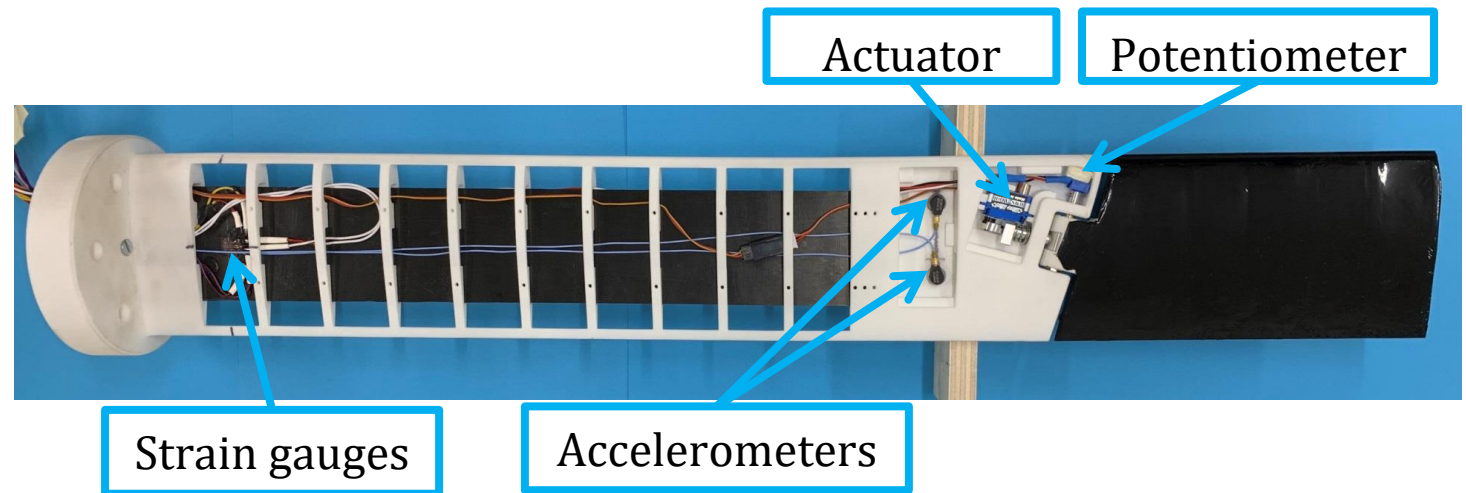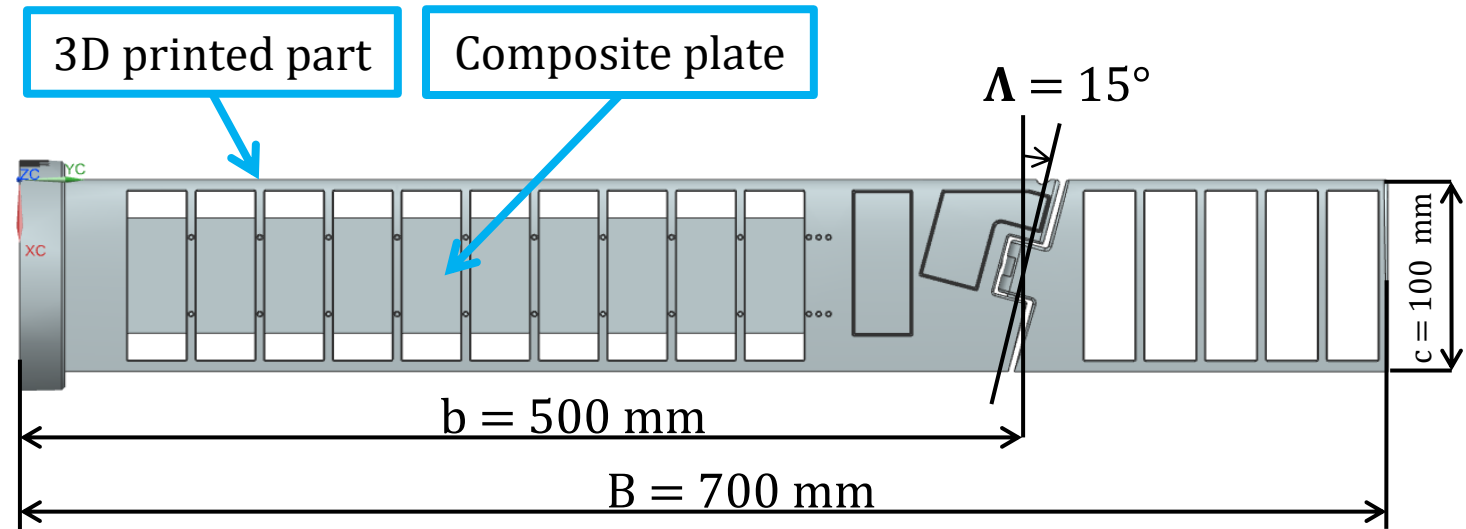# AeWP4 –FFWT Pazy wing

16th May 2024

TUDelft

# FFWT Pazy wing – Main features

- Based on Pazy wing

- 5 wings with different plates

- Sensors:
  - Strain gauges (both sides): WRBM
  - Accelerometers
  - Potentiometer: fold angle
  - Actuator*: release signal



3D printed part

Composite plate

$\Lambda = 15°$

$c = 100$ mm

$b = 500$ mm

$B = 700$ mm

Actuator

Potentiometer

Strain gauges

Accelerometers

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# FFWT Pazy wing - Experiment

- Initial sizing conducted using linear Nastran model

- Experimental setup:

  - W-tunnel at TU Delft

  - Objective:

    - Active release during the gust

    - Effect of bending stiffness of main wing

    - Effect of tailoring of main wing

- Other findings:

  - Underprediction of flutter speed

  - Subcritical instability

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# FFWT Pazy wing − Available data

- Paper: https://doi.org/10.2514/1.C037108

- Dataset: https://doi.org/10.4121/c.6070238.

  - Static: WRBM and fold angle polars

  - Gust response

| Parameter | 1-cosine gust |
|---|---|
| Hinge release | Free, Locked, Pre-released, 0%, 50%, 100% of peak load |
| Angle of attack [⁰] | 0, 5 |
| Gust amplitude [⁰] | 2.5 |
| Gust Frequency [Hz] | 0.5, 5, 8, 1st Bending, 1st Flapping |

- Other (on request):
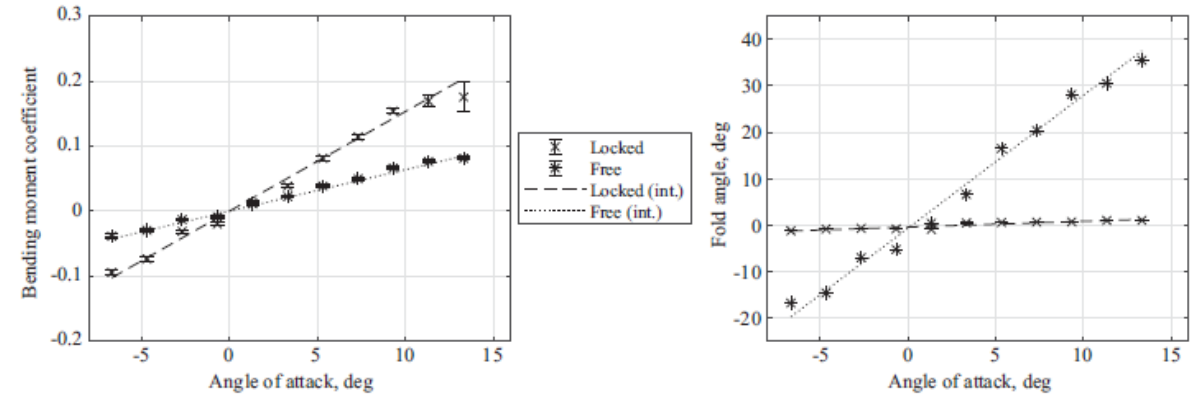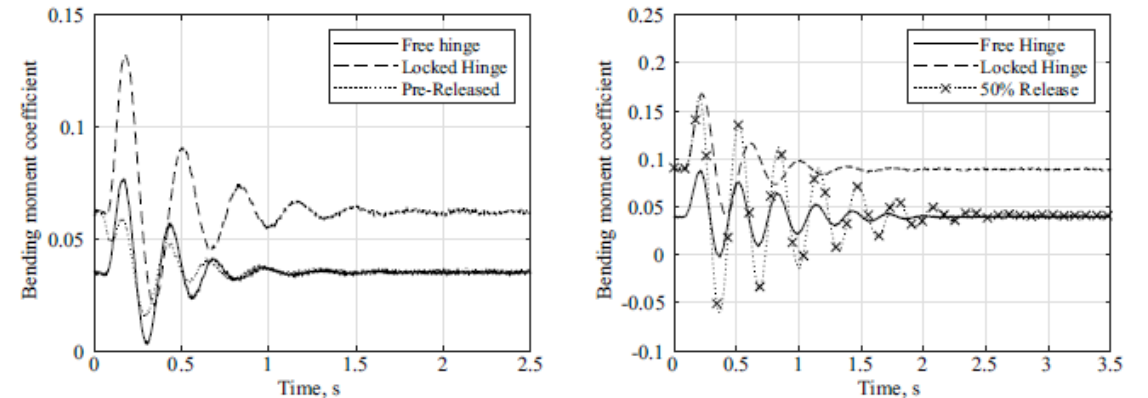
  - GVT

  - Nastran models



Fig. 17    Plate B interpolated $C_B$ and $\beta$ polars.



a) Comparison of prerelease threshold with locked-hinge and free-hinge conditions at $\alpha = 5°$; example from wing B for 8 Hz gust

b) Comparison of 50% threshold with locked-hinge and free-hinge conditions at $\alpha = 5°$; example from wing A for 5 Hz gust

Fig. 22    Bending moment coefficient time response examples.