DEVELOPMENT OF RUMPIN AS A DRONE PRECISION FARMING LABORATORY

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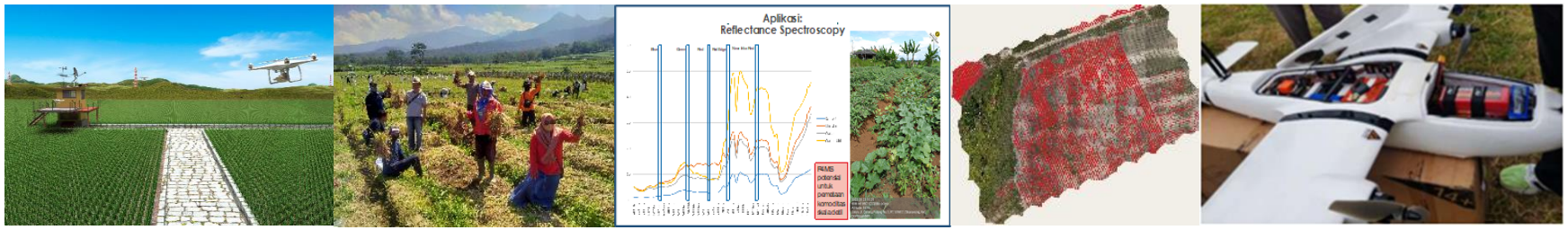
active in drone application group research, to implementation drone technology for precision farming in many areas

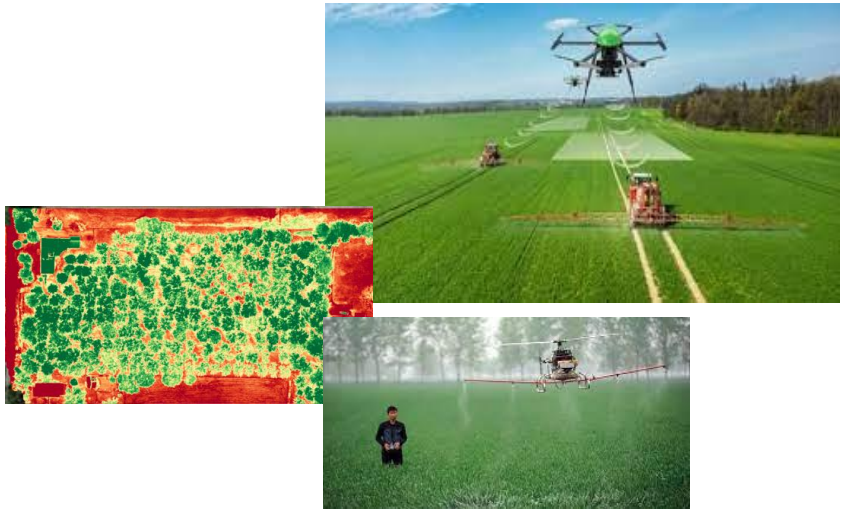


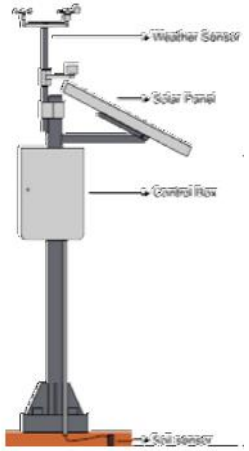
BACKGROUND AND MOTIVATION

Climate Change and effect for farmers

Socialization, education of this phenomena must be provide by government

Technology should become solution





How e-technology can be part of agricultural solutions ?

How to choose the right technology ?

How to start The right steps in its implementation ?

SOLUTION AND CHALENGES

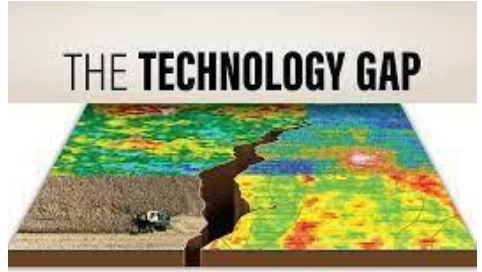
PART OF E-TECHNOLOGY/AVIATION TECHNOLOGY SOLUTION FOR AGRICULTURE

Drone monitoring

Ai and Information system

Drone spraying

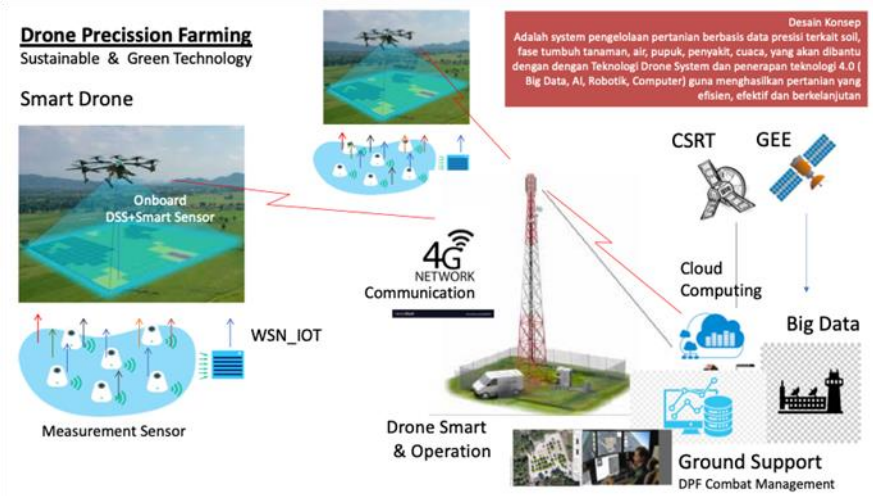
Facts about the condition of farmers in Indonesia (the majority are old, the area is minimalist, very traditional, etc.)→ gap technology and social/economy aspect



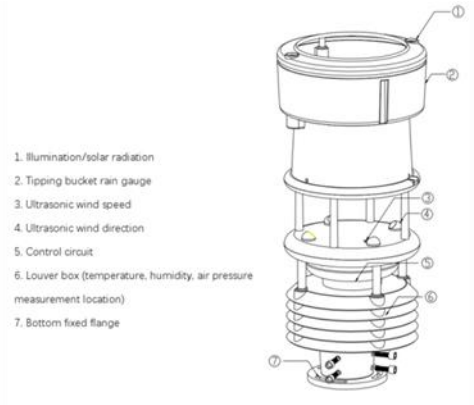
SOCIAL AND ECONOMY ASPECT

IMPLEMENTATION EXPERIENCE

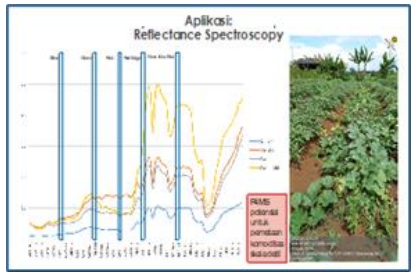
CONCEPUAL DESIGN OF DRONE INTEGRATED SYSTEM FOR AGRICULTURE



DESIGN A DIGITAL CLIMATE MEASUREMENT SYSTEM



Study soil nutrient condition using multispectral camera for potato plants



Study on the development of a prediction system and introduction of drone-based production anomaly, for shallot farming in Malang district, East Java

Drone-based integrated system proposal for food estate in humbang hasundutan, North Sumatra

Study related to the use of drones on the imposition of nutrition and disease maps using drones on horticultural crops, in Brebes district, Central Java

" The application of E-technology (drones, AI, information systems, etc.) cannot be automatically applied, the problem of knowledge related to technology and agricultural process habits is one of the problems in implementation that requires sustainability "

POTENTIAL LAND USE OF RUMPIN AS DEMPLOT AND PROTOTYPING OF PRECISION FARMING DRONES

Precision farming may seem unfamiliar or even expensive to some farmers or farmer groups. That's why it's important to provide a concrete example of what precision farming actually entails.

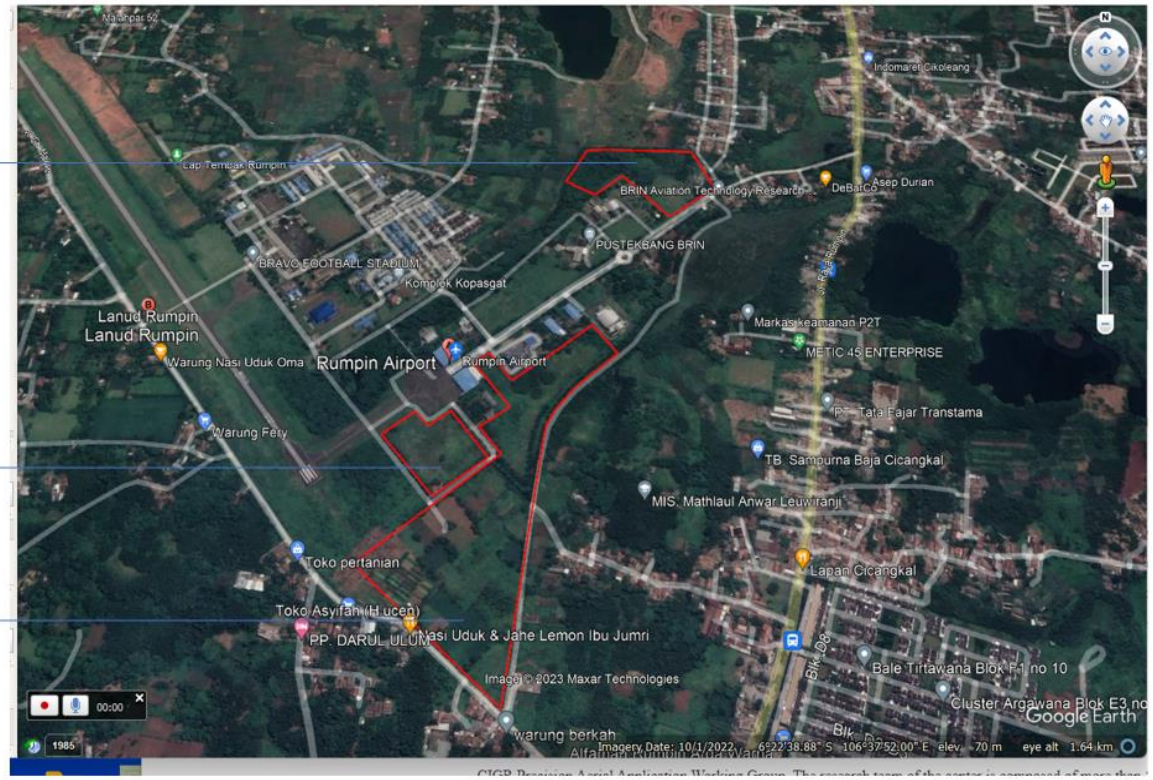
The gap in technology that currently exists can be bridged through technology transfer initiatives, such as pilot projects.

To achieve this, we propose Rumpin as a potential location to showcase model examples for the implementation of precision farming to farmers...

5,4 Ha

3,4 Ha

10.8 Ha



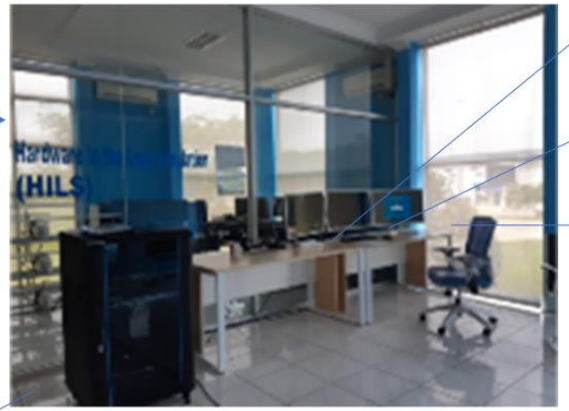
Is the area around the aviation technology research office that has enough land to be used as a research and experiment land Like the application of technology 4.0 for agriculture.
We can explore, test and design optimal precision farming drone station platforms before being delivered to farmers/farmer groups/local governments or agricultural centers

Drone Precision Farming Station

- **The system is dedicated and designed to be operated only by institutions or organizations, such as districts, farmers groups, etc., with its core concept revolving around the implementation of Climate-Smart Agriculture (CSA) as a comprehensive paradigm.**

Parameters	Measure range
Wind speed	0-60m/s
Wind direction	0-360°
Air temperature	-40-60°C
Air relative humidity	0-100%RH
Atmospheric pressure	300-1100hpa
Solar Radiation	0-2000W/M2
Rainfall	0-200mm/h

LoRaWAN



Desktop for Data Storage

Desktop for data processing (ML, AI, etc)

Desktop Rempte Operation for drone

VTOL Spesification

- Wingspan 2430 mm
- Fuselage length 1450 mm
- Fuselage height 180 mm
- 1x Cruise 5015 kv210 Disc Motor
- 1x 12s 60A ESC
- 4x VTOL5015 kv170 Disc Motor
- 4x 12S 40A Brushless ESC
- 1x Wire Package
- 2x VTOL Propeller CW&CCW 2070
- 1x Cruise Propeller APC2013
- 1x 12S 10A 5V BEC
- 5x Fixed-wing Servo 3054
- Coverage up to 1000 Ha
- It is preferable to have the ability to load a multispectral camera, RGB camera, or Lidar, if possible.

Server Specification

Processor	Xeon E-2226G
Memory	16 GB
Hard disk capacity	4TB + 1.2TB
Operating System	Ubuntu
Database dan Application	LoRaWAN
Display	3x LED Monitor 31.5" Curved
KVM	KVM console with 17inchi LCD
UPS	APC UPS SMC1500I-2UC
Router	Mikrotik CRS326-24G-2S+RM

The 1st prototype now is has intalled ata Rumpin Area

Sprayer Drone 15 lt

- Tank Capacity : 10 liters
- Number of Rotors : 4
- Body : Design Foldable
- Total Drone Weight without payload : 12 Kg
- Total Drone weight with Payload : 24.5 kg
- Transmission Frequency : 2.4 GHz
- Transmission Distance : 10 km
- GPS System : Yes

Drones, IOT, External data

Server for data Collection

Data Processing, Data Assestment, and drone remote operation

This mobile station can be transported to various agricultural centers or groups of farmers with the aim of educating them on precision farming using the latest technology. It has the capacity to cover up to 1000 hectares or one entire village. These areas can be connected to provide updated data on yield, potential problems and predictions to support the government in managing the productivity of food on a national scale, using data precision based on drone-generated information.

CONCLUSION

- One strategy that matches the conditions of farmers, is to provide examples/proototyping of the application of e-technology for agriculture in real operation
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- The prototype is the Agricultural monitoring stations and data processing to support agricultural areas in the context of identifying plant growth precisely
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- With this pilot project, it is expected to overcome the technology gap and facilitate the use of e-technology for agriculture

- With temporal and spatial image capability, Drone become significant tools for precision farming