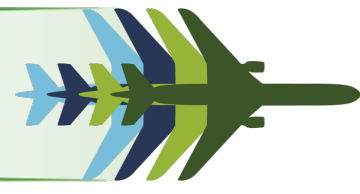


Low-noise propeller concepts

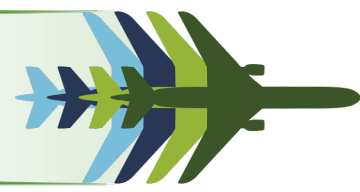
Contact: Royal Netherlands Aerospace Centre | info@nlr.nl | © Royal NLR 2024

BACKGROUND

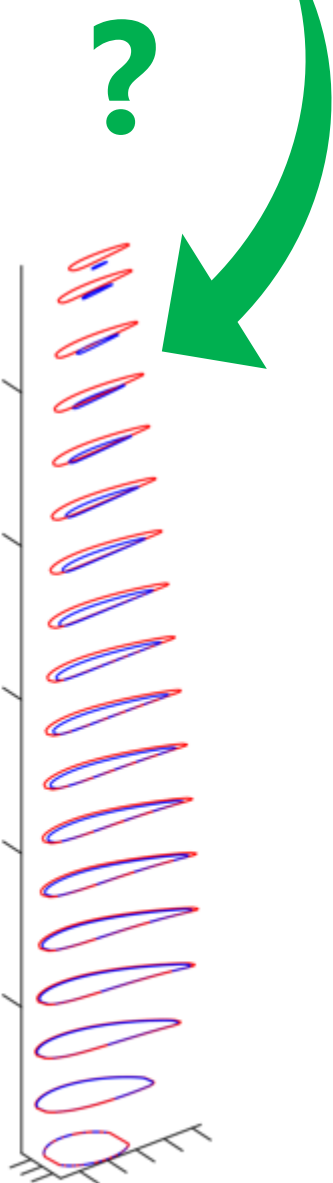
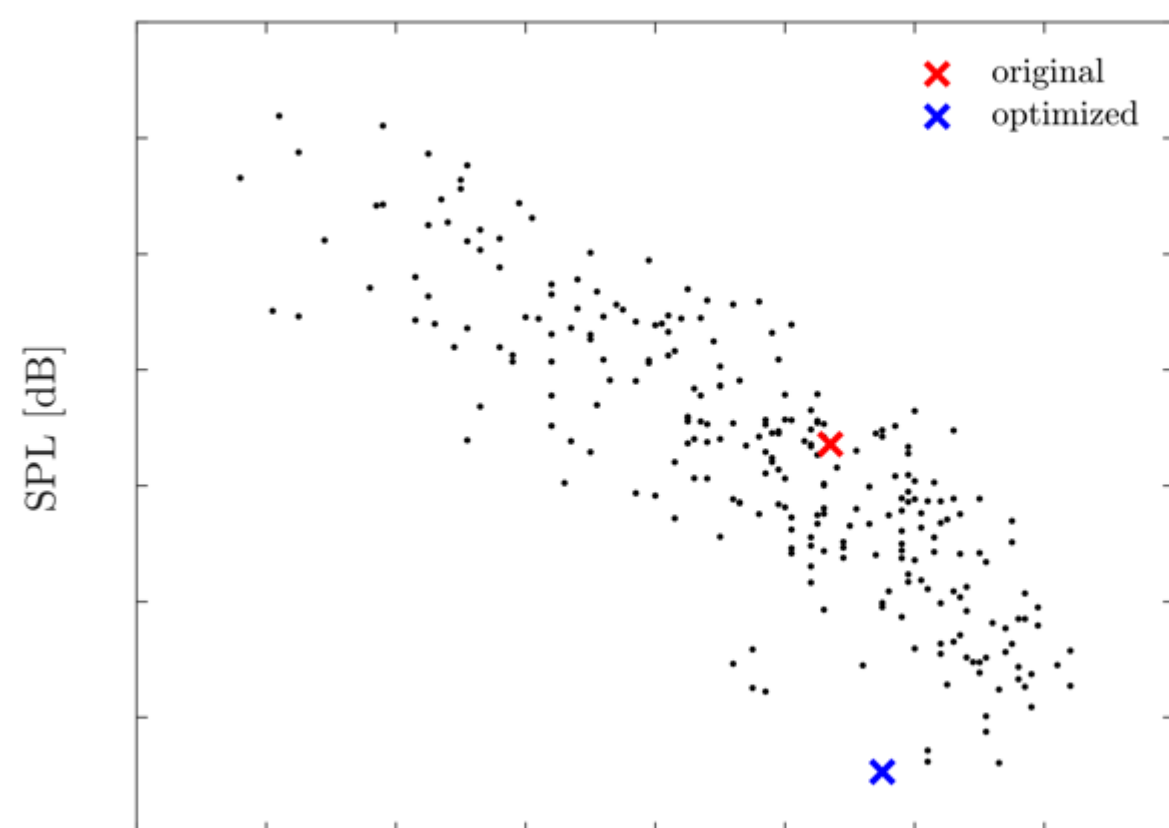


- Sustainable aviation requires disruptive concepts. Currently a broad range of identified potential concepts are shown in the public domain, varying from fixed wing DEP to multi-copter eVTOL.
- It is expected that future configurations include integrated propeller technology, where noise reduction is an important factor for market acceptance.

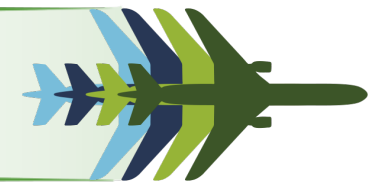
HOW?



- Propeller noise prediction: semi-empirical broadband noise models, rotating lifting-line tonal noise model
- Aero-acoustic optimization incl. hot2cold blade deformation and high-fidelity design validation
- Manufacturing composite model scale propeller
- Aero-acoustic wind tunnel tests with low- and high-power propeller electric drive system
- Pipistrel Velis Electro propeller blade optically scanned as reference for optimisation tool chain:

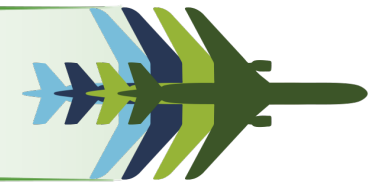


OBJECTIVE(S)



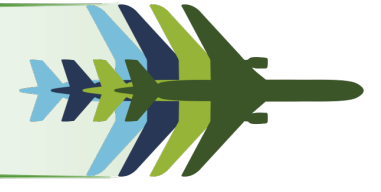
- Validation of broadband noise prediction models for propellers with relative low tip speeds
- Assessment of manufacturability of low end+ propellers
- Evaluation of tonal noise reduction and full tool chain for propellers with extreme planform

WHY?



- In order to realise low-noise propellers i) validated prediction tools during design and ii) validated wind tunnel model testing capabilities are required.

RESULTS



- Low-power test in NLR's AWT facility:

