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# Supraleitende Antriebsmotoren für Anwendungen in der Luftfahrt

Thomas Reis, Oswald Elektromotoren GmbH  
11.04.2024

**OSWALD**  
POWER TO MOVE

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**OSWALD**

# Oswald Elektromotoren GmbH

- German SME - mechanical engineering (~200 employees)
- Manufacturer of electric motors for over 100 years
- Specialist for customized electric machines
  - Power range: 10 kW - 4.000 kW
  - Torque range: 100 Nm – 1.500.000 Nm
  - Speed range: 0 - 30.000 min-1
  - Dynamic - compact - low maintenance
- Customers from all industrial segments

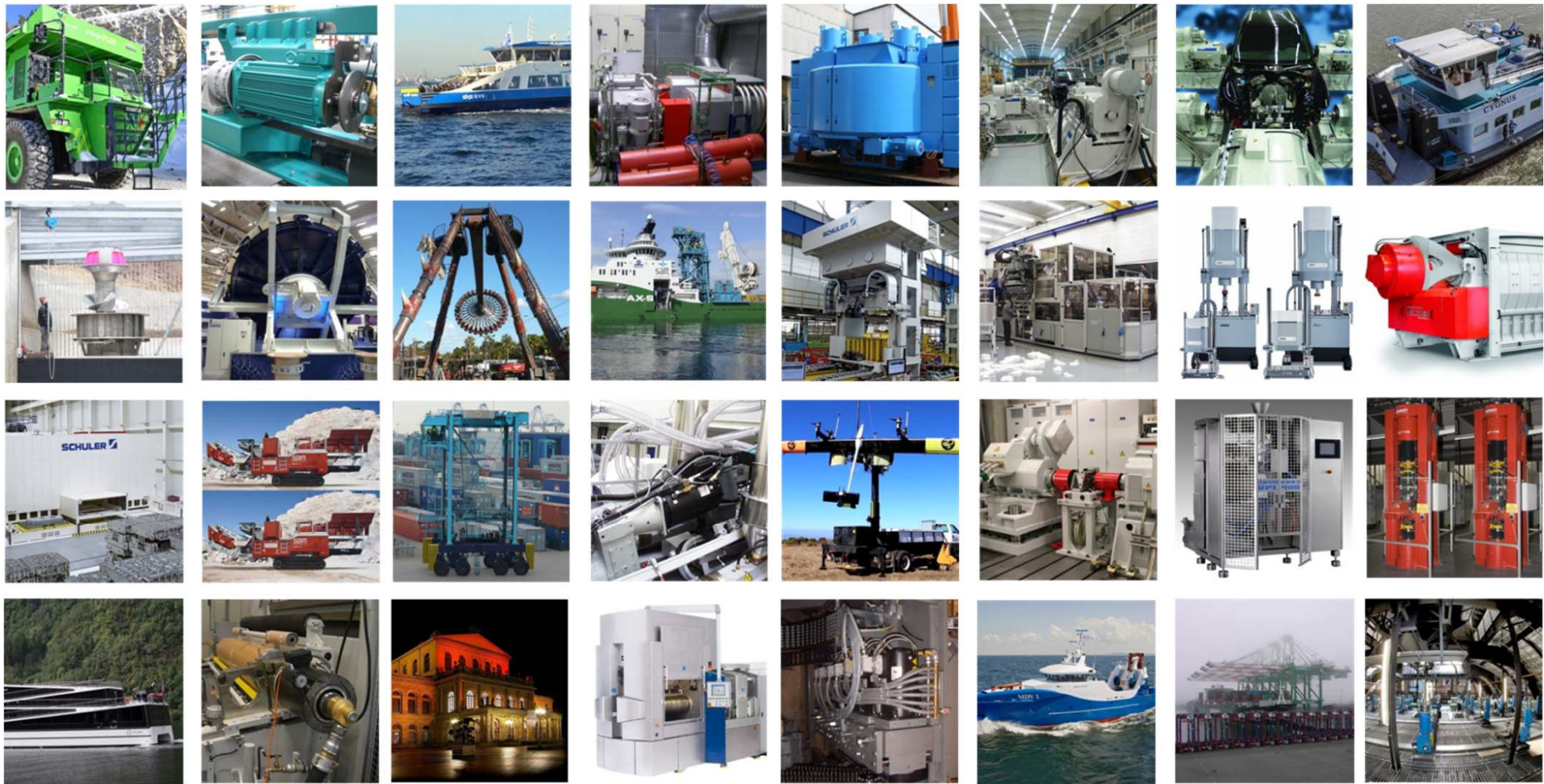


# Oswald Elektromotoren GmbH

PRODUKTE  
torque – power – speed



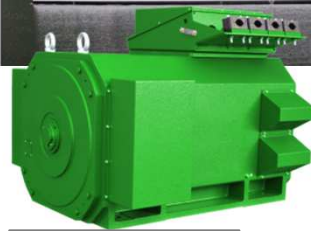
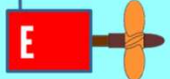
# Oswald Elektromotoren GmbH



# ZIEHL: Nachhaltigkeit ... in der Schifffahrt



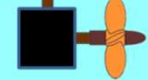
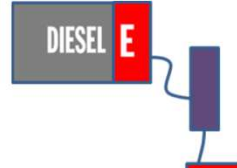
400 kW  
35.045 Nm  
109 rpm



220 kW  
1.400 Nm  
1.500 rpm



600 kW  
9.550 Nm  
600 rpm

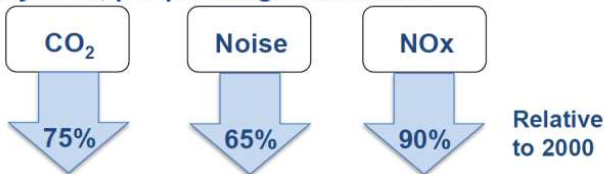


up to -70%  
fuel  
consumption

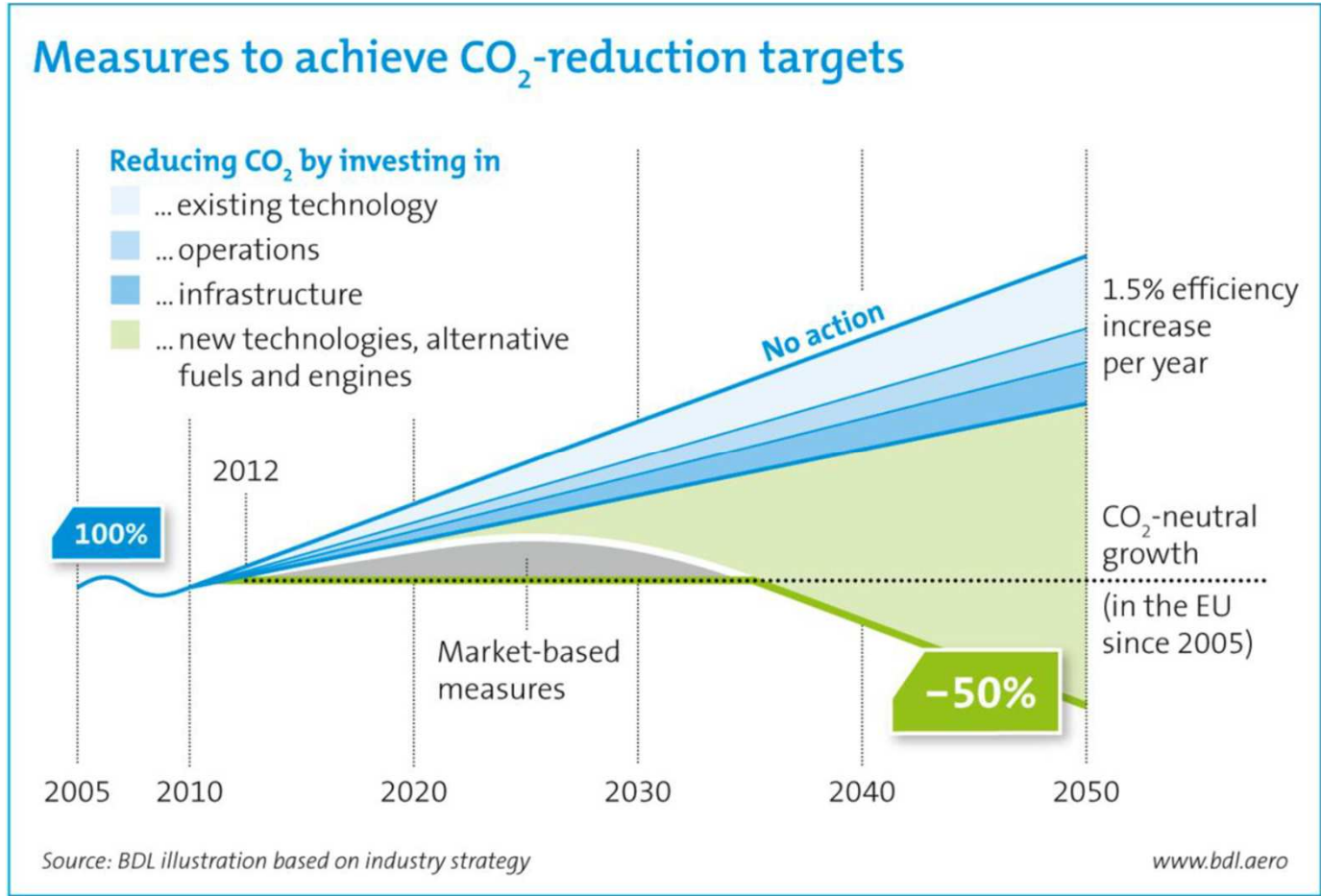
# ZIEHL: Nachhaltigkeit ... in der Luftfahrt

## ACARE's Flightpath 2050:

By 2050, per passenger kilometre:

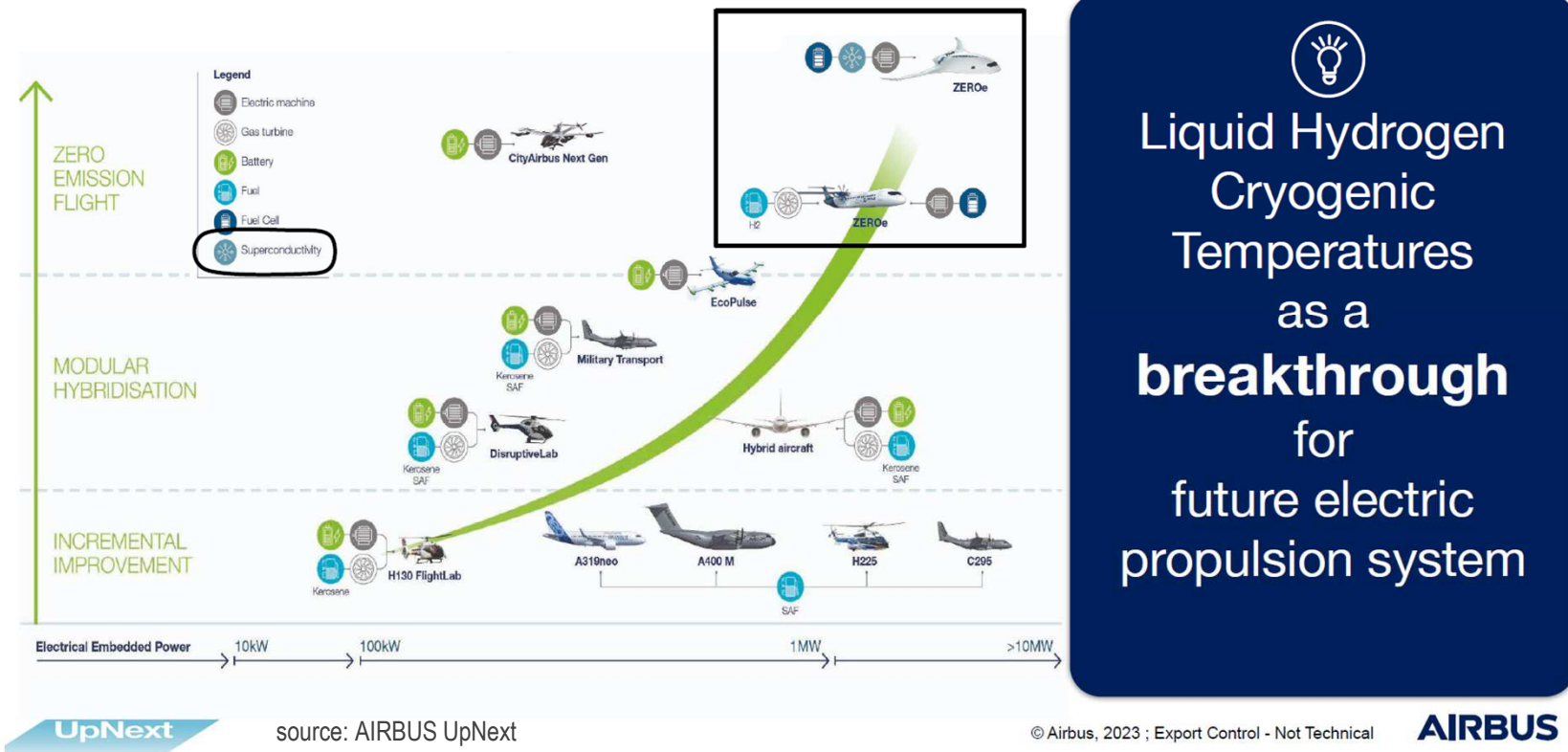


- Optimise air operations and traffic management
- Improve airport noise and air quality
- Provide affordable and sustainable alternative fuels
- Atmospheric Research

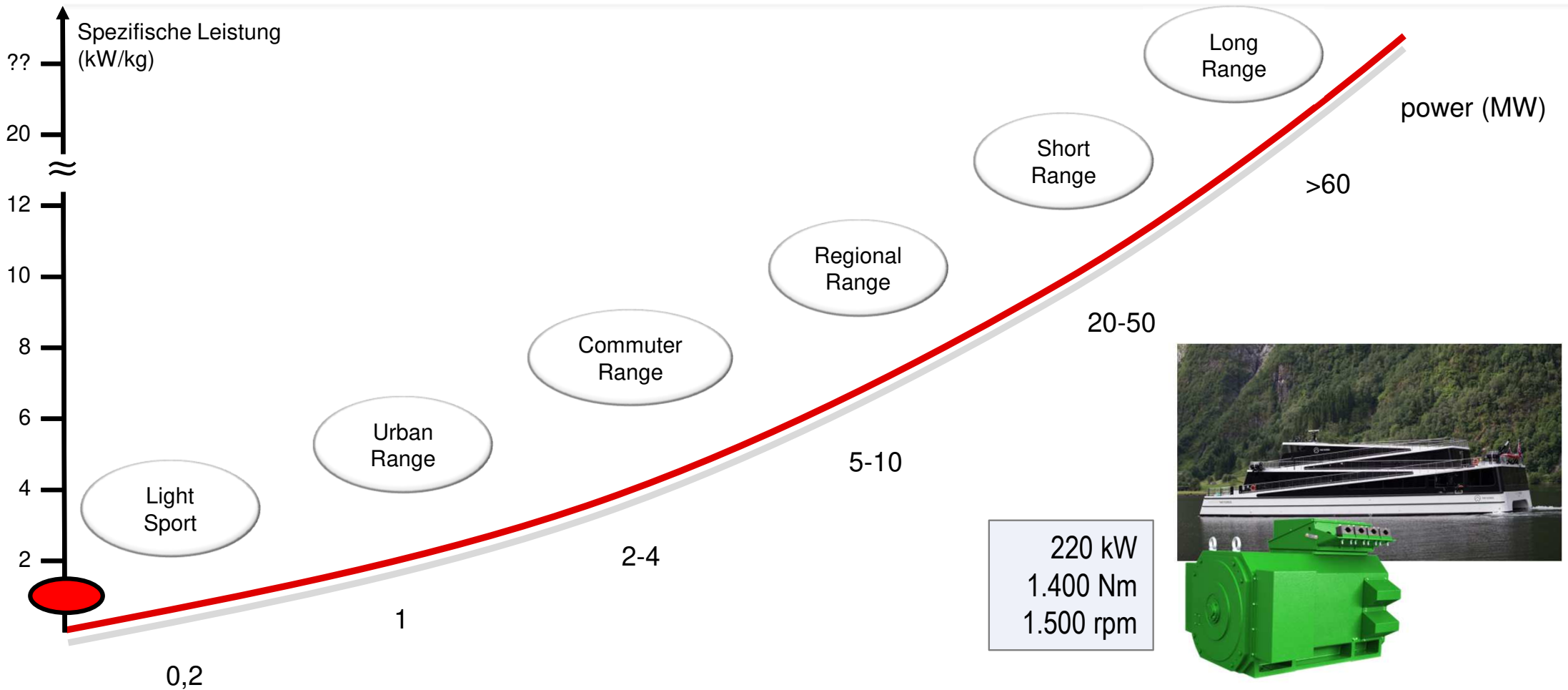


# ZIEHL: Nachhaltigkeit ... in der Luftfahrt

## Pathways to decarbonise the AVIATION sector

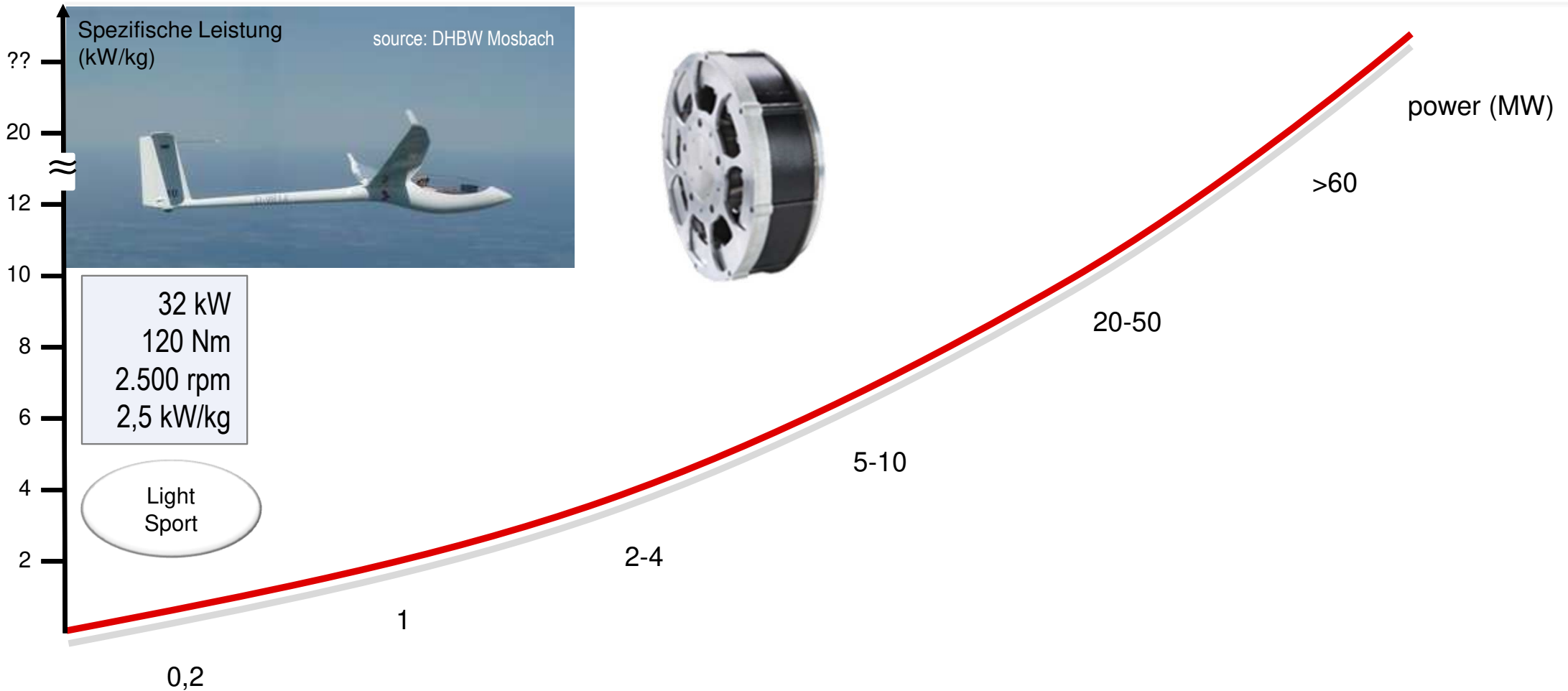


# Elektrische Antriebe in der Luftfahrt

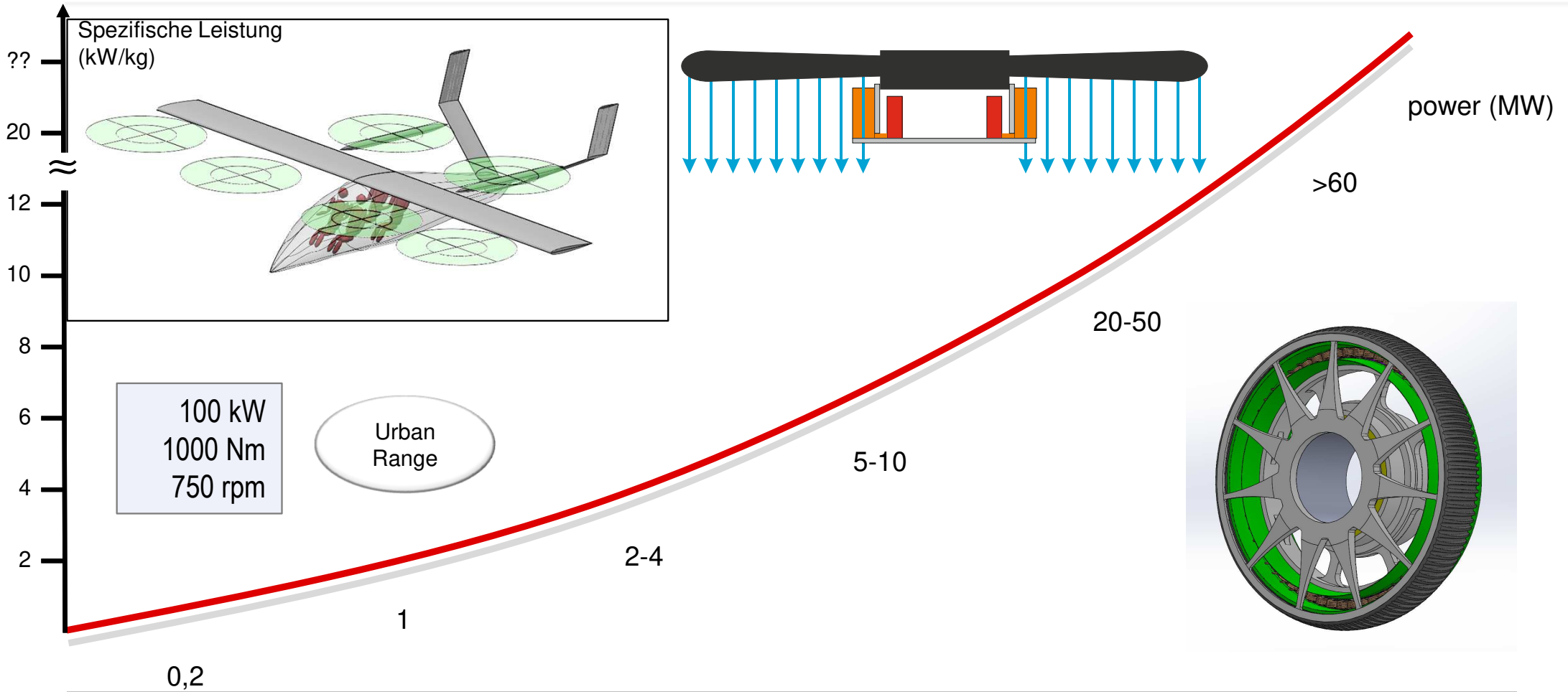




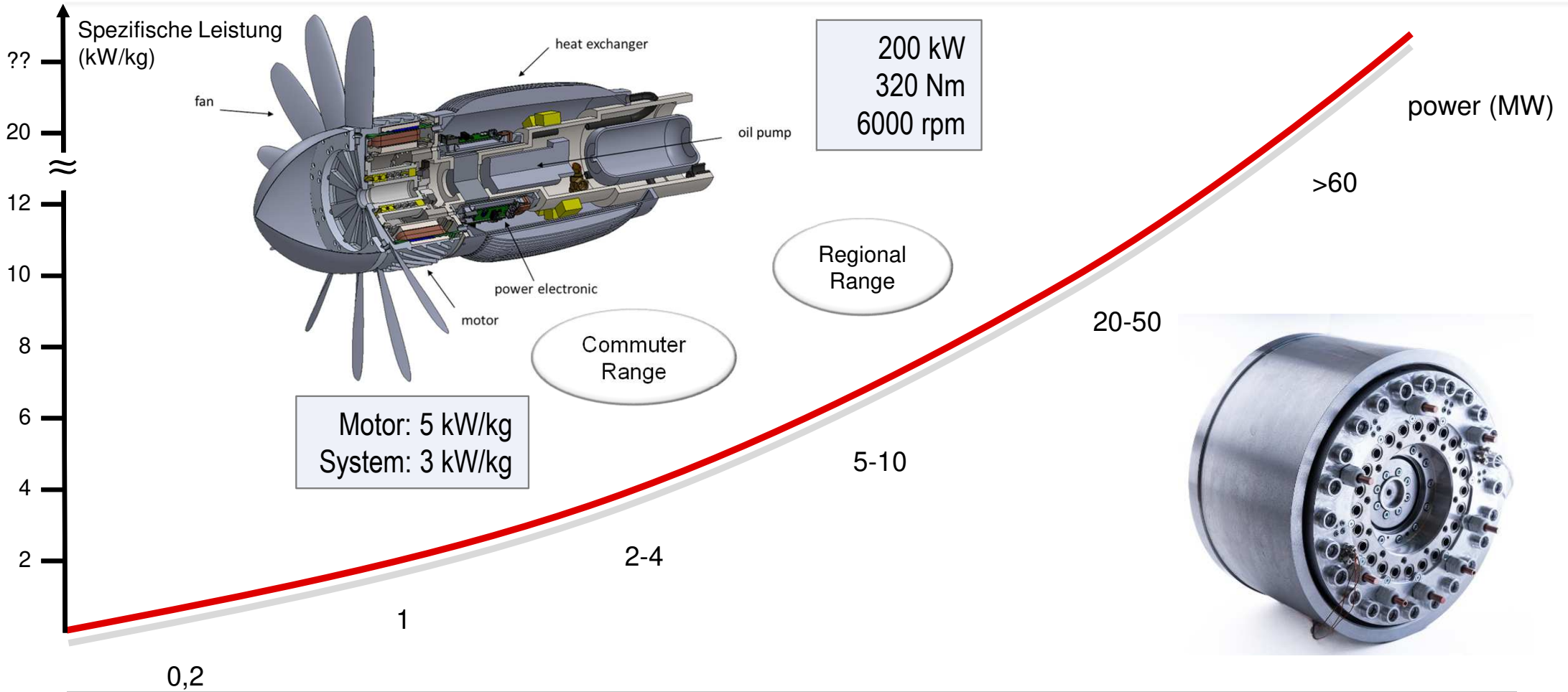
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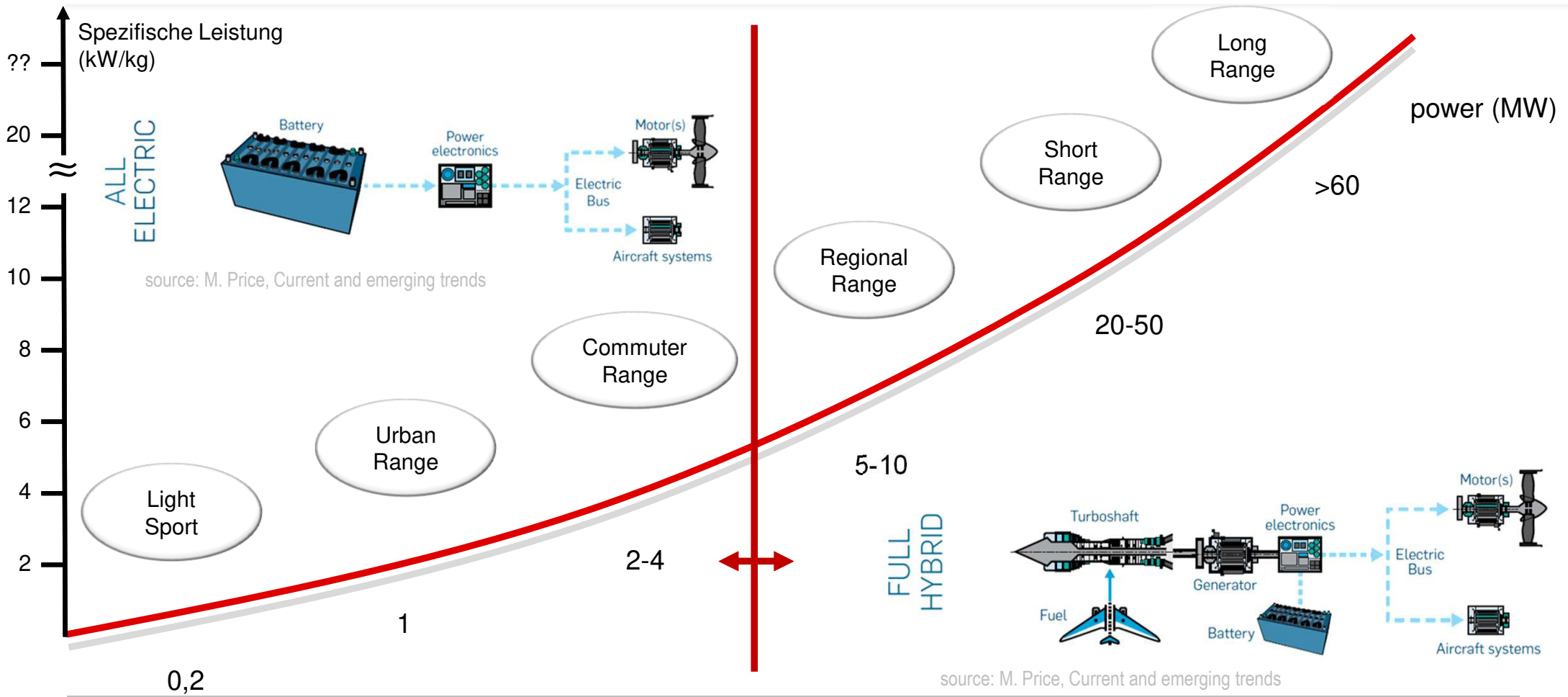
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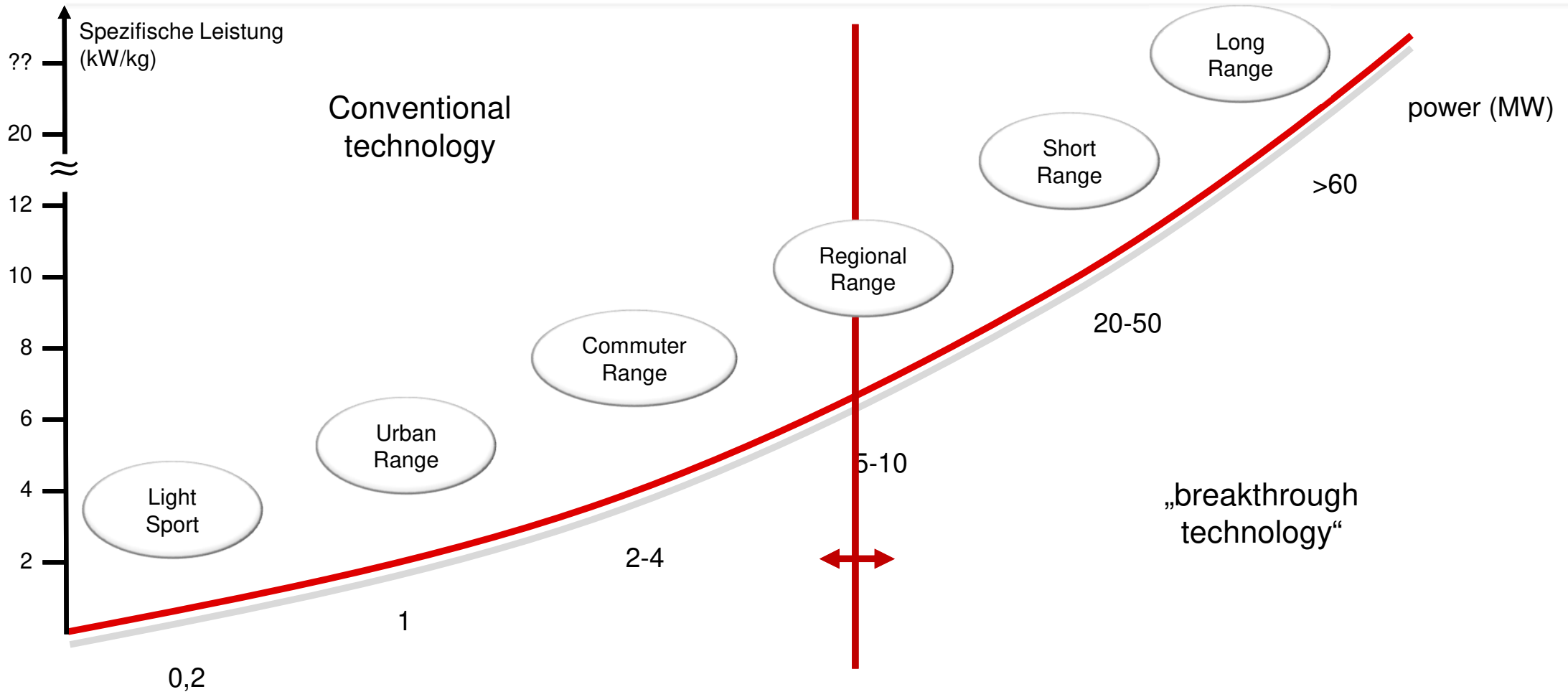
# Elektrische Antriebe in der Luftfahrt



# Elektrische Antriebe in der Luftfahrt



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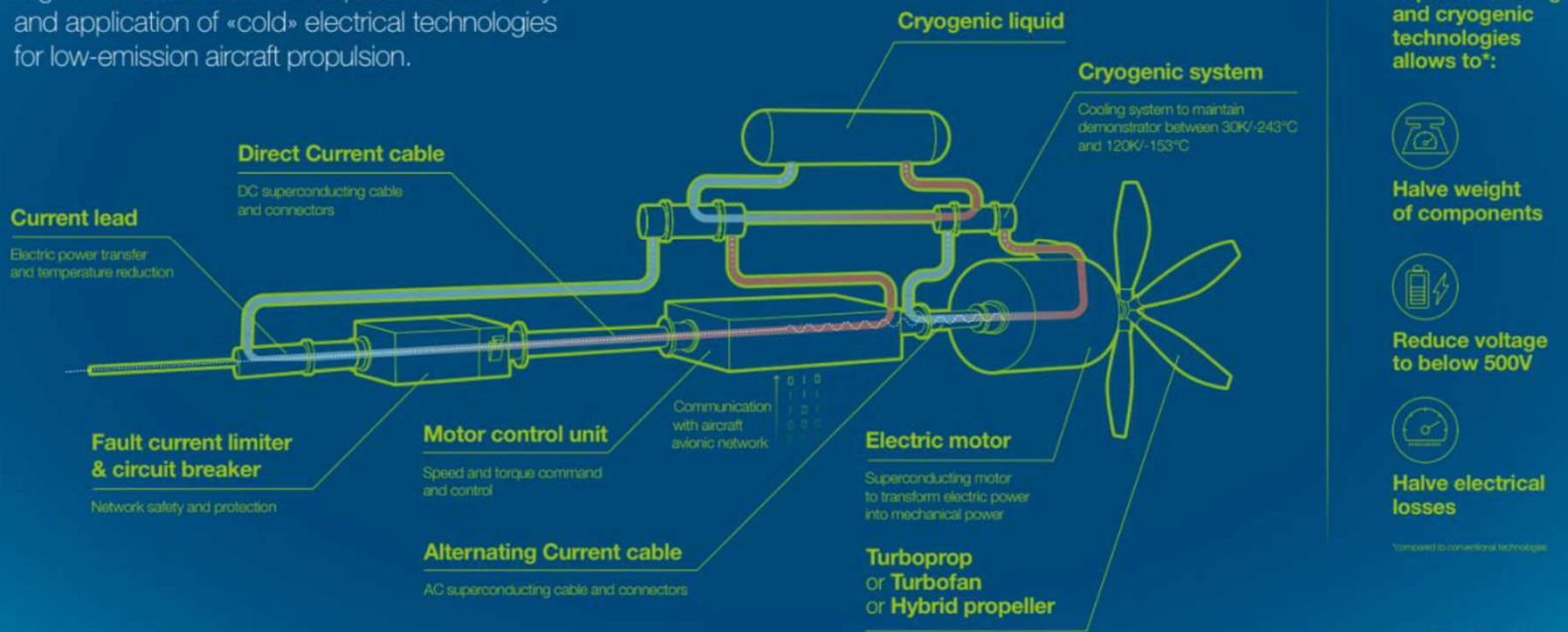


# Supraleitende Antriebe in der Luftfahrt

## ASCEND

Advanced Superconducting & Cryogenic Experimental powertrain Demonstrator

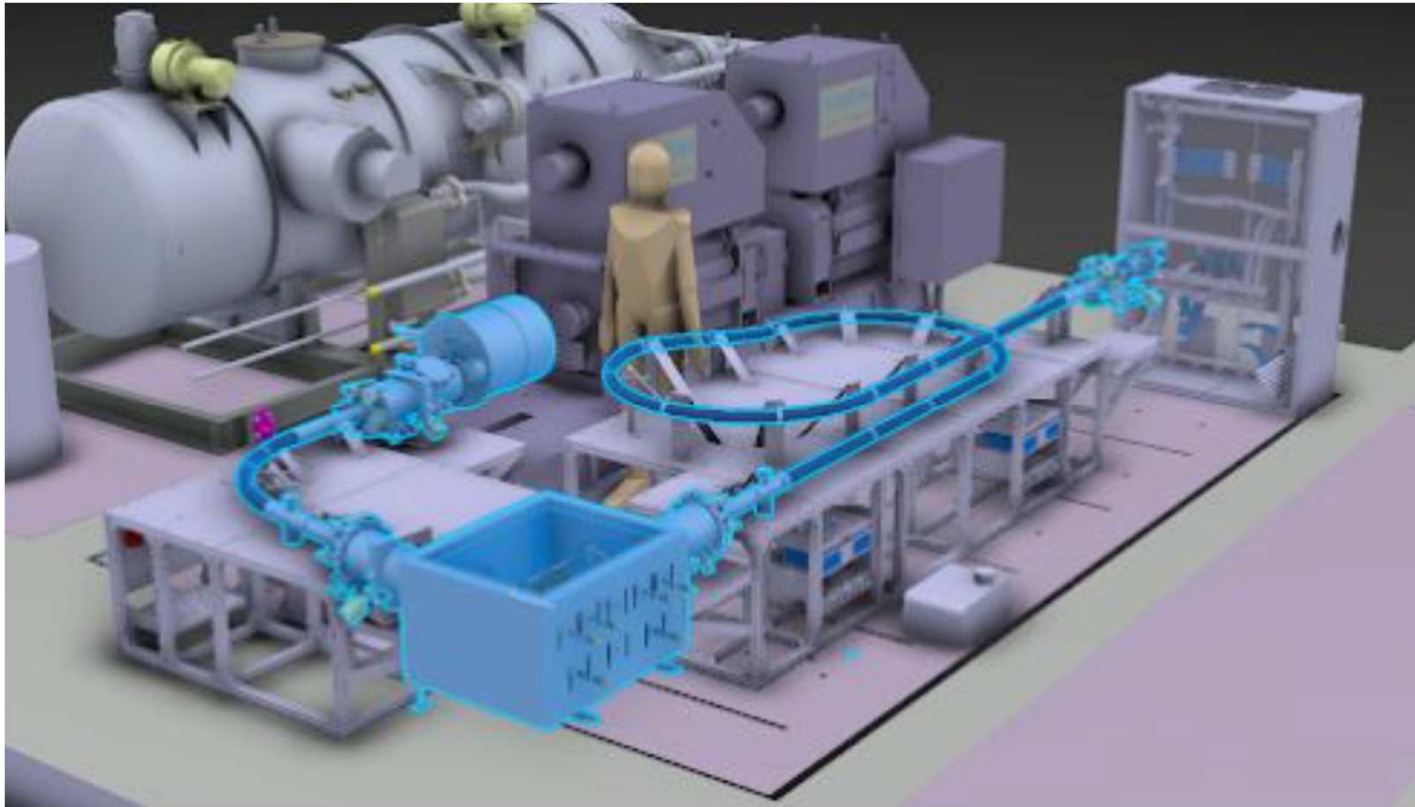
A ground demonstrator to explore the feasibility and application of «cold» electrical technologies for low-emission aircraft propulsion.



source: AIRBUS UpNext

AIRBUS

# Supraleitende Antriebe in der Luftfahrt



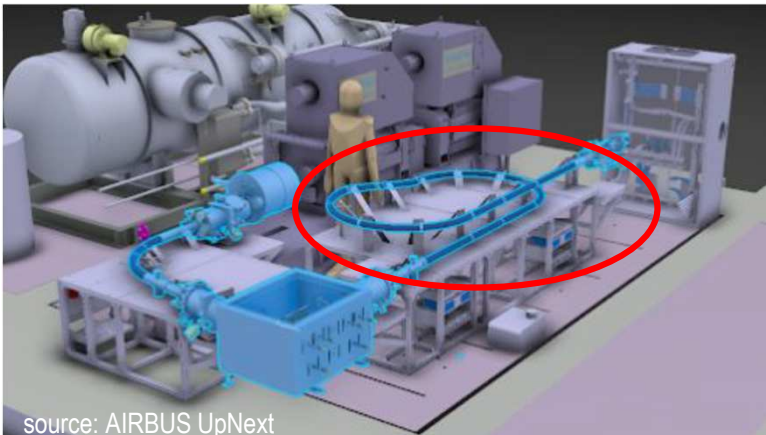
source: AIRBUS UpNext

# Supraleitende Antriebe in der Luftfahrt

DC cable  
cooled with liquid nitrogen



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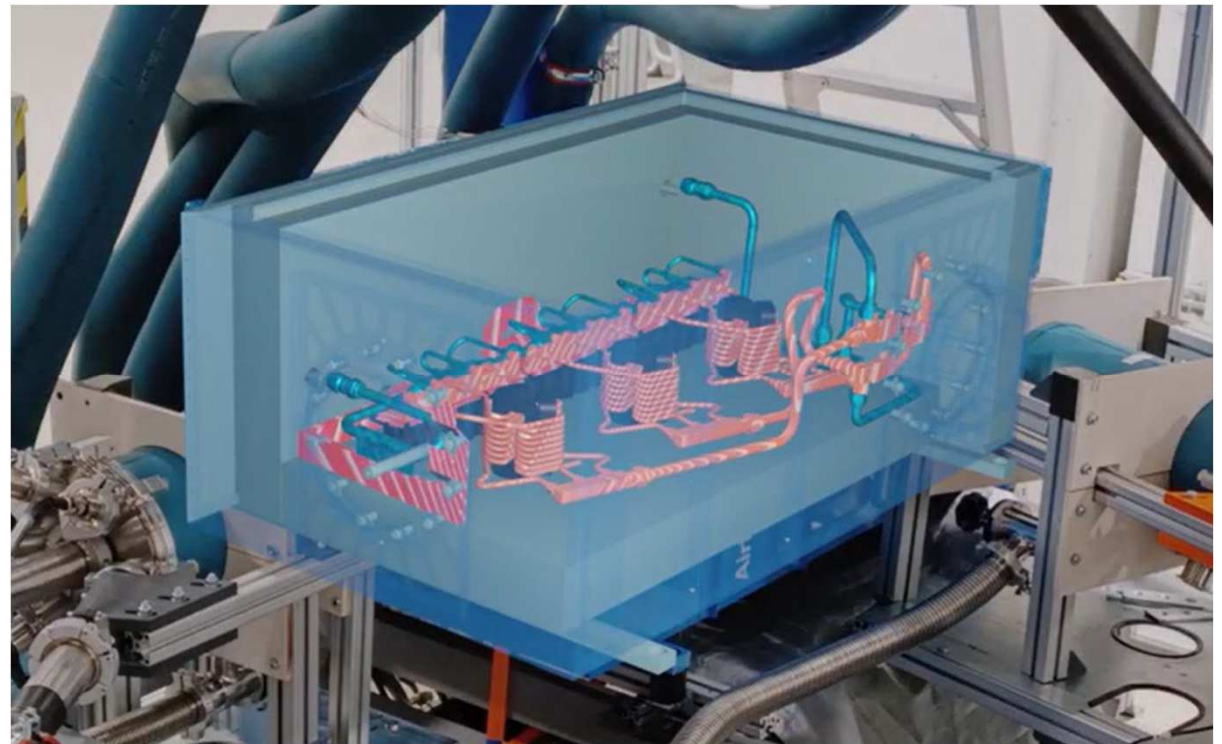


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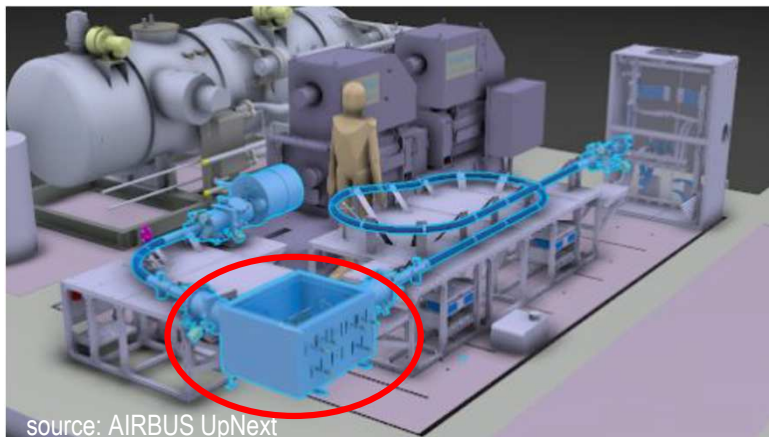


# Supraleitende Antriebe in der Luftfahrt

MCU (power inverter)  
cooled with liquid nitrogen



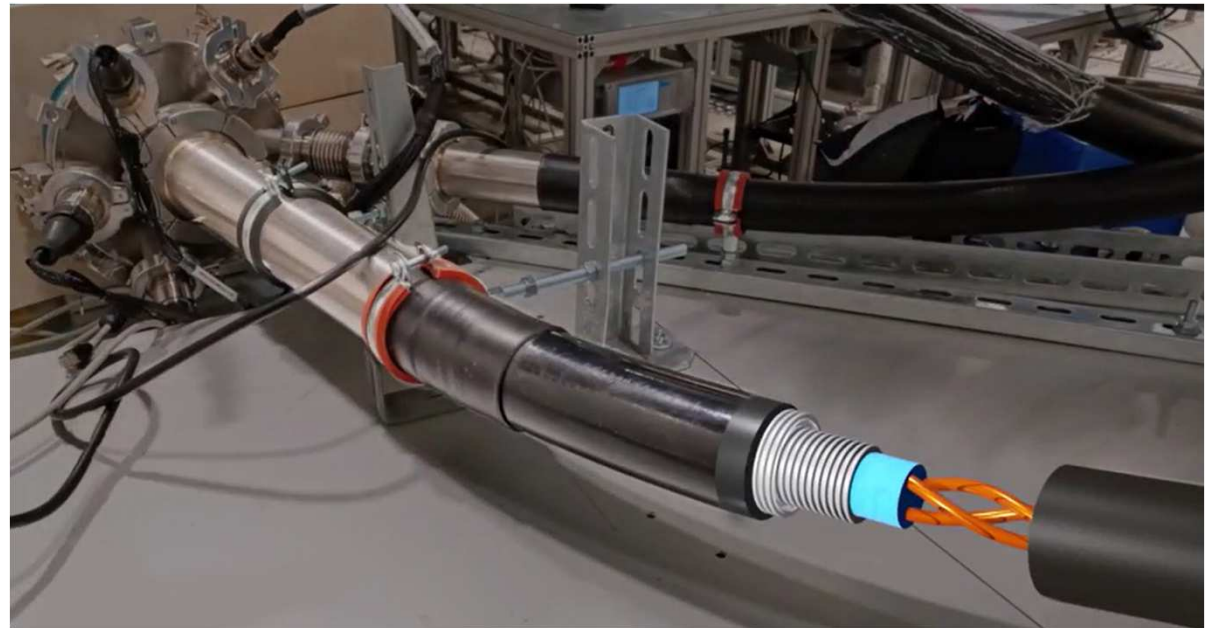
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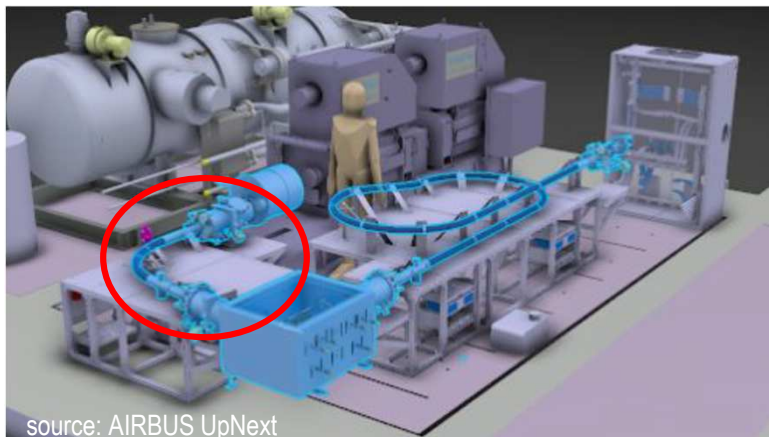
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# Supraleitende Antriebe in der Luftfahrt

AC cable  
cooled with liquid nitrogen



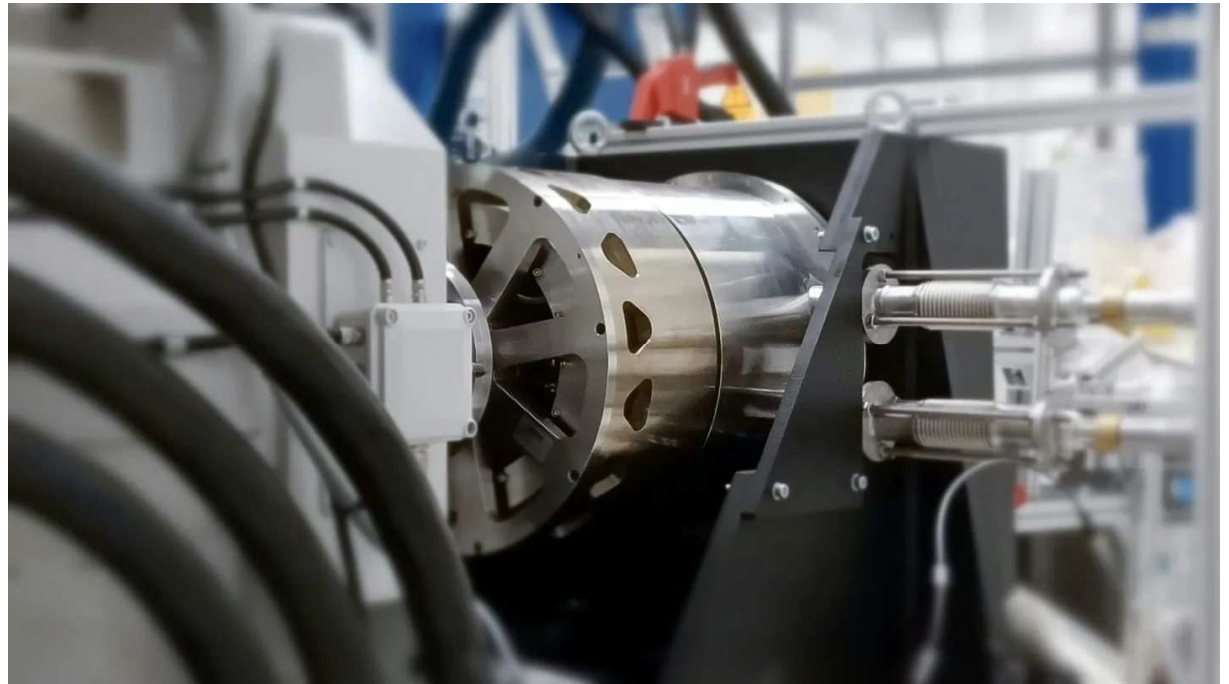
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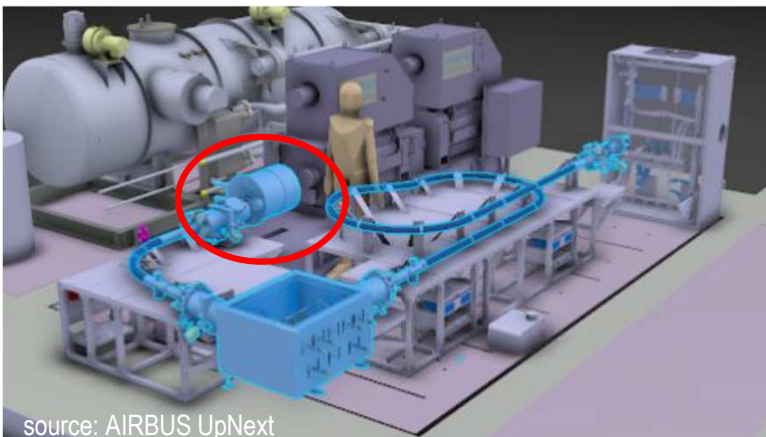
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# Supraleitende Antriebe in der Luftfahrt

Motor  
cooled with gaseous Helium



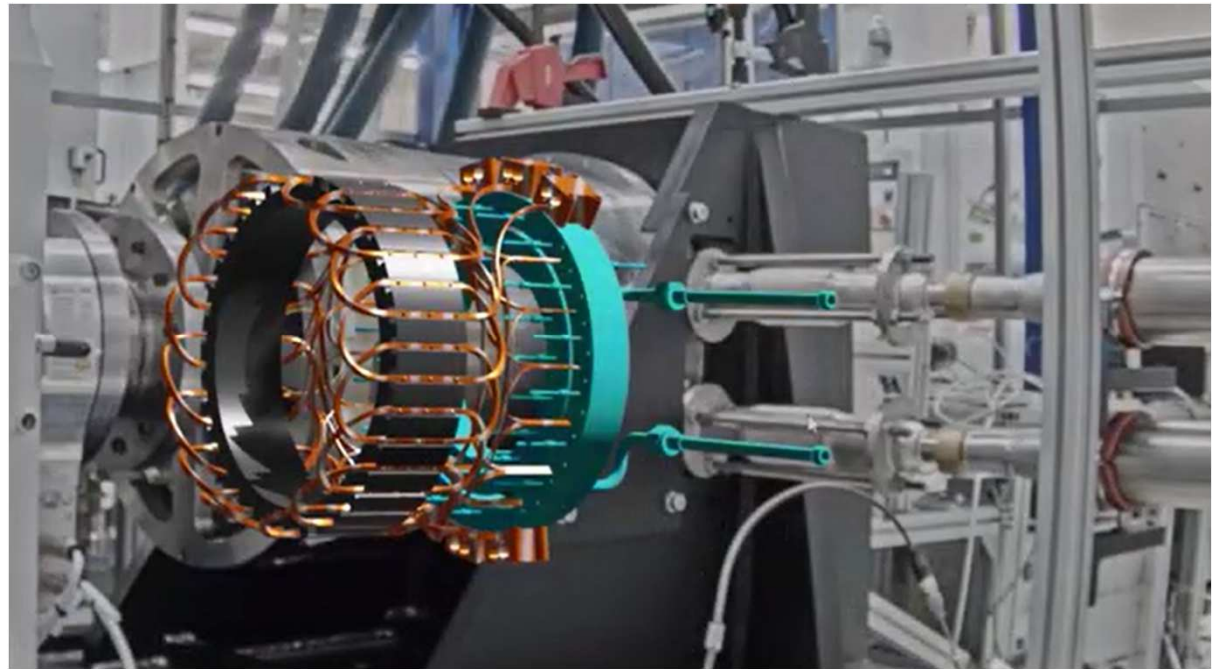
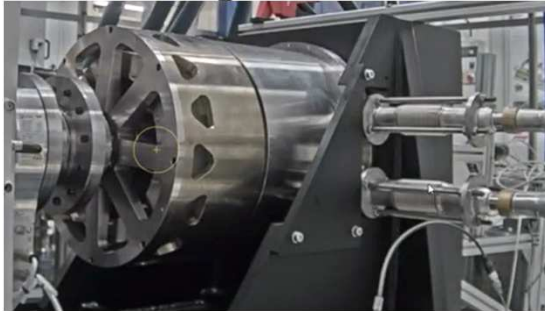
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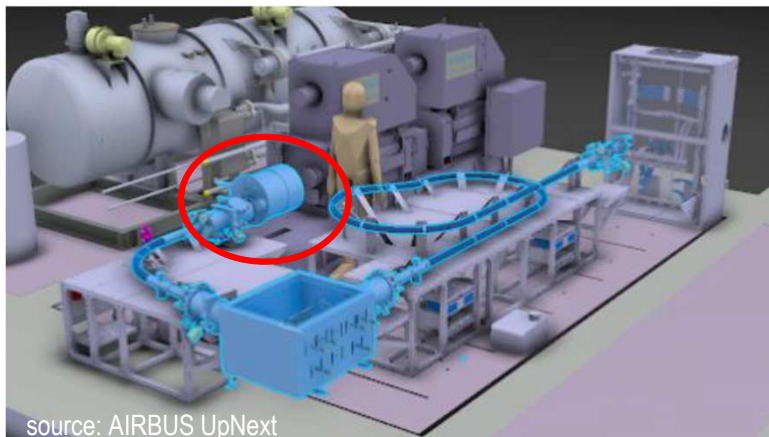
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# Supraleitende Antriebe in der Luftfahrt

Motor  
cooled with gaseous Helium



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# Vielen Dank!



Acknowledgements to our team

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Sandra Kleemann, Marcel Riewe, Sara Pinho

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**AIRBUS**

**DEMACO**

**KIT**  
Karlsruhe Institute of Technology



**IMAB** Institut für Elektrische Maschinen,  
Antriebe und Bahnen  
TU Braunschweig



**Rolls-Royce**

**SuperOx**

hochschule aschaffenburg  
university of applied sciences

**IFAS** Institut für Flugantriebe  
und Strömungsmaschinen

Institut für Flugzeugbau und  
Leichtbau  
Lehrstuhl für Flugzeugentwurf IFL