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# D isaster R obotics

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# Perkenalan

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- Direktur Poliwangi, 2017-sekarang
- Atdikbud KBRI New Delhi 2011-2014
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- Staf Khusus Menkominfo 2008-2009
- Asisten Profesor, Tokyo University of Agriculture and Technology, 2003-2



**RABBIT-TEAM**  
ROBOTIC AND AUTOMATION  
BASED ON BIOLOGICALLY-INSPIRED





水滴石穿，绳锯木断

WATER DROPS PIERCE STONE;  
ROPE SAWS CUT WOOD.



Pepatah Cina

If you are always  
trying to be normal,  
you will never know  
how

**AMAZING**

you can be.

Maya Angelou – American Poet



A photograph of a dense forest with large, gnarled trees and a path leading into the distance. The lighting is warm and golden, suggesting late afternoon or early morning. The text is overlaid on the image.

We can only see a SHORT distance ahead,  
but we can see

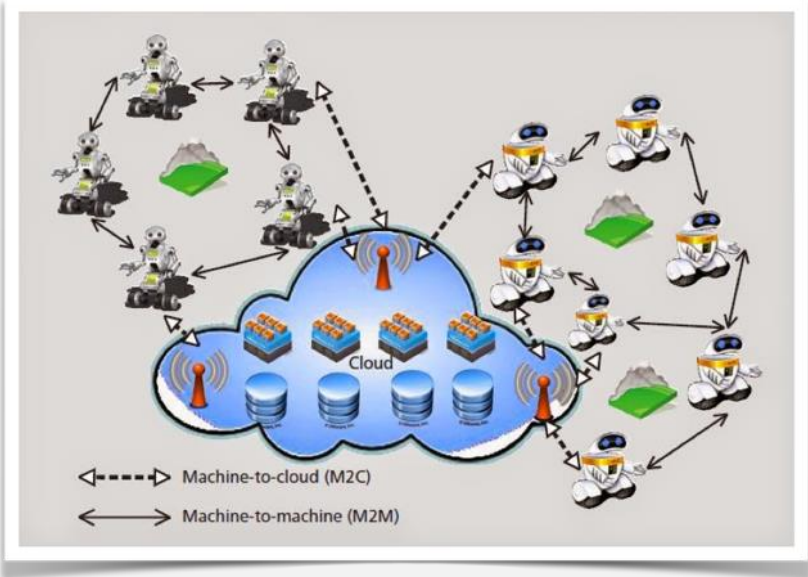
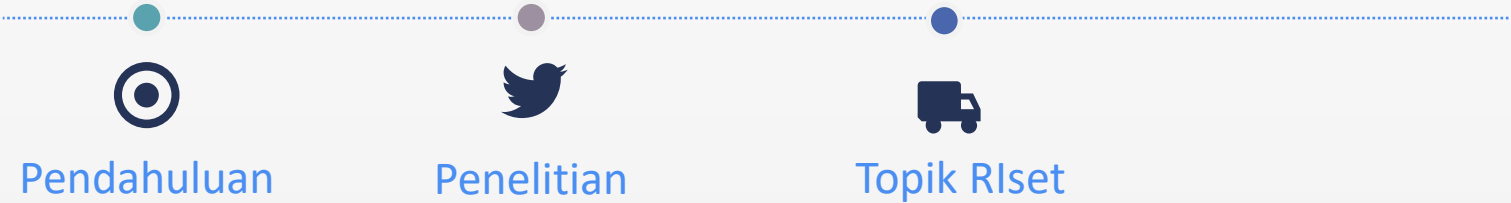
PLENTY

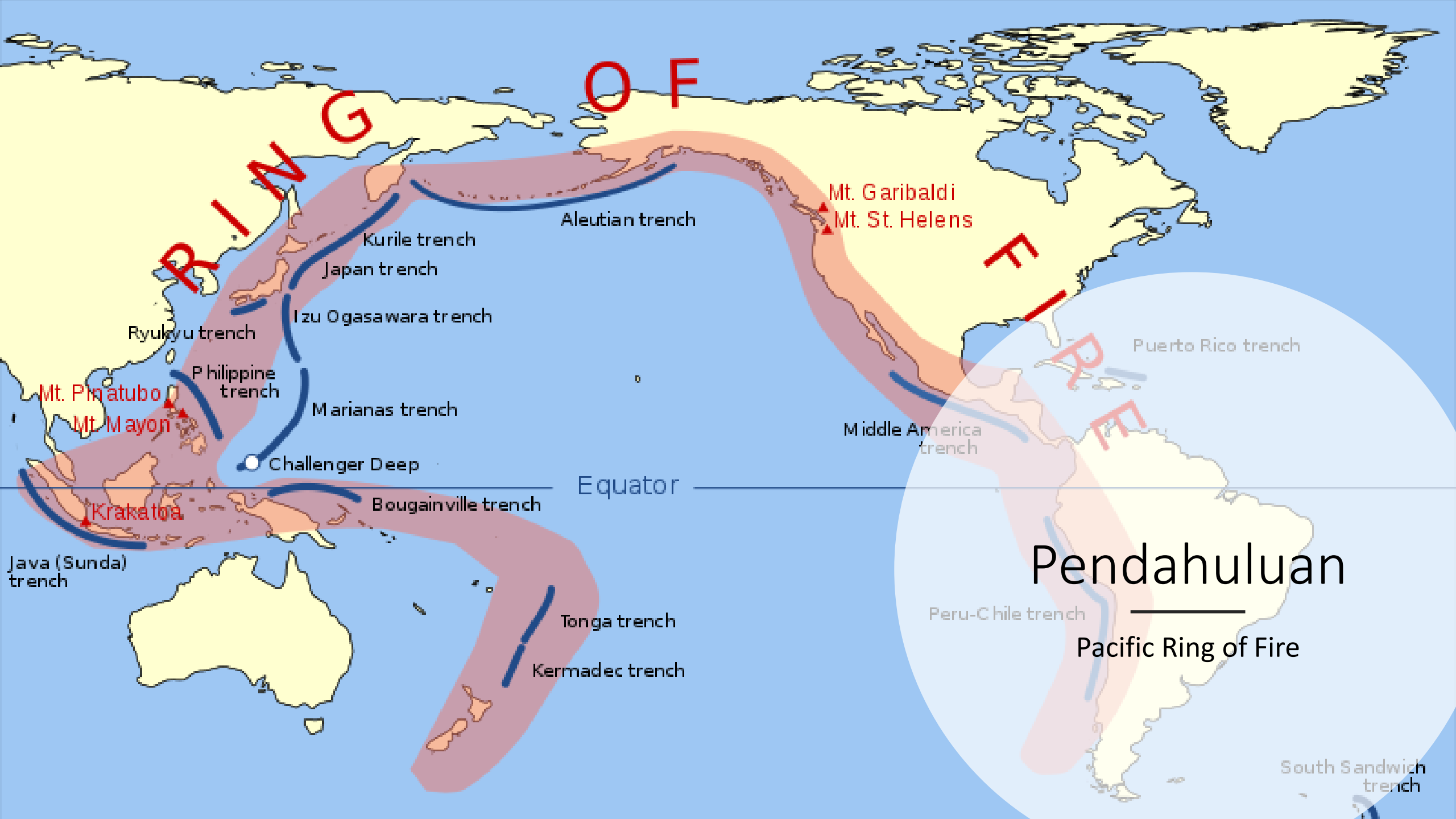
there that needs to be done.

*Alan Turing – British Computer Scientist*

# Agenda

Diskusi





R I N G O F F I R E

Aleutian trench

Kurile trench

Japan trench

Izu Ogasawara trench

Ryukyu trench

Philippine trench

Marianas trench

Challenger Deep

Bougainville trench

Equator

Tonga trench

Kermadec trench

Mt. Garibaldi  
Mt. St. Helens

Puerto Rico trench

Middle America trench

Peru-Chile trench

South Sandwich trench

Mt. Pinatubo  
Mt. Mayon

Krakatoa

Java (Sunda) trench

Pendahuluan

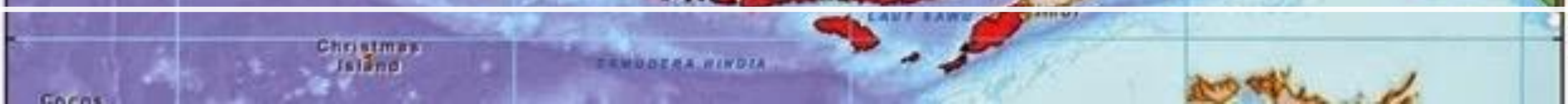
Pacific Ring of Fire



# PETA INDEKS RISIKO BENCANA GEMPABUMI DI INDONESIA

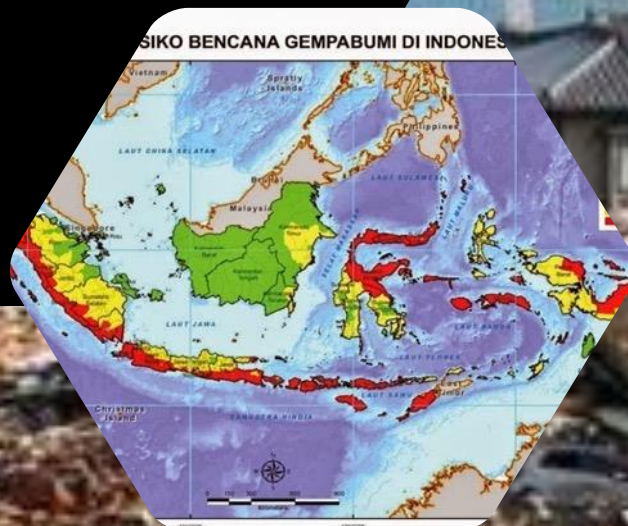



Pendahuluan





# Pendahuluan

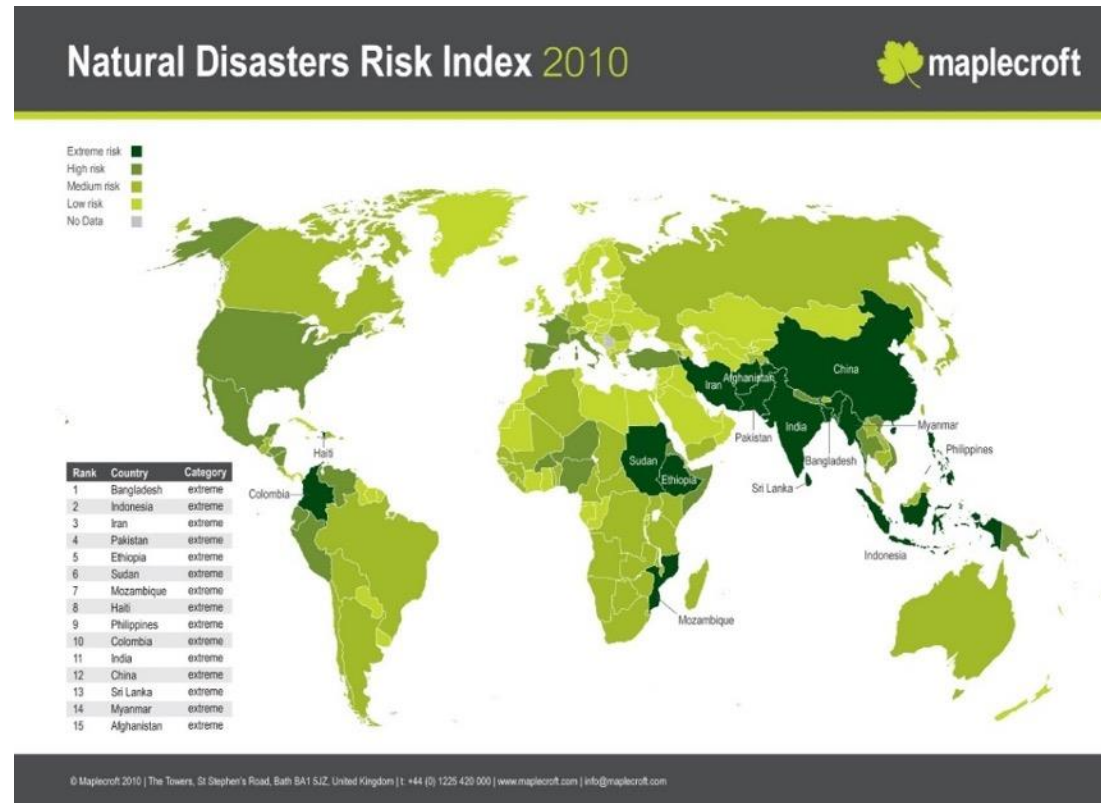




# Pendahuluan

Gempa Padang, 30 September 2017

# Pendahuluan



Natural disaster risk index 2010, menempatkan Indonesia dengan resiko tertinggi ke-2 setelah Bangladesh

<http://www.preventionweb.net/english/professional/maps/v.php?id=14169>

# Pendahuluan

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**KADO PILIHANKU**  
Selama periode  
**1 Agustus - 30 September 2017**  
Kompas.com bagi-bagi kado spesial!

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## Sesar Kendeng Terbukti Aktif, Jawa Timur Perlu Lebih Waspada Gempa

**YUNANTO WILJI UTOMO**  
Kompas.com - 27/04/2016, 21:26 WIB

f t G+





5,4 Juta  
Orang

Urutan Pertama dari 265 negara Resiko Tsunami

197 rb  
Orang

Urutan Pertama dari 162 negara Resiko Tanah Longsor

11 Juta  
Orang

Urutan Ketiga dari 153 negara Resiko Gempa Bumi

2 Juta  
Orang

Urutan 36 dari 184 negara Resiko Kekeringan

## LATAR BELAKANG



5,4 Juta  
Orang

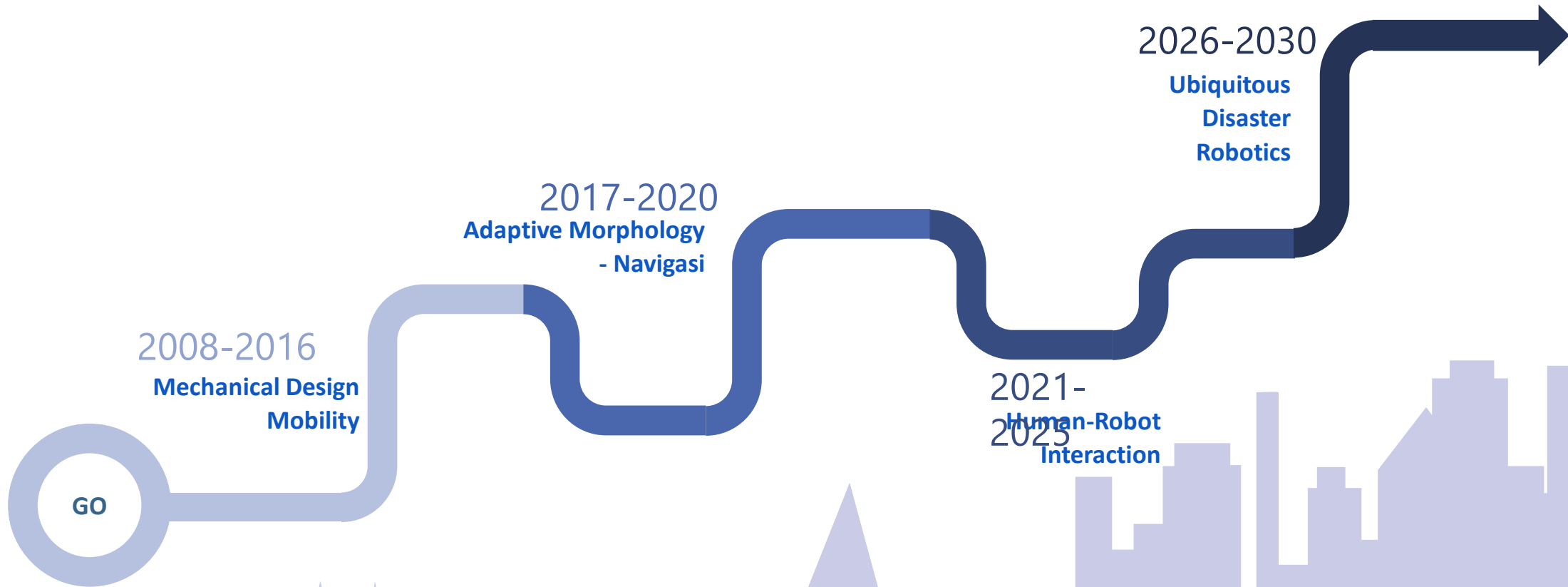
Potensi kerugian bencana tsunami US\$ 3,46 milyar

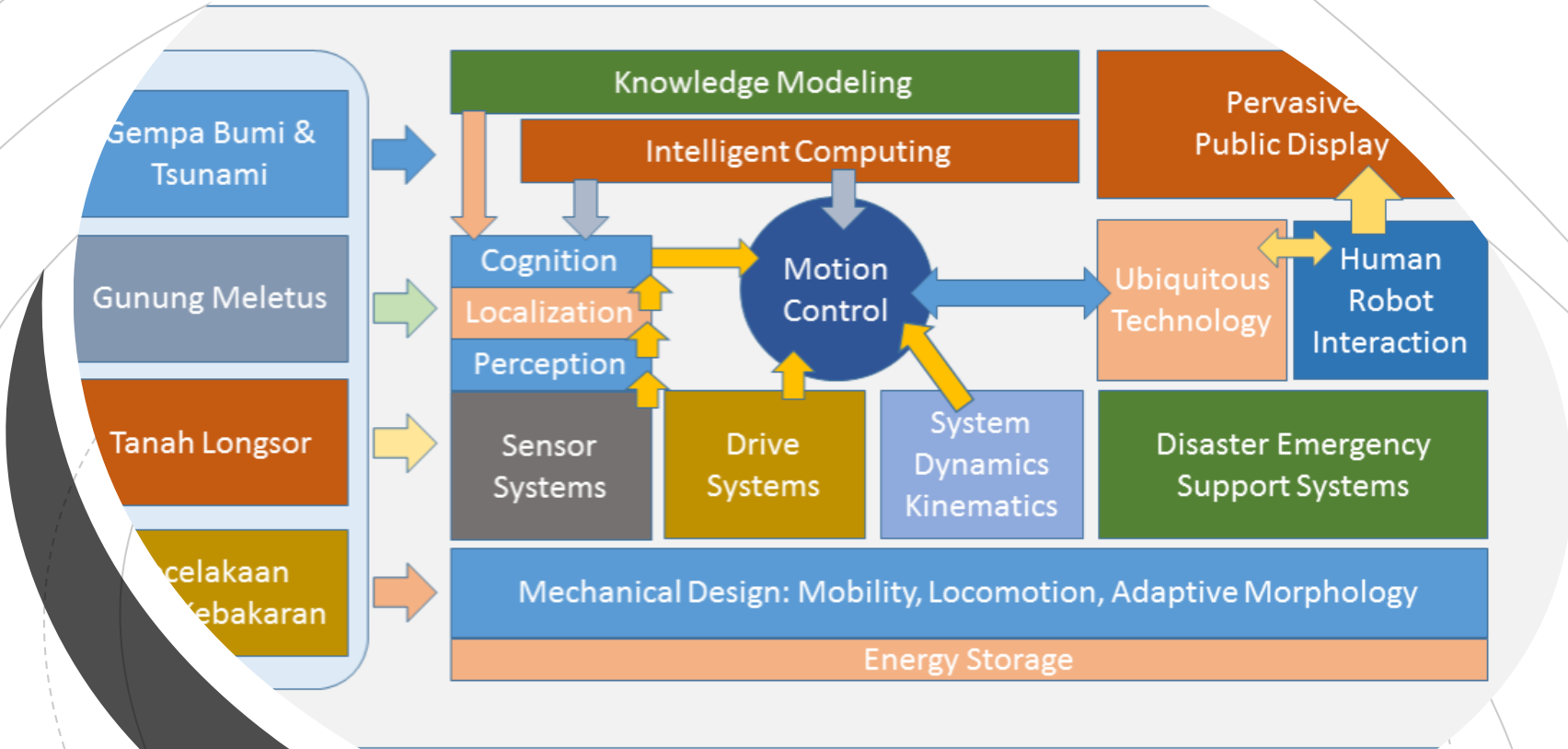
11 Juta  
Orang

Potensi kerugian bencana gempa bumi US\$ 79,13 milyar

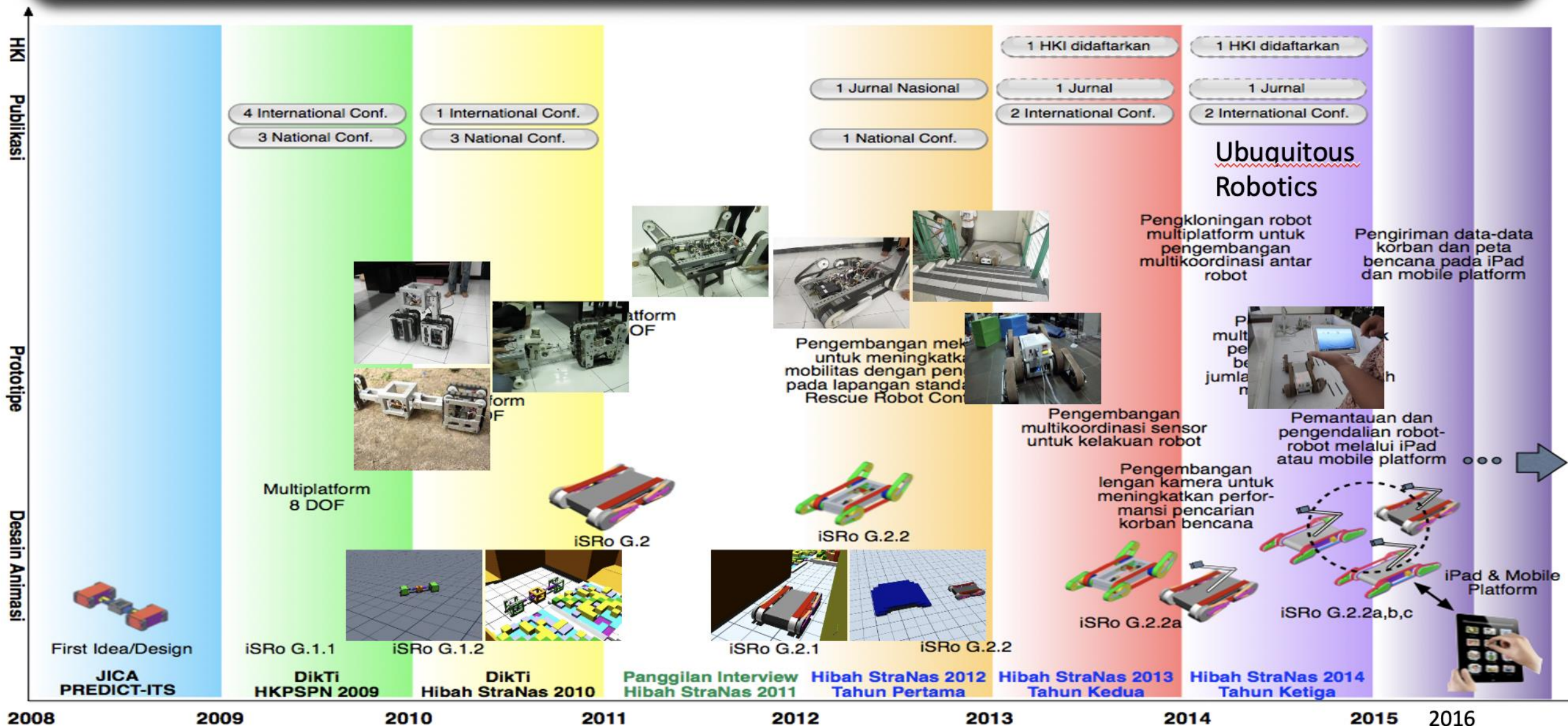
# Pendahuluan

# Penelitian Kami





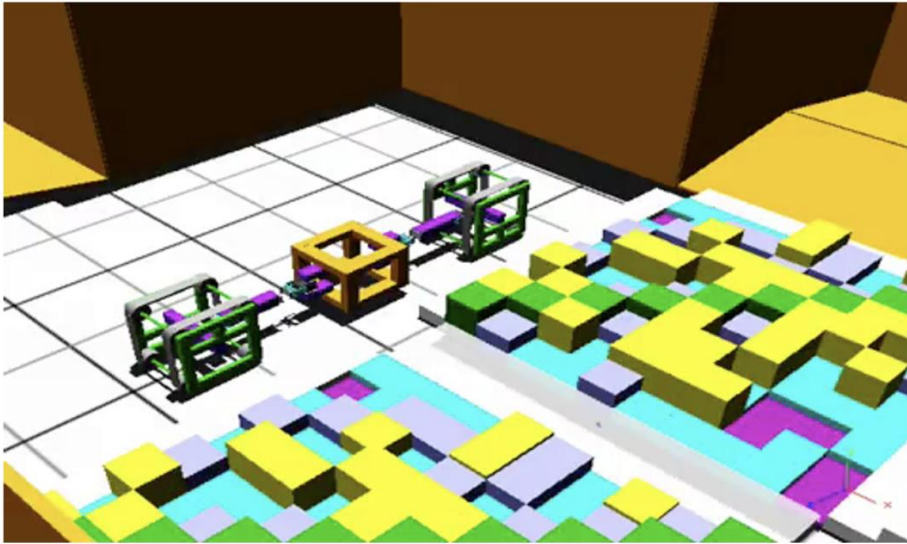
# Framework Penelitian





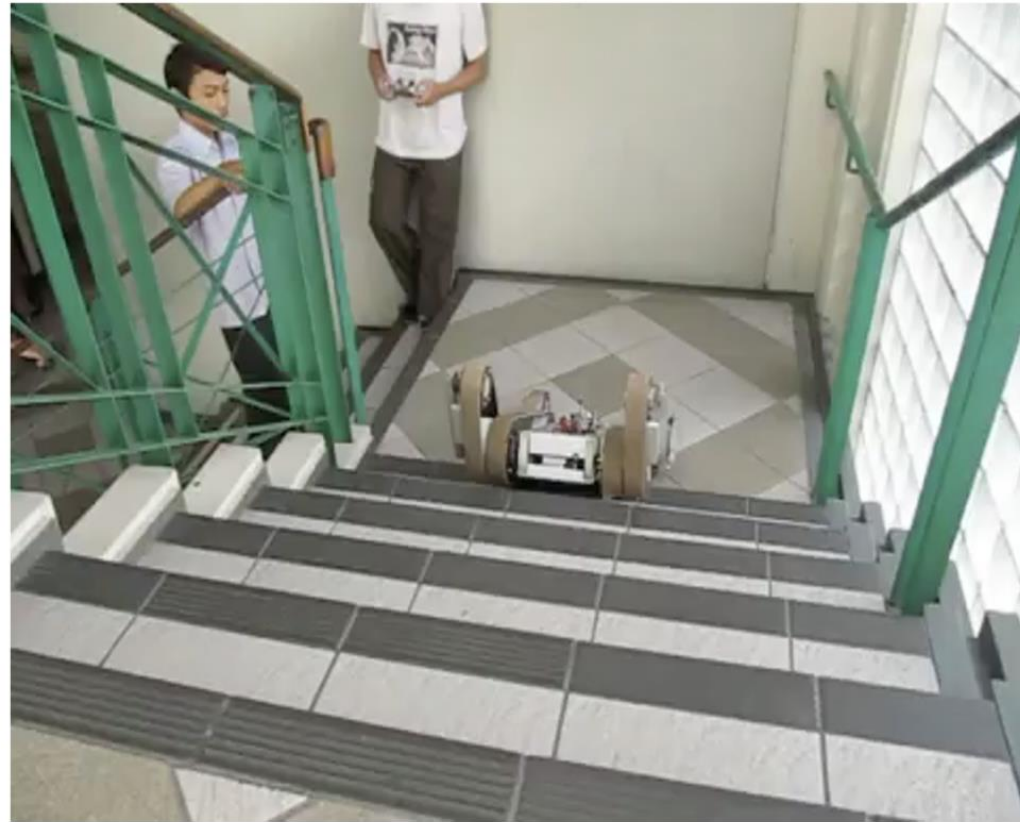
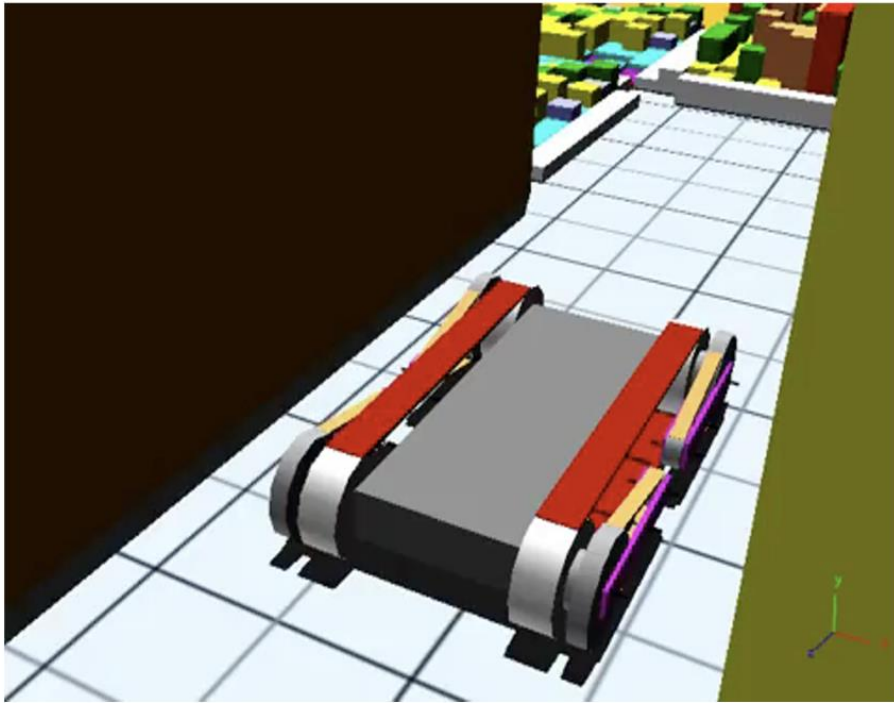
# 8 DOF Multi Platform - iSRo

(2008-2010)



# 10 DOF Multi Platform iSRo G.2.1

(2011-2013)



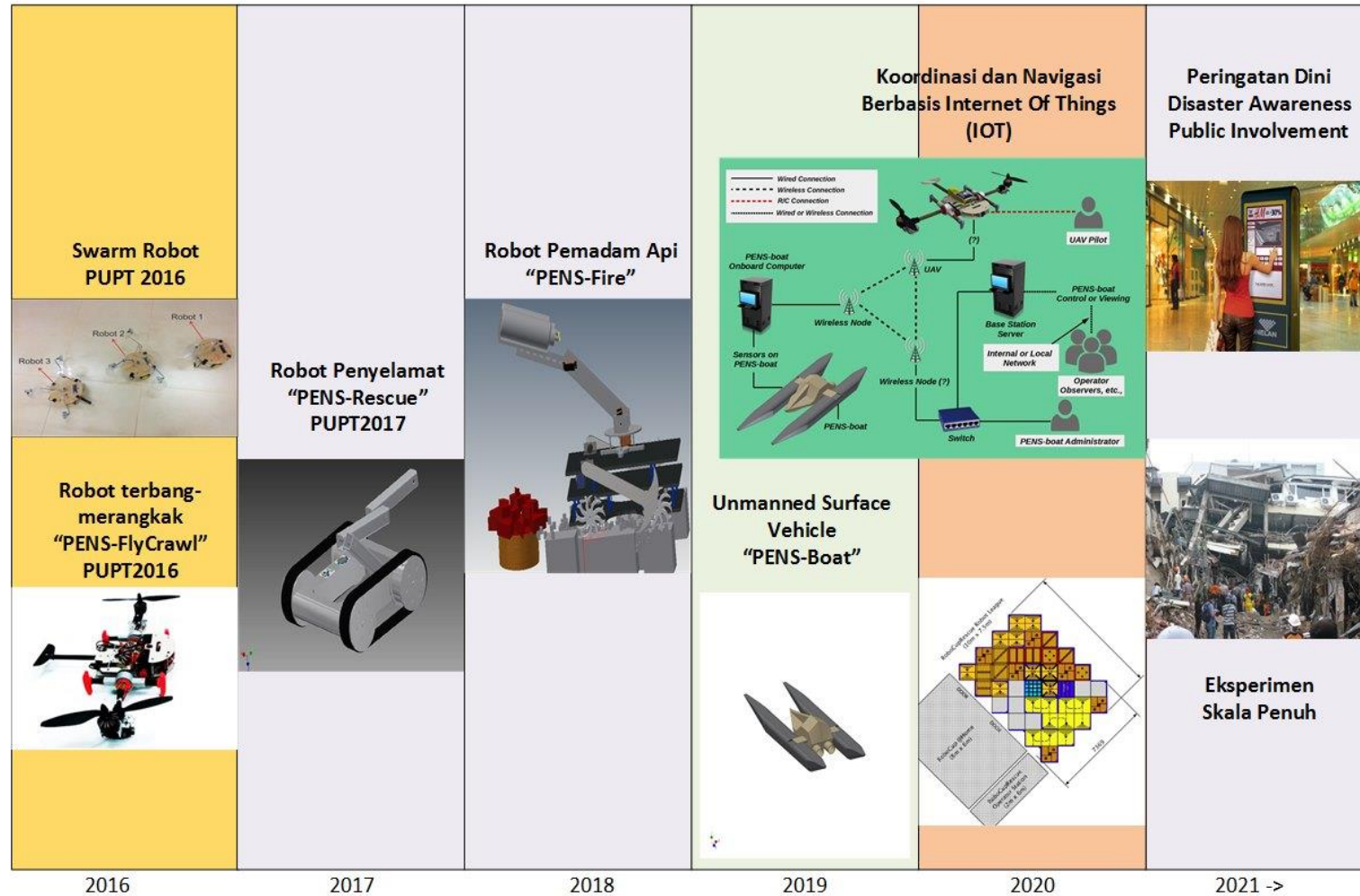
# Pengendali Tablet

(2014-2015)



Menuju Ubiquitous Robotics

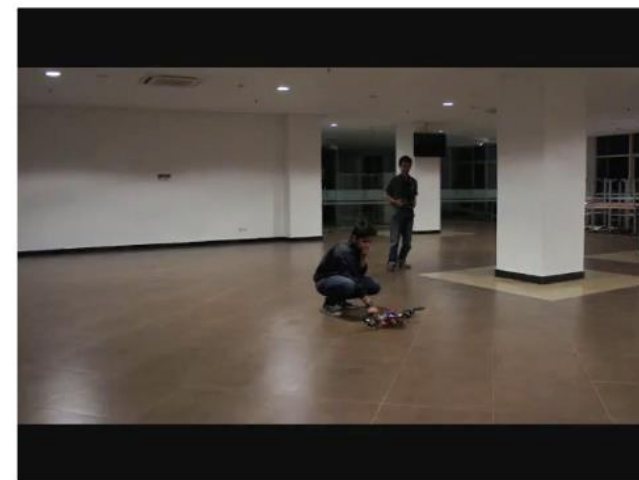
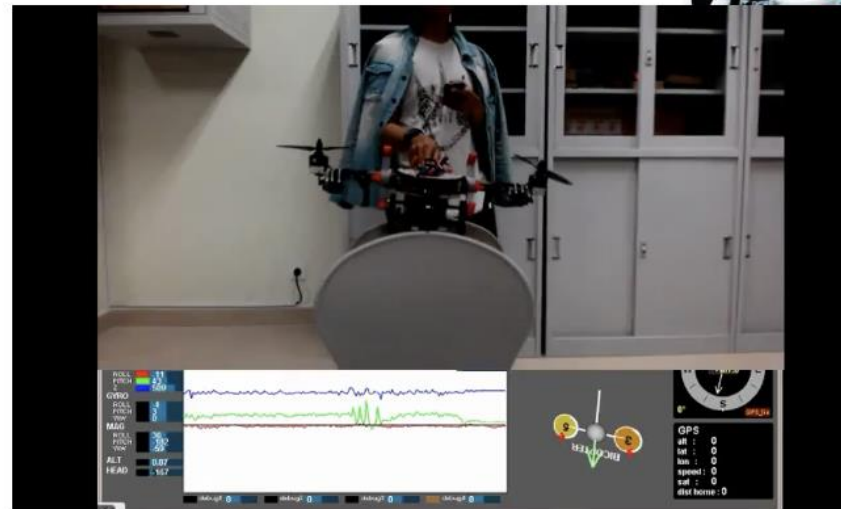
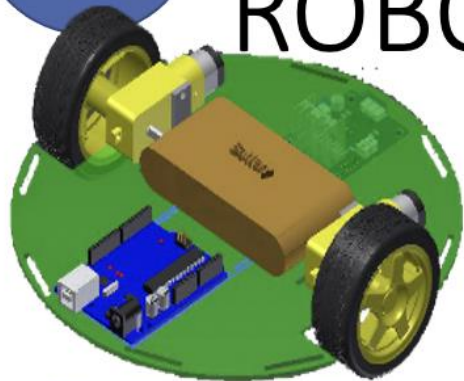
# FASE KEDUA ROADMAP PENELITIAN



2016

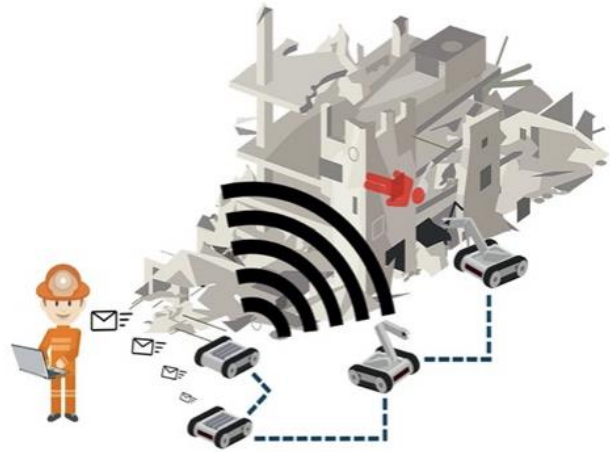
# ROBOT MULTI LOCOMOTION

## ROBOT SWARM



2017

# DISASTER SWARM ROBOT



Fied Test

Robot Leader



Robot Follower 1  
(Pembawa Air Mineral)



Robot Followe 2  
(Pembawa Oksigen)



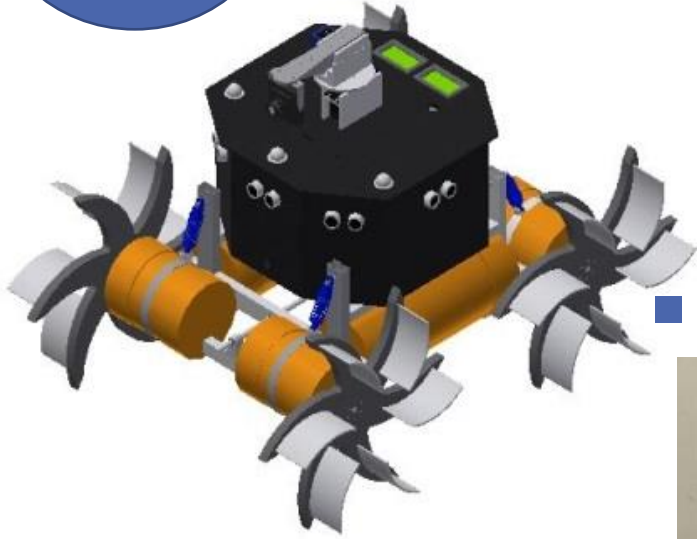
Pengujian 1

Mapping

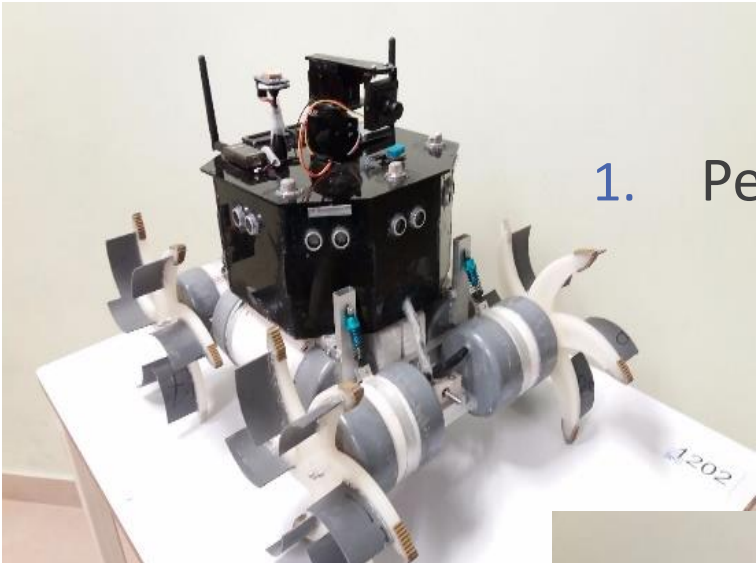


Navigasi

2018-  
2019

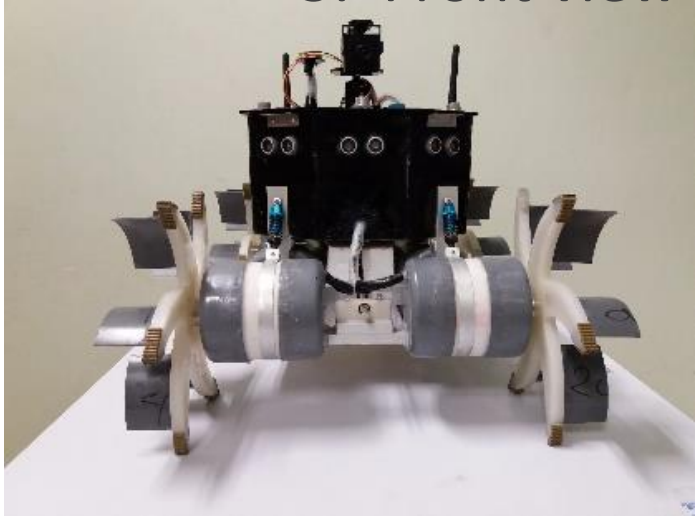


■ 2. Side view



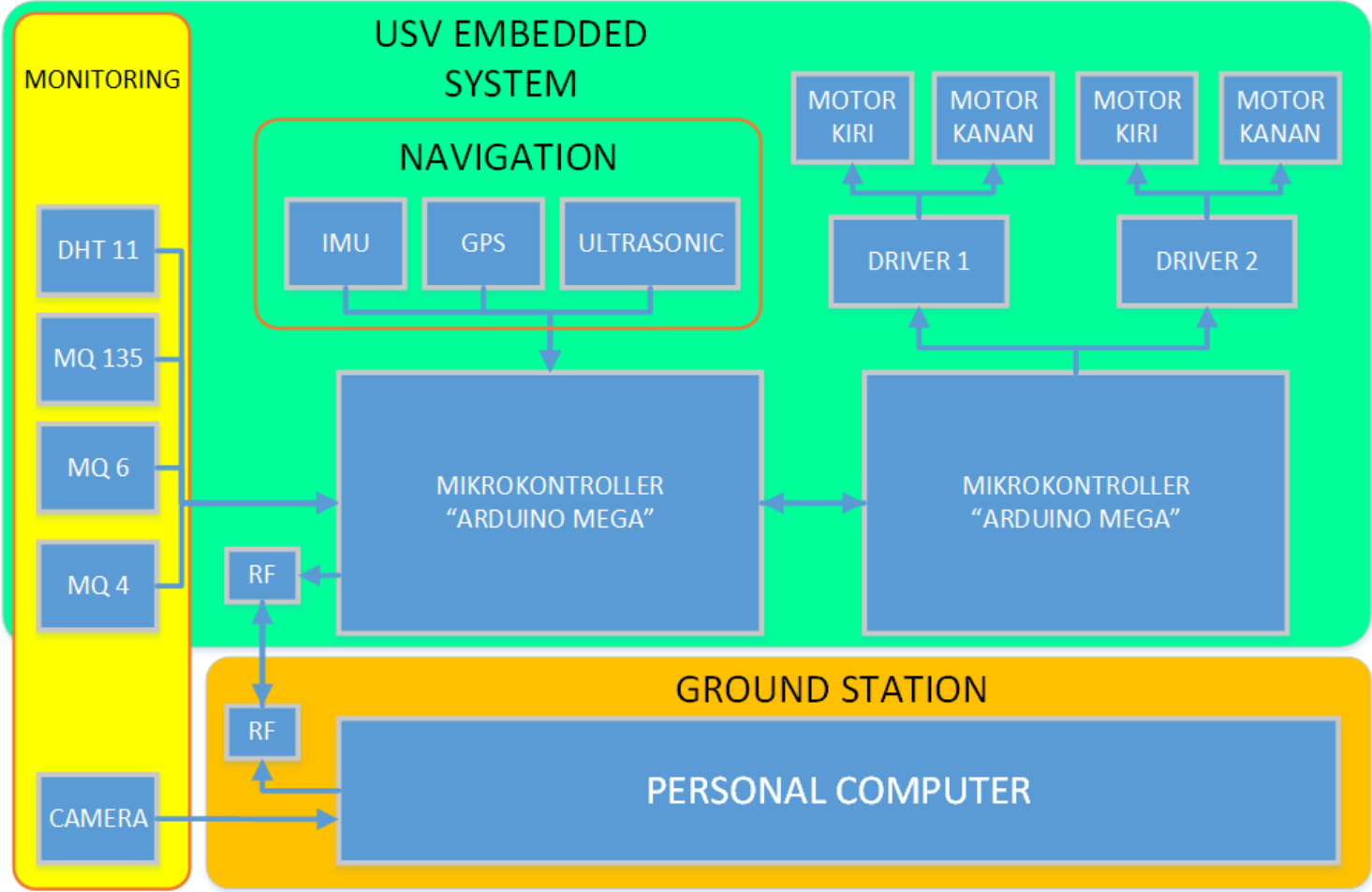
1. Perspective view

■ 3. Front view

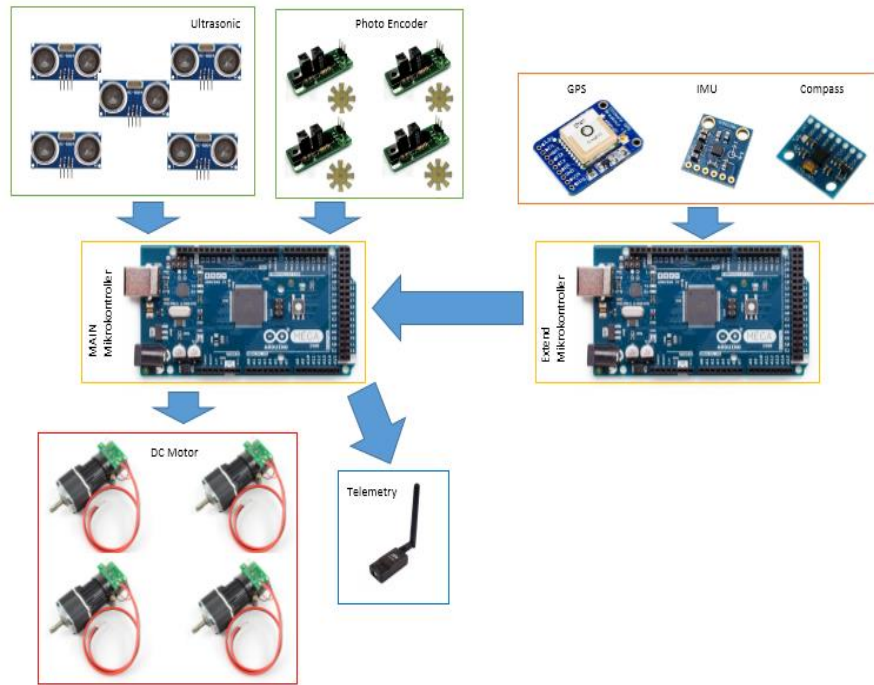


Unmanned Surface  
Vehicle

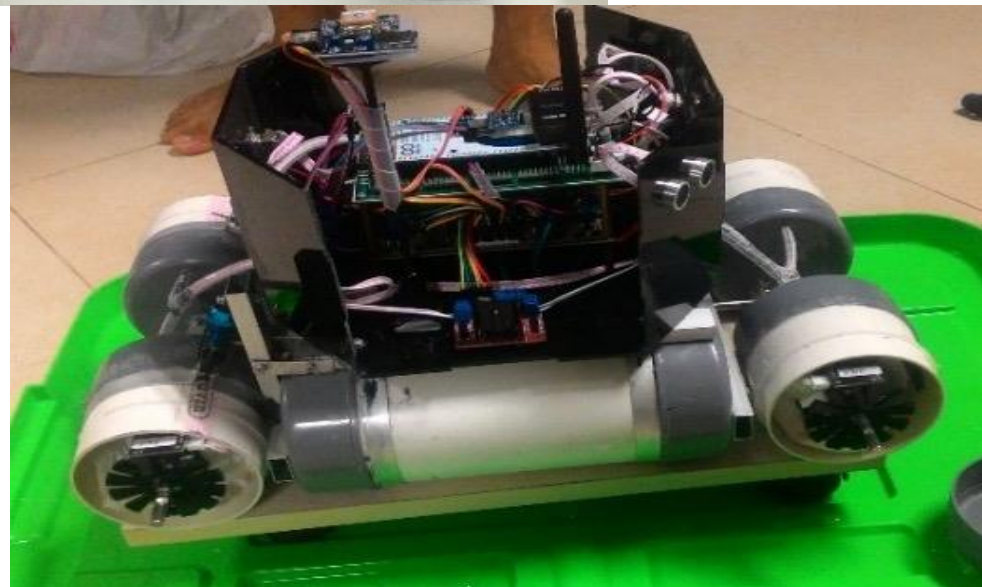
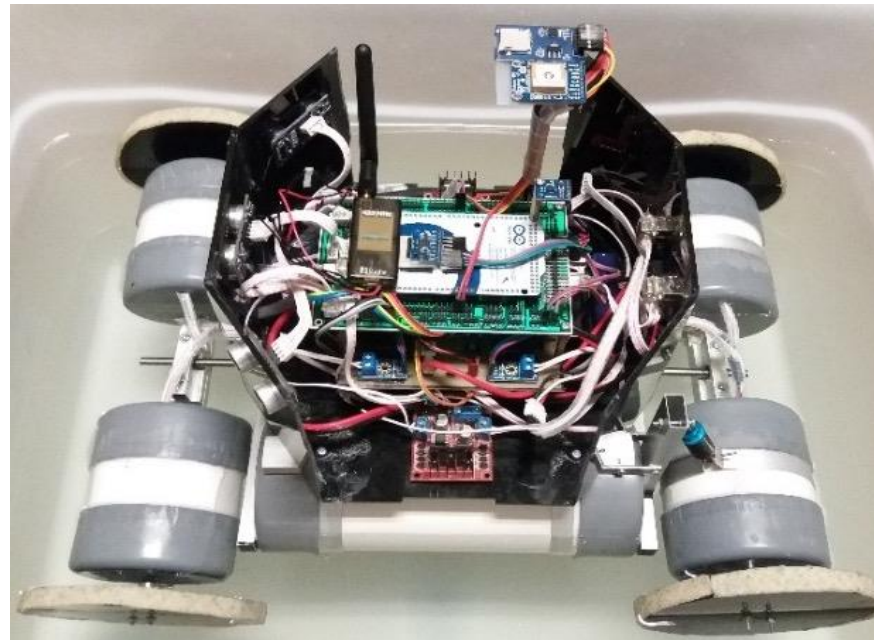
■ System architecture of USV

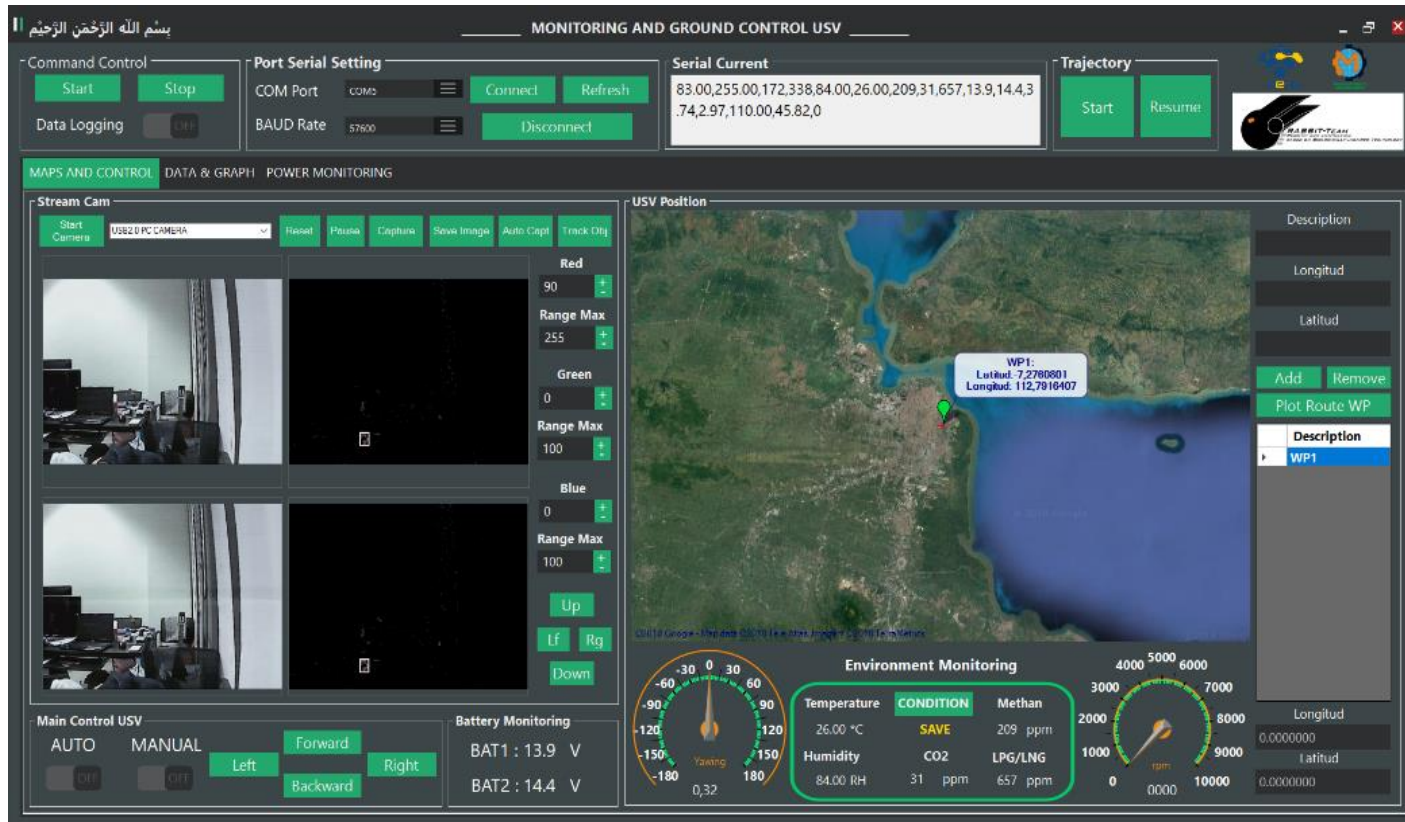






## ■ Electronic Design





GUI Design

- Main Windows (Maps and Control)



GUI Design

■ Low Level Control



- Waypoint following experiment



1. Latitude and Longitude USV
2. USV tracking path to the victim
3. Environmental monitoring
4. Video streaming

■ Maneuverability testing in the water

# Topik Riset

- Robot mobility, locomotion and adaptive morphology in messy terrain
- Robot Navigation using Behavior-based systems
- Forest fires area prediction using robotic systems
- Disaster victim recognition systems

Thanks  
for  
Watching