

2-Phase cooling solution brought to the automotive market

Calyos SA

ESA COMMERCIALISATION GATEWAY

SPACE FOR BUSINESS
BUSINESS FOR SPACE

Olivier de Laet
Founder of Calyos
November 2023

The Story of Calyos



supported the creation
of a **worldwide expertise**
in 2-Phase thermal
management.



became the **leader** on
the European Space
market.

acquired by **Airbus** in
2017.



providing this 2-Phase
cooling solutions for
electronics **on Earth**.

Facing ever more Thermal Problems

1 Increasing in power and thermal dissipation.

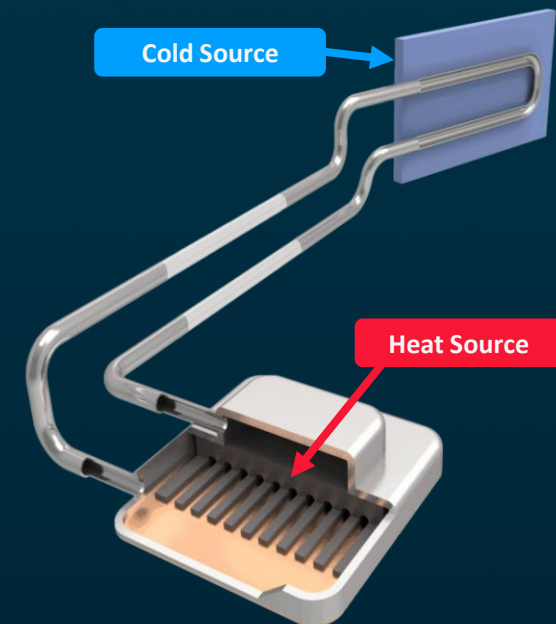
2 Decreasing in component and packaging size.

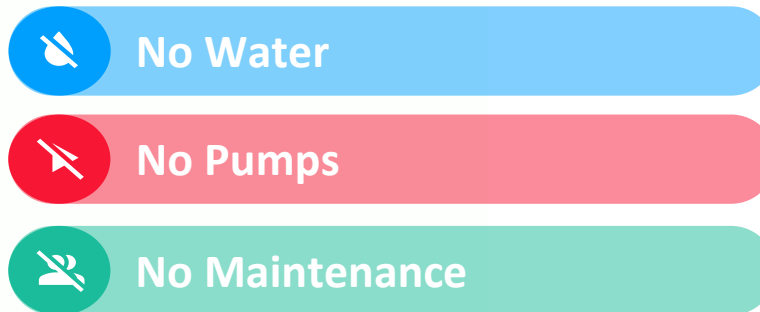


3 Local heat exchange is no longer enough

4 New cooling strategies are required...

Loop Heat Pipes





Loop Heat Pipe long distance **transport capabilities** to reach a remote, **better** cold source:

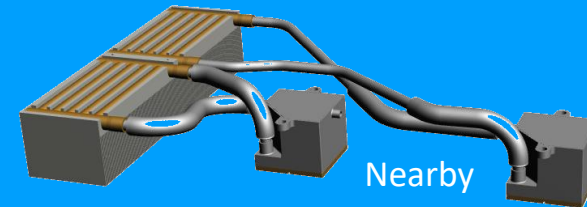
$$Q = h \cdot A \cdot \Delta T$$

(Newton's Law)



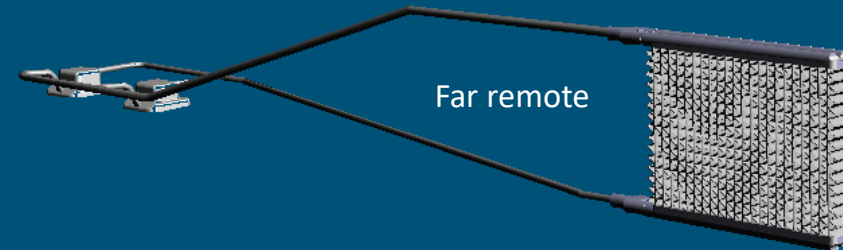
**40W
max**

1 LHP Air Cooling



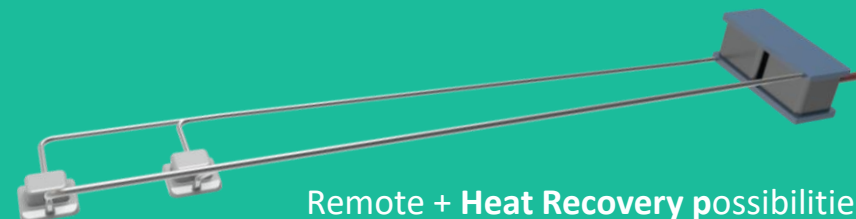
**200W
max**

2 LHP Air Cooling

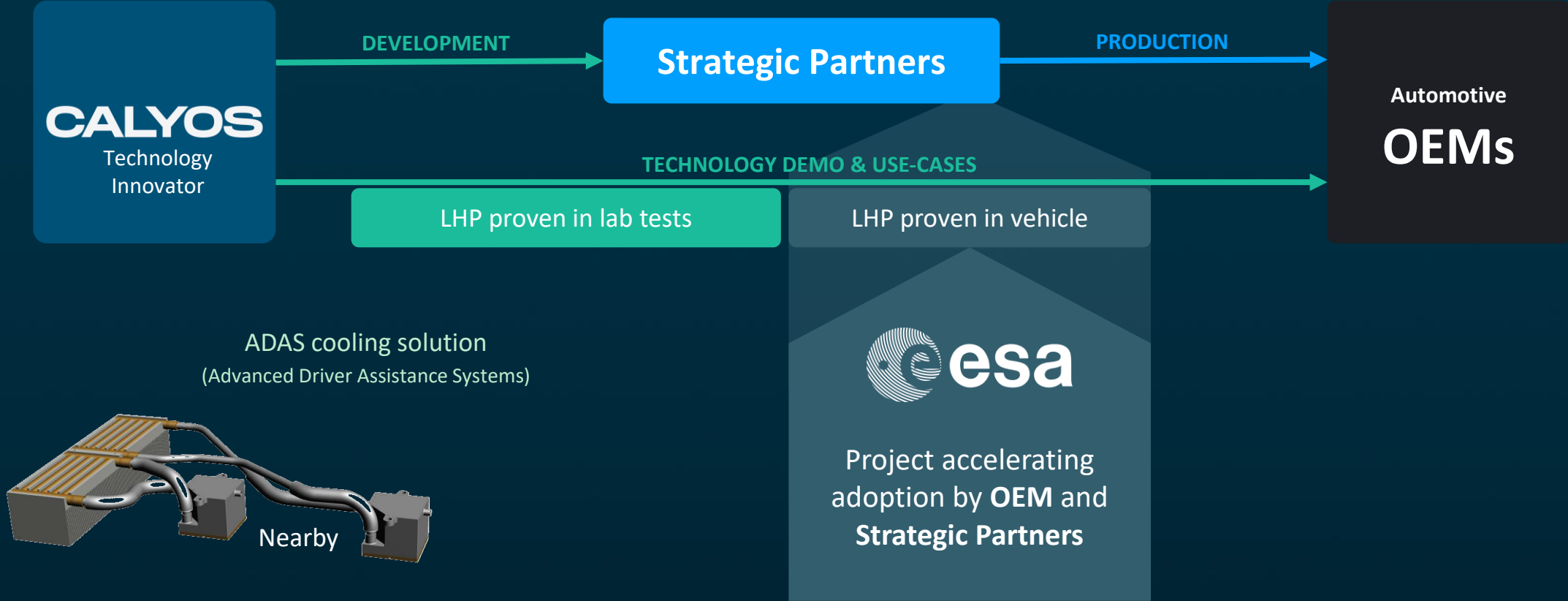


**>200W
max**

3 LHP Water Cooling



**>>200W
max**



Successful In-Vehicle Testing



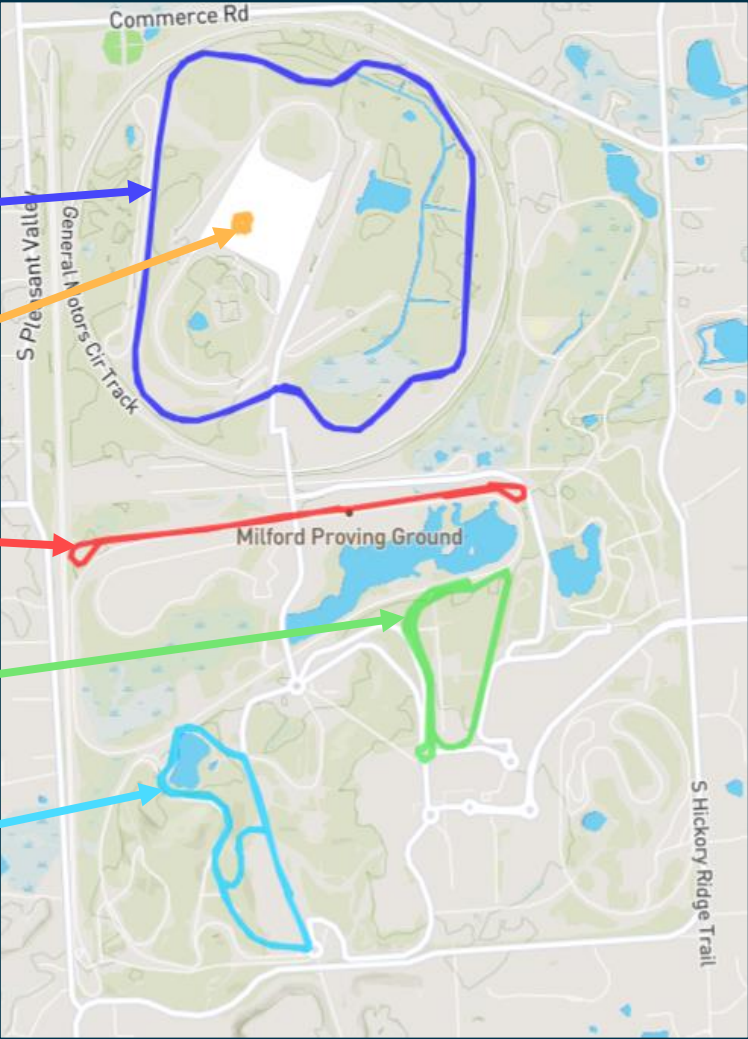
Durability Testing

Lateral Acceleration (Cornering)

Acceleration & Braking

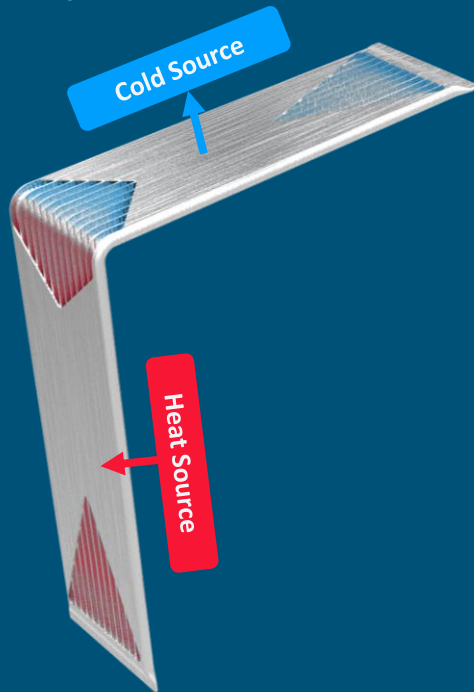
Inclination Performance (7 – 11 %)

Inclination Performance (21%)



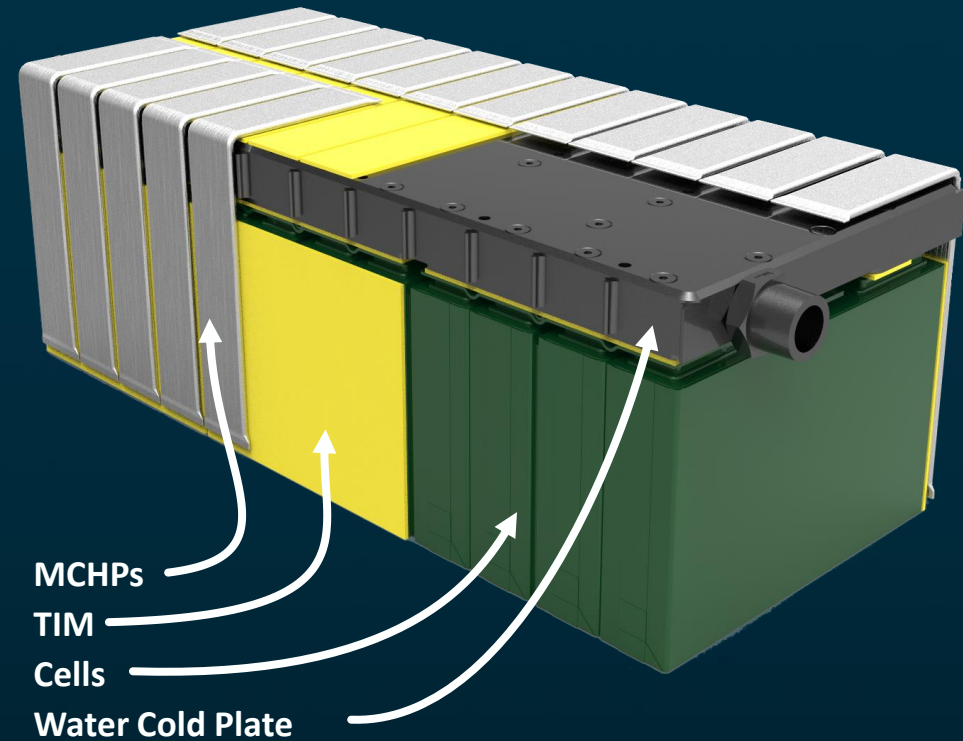
Micro Channel Heat Pipe for Batteries

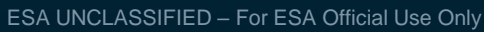
Micro Channel Heat Pipe (MCHP)



Improving the performance of existing water cold plates to allow Fast Charging

Enlarge
the cell surface
cooled





Thanks.

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