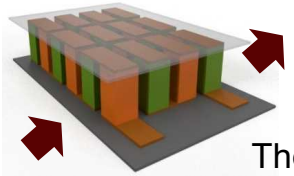
Project Name: International Joint Research of Innovative Thermoelectric Devices and Advanced Evaluation Technology (2020–2023)
Entrusted party: National Institute of Advanced Industrial Science and Technology (AIST)

Outline of the project

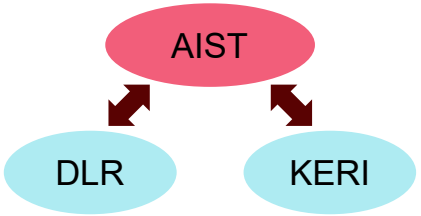
- **Background of the project:** Substantial reduction in GHG by thermoelectric waste heat recovery in vehicles and industrial processes and energy harvesting
- **Purpose of the project:** Development of high-efficiency and highly reliable thermoelectric power generation devices.
  Establishment of international framework for developing high-accuracy evaluation methods.
- **R&D content:** By combining state-of-the-art technologies in Japan and overseas, power generation performance and the reliability of thermoelectric devices can be improved under harsh conditions, such as large temperature gradients of 100 °C/mm or more. The accuracy of thermoelectric evaluation methods can be improved to ±5% or less through international mutual evaluation.



Improved efficiency and reliability

Thermoelectric device

Combining cutting-edge technologies of CNRS-CRISMAT, CEA-LITEN, AIST, and so on



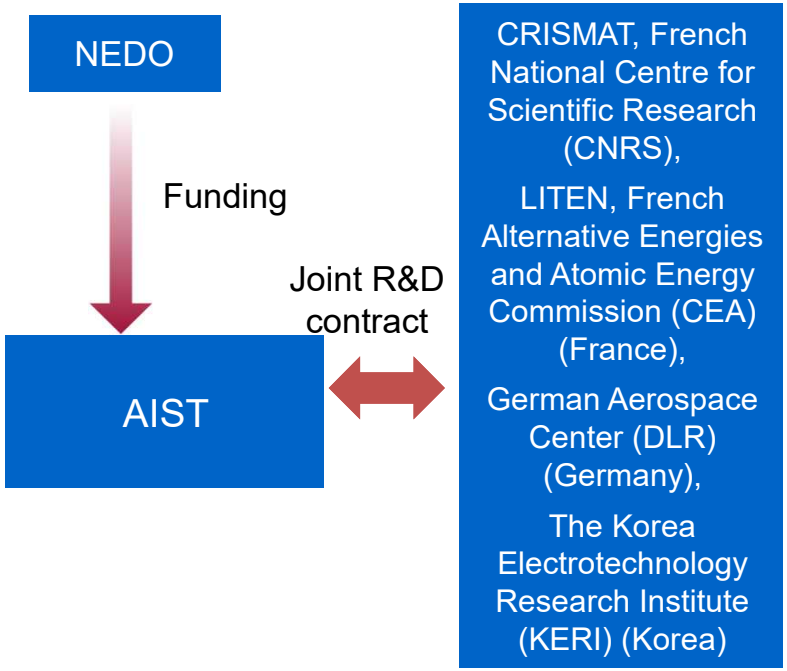
Sophisticated evaluation methods through international collaboration

Significance of international R&D

Utilization of cutting-edge technologies developed in international research insititutes and establishment of international framework for evaluation methods.

- CNRS-CRISMAT: Study of the thermoelectric materials and devices using state-of-the-art transmission electron microscopy technology.
- CEA-LITEN: Search for new high-performance materials using computational science and informatics
- DLR and KERI: Development of advanced power generation evaluation methods by establishing an international framework

Project scheme



Expected outcomes

- After the 2030s, thermoelectric technology is expected to be applied to power generation and energy harvesting from waste heat. Furthermore, the development of high-accuracy evaluation methods is expected to promote market growth.
- By converting just a small percentage of waste heat from vehicles and industrial processes into electricity, CO_2 reduction of more than 5 million tons/year is expected.
- The technologies developed in this project will be transferred to private companies, hence promoting market growth.