

Field Testing in Semarang: “Smart Aquaculture Quality Monitoring System with Internet of Things (SAM-IoT)”

Aquaculture in Central Java

Kabupaten/Kota <i>Regency/Municipality</i>		Budidaya Laut / <i>Marine Culture</i>	Tambak <i>Brackish / Water Pond</i>	Kolam Fresh <i>/ Water Pond</i>	Keramba / <i>Cage</i>	Jaring Apung <i>/ Floating Cage Net</i>	Sawah / <i>Paddy field</i>	Jumlah / <i>Total</i>
Kabupaten/Regency								
1.	Cilacap	-	1 622.70		507.38	6.15	52.00	
2.	Banyumas	-	-	9 966.42	-	-	1.03	9 967.45
3.	Purbalingga	-	-	5 001.57	-	-	-	5 001.57
4.	Banjarnegara	-	-	25 329.63	-	251.33	36.43	25 617.39
5.	Kebumen	-	1 462.59	747.73	-	10.85	-	2 221.17
6.	Purworejo	-	2 928.06	954.85	-	-	-	3 882.91
7.	Wonosobo	-		4 016.60	18.50	5 067.19		9 102.29
8.	Magelang	-		14 243.29	-	-	3 554.36	17 797.65
9.	Boyolali	-		25 277.81	-	7 748.97	-	33 026.78
10.	Klaten	-		27 608.76	-	689.54	14.04	28 312.34
11.	Sukoharjo	-		10 735.48	-	2 234.80	-	12 970.28
12.	Wonogiri	-		712.52	-	6 343.26	-	7 055.78
13.	Karanganyar	-		1 615.07	-	1.80	-	1 616.87
14.	Sragen	-		5 347.93	-	26 920.52	-	32 268.45
15.	Grobogan	-		1 987.95	-	45.86	-	2 033.81
16.	Blora	-		580.35	-	-	-	580.35
17.	Rembang	-	5 511.00	1 682.00	-	-	-	7 193.00
18.	Pati	-	31 755.94	10 257.69	-	-	23.24	42 036.87

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Kabupaten/Kota <i>Regency/Municipality</i>		Budidaya Laut / <i>Marine Culture</i>	Tambak Brackish / <i>Water Pond</i>	Kolam Fresh / <i>Water Pond</i>	Keramba / <i>Cage</i>	Jaring Apung / <i>Floating Cage Net</i>	Sawah / <i>Paddy field</i>	Jumlah / <i>Total</i>
19.	Kudus	-	-	2 095.19	-	-	12.32	2 107.51
20.	Jepara	22 784.79	15 897.89	795.38	-	23.37	10.89	39 512.32
21.	Demak	-	11 089.25	22 157.72	-	-	-	33 246.97
22.	Semarang	-	-	3 207.91	475.43	636.67	-	4 320.01
23.	Temanggung	-	-	4 443.95	-	5.62	2 962.81	7 412.38
24.	Kendal	-	21 189.71	1 932.13	-	-	-	23 121.84
25.	Batang	-	1 657.07	1 329.95	-	-	-	2 987.02
26.	Pekalongan	-	5 465.26	1 004.04	-	-	-	6 469.30
27.	Pemalang	-	12 862.11	953.50	-	-	-	13 815.61
28.	Tegal	-	706.31	1 167.73	-	-	-	1 874.04
29.	Brebes	-	77 200.65	3 130.96	-	-	-	80 331.61
Kota/Municipality								
1.	Magelang	-	-	165.37	-	-	-	165.37
2.	Surakarta	-	-	39.37	-	-	-	39.37
3.	Salatiga	-	-	677.10	-	-	-	677.10
4.	Semarang	185.00	2 516.85	624.69	-	-	-	3 326.54
5.	Pekalongan	-	1 392.00	110.00	-	-	-	1 502.00
6.	Tegal	-	721.02	32.07	-	-	-	753.09
Jawa Tengah		22 969.79	193 978.41	189 932.71	1 001.31	49 985.93	6 667.12	462 347.04

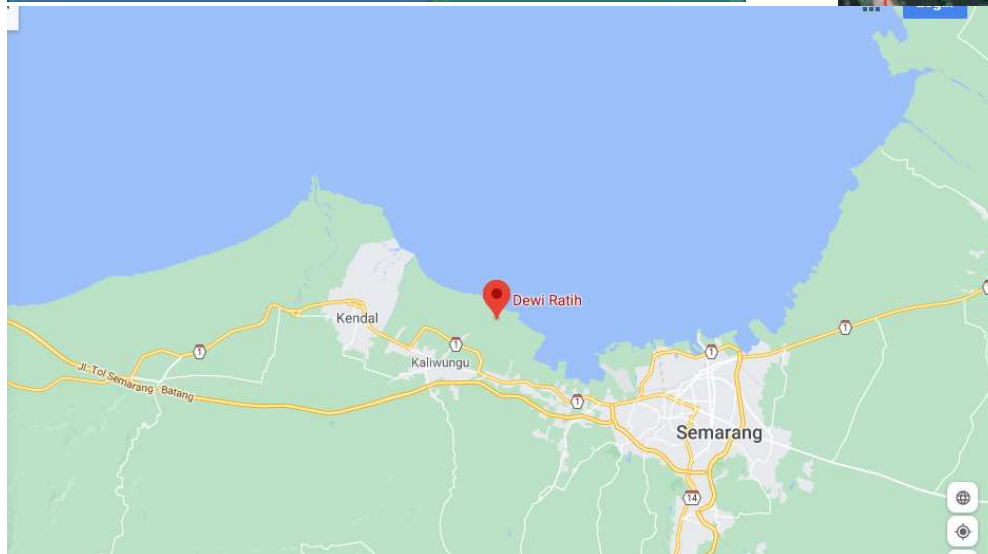
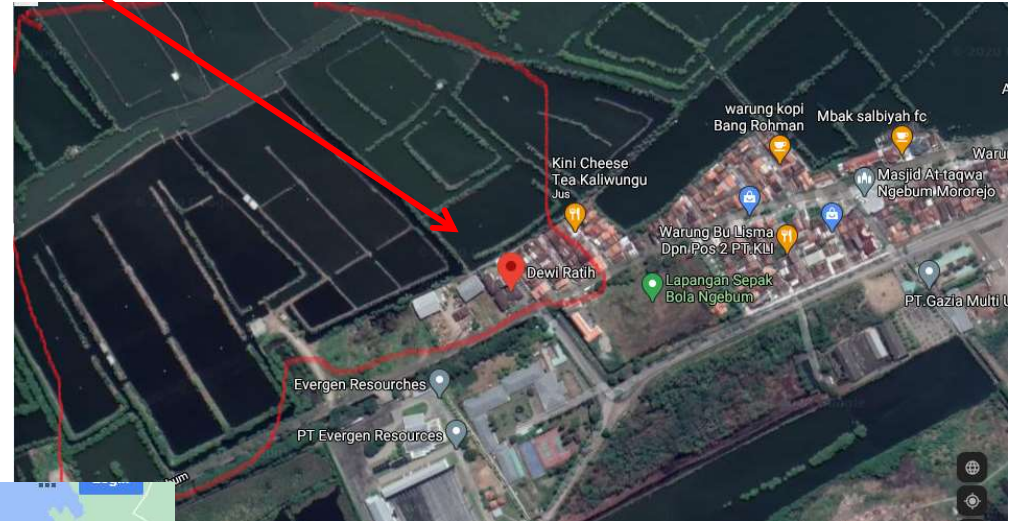
Sumber: Dinas Perikanan dan Kelautan Provinsi Jawa Tengah
Source: Fishery and Maritime Service of Jawa Tengah Province

Objective of Testing

- Verifying the functionality of the system
- Validating IoT components (especially sensors) in Milkfish pond environmental and operational conditions.

Site Testing

- *Milkfish* Fish Pond in Kaliwungu, Kendal, Central Java



Field Testing Activities

- *Sensor Node Equipment Setup*



Field Testing Activities

- *Sensor Node 1001 Equipment Setup*



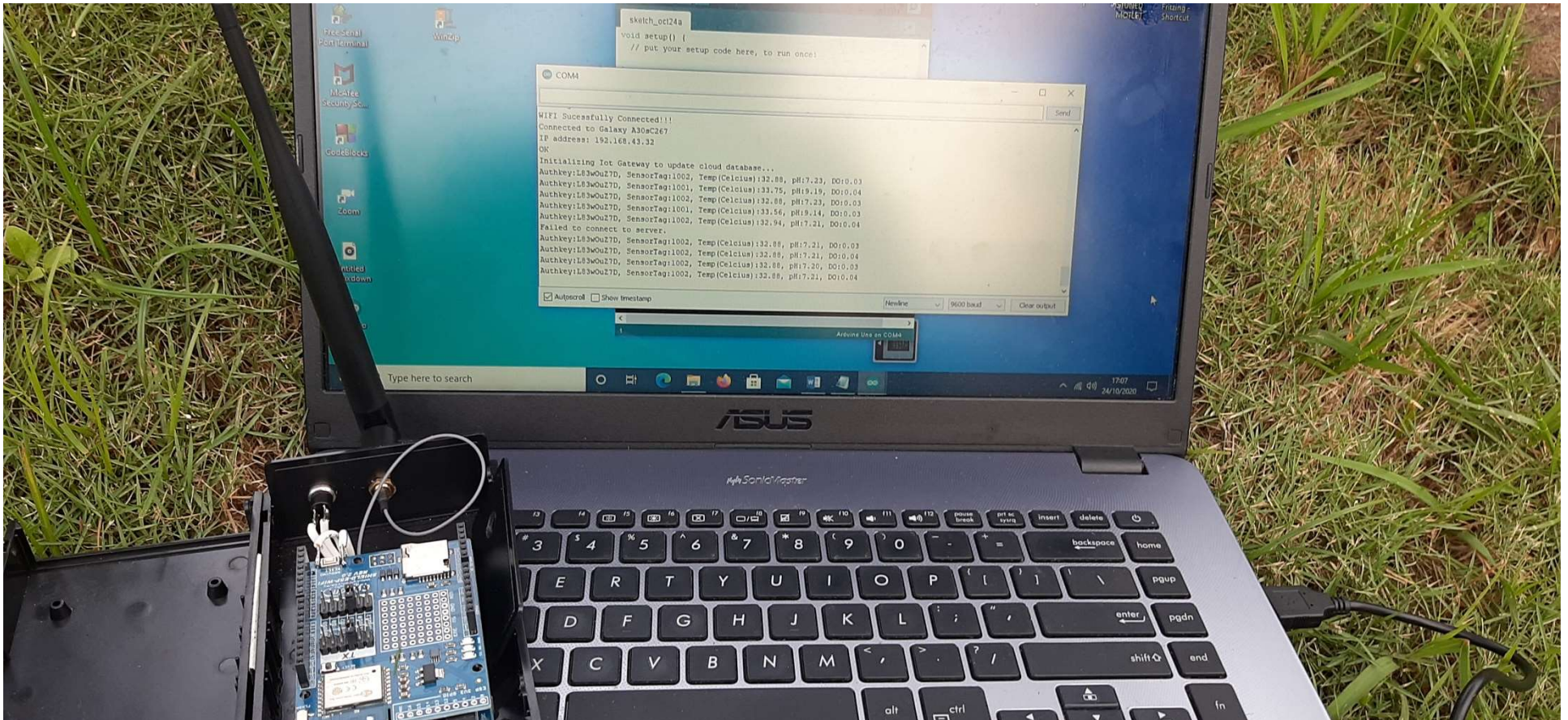
Field Testing Activities

- *Sensor Node 1002 Equipment Setup*



Field Testing Activities

- *Receiver Setup*



Results

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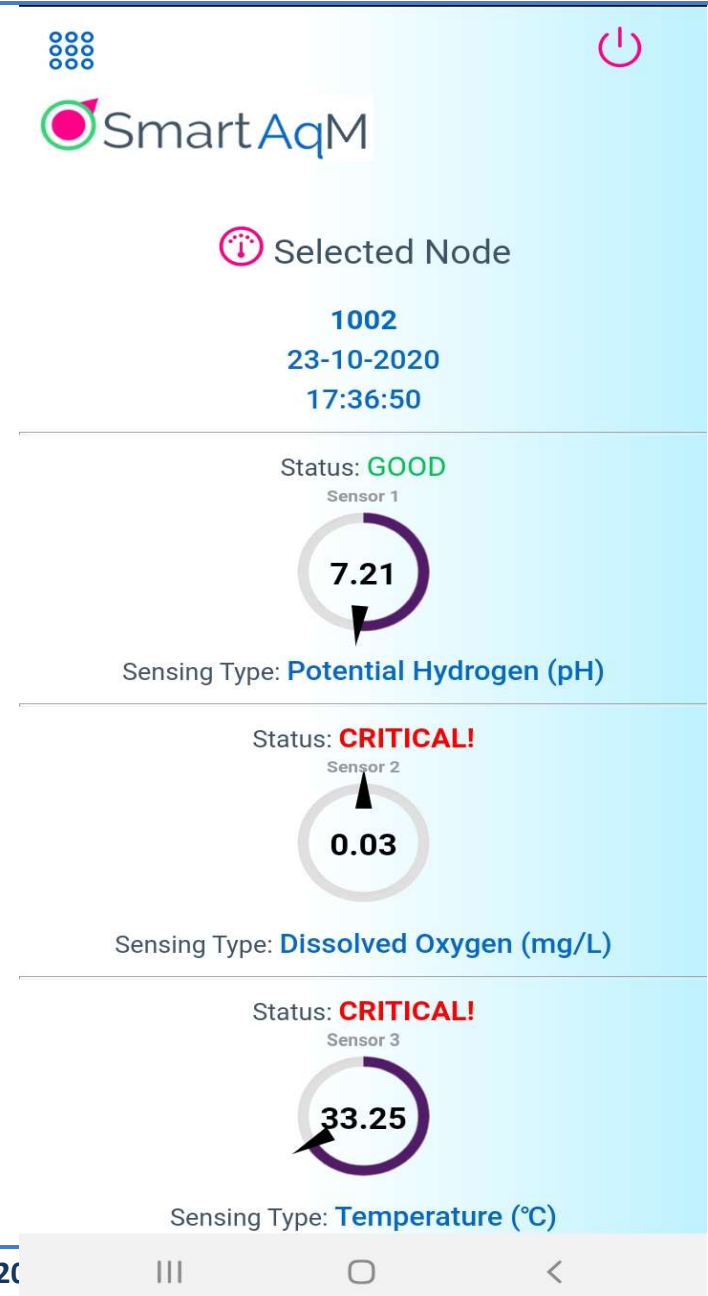
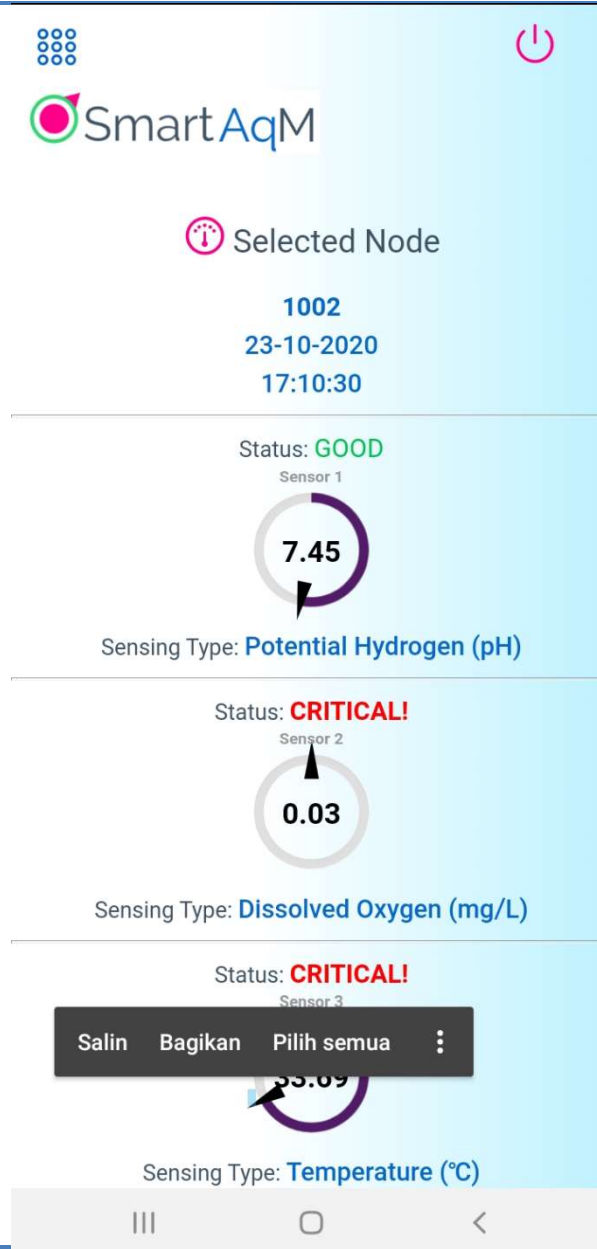
OK

Initializing Iot Gateway to update cloud database...

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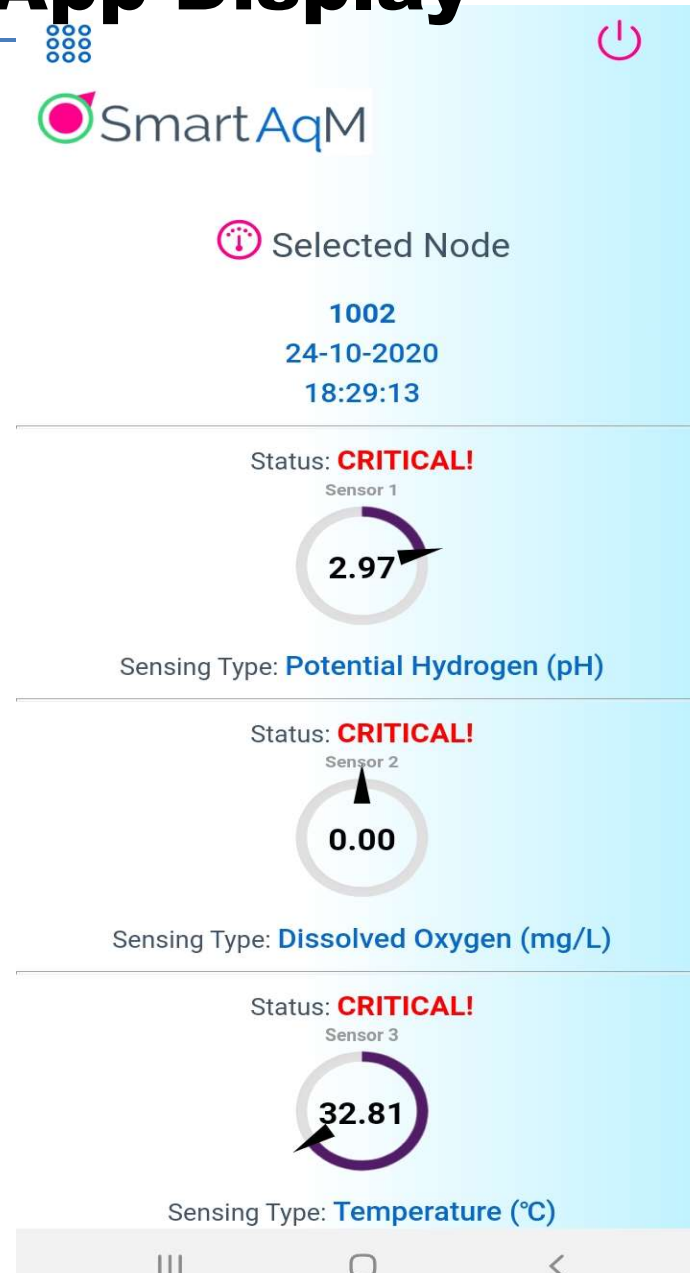
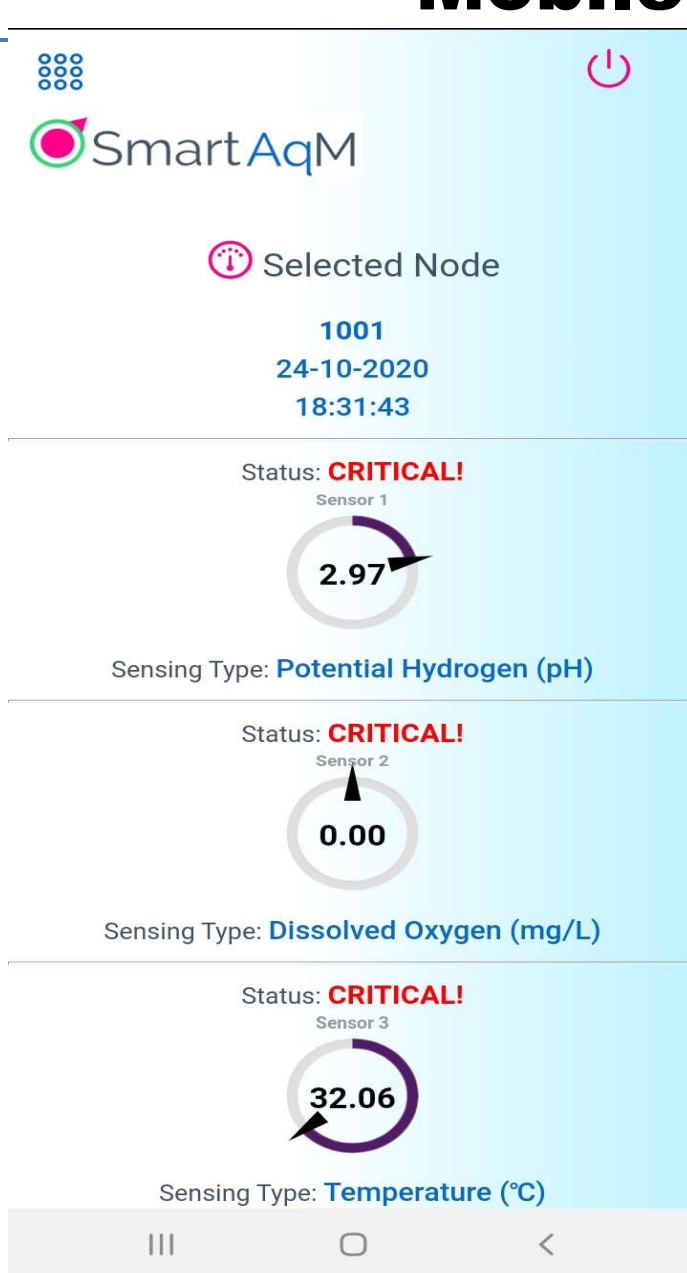
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```

Mobile App Display





Mobile App Display



Result of Functionality Testing

- Sensor node can function properly, namely
 1. Detect temperature of the milkfish pond
 2. Detect pH of the milkfish pond
 3. Detect Dissolve Oxygen of the milkfish pond
 4. Send data to receiver within 10 m, 30 m, 50 m, 100 m, 150 m
- Receiver can function properly, namely
 1. Receive data from sensor node within 10 m, 30 m, 50 m, 100 m, 150 m
 2. Sent data to cloud server

Progress Report SmartAqua

March – Oct 2020

Team UTM

Visit to Fisheries Research Institute (FRI) Brackishwater Research Centre Gelang Patah, 10th Augus 2020

- For establishing research collaboration and conducting field trial for 4 units of SmartAqua monitoring system.
- The first collaboration meeting with FRI Gelang Patah, chaired by Mr Azmi Rani, Director and attended by FRI management team and researchers, while UTM represents by Prof Sevia and project members.
- The FRI Research Centre in Gelang Patah, Johor, carries out research in brackishwater pond culture.



Site Survey at Fisheries Research Institute Brackishwater Research Centre Gelang Patah, 30th Sept 2020.

- Hosted by FRI research team to identify suitable location and ponds for field trial and data collection.
- UTM team has demonstrated 2 SmartAqua units and 2 ponds has identified for the first installation.
- Mr Lokman, an Aquaculture entrepreneur who has few ponds in Gelang Patah joined the visit. Mr Lokman has shown an interest to acquire one SmartAqua unit and voluntary participate in this field trial.
- Technical Director of iSmartUrus Sdn Bhd (UTM spin-off company) along with Prof Sevia nd Dr Asrul also join the visit and technical discussion





Infrastructure and Network Survey, 7th Oct 2020.

- To conduct network coverage and infrastructure for system installation.
- The 50 acres brackeshwater research center are located at remote area consists huge number of ponds, 3 internet provider were identified suitable for the network at the FRI area, Digi, Unifi and UMobile.
- Mr. Ashadie, a technical staff of FRI Gelang Patah assisting UTM team for site survey.
- Unifi hotspot service will be use for the project and location for the wifi router was identified.



Research Collaboration and Commercialization Activities

USM has signed collaboration for commercialization with iSmartUrus Sdn Bhd, a UTM Spin-off Company, while FRI Gelang Patah has issued letter of interest to acquire SmartAqua for the centre.



LETTER OF INTENT FOR CONSORTIUM COLLABORATION

Between

AUTO-ID LABORATORY, UNIVERSITI SAINS MALAYSIA

AND

ISMARTURUS SDN BHD


In line with the development of friendly collaboration in accordance with our interests in commercialization and business operation of 'Smart Aquaculture Water Monitoring System and Application (iSmartAqua)' for the purpose of establishing a long term mutually beneficial association, Auto-ID Laboratory, Universiti Sains Malaysia and iSmartUrus Sdn Bhd (Co. no. 1057063A) an ICT solution and services company incorporated under the Companies Act 1965 in Malaysia, join in the following letter of intent. Both parties agree to deliver their best effort to develop the following form of cooperation:

- iSmartUrus Sdn Bhd liaise with Auto-ID Laboratory, USM on matters pertaining to improve the iSmartUrus's water quality monitoring solution with the Smart Aquaculture Water Monitoring System and Application (a smart sensor system for monitoring aquaculture water quality) supported with Internet of Thing (IoT) platform and mobile application for efficient data management for iSmartUrus's clients.
- Development, promotion, marketing and implementation of the SAWM system platform for commercial level execution with commitment value up to RM50,000.00 for the benefit of small and medium and large fishery farms in Malaysia and surrounding region. The sale and delivery will be under the memorandum of agreement (MOA) of iSmartUrus to Auto-ID Laboratory.
- Promote mutual understanding on education, research, development and commercial collaboration in the area of sensor system, IoT and ICT solution between USM and iSmartUrus Sdn Bhd.

Both Auto-ID Laboratory and iSmartUrus Sdn Bhd are committed to working together to develop specific agreements on the points above. These agreements will provide logistical and management details appropriate to the successful process of the solution implementation and operation. These agreements will fulfil the spirit and purpose of this general letter of intent.

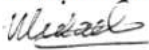
Signatories

SR MOHD SHAFIZAL ABDULLAH




24th July 2020
iSmartUrus Sdn Bhd
25 & 25A, Jalan Pulau Utama 26,
Taman Sri Pulau, Skudai,
81300, Johor Bahru, Johor, Malaysia.

PROF DR WIDAD ISMAIL



24th July 2020
Auto-ID Laboratory
School of Electrical & Electronic Engineering,
Engineering Campus, Universiti Sains Malaysia
14300, Nibong Tebal, Pulau Pinang, Malaysia.



JABATAN PERIKANAN MALAYSIA
KEMENTERIAN PERTANIAN DAN INDUSTRI MAKANAN
(Department of Fisheries Malaysia
Ministry of Agriculture and Food Industries)
BAHAGIAN PENYELIDIKAN AKUAKULTUR AIR PAYAU
(Brackish Water Aquaculture Research Division)
FRI GELANG PATAH
81550 GELANG PATAH
JOHOR DARUL TAKZIM

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Portal Rasmi : <http://www.dof.gov.my>
E-mel : pplap@dof.gov.my

Ruj. Kami : PRK.MAS(GP)100/19.JLD.2(1)
Tarikh : 26 Oktober 2020

Tuan Hj Mohd Shafizal Abdullah
Pengarah Urusan,
iSmartUrus Sdn. Bhd.
25 & 25A, Jalan Pulau 26,
Taman Pulau Utama, 81300,
Johor Bahru, Johor, Malaysia.

Assalamualaikum Tuan Haji,

Surat Tunjuk - Minat Pemasangan 'Smart Aquaculture Monitoring System Supported by IOT Platform (IoT-SAMS)' : Produk Teknologi Usahasama iSmartUrus Sdn Bhd dengan Universiti Teknologi Malaysia dan Universiti Sains Malaysia Di Bahagian Penyelidikan Akuakultur Air Payau, FRI Gelang Patah, Johor.

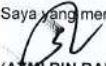
Merujuk kepada sesi perbincangan dan demonstrasi pihak tuan yang dihadiri oleh Dr Najwa Abu Bakar, Pengarah Teknikal iSmartUrus bersama kumpulan penyelidik UTM pada 30 September 2020. Pihak kami bersetuju untuk menggunakan alat IoT-SAMS ini di empat kolam terpilih bagi tujuan kajian lapangan untuk meneliti kemampuan dan kecekapan alat bagi pelaksanaan di kolam-kolam lain.

- Begitu juga merujuk kepada beberapa siri perbincangan dan pembentangan hasil kajian oleh Profesor Dr Sevia Mahdaliza Idrus dan pasukannya, kami sedia maklum produk IoT-SAMS ini adalah untuk memantau kualiti air kolam ikan dan udang secara jarak jauh dan automatik. Pihak kami yakin, cadangan menggunakan alat teknologi termaju seperti IoT-SAMS ini berpotensi untuk meningkatkan hasil keluaran penternakan ikan dan udang yang diusahakan secara moden.
- Kami berbesarhati untuk bekerjasama dengan pihak tuan serta UTM dan USM dalam menyediakan kolam ternakan udang dan ikan untuk percubaan keberkesanan sistem tersebut bagi peningkatan kualiti ternakan ikan udang tempatan.

Sekian, terima kasih

" BERKHIDMAT UNTUK NEGARA "

Saya yang menjalankan amanah,



(AZMI BIN RANI)
Pengarah
Bahagian Penyelidikan Akuakultur Air Payau
FRI Gelang Patah