



# Multi-sensor VTOL UAV



Agri-tech has undergone tremendous improvements with the introduction of remote sensing technologies, making many agricultural properties that were difficult to achieve before now accessible.

Multi-Spectral imaging has been widely used on satellites (e.g. Landsat) for earth observation science at a global scale. In the agricultural domain, UAVs as a platform have played a major role utilising various payload sensors including multi-spectral imaging.

The advantage of multi-spectral imaging is that it extends human sight sensitivity beyond the visible spectrum. Some wavelengths that are widely recognised for applications, such as the normalised difference vegetative index (NDVI), can be deployed into multi-spectral imaging. Nonetheless, it has been proved to be very useful in many other fields, greatly empowering the advancement of agriculture. The adoption of UAVs has made it possible to achieve large-scale mapping and thus better agricultural management.

## UAV System (Quantum Systems Trinity F90+):

1. Flight time can reach to 90 minutes, making the system large area coverage (up to 700 ha) possible for mapping and surveying applications.
2. Maximum Take-Off Weight = 5KG
3. Robust operation in field (Anti-Collision Lights, wind tolerance up to 12m/s when cruising, dynamic operating temperature range)
4. PPK (Post-processing Kinematics) facility together with iBase ground reference station is able to reduce geotagging errors down to 2-5cm

## Sensing System:

1. Interchangeable payloads to cover various mapping types (visible map, NDVI map, Thermal map, point cloud)
2. Multi-Spectral sensor (MicaSense Altum, RGB NIR RE/LWIR: thermal infrared 8-14um)
3. High-Resolution RGB sensor (Sony RX1 RII, 42MP)

This UAV and sensing payload system can be used for a variety of fruit orchard use-cases which include:

- Estimation of leaf area index
- Estimation of canopy volume
- Estimation of water stress
- Fruit biomass estimation
- Temperature variation across the orchard
- Temperature variation of specific plants over time
- Fruit count estimation

It can also be used in other agricultural areas which include:

- Pest infestation detection
- Quantity moisture levels
- Analyse wildlife damage
- Vegetation index creation like NDVI
- Crop counting
- Create 3D photogrammetry maps

The Multi-spectral VTOL UAV also has a potential use as ground truth technology for other technologies and/or systems.

For information on renting out our technical assets please contact [team@agri-epicentre.com](mailto:team@agri-epicentre.com).