

### 1. Experiment Title

"Establishment of database in microgravity boiling and two-phase flow for the design of high-performance thermal management systems in the next generation of space development"

### 2. Principal Investigator

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### 3. Outline of Experiment

Boiling and two-phase flow are useful means for high-performance heat exchange and heat transportation. Systematic experiments on pressure drops and heat transfer are performed by using long-term period in ISS to establish reliable database which is required for the design of the thermal management systems of high-power and high-heat flux density in the new generation of space development.

The experiments are performed in MPSR. The knowledge and database obtained are also utilized for the design of cooling systems in commercial-off-the-shelf products such as hybrid automobiles to promote the energy conservation and global environmental protection.

### 4. Experiment Facility

A common test loop of two-phase flow with interchangeable test sections are integrated in MPSR (Multi Purpose Small payload Rack)

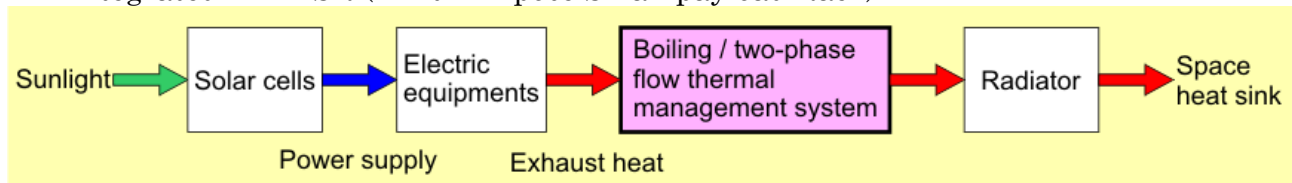


Fig.1 Application of boiling and two-phase flow to thermal management systems in space platforms.

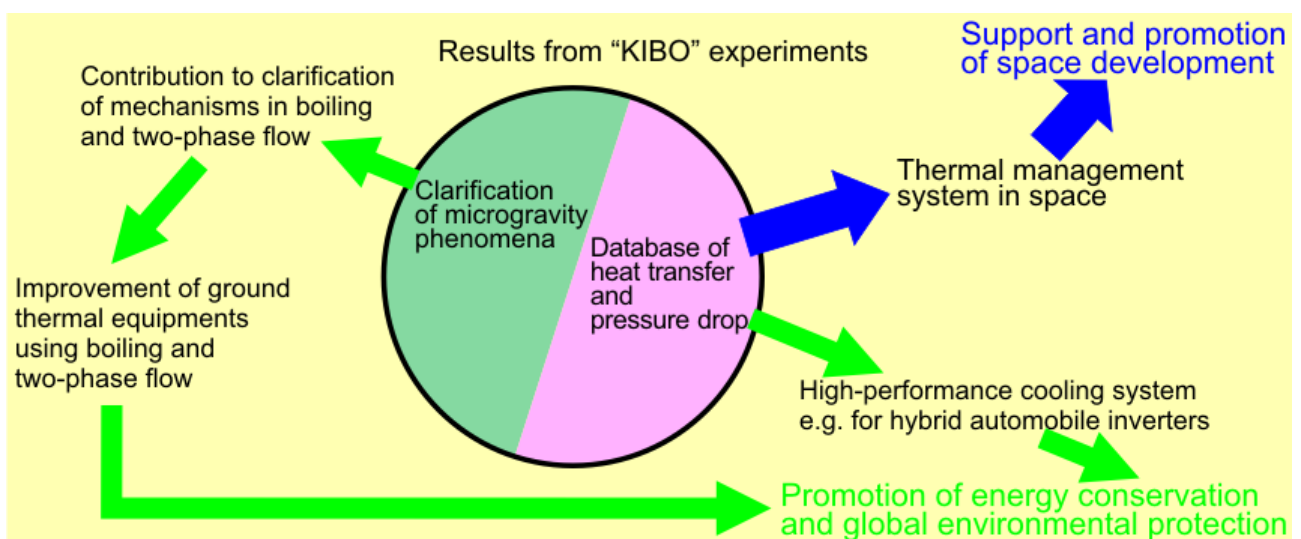


Fig.2 Scenario for the application of experimental results to both of space development and commercial-off-the-shelf technologies