



Cooperation Agreement

of China-ASEAN Joint Research Project

Date: June 1st, 2023

Project title: AI-driven Computational Electromagnetic Imaging Technology for In-pipe Inspection of Oil & Gas Pipeline (The exact proposal title may be slightly different with this one, but it also works under this cooperation agreement. Hereinafter referred to as the "Project".)

Duration: Three (3) years, from the date of approval.

This Agreement represents the entire understanding and agreement of the Parties with respect to the purpose and supersedes and cancels all prior agreements among the Parties.

1. Project Responsible Persons:

Dr. Ruslee Sutthaweekul, Department of Electrical and Computer Engineering, Faculty of Engineering, King Mongkut's University of Technology North Bangkok (KMUTNB), 1518 Pracharat 1 Road, Wongsawang, Bangsue, Bangkok 10800, Thailand. Tel/Fax: +66 2552000 ext. 8519, Email: ruslee.s@eng.kmutnb.ac.th

Dr. Chaoqing Tang with Department of Measurement Science and Instrumentation, School of Artificial Intelligence and Automation, Huazhong University of Science and Technology (HUST), Wuhan, 430074, China. Tel/Fax:+86 27 87543130, Email: billtang@hust.edu.cn

2. The Main Goal of Cooperation

By combining the research efforts and integrating technologies in the research of artificial intelligence and electromagnetic imaging for oil & gas pipeline, we would be able to carry on further research project, and further the theoretical and practical contribution produced in collaborative research, which is expected to be significant in both the educational and academic points of view.

3. Detailed Goals

- 3.1 Co-author at least 3 papers for the approved project.
- 3.2 Mutual visit at least 2 months*person within the three years of project duration.
- 3.3 Quantitative defect imaging methods with magnetic flux leakage for oil & gas pipeline.
- 3.4 Prototype world-leading software packages for quantitative pipeline defect detection.
- 3.5 Workshop focus on the topic of the Project is supposed to be organized in participant country within 2023-2026.
- 3.6 A long-term academic cooperation in the field of NDT and oil & gas pipeline industry aimed to establish special issues/sessions in leading conference or journal.

4. Tasks

- 4.1 KMUTNB Team is responsible for the research work of magnetic flux leakage sensor signal characterization, figuring out the sensor signal response law to basic defect shapes/parameters and material parameters.
- 4.2 HUST Team is responsible for the research work of system modeling and high-resolution defect quantification techniques including multi-modality integration, 3D defect reconstruction, key parameter reconstruction.

5. Sources of Funding and Its Use

- 5.1 Within the frame of the signed The 11th Meeting of ASEAN-China Joint Science, Technology and Innovation Committee (ACJSTIC-11) agreement each side is responsible for the grant from their own government or funder.
- 5.2 For mutual visits, each side will cover international flight tickets and local-accommodations by themselves.

6. Intellectual Property

- 6.1 In case of need, on the base of reciprocity and confidentiality, the Parties agree to transfer each other their own know-how, obtained before the cooperation on the Agreement and connected with the subject of the Agreement if there is no any obligation towards any third party prohibiting such transfer.
- 6.2 Transfer of know-how and results that are the property of one of the Parties and obtained before the cooperation on the Agreement is possible only for the purposes and tasks of the present Agreement. Those know-how and results remain the property of first Party.
- 6.3 The Two Partners shall exchange information on the progress of the work and on prospects of its further development.
- 6.4 The Parties exchange the specialists, involved into the joint cooperation, and it shall be a direct exchange.
- 6.5 The results of research obtained by one of the Parties independently and without participation of the other Party, are the property of this Party.
- 6.6 Results that are not the subject of discovery or invention can be transferred to the other Party free of charge or by payment according to the terms, agreed by two Parties. Scientific results that are the subject of discovery or invention solely pertain to the Party that has obtained those results.
- 6.7 In the event that Results were to be created by the staff of Parties, without the pre-eminent proportion as regards inventive activity of either of them in obtaining such knowledge being able to be assessed, those Results, hereinafter referred to as the "Joint Results", shall be jointly owned by the Parties, hereinafter referred to as the "Co-Owner Parties", proportionally to their intellectual, human, material and financial contributions, unless said Parties were to contractually agree to the related property rights being transferred to one of them.
- 6.8 The Joint Results transfer to the third parties is possible only by mutual consent of Co-Owner Parties. Terms and conditions of such transfer shall be defined by a separate agreement; gains shall be distributed among the Co-Owner Parties proportionally to their intellectual, human, material and financial contributions to the Joint Results.
- 6.9 During the implementation of the present Agreement the Parties pledge themselves to take appropriate measures:
 - to carry out patent research to reveal world technical and technological level on the subject of the present Agreement;
 - to inform each other about their own inventions and production pieces on the subject of cooperation, with the applications made before the signing of the Agreement as well as within the terms of the Agreement.
- 6.10 Authors of discoveries, inventions and other scientific and technical achievements, made in the implementation of the present Agreement reserve the right of personal authorship.

7. Amendment and Withdrawal

- 7.1 The present Agreement can be modified, amended or withdrawn. No modifications and/or amendments to this Agreement shall enter into effect before having been agreed in writing by the Parties. Agreed modifications and amendments shall enter into effect.
- 7.2 Neither Party has a right to assign its obligations and rights under the present Agreement to any third Party without written consent of the other Party.
- 7.3 All the appendices to the present Agreement are to be considered its integral part.

8. Legal Validity

- 8.1 If a dispute arises to the Agreement, the Parties shall meet the attempts to settle amicably and such dispute by negotiations.
- 8.2 Any dispute that cannot be settled amicably shall be resolved finally by a competent course (arbitration tribunal) in accordance with its rules according to defendant's country law.
- 8.3 Legal addresses

- KMUTNB

King Mongkut's University of Technology North Bangkok
No 1518 Pracharat 1 Road., Wongsawang, Bangsue, Bangkok 10800, Thailand

- HUST

Huazhong University of Science and Technology
No 1037 Luoyu Rd., Wuhan 430074, China

For and on behalf of
**King Mongkut's University
of Technology North Bangkok, Thailand**

Kittichai

Kittichai Thanasupsin
Dean, Faculty of Engineering

Date June 2, 2023

For and on behalf of
**Huazhong University of Science and
Technology, China**

Haitao Zhang

Haitao Zhang
Vice-dean, School of Artificial Intelligence
and Automation

Date 2023.6.2

Ruslee Sutthaweekul

Ruslee Sutthaweekul
Project responsible person

Date 04/06/2023

Chaoqing Tang

Chaoqing Tang
Project responsible person

Date 1st Jun 2023