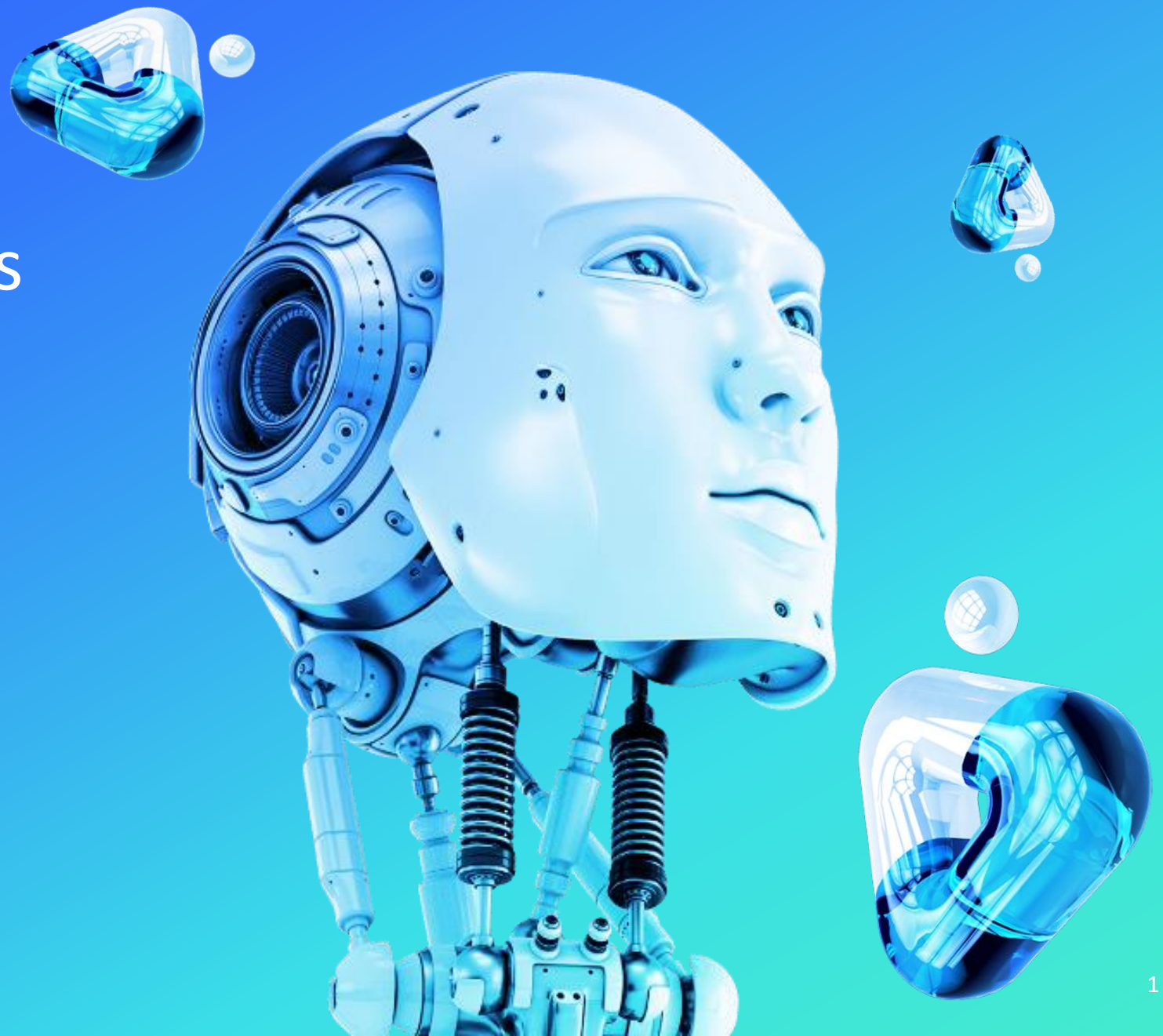
AI AND ROBOTICS VENTURES

Embracing AI & Robotics at PTTEP



Thana Slanvetpan

SPE WA Webinar

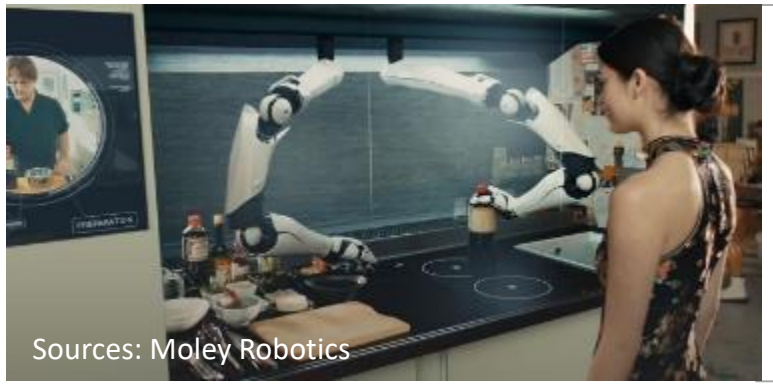
21 January 2021

Rev 17-01-21

Presentation Outline

- Rationale
- Introduction to AI[1] & Robotics for the E&P
- PTTEP Case Studies
- Beyond E&P
- Vision for the Future
- Summary

Rationale


Sources: Moley Robotics

Tech & Commercial Overview

- **$300+B** worldwide in 2027[1,2,3].
- **Fastest growing area in digital** tech over the next 3-5 years[4].
- Improve **productivity** – reduce operating costs and improve safety.
- Countless numbers of **AI & Robotic applications**.

E&P Opportunities

- **Remote and harsh location** – new discovery, new frontier.
- Potential AI & Robotics contribution to our operations – **safer, less cost, and more reliable**.
- E&P workers still perform field works in **high risk areas**.
- Currently **under-invested in the E&P** industry.

Sources: 1) BCG Analysis 2) Fortune Business Insights 3) Tractica 4) World Economic Forum/Accenture

Embracing AI & Robotics at PTTEP

With a long vision, a small robotic team within Thai NOC was formed in 2013 with the key objective to develop human resource capability within country and robotic solutions required by our future operations.

2013

Establishment of PTTEP Robot Club

Autonomous Underwater Vehicle (AUV)

2014

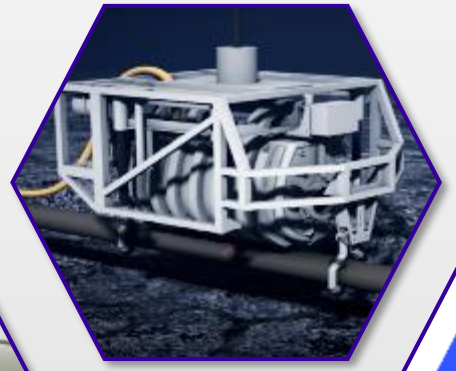
2015

Multi-purpose Inspection Octocopter (MPIO)

In-pipe inspection robot (IPIR)

2016

2018



Subsea Flowline Control and Repair Robot (SFCR)

AI & Robotics Ventures (ARV)

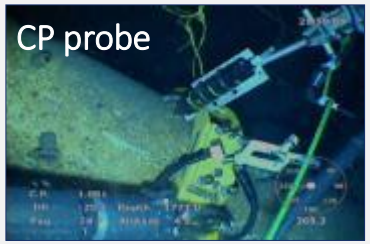
2018

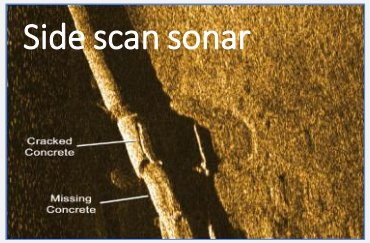
Visualization and sensing → **Cognition and manipulation** → **(Human) Interaction** →

Source: PTTEP Plc.

AI & Robotics for Subsea IRM

Offshore facilities are critical assets and maintaining them in reliable working conditions is one of the major challenges which operators are faced with. Facility failure usually results in incidents that can have devastating impacts.





Advanced Subsea IRM Project

- Intended for subsea pipeline.
- A step-change to counter disadvantages of vessel-based technique relying on ROVs and divers.
- Minimize the use of supporting vessels and divers.
- Projected to reduce subsea IRM cost by 30-40%.

*IRM = Inspection, Repair, and Maintenance

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Nautilus SCFR

- Semi-autonomous, robotic repair of subsea flowlines subject to both external and internal corrosion.
- Enclosed subsea habitat under digitally controlled environmental conditions.
- A combination of robotics and material science.
- Faster, no diver, and cost saving.
- The Nautilus is ADIPEC Award winner for Breakthrough Technology of 2020.

The Power of AI Computer Vision

With rising of AI technology, our idea is to apply such technology to our operations by integrating a computer vision module into the CCTV to enhance safety in the work place.

Background

- The only control over the use of PPEs consists of a visual inspection either directly or through CCTV.
- Integrating AI computer vision into the CCTV that allows a supervisor sitting in a control center monitor or receive an alert for any unsafe activities via high-definition video.

Source: PTTEP Plc. and ARV

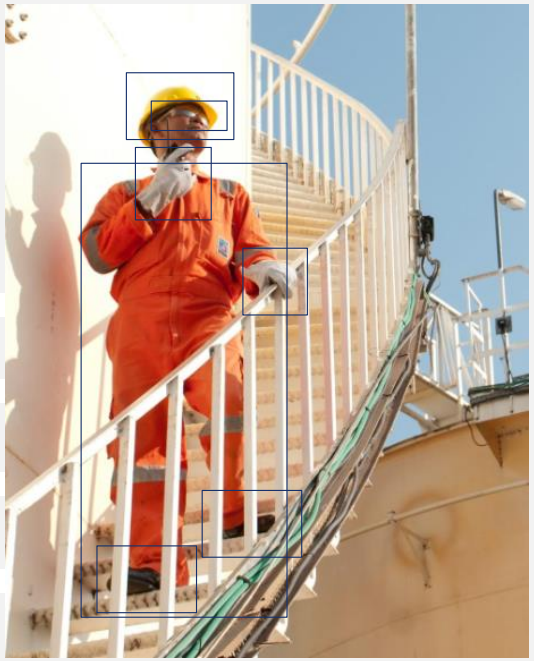
AI-enabled PPE Compliant Monitoring

Our main purpose behind the development of AI-PPE Compliant is to improve a company's health and safety compliance.

Mr. Safety

Time stamp : 24/08/19 10:00:00

- Safety helmet ✓
- Safety glasses ✓
- Coverall suit ✓
- Safety boots ✓
- Gloves ✓



1. Reduce risk of **accident**.
2. Ease-up human burden for **repetitive routine tasks**.
3. Provide **analytics** on safety of the work place
4. Not restricted to E&P, but can extend to **other industries**, e.g. construction, maritime, manufacturing, etc.

Source: PTTEP Plc. and ARV

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AI-enabled Drone-based Solutions for Energy Sector and Beyond

A combination of cutting-edge hardware and software to meet all inspection and maintenance requirement in a safer and faster manner, without due compromise to quality

Unmanned Aerial Vehicles

Scope of UAV applications is intended to response to the extremely safety risks and costs of E&P operations and beyond...

Beyond Oil and Gas and NOC’s Implications

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Thailand

- Application of AI & Robotics to grassroot farmers.
- Agriculture supplies 70% of employment.
- 55% out of 128 million acres are dedicated to farming.
- Agriculture contributes 10% of GDP.

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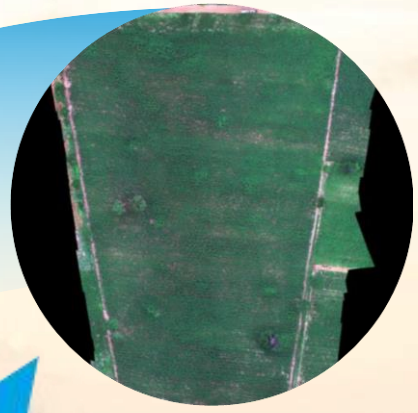
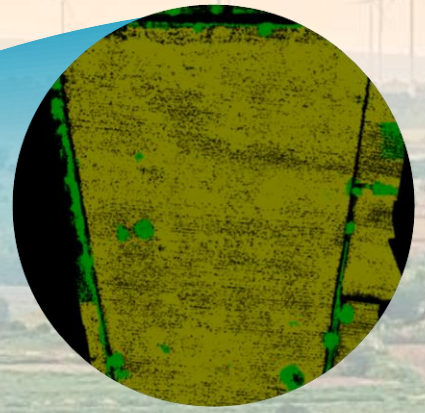
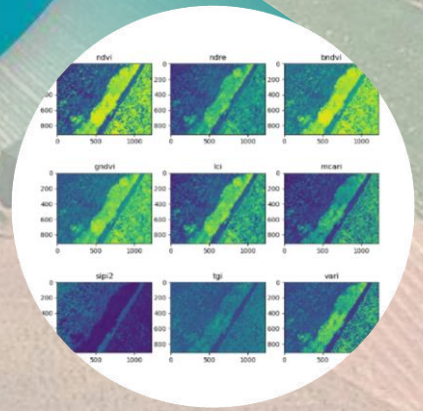
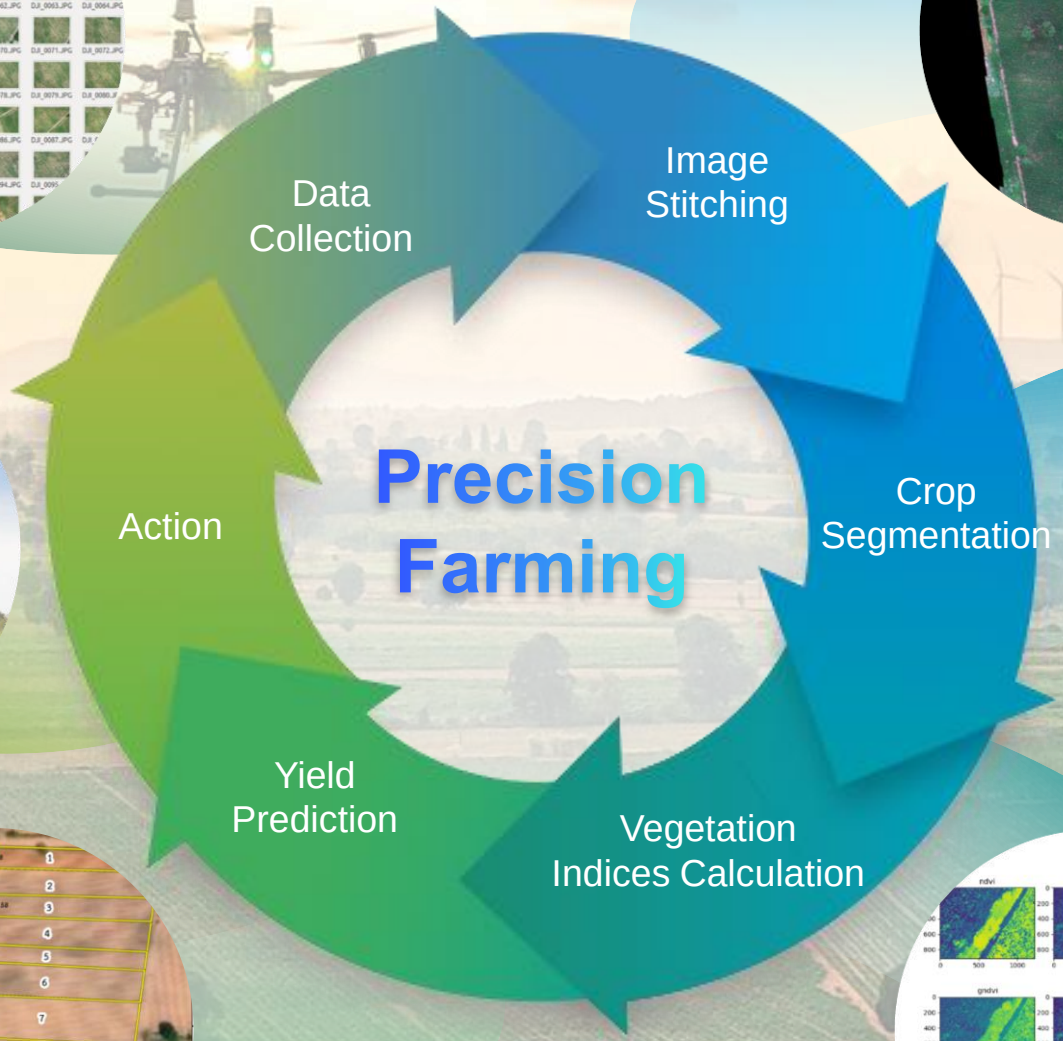
Precision Agriculture









Data Analytics

Analyze data (images)
Identify areas for pesticides and fertilizers.
Up to 20% cost saving on costly fertilizer & harmful pesticides.
Yield prediction, product quality grading.
Planting & harvest planning.

Precision Spraying

10x faster spraying duty.
Higher yield per square meter.

A Platform to Deliver the Future…

In the future, autonomous robots in various forms will replace humans when dealing with critical situations in extreme environments or perform repetitive routine in high-risk areas covering air, land, and sea.

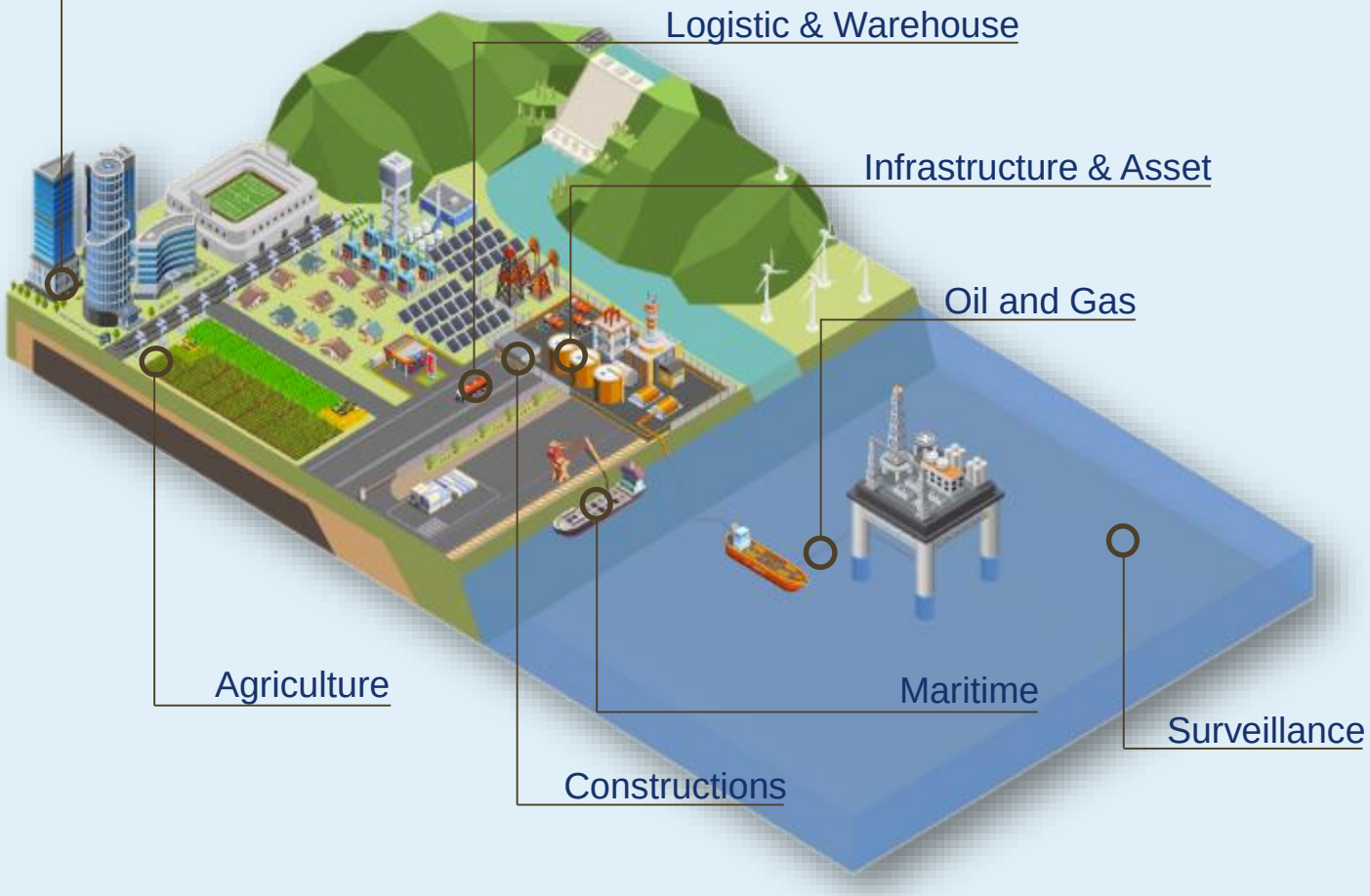
ARV Key Solutions

Energy

Industrial Infrastructures

Precision Farming

Others



ARV Full stack of Services

RaaS
(Robot as a Service)

+

SaaS
(Software as a Service)

=

AaeP
(ARV as an Enterprise Platform)

Conclusions

- **ROLE**: AI & Robotics will play a key role in achieving industry 4.0, both from the business perspective and country development progression, i.e. sustainability transformation.
- **OPPORTUNITIES**: Opportunities to apply AI & Robotics to E&P do exist to minimize human exposure to hazardous conditions and improve operational efficiencies as well as reduce carbon footprint.
- **PTTEP CONTEXT**: Applications of AI & Robotics have a significant impact to the future sustainability, i.e. country aspect and human resource development.
- **COLLABORATIONS**: Advancing AI & Robotics will require an integrative effort and cross-disciplinary from all the sectors involved, i.e. oil companies, service companies, academics, and those from other industries.

PTTEP

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