



**EASA**  
European Aviation Safety Agency

# GA Road Map: Working towards... the future



**Simpler, lighter, better rules for  
*General Aviation***

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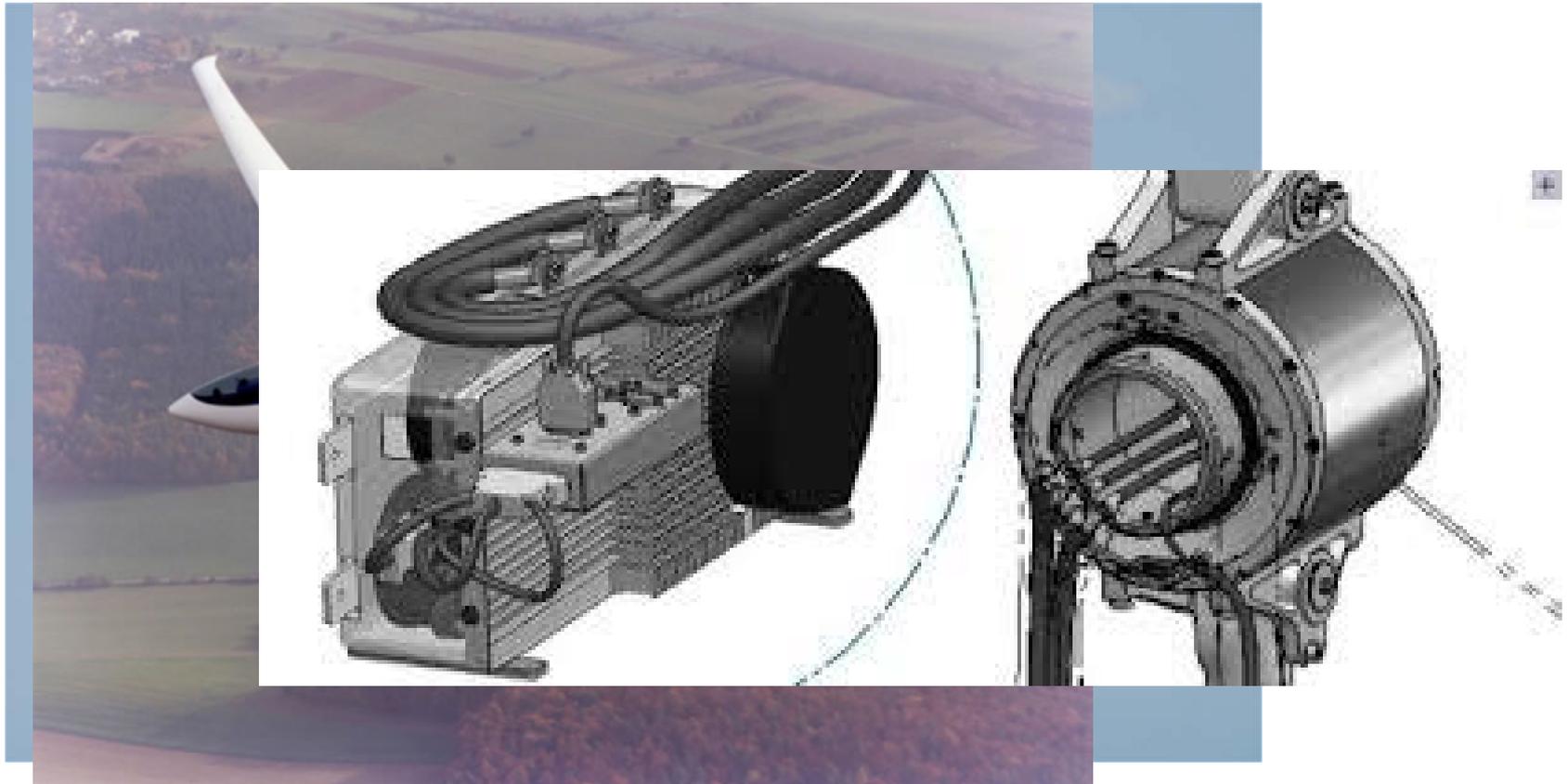
# **ELECTRIC PROPULSION**

and its impact onto  
aviation regulation



# Electric Propulsion - History

## ➤ GA & Electric Propulsion





# Electric Propulsion -- Present and Future

## ➤ Some Initiatives done / ongoing in Europe

- HypstAir within the Framework 2020 (EU Initiative)
- ASTM Electric Propulsion Working Group
- Solar Impulse and others

## ➤ Outlook into the Future

- Electric propulsion is clearly developing far further and quicker
- Allows for a sustainable and environmentally friendly GA
- Promise to be an economical means for different operations
- There are challenges ahead (e.g. battery technology, controller of motor and battery, energy supply, ...)
- There is the need for EASA to look into the details



## ➤ EASA's participation

- Proposed to extend the MTOM of Microlights in Annex II when using electric propulsion, however no mutual recognition
- In parallel simplify procedures for certification to CS-LSA which already allows for electric propulsion and with mutual recognition
- New, re-organized Certification Specification CS-23
- Working further (currently) on Special Conditions for CS-23
- EASA is highly committed to support electric propulsion
  - Increasing internal expertise and resources
  - Developing adapted specifications, standards, and guidance
  - Working on Action Area for Electric Propulsion
- Initiated Action Area on Electric Propulsion



## ➤ Action Area for Electric Propulsion

- Currently a PIA (Preliminary Impact Assessment) is under development
- Including investigation on
  - Impact of Electric Propulsion on regulation
  - Comparison of risks of new electric thrust generation against conventional thrust generation (pro and cons)
  - Economical impact (if nothing is done), but also
  - Political Issues
  - Already available and future technology and philosophy
- Looks into all regulations
- Issue for review and comments planned soon



# Example on Regulations (an easy one)

## ➤ Regulation (EU) 216/2008

- This is one of the easy ones and already on its way
- Main problem is the link to fuel in some areas
- Example

### **Article 3. Flight Operations**

3.a.9. ... the applicable in-flight fuel management procedures must be used, when relevant.

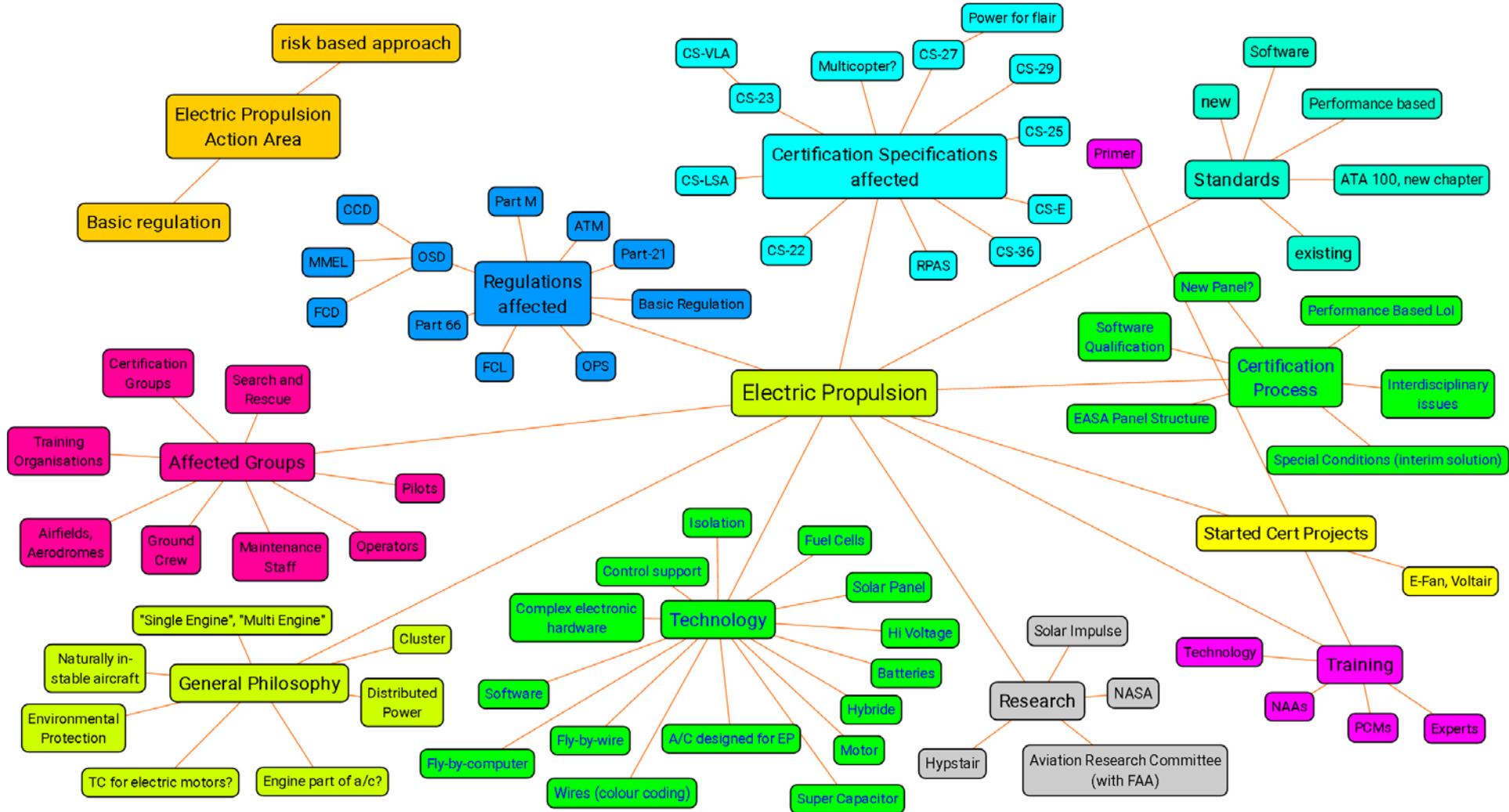
### **Proposal**

3.a.9. the applicable in-flight propulsive energy management procedures must be used, when relevant.

## ➤ But other regulations are also affected



# Electric Propulsion -- Impact





# And finally just some thoughts ....

- Partly still thinking in the "old view and systems" on what is an aircraft and how to fly, but we need to look ahead
- First go with Special Conditions to avoid selection of technology by regulator
- Logical path from installation into conventional aeroplanes up to full electric propulsion design aeroplanes
- Aerodynamics influenced by the electric propulsion (active control of airflow)
- Talking about multi-engine / multi-cluster / distributed propulsion
- fly by wire -> control by electric motors -> fly by computer -> naturally instable aircraft -> pilotless aircraft (UAV)
- → software approval
- Very high voltage → sparking, insulation and segregation, **rescue issues**
- „fuel status“
- Accepted risk level, Cyber Security, ....



# EASA

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## Thank you for your attention !

### Your safety is our mission.

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