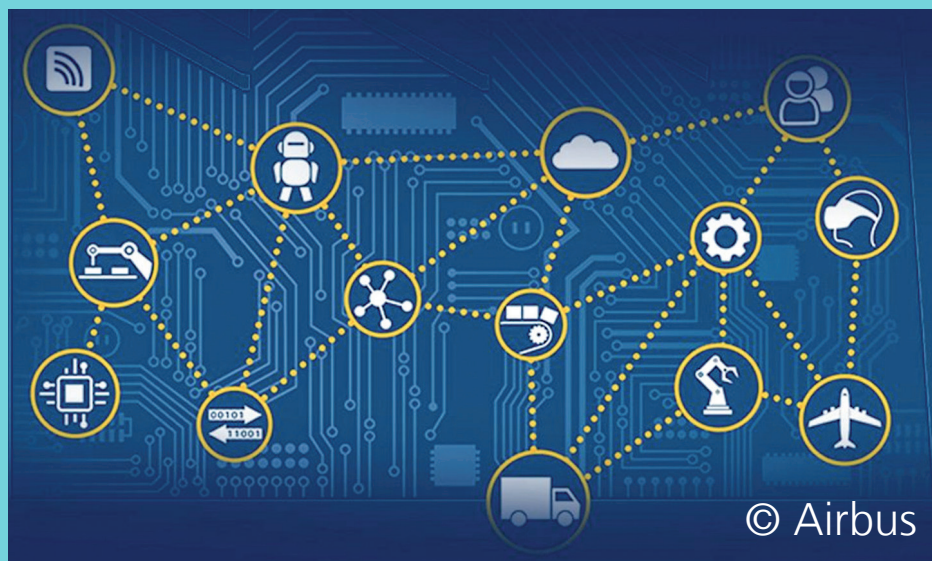


# DYNAMIC THERMOELECTRIC ENERGY HARVESTING IN AIRCRAFT

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## AIRCRAFT OPERATIONS 4.0

Digitalisation offers optimised aircraft operation

- enabling more efficient airspace use
- maintenance and crew support
- extraordinary passenger experience

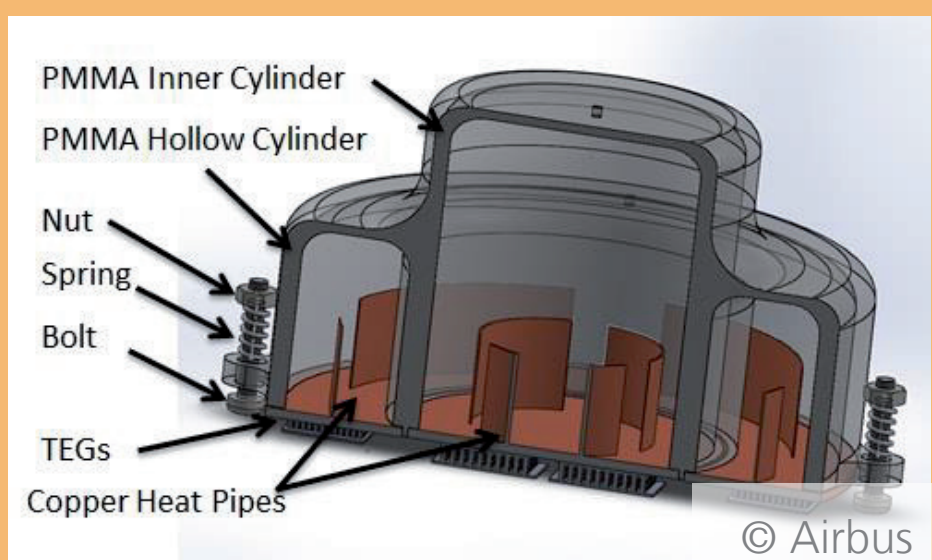


Picture 1

## “WATER BATTERY”

A simplified, green design!

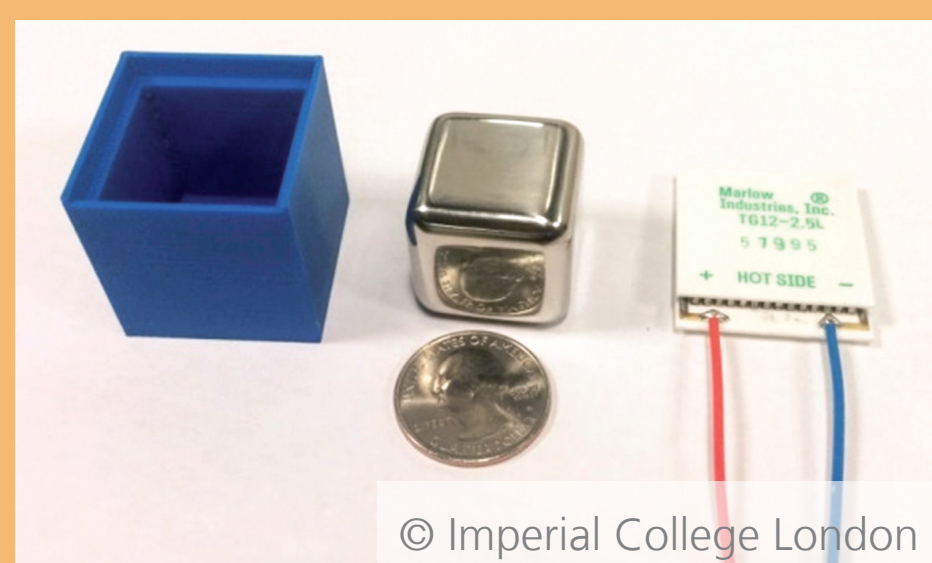
- use heat fluctuations in time to create temperature differences in space!
- green phase change material (water) deployed in a heat storage unit



Picture 2

## TEMPERATURE RANGE ADAPTATION

- use of tailor made phase change materials
- high temperature harvesting devices



Picture 3

## WEIGHT AND SIZE OPTIMIZATION

- custom made designs
- flexibility and cost optimization by lean production

## TURN AIRCRAFTS INTO IoT-TYPE DEVICES

- by connected aircraft and
- wireless sensor network infrastructure

Key enabling technology:

- Thermoelectric Energy Harvesting

Opportunity:

- aircrafts offer unique temperature variations and high temperature differences for local energy conversion

## BENEFITS & OUTLOOK

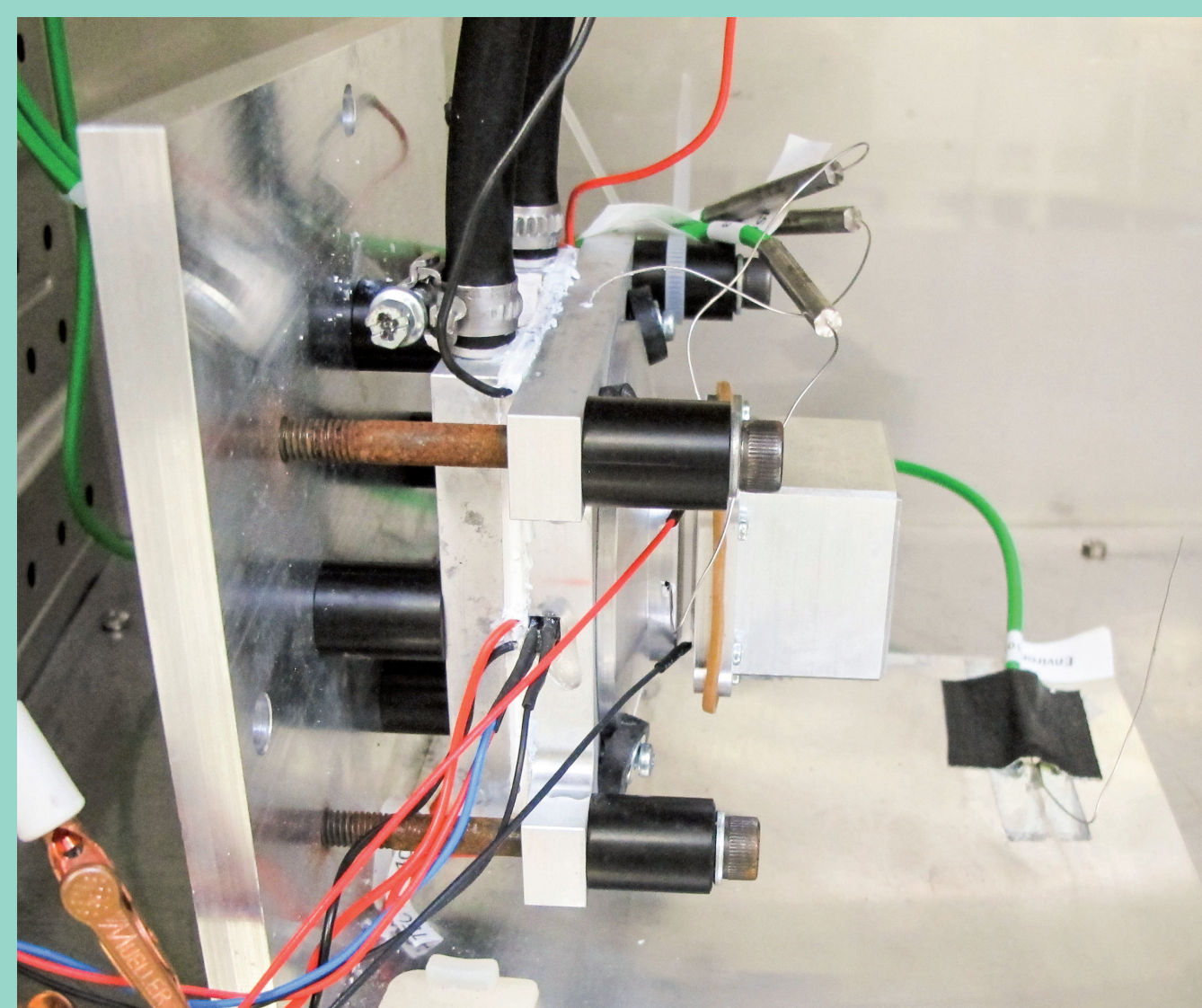
- seven months flight tested
- continuous optimisation
- ✓ reliability
- ✓ temperature range

Future research work is necessary in order

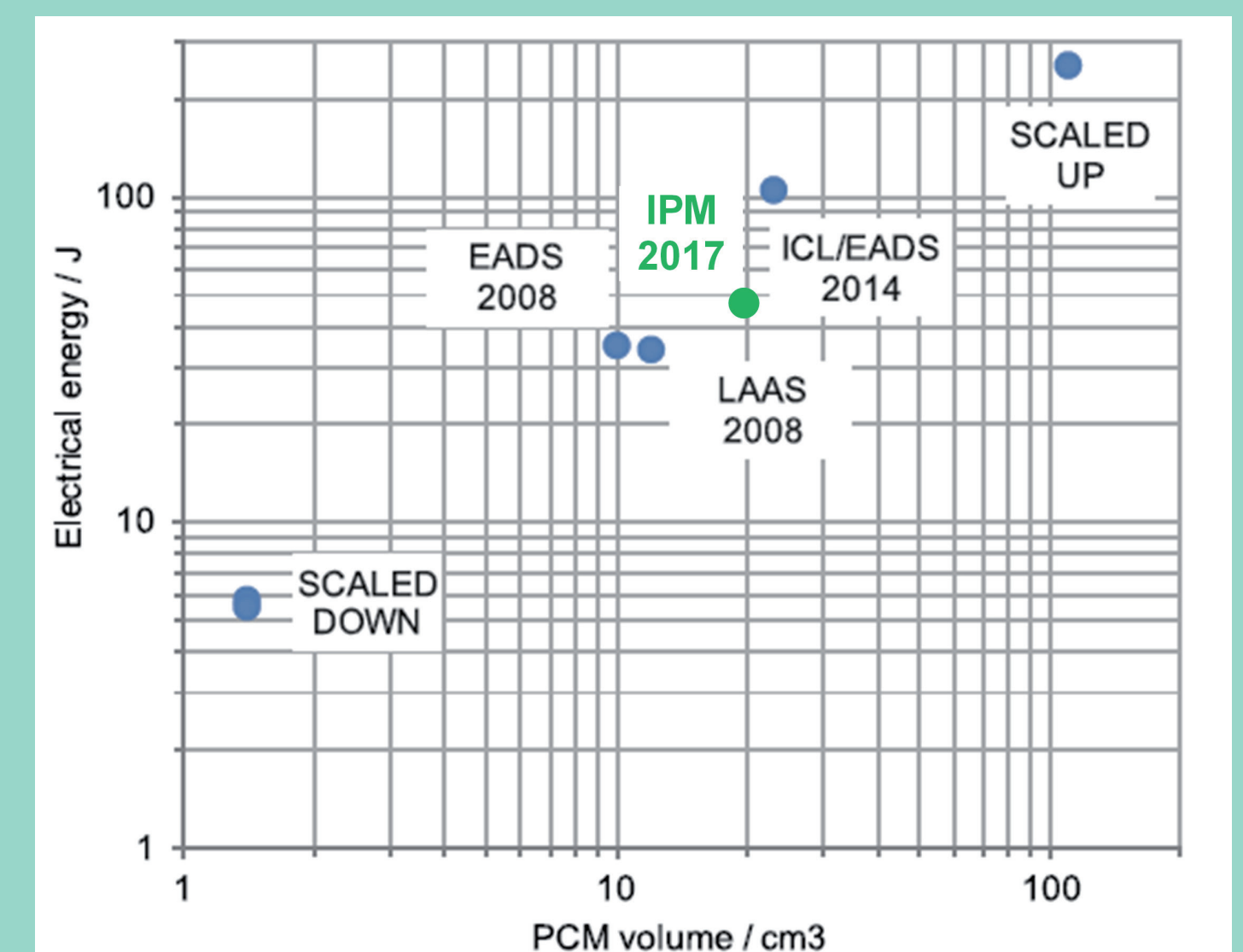
- to overcome the limitations of energy storage devices and
- to turn the harvester into a real power source

## RECENT RESULTS

- test bench simulation of flight profiles
- exploration of durability and design possibilities
- design optimisations
- reliability studies
- Power-Management



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## R&D PARTNERS



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