include:

- **ABZ Sense:** A LiDAR system providing real-time terrain following and obstacle avoidance, facilitating operation in varied landscapes. It assists in optimizing flight paths for efficient application.
- **RTK Accuracy:** Both drone models integrate seamlessly with a single Emlid RTK base station, enabling centimeter-level positioning accuracy useful for precise spot spraying and pattern flying.
- **Advanced Planning:** Allows creation of specific flight paths using waypoints. Users can program instructions (altitude, speed, application rate) for targeted treatments, optimized orchard/vineyard navigation, compensation for uneven ground equipment coverage, and specialized greenhouse operations.
- **Prescription Map Compatibility:** Capable of executing spot applications for spraying and spreading based on pre-existing field data maps, allowing inputs to be applied according to defined zones.

Available Models (Relevant to this proposal):

- **L10 V2:**



- **Capacity:** 10L spray tank / Optional 20L spreader tank.
- **Performance:** Sprays up to 10 ha/hour; Spreads up to 440 kg/hour.
- **Suitable for:** Smaller plots, targeted applications, supplementary tasks, specialized biological treatments, vineyard spraying.
- **L30 V2:**
 - **Capacity:** 30L spray tank / Optional 50L spreader tank.
 - **Performance:** Sprays up to 21 ha/hour; Spreads up to 1100 kg/hour.
 - **Suitable for:** Large area coverage, primary spraying/spreading tasks on farms of this scale, intensive orchard spraying, broadacre crops like sunflowers.

2. Equipment Investment Strategy for a 250ha Operation

Understanding Operational Speeds:

It's important to note that while catalogue data indicates maximum performance (e.g., L30 spraying up to 21 ha/hour), real-world operational speeds are influenced by factors like field shape, obstacles, terrain complexity, and turnaround times for refilling/battery swaps. A more realistic expectation for the L30 in open fields might be closer to 15ha/hour, and in more complex environments like orchards or vineyards, speeds could be around 5 ha/hour. The L10's speed will also be proportionally affected.

Initial Fleet Recommendation (1x L30 V2 + 1x L10 V2):

Considering the scale of a 250-hectare farm and the need for timely operations based on realistic speeds, we recommend starting with a combined fleet:

- **1 x ABZ Innovation L30 V2:** For large area coverage and high-volume tasks.
- **1 x ABZ Innovation L10 V2:** For smaller plots, complex areas, spot spraying, biologicals, or parallel operations.

Initial Investment Breakdown (please note, that these are RRP's, a potential collaboration would automatically mean a different pricing):

- **L30 V2 Package:**
 - Drone: €12,900
 - 4x Batteries: €5,560 (4*€1390)
 - Charger: €1,190
 - *Subtotal: €19,650*
- **L10 V2 Package:**
 - Drone: €9,900
 - 4x Batteries: €3,000 (4 * €750)



- Charger: €627
- Subtotal: €13,527
- **Shared Equipment:**
 - 1 x Emlid RTKBase Station: €2,500 (Can serve multiple drones)
- **Optional Spreaders:**
 - 1 x 50L Spreader (for L30): €1,600
 - 1 x 20L Spreader (for L10): €1,600
 - 1 x Trichogramma spreader (for L10): €1,900

Estimated Initial Investment (1xL30 Pkg + 1xL10 Pkg + 1xRTK):
 $€19,650 + €13,527 + €2,500 = €35,677$ (Excluding optional spreaders)

Scaling Strategy:

As your drone operation grows or if maximum throughput is required during tight operational windows, this initial fleet can be scaled. A logical next step would be to double the initial fleet to:

- **2 x ABZ Innovation L30 V2**
- **2 x ABZ Innovation L10 V2**

This provides significant capacity, redundancy, and the ability to run multiple specialized tasks simultaneously.

Estimated Scaled Investment (2x L30 Pkg + 2x L10 Pkg + 1xRTK):
 $(2 * €19,650) + (2 * €13,527) + €2,500 = €39,300 + €27,054 + €2,500 = €68,854$ (Excluding spreaders. One RTKbase is sufficient)

Operational Costs:

With a mixed fleet, the average operational cost per hectare will depend on the usage ratio of L10 vs L30. However, based on estimates and field data:

- L10 V2: Approx. **€0.60/ha** (estimate)
- L30 V2: Approx. **€0.90/ha** (estimate)
 - *These costs remain significantly lower than traditional methods (€6-€15/ha based on field data).*

3. Drone-Based Smart Farming Workflow Outline

Integrating ABZdrones involves the following operational steps:

1. **Mission Planning:**
 - Define field boundaries within the planning software existing SHPfiles can be used.
 - Upload prescription maps (if used) spot spraying.



- Utilize the Advanced Planning tool to create flight paths, setting parameters like altitude, speed, and application rate. Define specific routes for orchards, vineyards, or areas needing focused attention.
- 2. **Preparation:**
 - Transport equipment (drone, batteries, liquids/granules) to the field.
 - Fill the drone's tank or spreader hopper.
 - Perform standard pre-flight checks.
- 3. **Execution:**
 - Launch the drone for autonomous mission execution based on the plan.
 - ABZSense provides terrain adaptation and obstacle avoidance during flight.
 - Monitor progress via the ground station controller.
 - Swap batteries as needed for continuous operation on large areas.
- 4. **Post-Flight:**
 - Review mission logs and application data for record-keeping.
 - Perform routine equipment cleaning and battery charging.

4. Potential Advantages & Return on Investment (ROI) Considerations

Adopting ABZ drone technology offers several potential benefits to evaluate:

- **Resource Management:**
 - **Water Use:** Potential for significant reduction (field data shows 85-95% reduction in water carrier volume compared to traditional methods).
 - **Chemical Use:** Potential for reduction for up to 50% through precise application, reduced overlap, and spot spraying capabilities. Potential for further reduction via biological controls.
- **Crop & Soil Health:**
 - **Reduced Soil Compaction:** Eliminates ground machine traffic, avoiding associated soil compaction and direct crop trampling damage.
- **Operational Aspects:**
 - **Coverage Rate:** High potential throughput, even with realistic speeds (e.g., ~5 ha/hr/drone in vineyards, ~15 ha/hr/drone in open fields), multiplied by the number of drones operating. Reduces time required for application tasks.
 - **Operating Cost:** Significantly lower per-hectare operational costs (field data shows 50% reduction in Tokaj, €2/ha vs €6/ha in Portugal vineyards, €1/ha vs €15/ha in sunflowers).
 - **Labor Efficiency:** Reduced work hours per hectare (e.g., 0.5 workhour/ha vs 3 workhour/ha in vineyards).
 - **Accessibility & Flexibility:** Allows operation in conditions or terrain



challenging for ground rigs. Facilitates targeted spot spraying and specialized applications.

- **Precision & Sustainability:**

- Centimeter-level accuracy allows for precise placement of inputs.
- Reduced chemical and water usage align with sustainable farming goals.
- Lower CO₂ emissions (field data indicates 82% less in Tokaj vineyards).
- Enable treatment of specific problem areas without blanket application across entire fields.

5. Real-World Applications & Success Stories

ABZ Innovation drones are delivering tangible results across various agricultural sectors:

- **Tokaj Vineyards, Hungary (2019):** Drone usage resulted in **50% lower operating costs**, **54% less pesticide** use, **90% less water** consumption, and **82% lower CO₂ emissions** compared to previous methods.
- **Vineyards, Portugal (L10 vs. Backpack Sprayer):**
 - *Water:* L10 used **60 l/ha** vs. 400 l/ha (85% reduction).
 - *Speed:* L10 covered **2 ha/hour** vs. 0.3 ha/hour.
 - *Cost:* L10 cost **€2/ha** vs. €6/ha.
 - *Labor:* L10 required **0.5 workhour/ha** vs. 3 workhour/ha.
- **Sunflower Fields, Hungary (L30 vs. Tractor):**
 - *Water:* L30 used **15 l/ha** vs. 300 l/ha (95% reduction).
 - *Speed:* L30 covered **25 ha/hour** (peak) vs. 15 ha/hour (tractor). Consider realistic average closer to 15 ha/hr for planning.
 - *Cost:* L30 cost **€1/ha** vs. €15/ha.
- **Greenhouse Shading:** Drones apply shading paint far more efficiently than traditional methods. Using an 4-6m working width and precise height control (2.5-4m), drones reduce application time from 6-8 hours/ha to approx. 2 hours/ha, while cutting water usage for the mixture by two-thirds (from 1000 l/ha to 333 l/ha), saving time, labor, and resources.
- **Citrus Plantation Spraying (L30):** By leveraging the L30's downward airflow and CDA system for optimal canopy penetration, on our test we have reduced water usage from 2000 l/ha to just 200 l/ha (a 90% saving) without compromising coverage. Automated flight planning and return-to-home features ensure efficient and consistent application over realistic rates (potentially closer to 3 ha/hr in dense canopies) per drone.
- **Seed & Fertilizer Distribution (S20/S50):** The L10 (20L, up to 440 kg/hr) and



L30 (50L, up to 1100 kg/hr) spreader systems enable precise, uniform distribution of granular materials (0.5-6mm) over a 4-9m width. This enhances variable rate application, reduces labor, accesses difficult terrain, minimizes soil compaction, and improves resource conservation compared to ground machinery.

- **Biological Pest Control - Trichogramma (L10):** For combating the European Corn Borer, specialized drones deploy Trichogramma wasp pellets with high precision. Covering up to 36 ha/hour, these drones offer a highly efficient, sustainable, and cost-effective alternative to chemical pesticides, reducing environmental impact and improving crop quality without fostering pest resistance.

Conclusion:

ABZ Innovation drones offer a technological approach to enhance the efficiency, precision, and sustainability of your 250-hectare smart farm. By starting with a balanced fleet (e.g., L30 + L10) tailored to realistic operational speeds and scaling as needed, you can effectively manage diverse tasks. As demonstrated by real-world applications, utilizing this technology presents clear potential to reduce input costs (water, chemicals, labor), avoid yield loss from soil compaction and trampling, optimize operational time, and implement advanced strategies like biological pest control and precise variable rate applications. Evaluating the estimated operational costs, resource savings potential, and enhanced capabilities can help determine the return on investment for your specific operation. Adopting drone technology could be a valuable step in advancing your farm's practices.

We are available to discuss this concept in more detail and explore how a drone solution could be configured for your farm's specific needs.