AIRBORNE IOT NETWORK (AIN) FOR SMART AGRICULTURE AND ENVIRONMENT PROTECTION

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Motivations

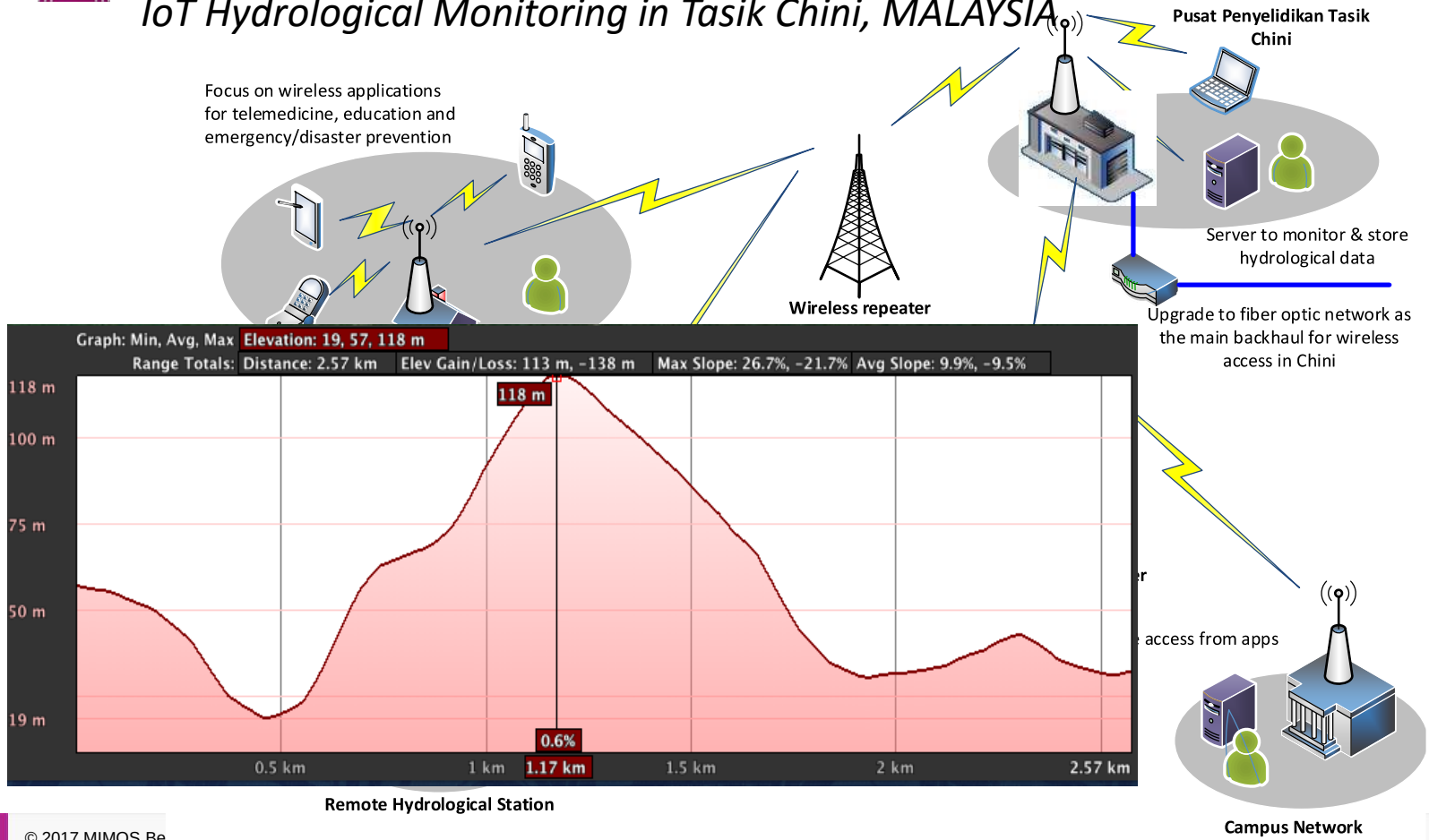
- The agriculture industry is looking for new ways to monitor and manage the fields, and optimize resources (money, time and fertilizers).
- Connected sensors are the ideal solution for this industry.
- Smart agriculture also includes all sorts of solutions and devices that can help better manage the environment or that can be used by farmers.

The greatest challenges in Smart Agriculture sector
The main barriers of the sector that IoT is breaking down

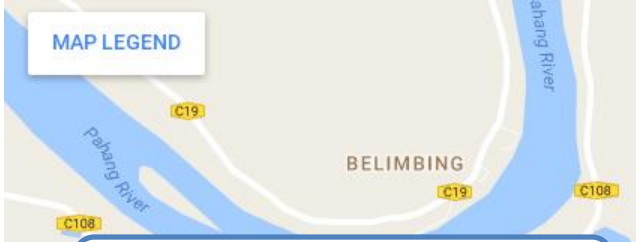
- Farmers with poor training in the technological area and also innovative solutions
- Fields located in remote or isolated areas
- Low budgets to carry out projects due to the dependence on harvest
- Most of the companies of Agriculture sector are very small with just a few employees
- Global climate change: is vital to control weather and ambient conditions
- Pests can ruin the entire harvest

Current Challenges on the Existing Work

IoT Hydrological Monitoring in Tasik Chini, MALAYSIA

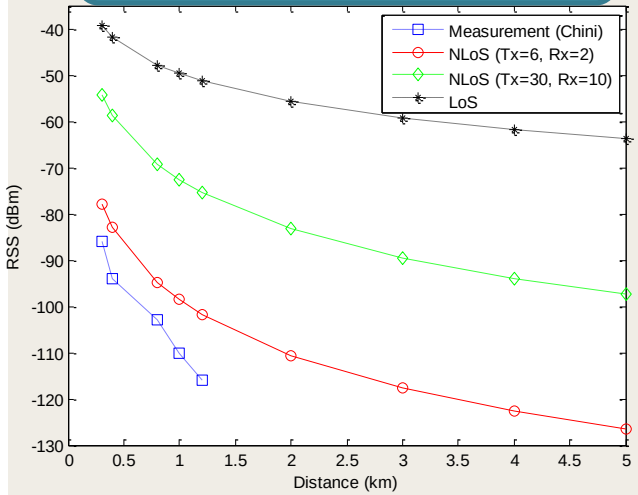


Hydrological Monitoring in Tasik Chini, MALAYSIA

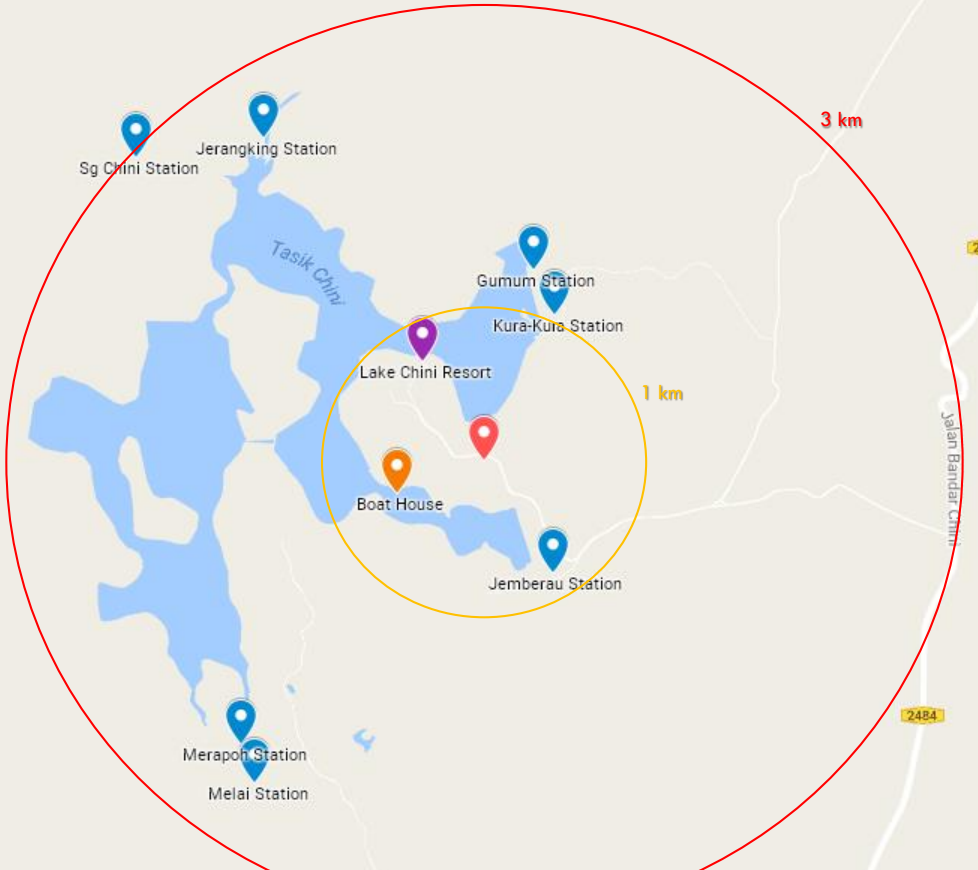


Device Battery Constraints

Propagation Issues



Received power at seven different HMSs based on simulation and measurement



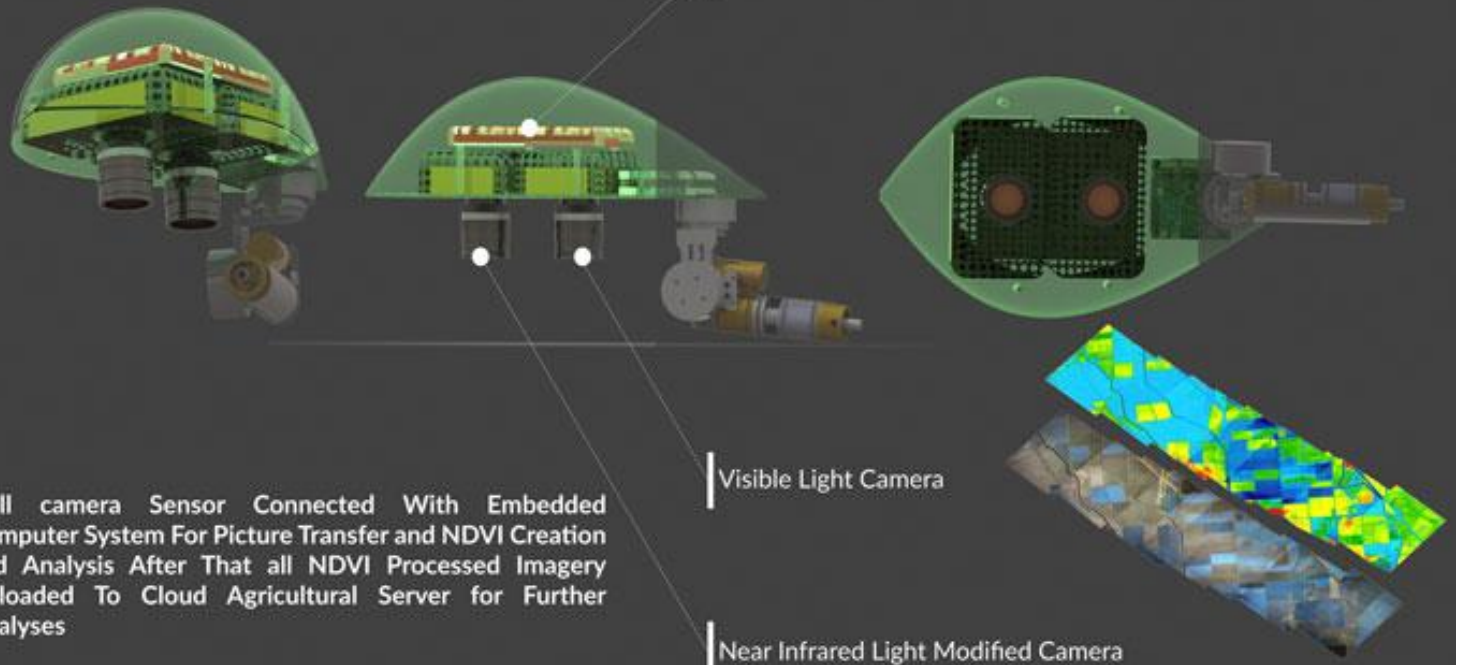
Airborne IoT Network (AIN)

Drones – Unmanned Aerial Vehicles

- A remotely controlled flying robots
- Drones fly autonomously through software-controlled flight plans that are embedded in their systems, working in conjunction with GPS
- Seamless Connectivity
  – Total flexibility, endless options
- Easy and fast deployments

Section I:
SAP Airborne (Agricultural Remote Sensing Terminal)

(SAP)Smart Agriculture Payload Dual Camera NDVI Rig



Dull camera Sensor Connected With Embedded Computer System For Picture Transfer and NDVI Creation and Analysis After That all NDVI Processed Imagery Uploaded To Cloud Agricultural Server for Further Analyses

Project Proposal

- **Title:** Airborne IoT Network (AIN) for Smart Agriculture and Environment P otection
- **Topic selection:** Smart Agriculture & Smart Environment Protection

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National R&D Centre in ICT

Proposed Project

Airborne IoT Platform

- Utilizes unmanned aerial vehicle/drones

Low Power Wireless Access Platform

- To establish a reliable data transmission to the cloud with better coverage

Data Analytic Platform

- Realtime/offline data processing and decision making

Palm Oil Farm Agriculture

Smart Inventory Management

Smart Growth/Health Assessment

Expected Project Outcomes

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To establish an airborne platform for smart agriculture and environment protection

- To perform RF measurement and link reliability test at the considered high altitude locations to validate the feasibility of high altitude P2P communications
- To perform link budget analysis and RF coverage prediction for point-to-point (P2P) communications from the monitoring centre to the sensors based on the sub-GHz wireless technologies
- Emerging narrowband-IoT wireless technologies, such as **WiSUN, LTE-M** and others will be considered in this study
- To identify suitable locations to establish P2P communications between the high altitude platform and the sensors
- To develop the narrowband IoT gateway prototype on the high altitude platform and incorporate the GPS sensor to perform tethering and perform schedule data collection
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Expected Project Outcomes

To develop a dashboard with data analytics

2

- To compile the long term agriculture and environmental data
- To identify important parameters and apply statistical method and advanced algorithms for the data analytics
- To develop the user interface for the online dashboard meter
- To showcase and demonstrate the IoJ framework to the public and stakeholders and identify potential commercialization and sustainability of the AIN system
- To test the functionality and reliability of the Internet of Jungle (IoJ) framework
- To prepare the network infrastructure, such as cloud storage and the middleware to allow real-time sensor data transfer to the online dashboard monitor
- To integrate the sensors, wireless networks and data analytics for a novel Internet of Jungle (IoJ) ecosystem

Conclusions

In this project, Airborne IoT Network (AIN)

- It is not (only) about drone, it is about the capability to create end to end solutions combining drones, sensors, and algorithms/APIS
- Consists of
  - an airborne platform,
  - narrowband IoT wireless network, sensors technologies and
  - big data analytic enablement platform
- Offers realtime data analytics
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THANK YOU

Any Questions?

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