

**KOLOKIUUM PENYELIDIKAN 2021
INSTITUT TADBIRAN AWAM NEGARA**

PREDICTIVE MAINTENANCE: MICROWAVE NON-DESTRUCTIVE TESTING

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Keywords

Industrial Revolution 4.0

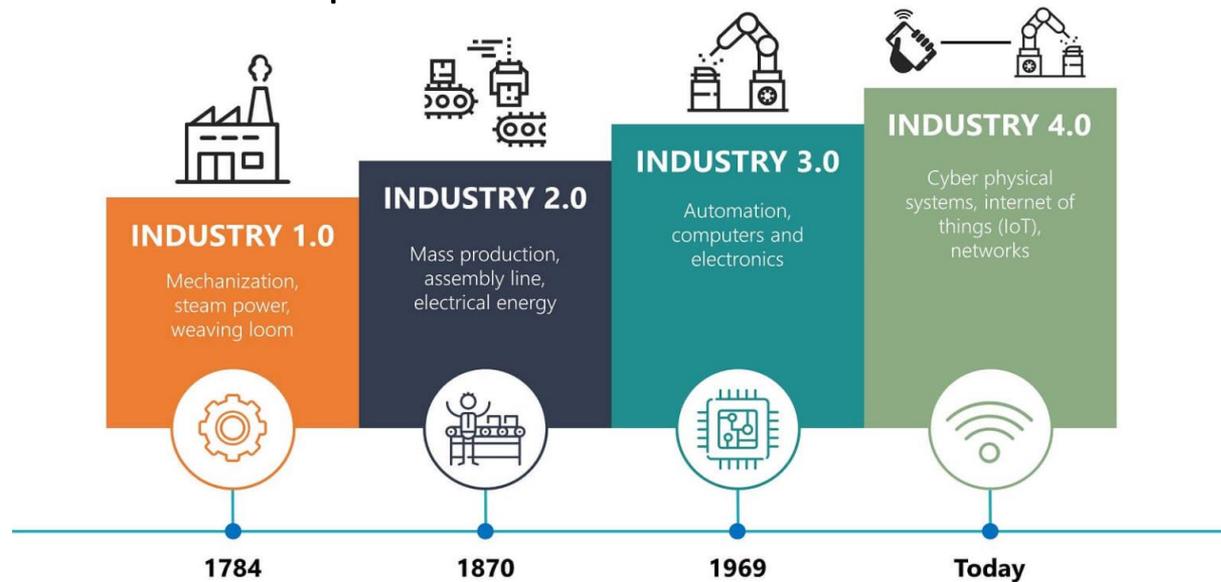
Predictive Maintenance

Microwave Non-Destructive Testing (NDT)

Industry 4.0

Keywords: Connectivity, Smart

As previous industry revolution was led by innovations in manufacturing processes and systems, the advancement of industry 4.0 will be driven by a smart, interconnected pervasive environment.



Simulation & Augmented Reality



Horizontal and Vertical Integration



Industrial Internet of Things



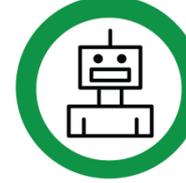
Cybersecurity



Cloud



Additive Manufacturing



Autonomous Robot



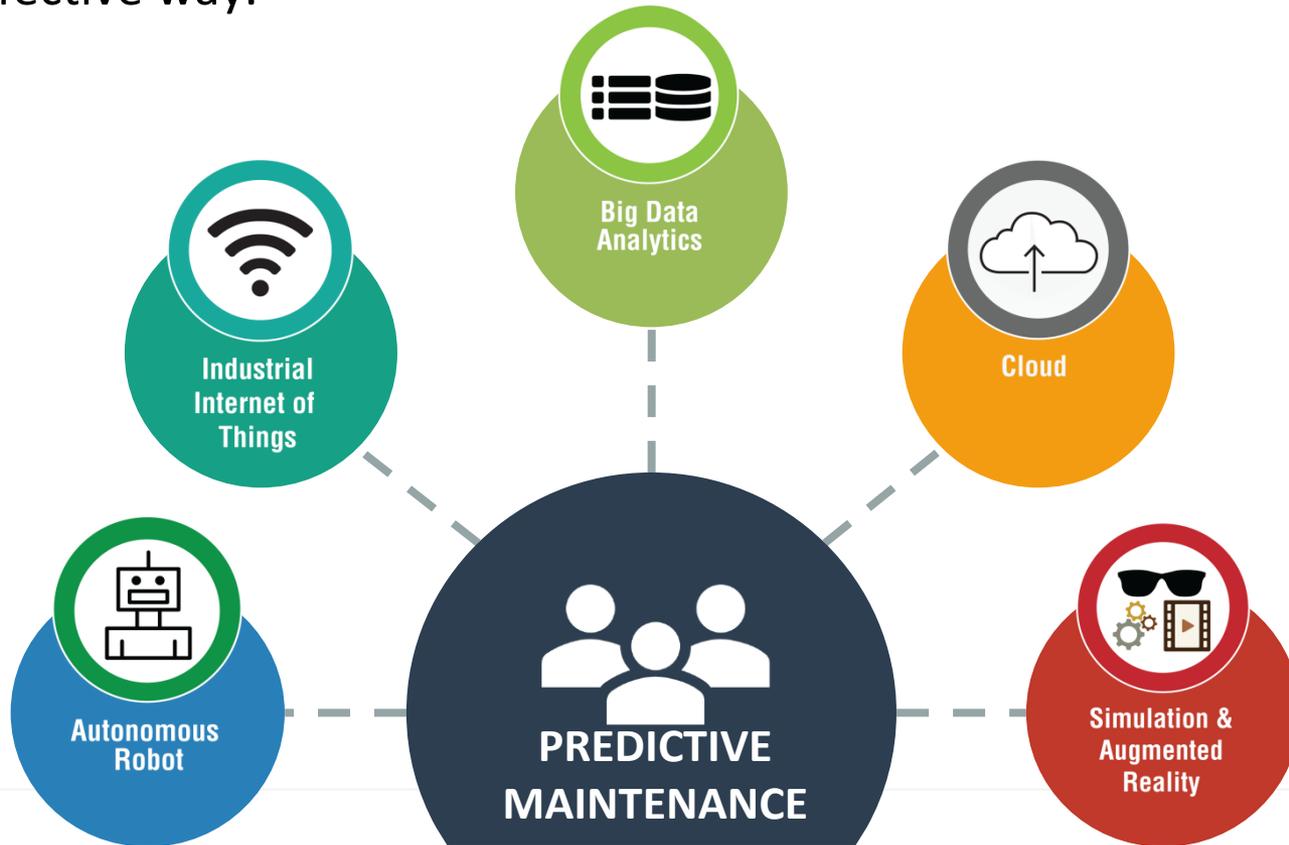
Supply Chain



Big Data Analytics

Predictive Maintenance

Predictive methods uses software and hardware **tools** to **monitor the condition of** equipment, system, structure, and it performs a **risk analysis** to **prevent the failure** in the most efficient and effective way.



Problem Statement



Insulation has been widely used in the oil and gas industry to protect the pipeline structure

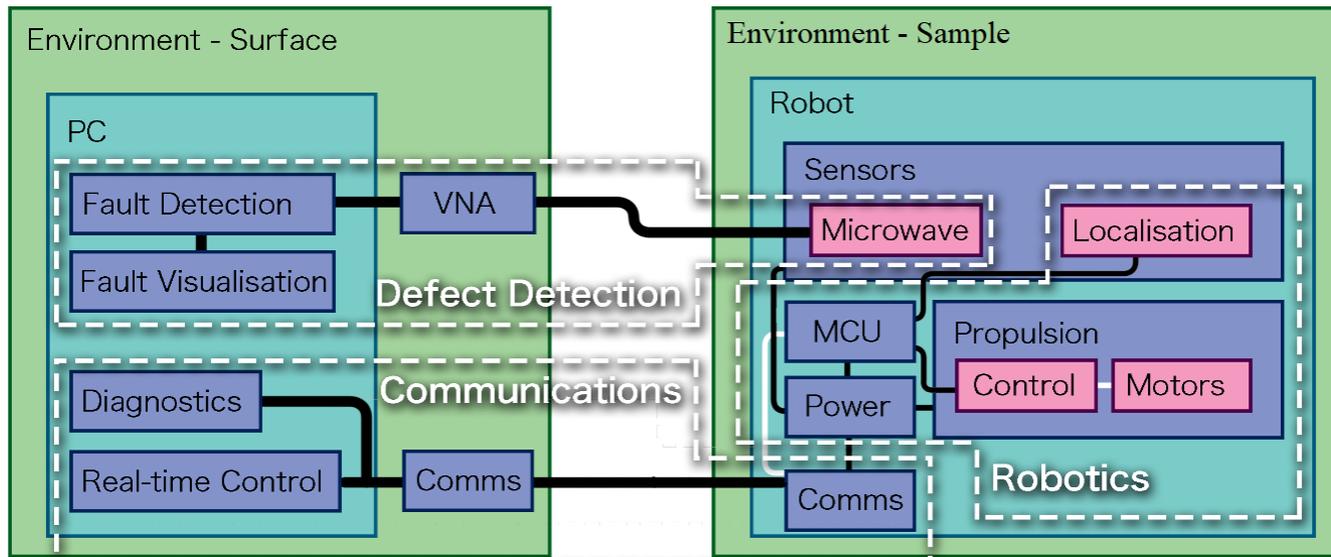
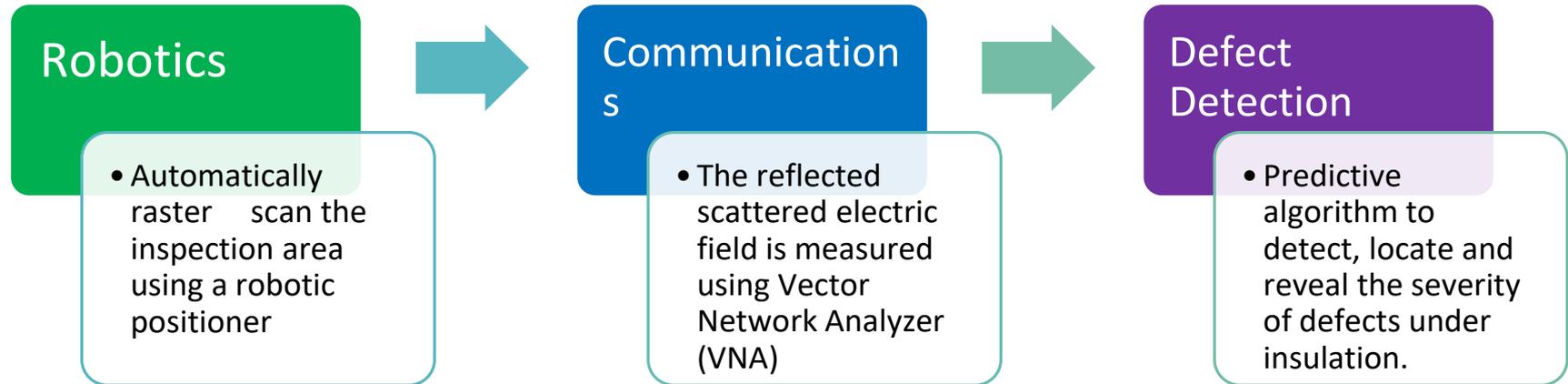


Corrosion and delamination to grow between the insulation and the pipeline surface



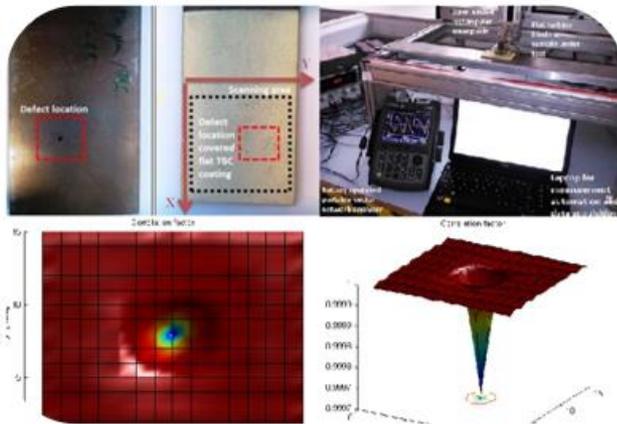
The existing inspection technique require to remove the insulation

Methodology

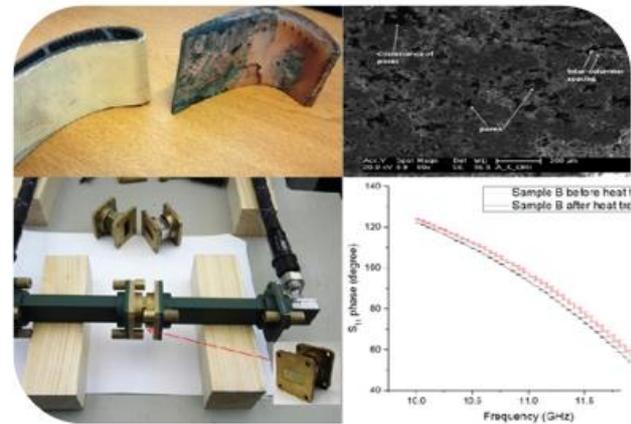


State of Art of Microwave Inspection

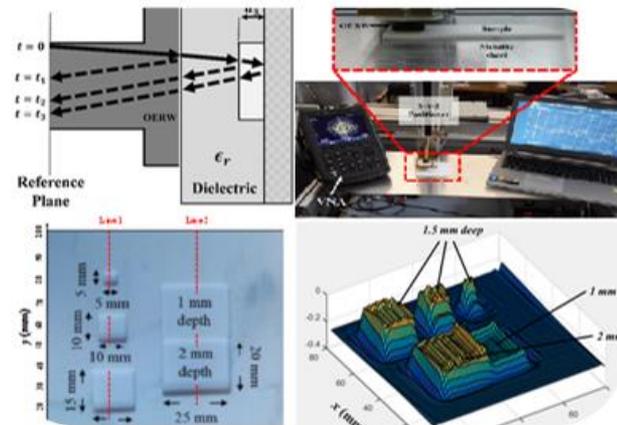
Research Findings



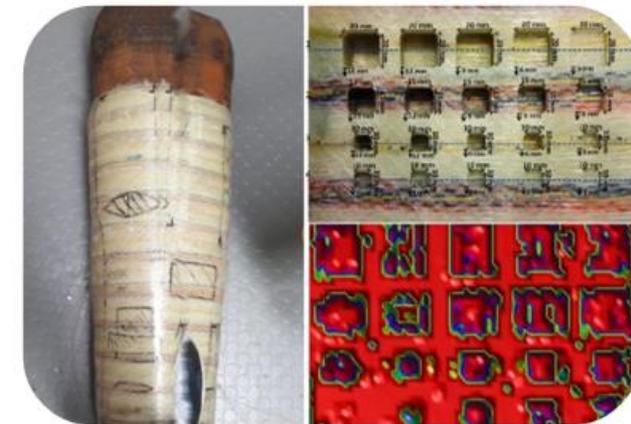
Defect detection and imaging of crack-on-metal surface under thermal barrier coating (TBC) insulation of turbine blade using microwave technique



Insulation evaluation of turbine blade coating using microwave technique



Detection and severity estimation of the defect under the insulation using microwave technique



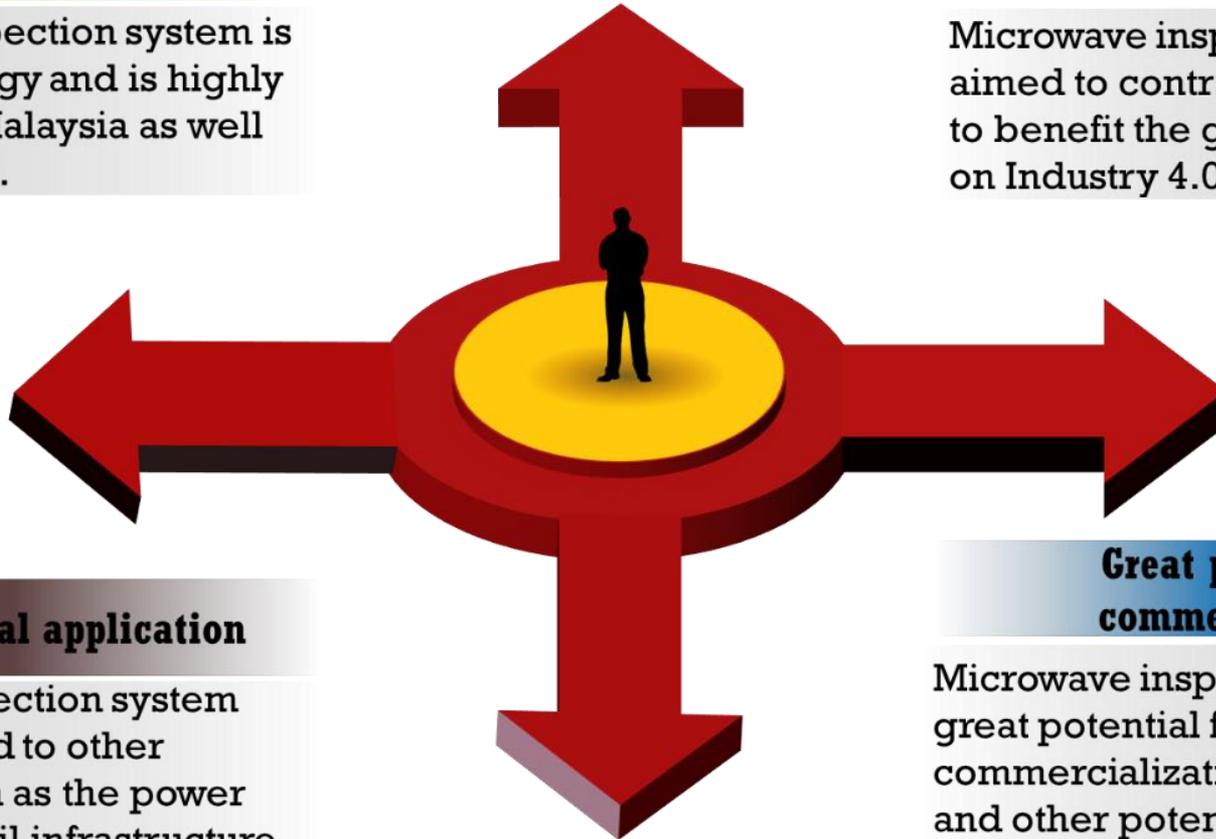
Defect detection and imaging of delamination under the insulation of oil and gas pipe using microwave technique

Highly patentable

Microwave inspection system is a new technology and is highly patentable in Malaysia as well as in the global.

Development of new technology

Microwave inspection system is aimed to contribute to SDG 9 and to benefit the government policy on Industry 4.0



Other potential application

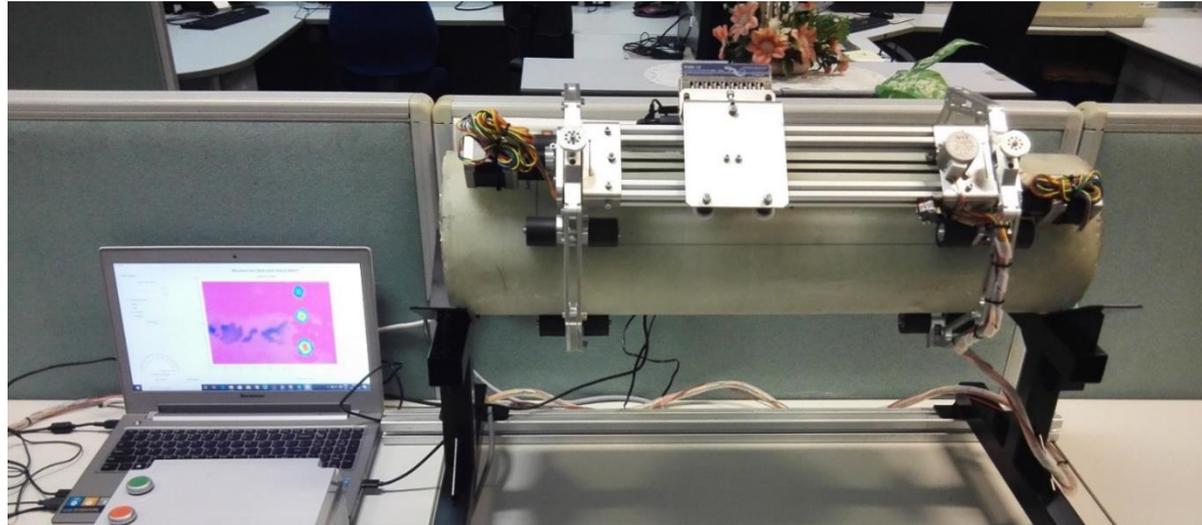
Microwave inspection system can be extended to other application such as the power industry and civil infrastructure

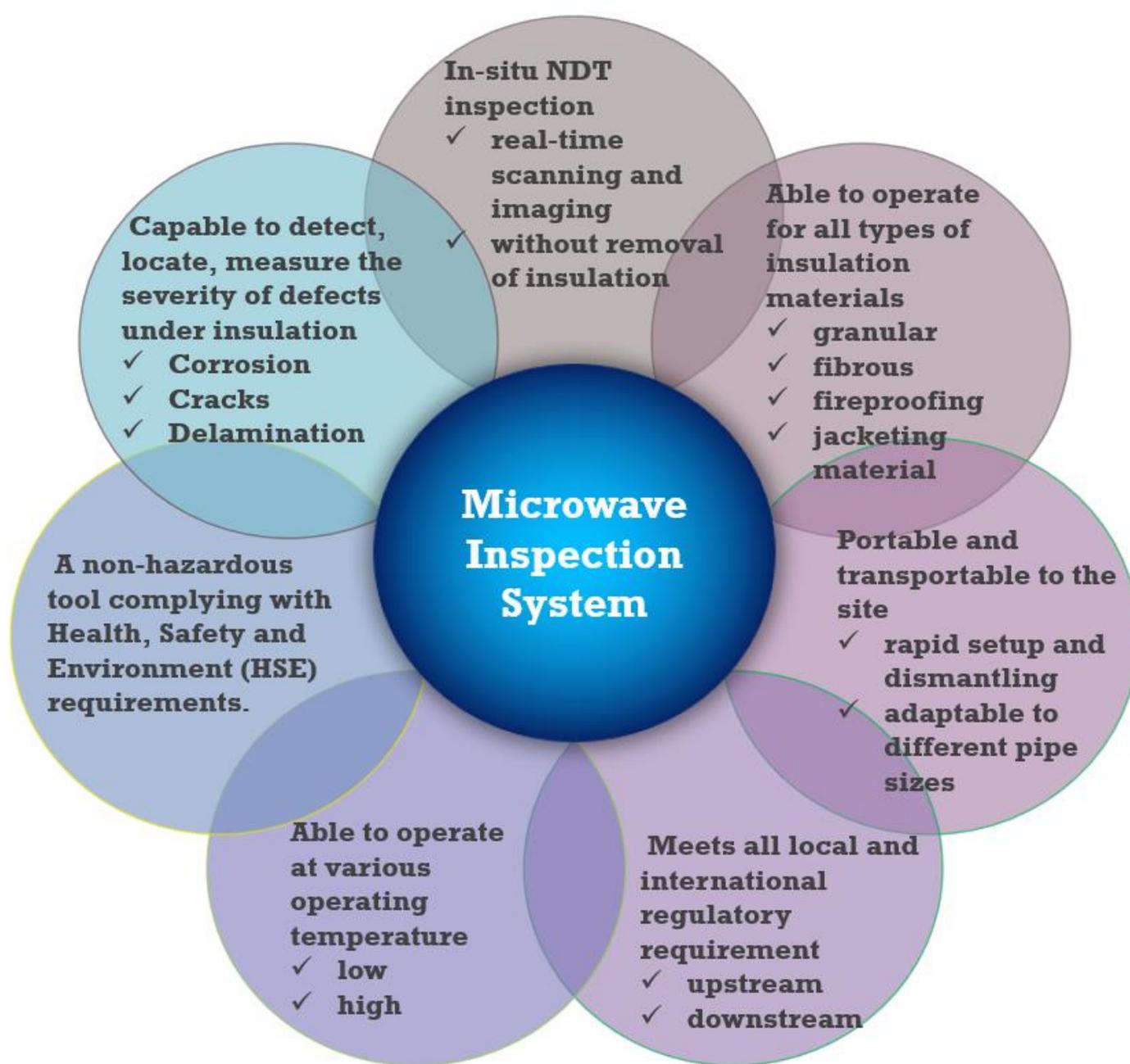
Great potential for commercialization

Microwave inspection system has great potential for commercialization with Petronas and other potential industries

Research Impact

Microwave Inspection System





Why Predictive Maintenance?



Maintenance
Predictive

THANK YOU |