

From ISS Experiments to the Next Stage

The Future of Space Combustion Research



Expected Outcomes

Contributing to human space exploration and next-generation combustion technology R&D!

For Space Applications

Improvement of fire safety in space environments

- Establishment of evaluation technologies for changes in material flammability due to gravity
- Expansion of the use of diverse materials
- Development of effective fire suppression methods

Demonstration of flame retardancy of commercial materials

- Accelerating market competitiveness through demonstration of material flame retardancy in human space environments



Combustion experiments in "Kibo"

For Ground Applications

Improvement of combustion equipment efficiency

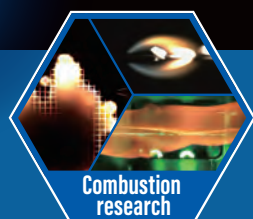
- Acceleration and accuracy improvements of spray combustion simulations
- Elucidation of low-temperature oxidation mechanisms

Development of a foundation for new type fuels

- Databases and models for evaporation and combustion
- Detailed and reduced chemical reaction mechanisms

Platform

Future Platforms representing the pillars of "Kibo" utilization



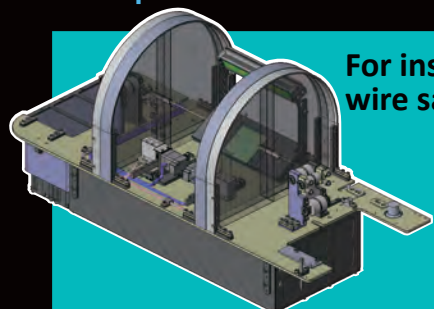
Advanced Combustion Research Platform

Contribution to improving fire safety in space through the advancement of material flammability evaluation technologies considering gravity effects

Building the Future Through Solid Combustion Experiments

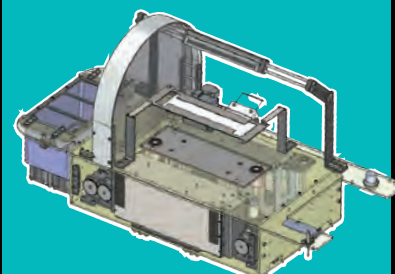
Solid Combustion

Experiment Inserts



For insulated electric wire samples (existing)

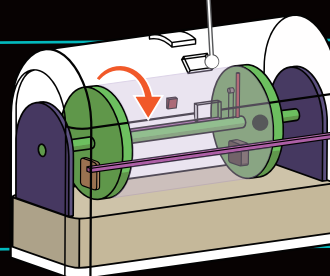
For flat and rod-shaped samples (existing)



Rotating housing

Combustion chamber

For experiments in artificial gravity environments (under consideration)



By rotating the combustion chamber, artificial gravity simulating the Moon (1/6 G) and Mars (1/3 G) is generated

Enabling Fire-Safe Materials Evaluation Across Gravity Conditions



Fire-Safe Human Space Exploration



Image by JAXA/ NASA



Image by JAXA/TOYOTA

Sustainable Energy and Transportation



Image by Yamaguchi University / JAXA

Images of flame spread among approximately 100 fuel droplets (Group Combustion experiment)

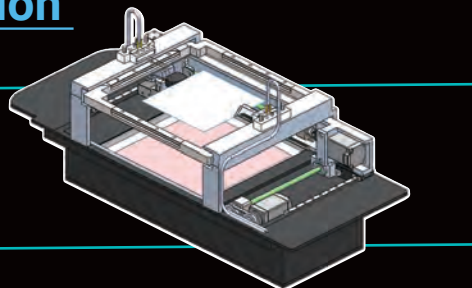


Building the Future Through Droplet Combustion Experiments

Droplet Combustion

Experiment Inserts

For droplet combustion (under consideration)



Enabling Efficient and Clean Combustion with Advanced Fuels, including SAF (Sustainable Aviation Fuel)



Save the date for our upcoming event!

First Announcement of the Event

The 1st International Workshop on Space Combustion Research

Toward Sustainable Platforms for Lunar Exploration and Broader Applications

What comes next for combustion experiments?

2000 2010 2020 • • • • • 2030 20XX

ISS

ISS Operations



Overlapping ISS to CLD Operations

Post-ISS

CLD Operations

Information



DATE: 2026/9/11 (JST) (Onsite and Online)

Location: Tokyo Japan X-NIHONBASHI TOWER