

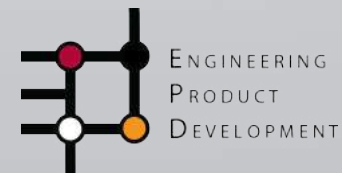
SALAMANDER

Portable Amphibious Spherical Rolling Robot with Live-Streaming Capability

Jaron Lee Jia Wen

Stevanus Satria

Chan Wei Ting, Samantha



Overview

- **Introduction**
 - The Need for SALAMANDER.
 - User Needs.
- **The Robot**
 - Features.
 - Design Considerations.
 - Requirements and Tests.
- **SALAMANDER in Action**
- **Summary**



Why SALAMANDER?

Seas



Picture taken from mirror.co.uk



Forests

Picture taken from flickr.com

Mangroves



Picture taken from eco-business.com



Coral Reefs

Picture taken from qualia.com.au

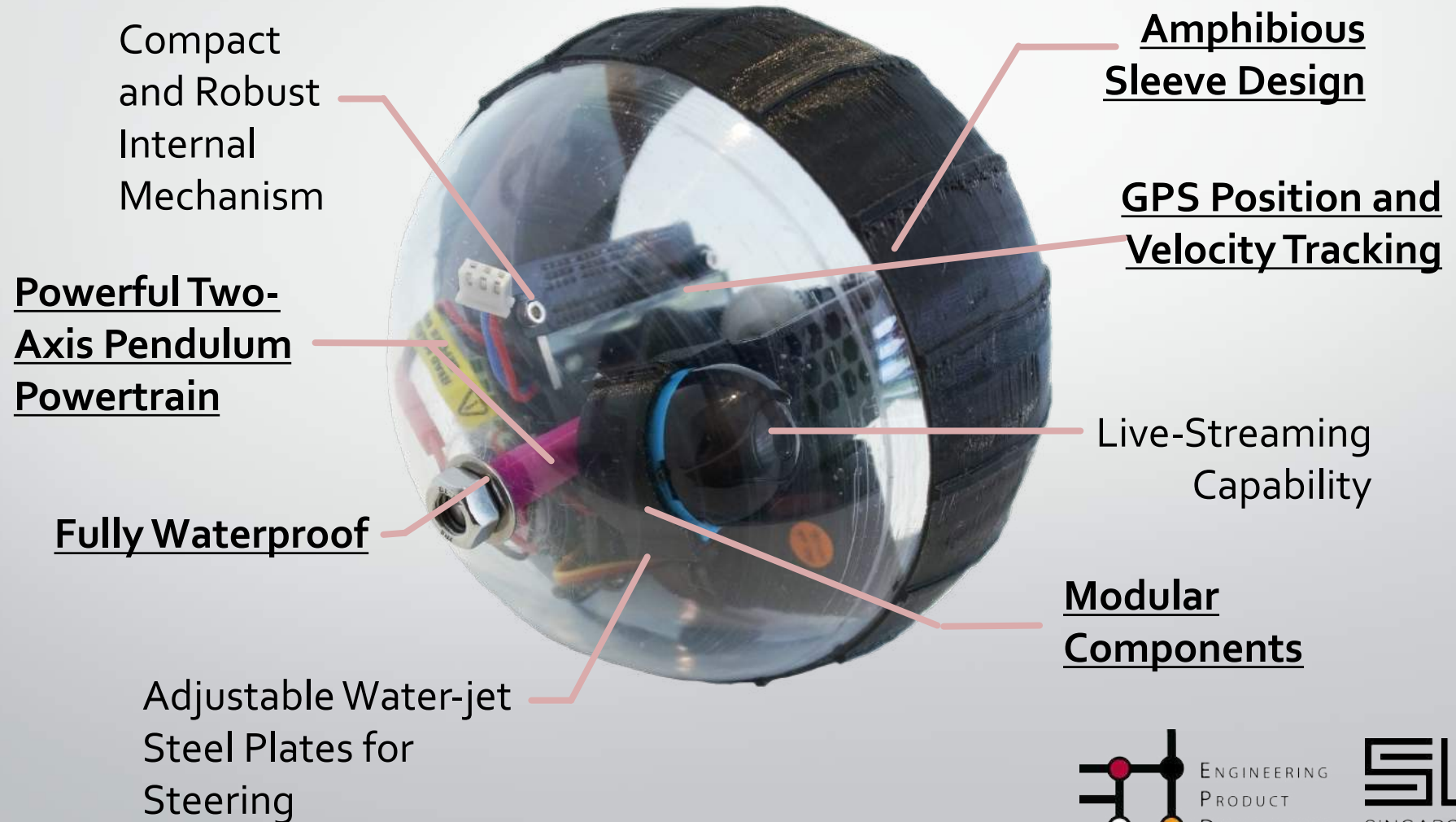
Desired Characteristics of SALAMANDER

- Small, Light, and Portable.
- Durable.
- Mobility on Land and Water.
- Meaningful Data Collection Mechanism.
- High Adaptability and Modularity.



What is SALAMANDER?

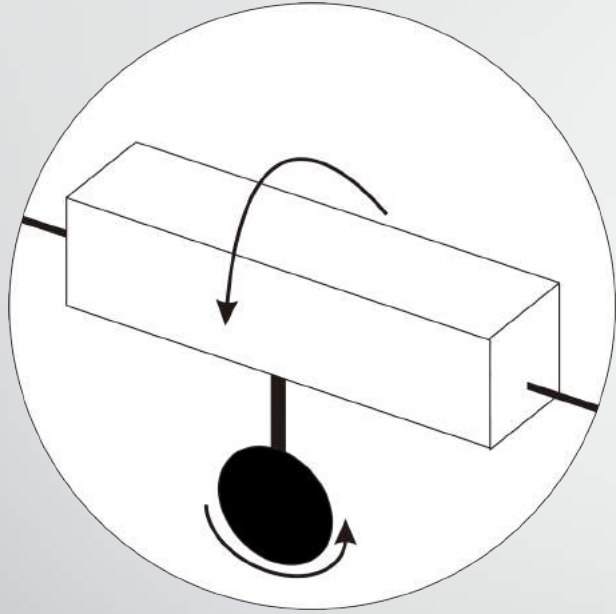
- **Portable** and **Amphibious** Spherical Rolling Robot with **Live-Streaming** Capability.



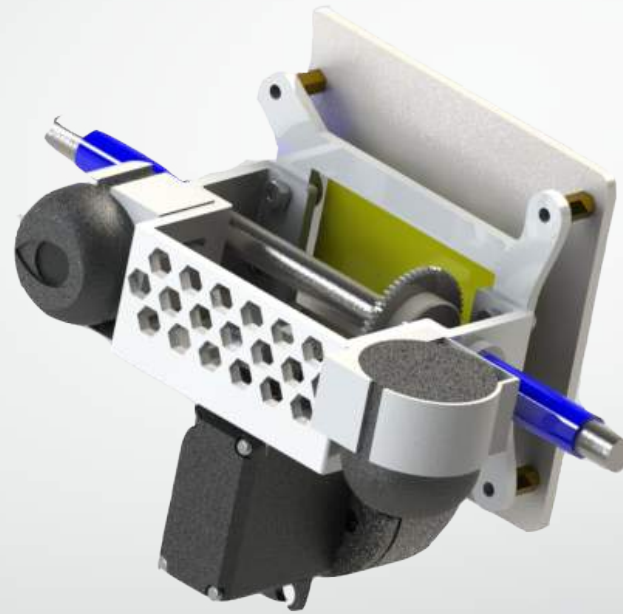
SALAMANDER's Special Features

- Powertrain: Single Two-Axis Pendulum.
- Live-Streaming: Modular Wi-Fi Cameras.
- Amphibious: Waterproofing and Custom 3D-Printed NinjaFlex Sleeve.
- Live Position and Horizontal Speed Tracking on Google Maps.

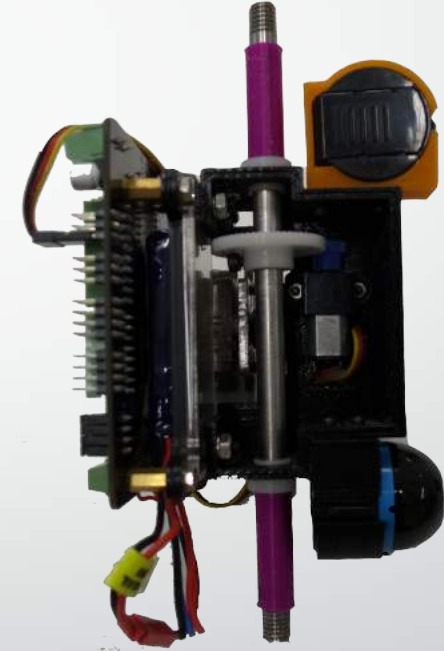
Powertrain: Single Two-Axis Pendulum



Two-Axis Pendulum
Mechanism Concept

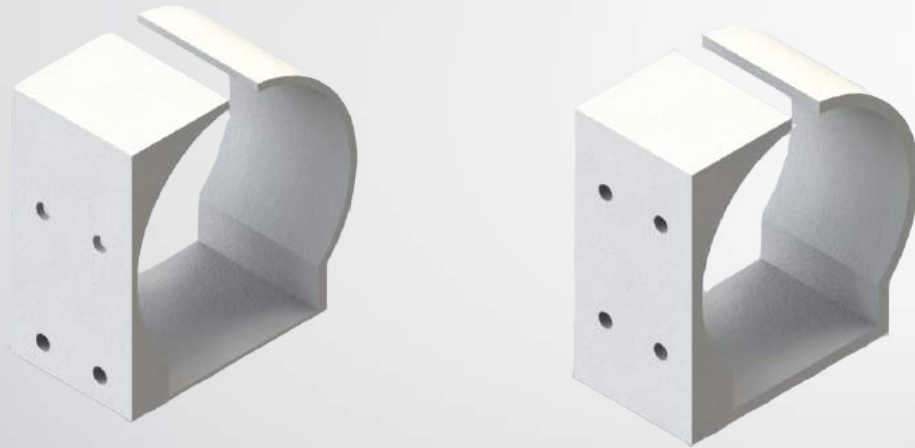


3D Rendering of Powertrain Design



Actual Powertrain

Live-Streaming: Modular Wi-Fi Cameras



Modular Design of Camera Mount



Actual Mount Design Assembly

Amphibious: Waterproofing and Custom 3D-Printed NinjaFlex Sleeve

Combines the Two Hemispheres

Waterproofing Capability

Improved Traction on Land

Improved Water Propulsion

Modular Design

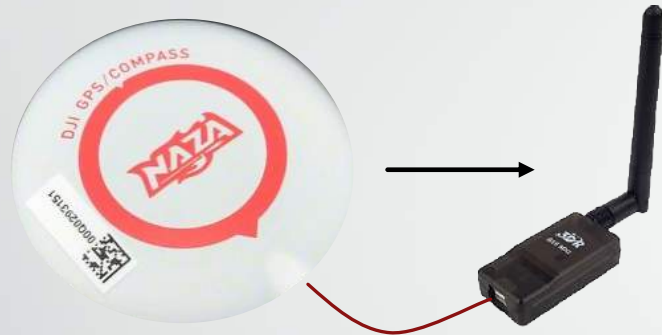


SALAMANDER in Action

- Water Mobility Test



Live Position and Horizontal Speed Tracking



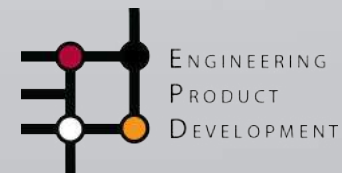
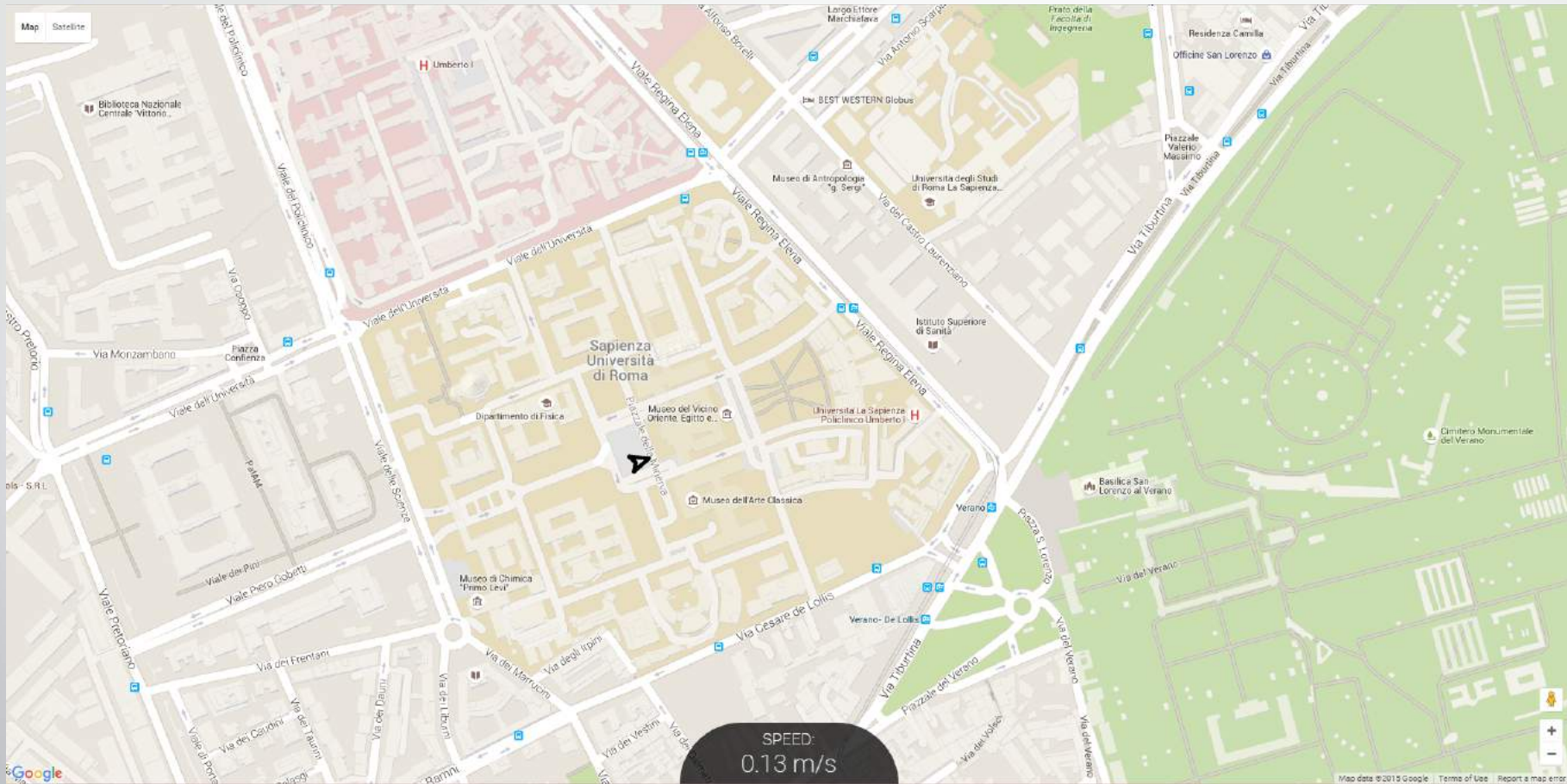
DJI GPS + 3DRobotics Telemetry

Onboard Spherical Robot

Radio Frequency 433Mhz



Live Position and Horizontal Speed Tracking



ENGINEERING
PRODUCT
DEVELOPMENT

SUTD
SINGAPORE UNIVERSITY OF
TECHNOLOGY AND DESIGN

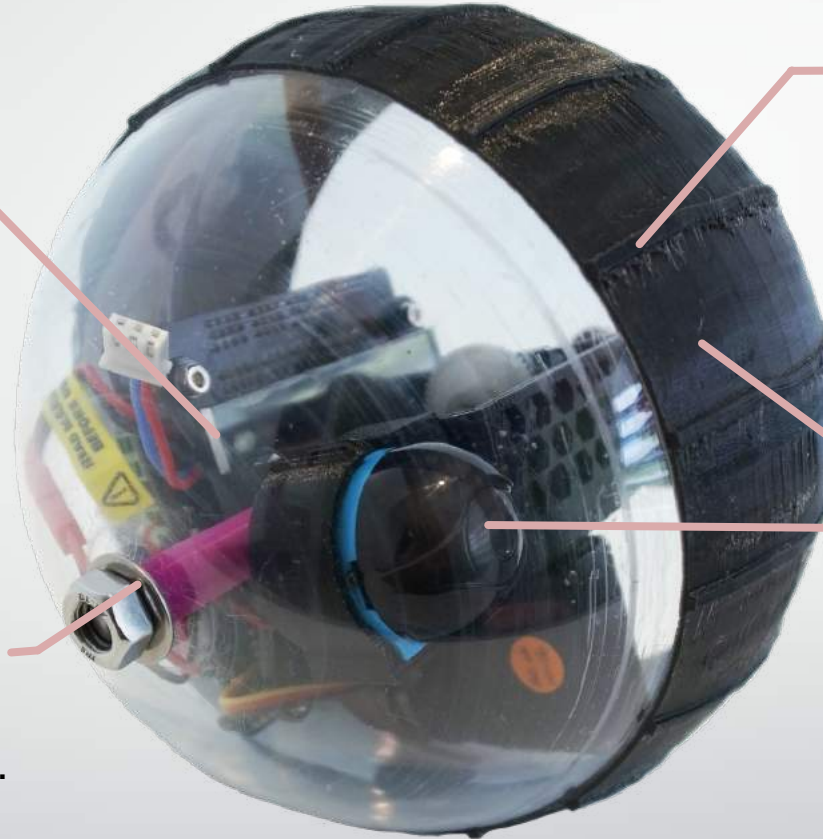
Summary

Powerful Powertrain

- Single Two-Axis Pendulum.
- Self-Correcting.
- High Maneuverability.

Fully Waterproof

- Rubber Gasket.
- NinjaFlex Sleeve.



Amphibious

- Ribs Improve Land and Water Propulsion.

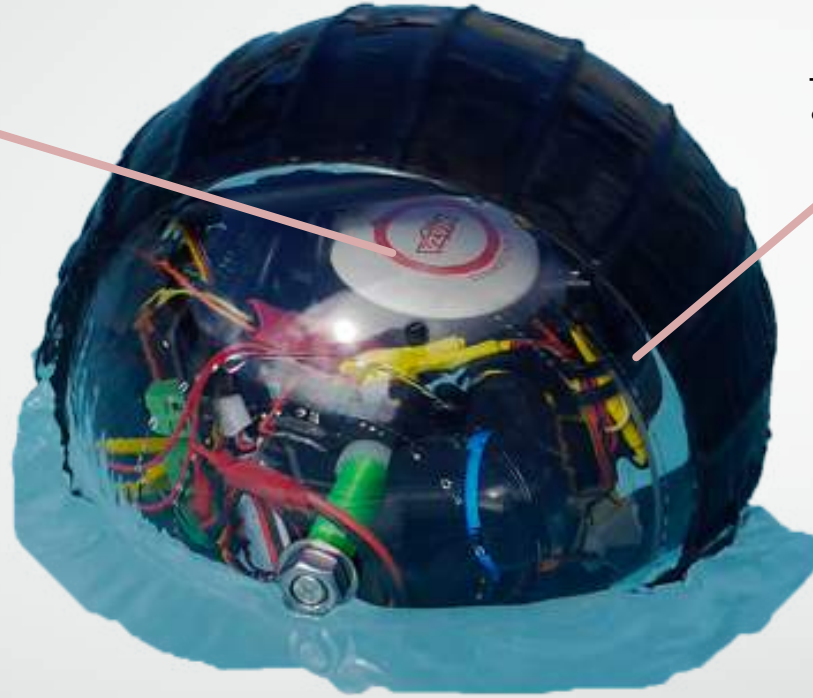
Modular Components

- Switchable Ai-Ball Cameras.
- Switchable NinjaFlex Sleeve.

Summary

GPS Antenna

- Obtains position and forward velocity



Radio Telemetry Unit

- Transmits GPS coordinates and forward velocity back to ground station

Acknowledgment

- Temasek Lab @ SUTD
- SUTD-MIT International Design Centre
- IDA Labs

Check us out at
Booth Z9

Thank You!

