Agency for The Assessment and Application of Technology

Heru D. Wahyono
Hammam Riza

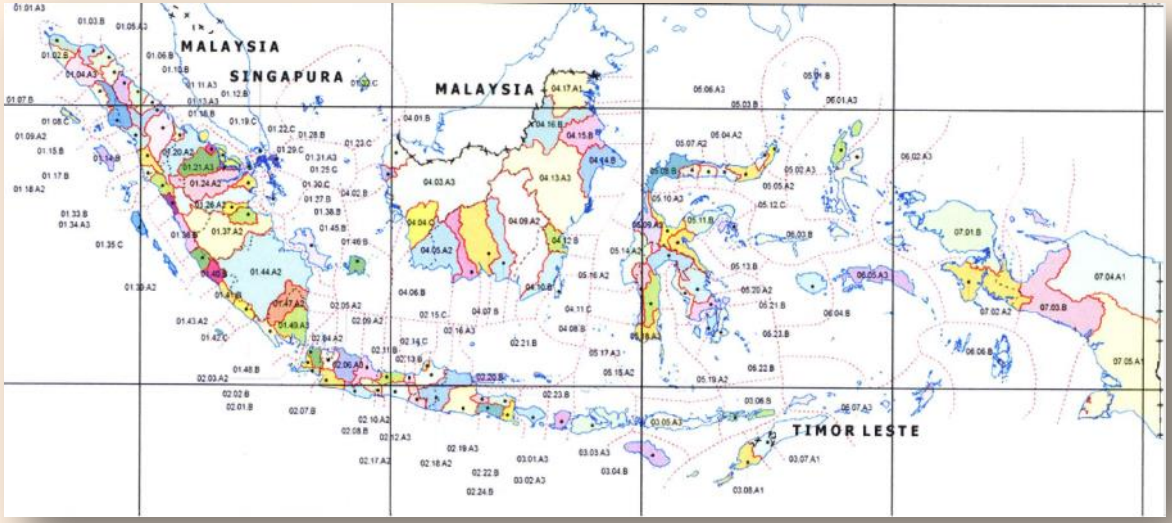
Development Program on Online Monitoring Technology (Onlimo) For Water Quality According To The Natural Conditions In Indonesia

ENVIRONMENTAL TECHNOLOGY AND GEOSCIENCE

Heru Dwi Wahyono (heru.dwi@bppt.go.id, +628121936120)

Center for Environmental Technology

Background

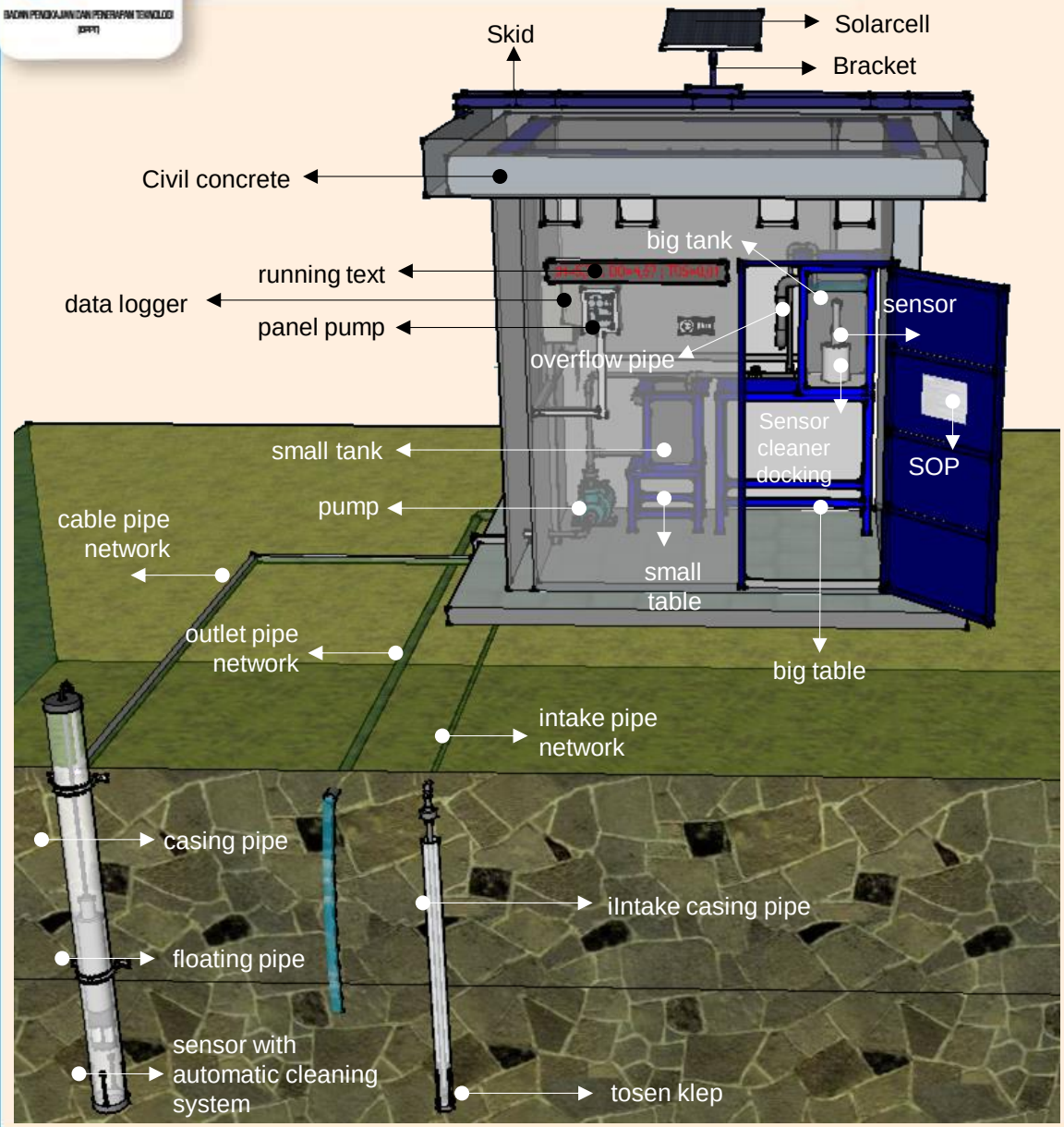


- Indonesia has **17,504 islands,** No. **5** largest country with **3,221 billion m³ / year** of water reserves.
- Indonesia divided into **7.972** watersheds. There is seriously problem with critical watersheds. There are 22 priority watersheds in 1984, 39 watersheds by 1992, 39 watersheds by 2005 and in 2009 increased become 108 priority watersheds.
- To maintain water resources, we need online monitoring technology for water quality as supporting technology for water pollution control activities suitable with natural condition in Indonesia.
- The development program on Online Monitoring Technology for water quality should be conduct to support technology needs in Indonesia.

Goals & Objectives

1. **Providing local alternative technology for telemetry** using **ICT and IoT Technology** to meet the needs of online water quality monitoring technology that supports water pollution control activities that are suitable for natural conditions in Indonesia
2. **Applying water quality monitoring technology online and real time** using innovative products with **high local content** to support water quality pollution control activities in Priority Watersheds.
3. **Implementation of Onlimo** Technology developed by BPPT for online and realtime water quality monitoring for priority watersheds in Indonesia.
4. **Establish an online and real-time water quality monitoring data center** that supports environmental pollution control activities in Indonesia.
5. **Provide technical recommendations to local governments** and industries in implementing online water quality monitoring technology
6. **Provide technical recommendations to the Ministry of Environment and Forestry** related to the selection of online monitoring technology that supports government policies in the context of controlling water quality pollution.

Layout of Onlimo Station Installation



Components of the Onlimo Station:

1. Protective buildings and safety fences
2. RTU / smart data logger system
3. Multi probe sensor & analyzer
4. Display running text / LCD monitor system
5. Solar cell electrical system and skid solar cell
6. Electrical power system or solar cell for pump systems
7. Automatic pump control system
8. Piping network system and pump intake
9. Direct immersed pipe system
10. Automatic sensor cleaning system
11. SOP for equipment and operators

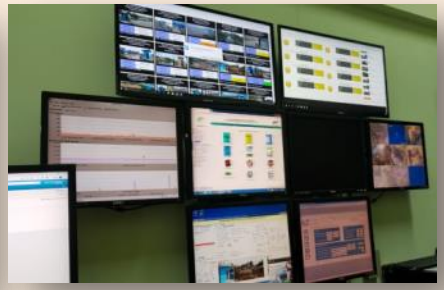
Onlimo System Componen

A. Remote Terminal Unit (RTU) :

1. SBC/Microprocessor based data logger
2. GSM modem
3. Wiring system for panel box
4. Solar cell system and bracket
5. Battery / dry cell

B. Water quality multiprobe sensor & organic analyser :

1. Sensor connection cable
2. Measurement parameter : Temp, Cond, TDS, Sal, DO, pH, turbidity, SwSG, Depth, Ammonium, Nitrate, ORP, COD, TSS, TOC, BOD



C. Water Sampling & Cleaning System :

1. Pumping system
2. Direct immersed system
3. Auto cleaning system

D. Data Center :

1. Computer for data server
2. GSM modem
3. Display system
4. System software :
   - ✓ MS Window / PCUnix
   - ✓ Web based Onlimo system
   - ✓ Server Xampp

SBC Based Data Logger

Features :

- ✓ Single 8GB FlashDisk/MicroSD for PC Unix OS and Software
- ✓ Operating System : FreeBSD, Linux, Raspbian
- ✓ Database Server : MySQL
- ✓ Web Server : Apache
- ✓ Program control sensor onlimo
- ✓ Web based DB Onlimo
- ✓ Communication Protocol : TCP/IP
- ✓ Sensor Connection : USB and RS232C
- ✓ Logger Connection : LAN, UTP, Wifi, 3G, 4G
- ✓ Display : 3”, 5”, 7” LCD Touchscreen
- ✓ Power Supplay : 5 ~ 12 VDC; 1,5 ~ 2 Ah
- ✓ Visual monitoring using webcam or IP CCTV
- ✓ 2 Interval time : periodik & EWS
- ✓ Remote configuration

Onlimo OSS

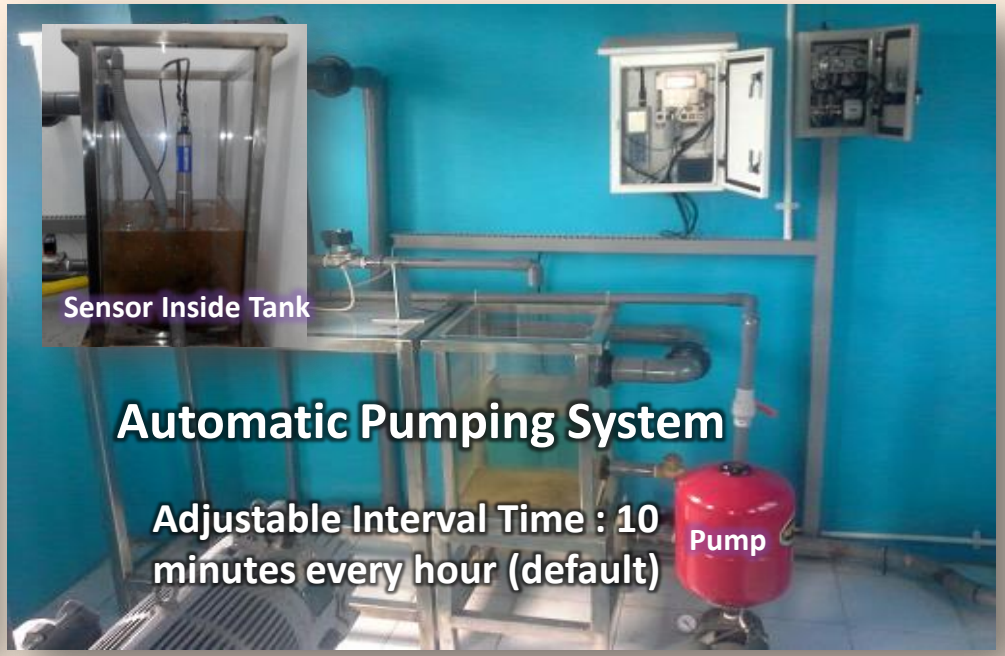
Versi 2.5

Multiprobe Sensor

No.	Vendor	Type	∑ Parameters
1.	YSI	6 Series, EXO Series	6~12
2.	DKK TOA	WQC-24, OPM1610	6~12 + 2
3.	Aquaread	AP Series	6~12
4.	Horiba	U50 Series	6
5.	WTW	Carbovis	4

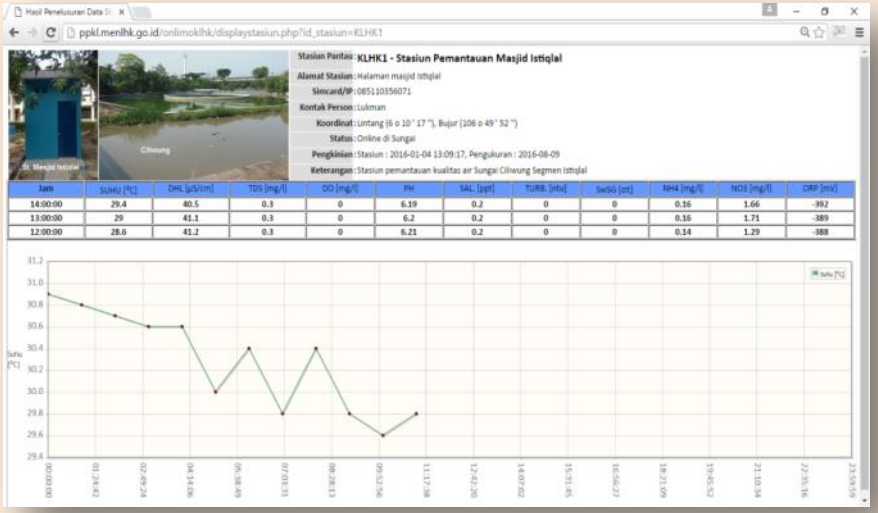
Temp, Cond, TDS, Sal, DO, pH, turbidity, SwSG, Depth, Ammonium, Nitrate, ORP, COD, TSS, TOC, BOD

Water Sampling System

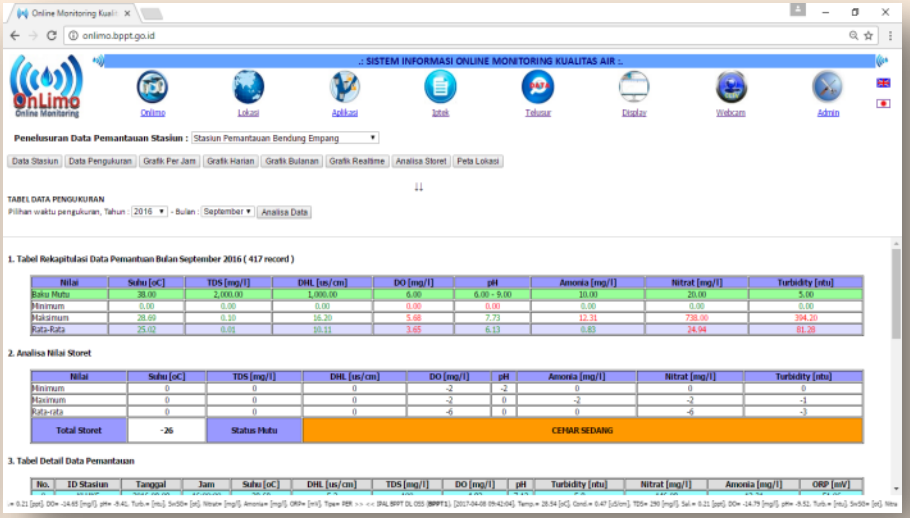


Value & Analysis For Monitoring Data

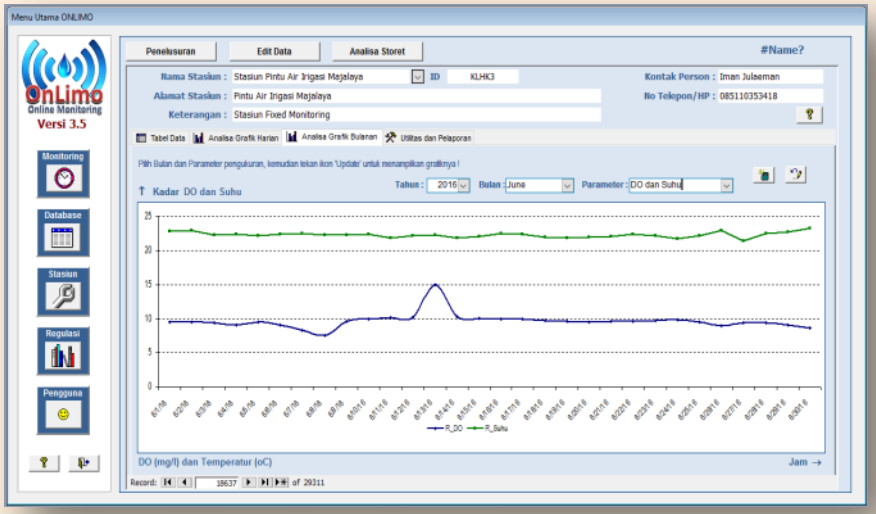
Value and Analysis Graphics :



Water Quality Status Using Storet Methode :



Comparation Analysis Graphics Between Parameters :



Resarch topics for development product :

- Usage of low cost ICT for developing smart data logger (eg : SBC based electronic board, GPRS/3G based communication network, FOSS for software development)
- Developing the data quality assurance algorithm for collected data from data logger
- Usage of android to develope and distribute of information data for water quality to the community

Onlimo Application In Indonesia

Client : Reg. Env. Inst. (BLHD), Nokia Siemens Network (NSN), Ministry of Env. & Foresty (KLHK)

Proposed Research

Problems, Research Title and Product Output

No	Problems	Research Title	Product Output
1	Sediment and mud in the river	Development of automatic sensor cleaning systems with various methods	Automatic sensor cleaning prototype with various methods
2	The steep, deep and distant location contours	Development of a relay pump sampling system	Prototype of relay pump sampling system
3	Domestic waste and heavy rains that cause floods of garbage	Development of a trash netting system and a building for civil protection for reinforced concrete	Protope the garbage netting system and the building of civilian reinforced concrete
4	There is no electricity in remote locations	Development of water sampling systems with DC solar pumps	Prototype of sampling system equipment with solar DC pumps
5	Various types of sensors from various vendors / variations of sensor products	Development of communication programs and packages of telemetry products with various types of sensors and sensor vendors that correspond to user grouping	Communication program and telemetry product package with various types of sensors and sensor vendors that are in accordance with user grouping
6	Monitoring requirements for specific parameters	Development and package of onlimo products for monitoring specific parameters	Onlimo prototypes and product packages for monitoring specific parameters
7	The need for water quality mapping in the waters of lakes, swamps and beaches	Development of water drones for mobile water quality monitoring	Prototype of water drone system for mobile water quality monitoring