

DYNAMIC THERMOELECTRIC ENERGY HARVESTING IN AIRCRAFT

M. Kluge¹, M.E. Kiziroglou², E.M. Yeatman², U. Schmid³, D. Schupke⁴, Th. Becker⁵
 Contact: martin.kluge@ipm.fraunhofer.de



AIRCRAFT OPERATIONS 4.0

Digitalisation offers optimised aircraft operation

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

TURN AIRCRAFTS INTO IoT-TYPE DEVICES

- by connected aircraft and
- wireless sensor network infrastructure

Key enabling technology:

- Thermoelectric Energy Harvesting

Opportunity:

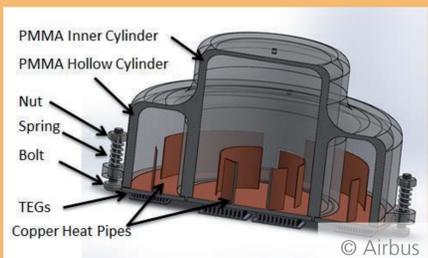
- aircrafts offer unique temperature variations and high temperature differences for local energy conversion



"WATER BATTERY"

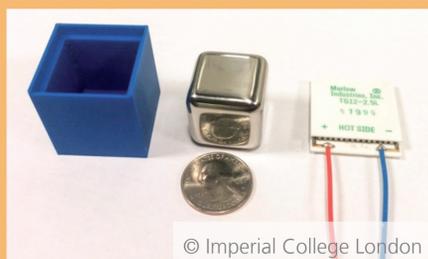
A simplified, green design!

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



TEMPERATURE RANGE ADAPTATION

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



WEIGHT AND SIZE OPTIMIZATION

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

BENEFITS & OUTLOOK

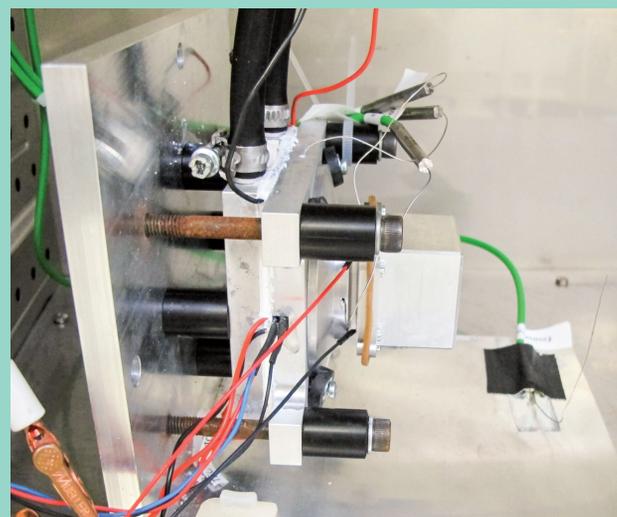
- seven months flight tested
- continuous optimisation
- ✓ reliability
- ✓ temperature range

Future research work is necessary in order

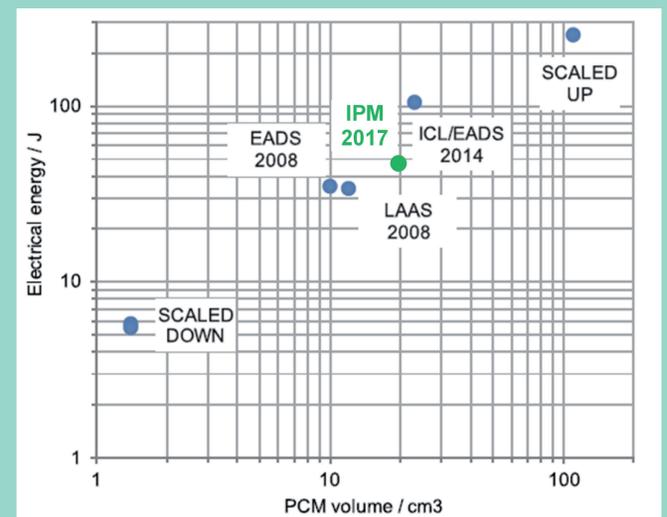
- to overcome the limitations of energy storage devices and
- to turn the harvester into a real power source

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



1. Fraunhofer IPM, Freiburg, Germany



2. Imperial College, London, U.K.



3. TU Wien, ISAS, Vienna, Austria



4. Airbus, Munich, Germany



5. NTA Isny, Isny, Germany

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